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Mapeamento das evidências das revisões sistemáticas do Grupo Anestesiologia da Colaboração Cochrane: entendendo seu valor para a prática clínica

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DEDICATÓRIA

Dedico a minha família, minha maior conquista.

Aos meus três filhos, que são os responsáveis pelos melhores e mais puros momentos da minha vida.

À minha esposa e mãe dos nossos três filhos.

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RESUMO

Justificativa e objetivos: As revisões sistemáticas da Colaboração Cochrane visam oferecer informações atualizadas, objetivas e com evidências consistentes para a prática clínica e para o estabelecimento de políticas de saúde. Entretanto, verifica-se frequentemente uma inconsistência de evidências e incapacidade de gerar recomendações. O objetivo desse estudo foi analisar as revisões sistemáticas do Grupo Anestesiologia da Colaboração Cochrane e mapear sua utilidade para a prática clínica e para a pesquisa científica. **Método:** Realizou-se estudo transversal com análise de todas as revisões sistemáticas publicadas no Grupo Anestesiologia da Colaboração Cochrane até fevereiro de 2014, verificando-se qual o tipo de recomendação para a prática clínica e para a pesquisa científica, por meio da análise das conclusões de seus autores. Os valores são apresentados em porcentagem e intervalo de confiança de 95%. Além disso, computou-se o número de ensaios clínicos e meta-análises por revisão sistemática. **Resultados:** 115 revisões foram analisadas. Evidências que apoiam a intervenção, com recomendação para a realização de mais estudos ou sem recomendação para mais estudos: 32,2% [IC 95% 23,7; 40,7] e 2,6% [IC 95% 0; 5,5], respectivamente. Evidências contrárias a intervenção, com recomendação para realização de mais estudos ou sem recomendação para mais estudos: 6,1% [IC 95% 1,7; 10,4] e 1,7 [IC 95% 0; 4,0], respectivamente. Ausência de evidências, com recomendação para a realização de mais estudos ou sem recomendação para mais estudos: 57,4% [IC 95% 48,4; 66,4] e 0%, respectivamente. Do total, 95,7% das revisões sugerem a realização de mais estudos independentemente dos resultados obtidos. O número médio de ensaios clínicos nas revisões foi de 19,6, variando entre zero e 737 e o número médio de meta-análises foi igual a 9,3, variando entre zero e 92. **Conclusão:** A maioria das revisões sistemáticas do Grupo de Anestesiologia da Colaboração Cochrane resulta em ausência de evidências ou evidências insuficientes para recomendar determinada intervenção na prática clínica e ressaltam a necessidade de realização de novos estudos clínicos controlados e aleatorizados.

Palavras-chave: Medicina Baseada em Evidências, Anestesiologia, Revisão Sistemática, Meta-análise, Pesquisa Científica.

Santos Junior RS. Mapping the Evidence of Systematic Reviews of Cochrane Collaboration Anesthesiology Group: Understanding its Value for Clinical Practice. Botucatu, 2014. 171p. Dissertation for Master's degree. – Botucatu Medical School, UNESP-Univ Estadual Paulista.

ABSTRACT

Objectives: Cochrane Collaboration systematic reviews aim to offer updated, objective and consistent information for clinical practice and in order to settle Health policies. However, inconsistence of evidence, as well as inability of raising recommendations is being observed. The aim of this study is to analyze the systematic reviews of Cochrane Collaboration Anesthesia Group and to map its use for clinical practice and scientific research. **Methods:** A systematic study was conducted, having the analyzes of all systematic reviews of Cochrane Collaboration Anesthesia Group until February, 2014, and then validating which recommendation for clinical practice, based on the author's conclusions, would be more suitable. Data are shown in percentage and 95% confidence interval (CI). Besides, the number of clinical assays and meta-analyzes per systematic review is demonstrated. **Results:** 115 systematic reviews were analyzed. There is enough evidence to support recommendation either with or without the need of more studies, as in 32.2% and 2.6% [CI 95% 23.7; 40.7], respectively. Evidences that were opposite to interventions, with or without the need of further studies, consisted in 6.1% [CI 95% 1.7; 10.4] and 1.7% [IC 95% 0; 4.0], respectively. Absence of evidence, with or without the need of other studies, was found in 57.4% [CI 95% 48.4; 66.4] e 0%, respectively. Of all, 95.7% of the reviews suggest that independently of the results, more studies are needed to be made. The average number of clinical assays in the reviews was 19.6, ranging from zero to 737, and the average number of meta-analyzes was 9.3, ranging from zero to 92. **Conclusion:** Most of the systematic reviews of Cochrane Collaboration Anesthesia Group results in lack of evidence or insufficient evidence in order to recommend interventions for clinical practice, thus highlighting the need of new controlled and randomized clinical studies.

Key Words: Evidence Based Medicine, Anesthesiology, Systematic Review, Meta-analyzes, Scientific Research.

1 INTRODUÇÃO

Nos últimos 50 anos houve um extraordinário avanço nas pesquisas destinadas ao conhecimento médico. O número de subcategorias de doenças, de testes diagnósticos e de práticas terapêuticas aumentou dramaticamente, assim como o número de publicações científicas[1]. O desenvolvimento tecnológico ocorreu paralelamente a explosão do número das referidas publicações, proporcionando um acesso mais abrangente e mais rápido do conhecimento para toda a comunidade científica.

Entretanto, o profissional que trabalha na área de cuidados em saúde sabe que existe uma lacuna considerável entre o conhecimento oriundo das pesquisas científicas e sua aplicabilidade clínica[2]. Um motivo claro responsável por tal lacuna está na sobrecarga de informações geradas continuamente. Por exemplo, aproximadamente 8.000 referências e cerca de 350 ensaios clínicos randomizados são incorporados ao *Medline* a cada semana[3], mas apenas uma pequena fração destes tem validade interna e relevância suficientes para proporcionar mudanças na prática clínica.

Manter-se atualizado com esse imenso volume de informações é algo problemático. Além do mais, é necessário o conhecimento de que nem todas as pesquisas tem o mesmo nível de qualidade e, muitas vezes, dois grandes problemas são verificados: a dificuldade em se encontrar a informação mais adequada diante das mais diversas fontes e recursos de pesquisas, e saber se as informações produzidas são de confiança.

A partir do início da década de 90, o movimento da Prática Baseada em Evidências cresceu exponencialmente[4], aumentando de apenas uma citação no *Medline* em 1992, para 2.957 citações em fevereiro de 2000 e passando a ser discutido com maior ênfase, principalmente no Canadá, Estados Unidos e Reino Unido. Especificamente, a Prática Baseada em Evidências associada à medicina nasceu em Ontário, no Canadá, com um grupo de clínicos e epidemiologistas da *McMaster University*, com a finalidade de promover credibilidade e melhorias na assistência à saúde e no ensino.

O modelo original de Medicina Baseada em Evidências foi apresentado em 1992 no *Journal of the American Medical Association*[4] e orientava que, uma vez surgida a questão clínica, o médico deveria iniciar uma ampla pesquisa científica (as vezes

centenas de artigos), selecionar as melhores publicações, avaliar cada pesquisa e determinar sua validade interna e externa.

Em uma definição mais ampla e de acordo com David Sackett, um dos grandes expoentes da Medicina Baseada em Evidências e membro do grupo da *McMaster University*, a Medicina Baseada em Evidências corresponde ao uso correto e consciente das melhores evidências atuais, na tomada de decisões relacionadas aos cuidados dos pacientes[4,5]. É um processo abrangente, pautado em abordagem que envolve algumas etapas: definição do problema, busca das evidências disponíveis, avaliação crítica e imparcial dos dados obtidos, implementação das evidências na prática e avaliação dos resultados (Tabela 1).

Tabela 1. Etapas envolvidas na prática da Medicina Baseada em Evidências[6].

1. Transformar a necessidade de informação em questões a serem respondidas
2. Buscar as melhores evidências para responder as questões
3. Avaliar criticamente a evidência na sua validade e importância
4. Integrar a avaliação com a experiência clínica e valores dos pacientes para aplicar os resultados na prática clínica
5. Avaliar o desempenho

Um foco relevante e particular da Medicina Baseada em Evidências também está na formação de massa crítica com intuito de identificar pesquisas fraudadas. Ressalta-se que a Medicina Baseada em Evidências não nega o valor da experiência pessoal, apenas propõe que esta seja alicerçada em evidências e em boas pesquisas científicas[5], ou seja, as evidências obtidas de estudos previamente realizados ajudam na tomada de decisões mais seguras e acertadas, mas não devem ser desvinculadas da experiência clínica, dos desejos e circunstâncias as quais os pacientes estão envolvidos.

Por meio de rigorosa metodologia e análise estatística adequada, a Medicina Baseada em Evidências proporciona ao profissional de saúde maior confiabilidade no processo de entendimento e aplicação das informações obtidas das pesquisas científicas[7]. Entretanto**,** a validação interna e externa das publicações cientificas é condição necessária e essencial para que essas pesquisas de alta qualidade de amostras populacionais possam ser aplicadas aos indivíduos nos mais diversos cenários.

1.1 Níveis de evidências e qualidade dos estudos

O termo “nível de evidências” refere-se ao grau de informação proporcionada pelos diferentes desenhos de estudos, como por exemplo, estudos controlados e aleatórios, estudos coorte, modelos em animais e *in vitro*. Sabe-se que a metodologia de um estudo exerce grande influência nos seus resultados[8]. Portanto, quanto maior o rigor e a qualidade metodológica da pesquisa, maior será o nível de evidências, a qualidade e a confiabilidade das informações geradas.

Ao se analisar um artigo científico, visando obter respostas para uma questão específica, deve-se observar os seguintes aspectos:

- o objetivo do estudo;
- a metodologia empregada;
- os resultados; e
- a aplicabilidade dos resultados na prática clínica.

O objetivo do estudo permite concluir se o artigo tem relação com a questão clínica envolvida. Já a análise da metodologia empregada, intimamente ligada ao objetivo, permite avaliar a credibilidade dos resultados encontrados[9]. A figura 1 descreve a hierarquia dos níveis de evidências para a tomada de decisões relacionadas aos cuidados dos pacientes[10].

Figura 1. Gráfico demonstrativo dos níveis de evidências segundo o tipo de estudo, para tratamento e prevenção (Figura extraída de Tese de Doutorado de El Dib, 2006)[11].

No topo da pirâmide encontram-se as revisões sistemáticas com ou sem meta-análises, que são consideradas o nível I de evidências, seguidas dos grandes ensaios clínicos aleatórios (os chamados *mega trials* com mais de 1.000 pacientes). Em escala mais abaixo encontram-se os ensaios clínicos aleatórios com menos de 1.000 pacientes, seguidos dos estudos observacionais sem randomização (coortes), estudos caso-controle, séries de casos, relatos de casos, opiniões de especialistas, pesquisas com animais e *in vitro*. Como se pode observar, estas três últimas encontram-se no último e no mesmo patamar de evidências, com o poder de gerar hipóteses apenas, que embasarão a realização de novos estudos de melhor qualidade. Portanto, idealmente, a melhor evidência possível deverá ser proveniente de uma revisão sistemática de ensaios clínicos aleatórios[10]. Entretanto, ressalta-se que a hierarquia dos níveis de evidências estabelecida não é estática, mas sim dinâmica, conforme a pergunta a ser elaborada[12]. Em outras palavras, é de suma importância saber qual é o desenho de estudo que melhor responde à questão clínica.

Todo o processo inicia-se com a formulação da pergunta que irá nortear a busca da melhor resposta. Com a pergunta em mãos, classifica-se o tipo de estudo: etiologia, diagnóstico, terapêutica, prognóstico, profilaxia ou custo-benefício. Uma vez formulada a pergunta, saber-se-á qual o melhor desenho de pesquisa para respondê-la.

1.2 Revisões sistemáticas

Um dos grandes achados da Medicina Baseada em Evidências foi o desenvolvimento das revisões sistemáticas com ou sem meta-análises, método cujos pesquisadores identificam múltiplos estudos, separam os melhores, e os analisam criticamente na busca de um sumário da melhor evidência disponível no momento. Nos últimos anos houve grande explosão em número de publicações de revisões sistemáticas, em tópicos profícuos (por exemplo, a utilização de baixos volumes correntes na ventilação mecânica de pacientes com lesão pulmonar aguda[13]) e práticos (como é o caso do emprego perioperatório da Ketamina como fármaco poupador de opioide na dor aguda dos pacientes[14]), que não eram valorizados anteriormente.

As revisões sistemáticas representam a melhor forma para mapear e documentar as evidências, uma vez que constituem um método rigoroso para avaliação de um conjunto de dados simultaneamente, baseado em metodologia reprodutível e consistente[15]. São classificadas como estudos secundários, já que sumarizam resultados

dos estudos primários, ou seja, ensaios clínicos aleatórios ou estudos de coortes[16]. Quanto maior a qualidade e menor a heterogeneidade dos estudos primários, particularmente dos ensaios clínicos aleatórios, mais forte e mais confiável serão as conclusões das revisões sistemáticas, com menor ocorrência de vieses em seus resultados.

A primeira fase do processo para a condução de uma revisão sistemática consiste na elaboração do protocolo no qual deve constar a pergunta científica. Tal pergunta consiste em quatro itens, mais conhecidos pela sigla "*PICO*": "*P*" (*patients*), ou seja, a situação clínica ou a doença em questão; "*I*" (*intervention*), intervenção, ou seja qual a terapêutica a ser testada; "*C*" (*control group*), refere-se ao grupo controle, representado pelo placebo, nenhuma intervenção ou outra intervenção e "*O*" (*outcome*), desfecho clínico[17].

Um exemplo para o "*PICO*" é apresentado a seguir[18]:

"*P*": Pacientes com sepse grave ou choque séptico.

"*I*": Uso de albumina 20% associado a cristaloides na ressuscitação volêmica.

"*C*": Uso de cristaloides apenas na ressuscitação volêmica.

"*O*": Mortalidade em 28 dias.

Em 1992, o Dr. Iain Chalmers (Oxford, Reino Unido), criou a Colaboração Cochrane em resposta ao pedido de Archie Cochrane (1909-1988), epidemiologista britânico considerado como grande pesquisador médico da época e que muito contribuiu para o desenvolvimento da epidemiologia como ciência[19]. O objetivo da organização internacional seria realizar, auxiliar e disseminar as revisões sistemáticas de intervenções em diversas áreas da saúde em todo o mundo, promovendo a busca por evidências, principalmente na forma de ensaios clínicos aleatórios[20,21]. Atualmente, a Colaboração Cochrane possui centros em vários países, inclusive no Brasil (Centro Cochrane do Brasil), tendo este sido fundado em 31 de outubro de 1997, na Universidade Federal de São Paulo/Escola Paulista de Medicina. Uma das melhores formas de divulgação das revisões sistemáticas é a biblioteca Cochrane, que contém revisões sistemáticas completas e um imenso banco de dados de ensaios clínicos sob os mais variados temas à disposição da comunidade científica.

Esta colaboração foi a precursora na realização de revisões sistemáticas da mais alta qualidade metodológica. Graças ao profundo impacto provocado na prática médica, nas políticas de saúde e nas definições de prioridades em pesquisas clínicas, o

trabalho realizado pela Colaboração Cochrane tem sido considerado o correspondente clínico do projeto Genoma, sendo comparado ao mesmo em sua importância para a prática médica mundial[22].

1.3 Meta-análises

A meta-análise corresponde a síntese matemática dos resultados de dois ou mais estudos que testam uma mesma hipótese. Após a análise dos estudos incluídos e a extração de dados dos mesmos, o pesquisador avaliará a possibilidade de realizar meta-análises, que resumem estatisticamente os dados dos ensaios clínicos que atenderam aos critérios pré-estabelecidos. A meta-análise utiliza a análise estatística para combinar resultados de estudos individuais para determinar se existem diferenças nos resultados combinados dos grupos, aumentando, desse modo, o tamanho amostral. Tal ferramenta tem o potencial de resolver controvérsias da literatura, de chegar a conclusões que podem ser estatisticamente significantes, ou até mesmo inconclusivas.

A figura 2 é o logotipo da Colaboração Cochrane, representada por uma meta-análise que mensura o tamanho dos efeitos de sete ensaios clínicos que avaliaram o uso de corticosteroide ao final da gravidez de mães de recém-nascidos prematuros na ocorrência de mortalidade neonatal.

Figura 2. Figura ilustrativa do logotipo da Colaboração Cochrane.

Cada linha horizontal representa os resultados de um ensaio clínico e o diamante representa o resultado combinado de todos os ensaios clínicos. A posição do diamante para a esquerda da linha vertical indica que o tratamento estudado é benéfico, ao passo que o diamante, caso situado à direita, demonstraria que o tratamento é desfavorecido em relação ao grupo controle. No gráfico de uma meta-análise também é possível observar que cada linha horizontal representa o intervalo de confiança (IC) de um ensaio clínico que passou pelos critérios de validade, ordenados de cima para baixo. Entende-se por intervalo de confiança de 95% aquele cujas proporções de eventos seriam verificadas 95 vezes, caso o mesmo estudo fosse repetido 100 vezes. A verificação dos limites inferior e superior do intervalo de confiança permite determinar os benefícios máximo e mínimo de uma intervenção comparada com outra. Isso quer dizer que a linha horizontal representa o efeito do tratamento[23].

Outro detalhe importante é que, quanto maior o tamanho da amostra e a quantidade de eventos, menor é o intervalo de confiança. Toda vez que o intervalo de confiança de 95% não ultrapassar a linha vertical, a probabilidade de acaso é menor que 5%.

O gráfico é dividido por uma linha vertical que marca o efeito nulo, ou seja, o *odds ratio* ou risco relativo igual a 1 e a diferença de risco absoluto igual a zero. Se a divisão das proporções dos eventos no grupo controle e no tratado for igual a 1, ou o resultado das diferenças nas proporções dos eventos nos dois grupos for igual a zero, o efeito do tratamento foi igual nos grupos tratado e controle. Isso quer dizer que não houve diferença estatisticamente significante entre eles[23].

De forma geral, à esquerda do eixo vertical encontarm-se os resultados que apresentaram redução do risco devido ao tratamento estudado, ou um efeito benéfico do tratamento em relação ao grupo controle. À direita estão os resultados que significam ineficiência ou aumento de risco decorrente do tratamento, o que significa que o grupo controle, ou placebo ou de tratamento alternativo, obteve melhores resultados do que o grupo submetido ao novo tratamento[23]. Quando essa linha cruza a linha vertical, significa que o resultado não é estatisticamente significante e o acaso pode ser responsável pela diferença encontrada.

Ainda com relação ao estudo supracitado (logotipo da Colaboração Cochrane), é possível perceber que apesar de apenas dois estudos apresentarem efeitos estatisticamente significantes a favor do tratamento, os resultados combinados, mesmo

somando-se os cinco estudos inconclusivos (os que ultrapassam a linha vertical), aumentaram o poder estatístico do estudo, indicando que o corticosteroide realmente reduziu o risco dos bebês irem a óbito por complicações relacionadas à imaturidade pulmonar.

Existem situações em que não há dados para se agrupar os estudos e portanto sem condições para realizar uma meta-análise. Isso acontece quando os estudos primários diferem em um ou vários aspectos, ou seja, em casos de populações heterogêneas, mensuração de resultados diferentes, intervenções e metodologias distintas[24]. Muitas vezes a heterogeneidade nas características de pacientes e regimes de tratamentos é tão expressiva que não justifica a combinação de tais estudos. O resultado, então, será uma revisão sistemática sem a realização de meta-análise. Mesmo assim, esta continua sendo considerada nível I de evidências, uma vez que mapeou o conhecimento de determinado assunto e alertará a comunidade científica para a realização de mais estudos primários.

Como exemplo de meta-análise na área de Anestesiologia, a Figura 3 mostra uma meta-análise de ensaios clínicos aleatórios produzidos a partir de uma revisão sistemática que comparou ventilação mecânica protetora (grupo intervenção) em relação a ventilação convencional (grupo controle) em pacientes com Síndrome da Angústia Respiratória Aguda (SARA), tendo como desfecho mortalidade[13].

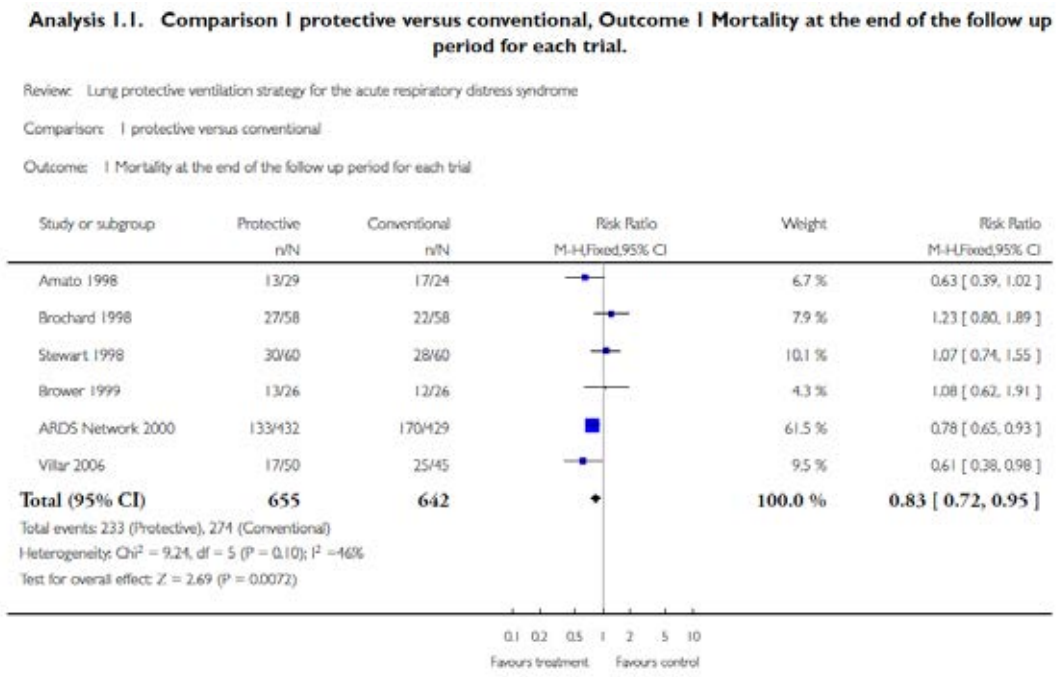

Figura 3. Gráfico demonstrativo de meta-análise de ensaios clínicos aleatorizados produzidos a partir de revisão sistemática que comparou a ventilação protetora *versus* a convencional na Síndrome da Angústia Respiratória Aguda (Meta-análise extraída da *Cochrane Database of Systematic Reviews*, 2007).

Na figura 3 foram incluídos seis ensaios clínicos. A maioria dos estudos (Amato, 1998; Brochard, 1998; Stewart, 1998 e Brower, 1999) não apresentou diferença estatisticamente significante entre os grupos estudados, ou seja, ventilação protetora e ventilação tradicional na ocorrência de mortalidade em pacientes com Síndrome da Angústia Respiratória Aguda. Entretanto, o diamante revela benefício favorecendo a intervenção (ventilação protetora) com redução do risco relativo (RR) em 17% e um RR de 0,83 [IC 95% 0,72; 0,95].

1.4 Críticas às evidências: os resultados das revisões sistemáticas

Apesar das numerosas vantagens, as revisões sistemáticas sofrem duras críticas a respeito de sua frequente inconsistência de evidências e ausência de recomendações estatisticamente significantes[25,26]. Em estudo que avaliou 100 revisões da base de dados Cochrane, verificou-se que 93% delas concluíram pela necessidade de recomendar mais pesquisas científicas para comprovar ou refutar os achados clínicos[16].

Um estudo publicado em 2007 analisou 1.016 revisões sistemáticas, correspondendo a 46% da totalidade das revisões sistemáticas publicadas em 2004 na base de dados da Colaboração Cochrane envolvendo todos os seus 50 grupos, com o

objetivo de mapear as conclusões encontradas em relação as implicações para a prática clínica e pesquisa científica. Os autores concluíram que cerca de 96% das revisões necessitavam de mais estudos, constatando alta prevalência de ausência ou pobreza de evidências relacionadas aos cuidados de saúde[25].

Recentemente, um estudo reanalisou uma amostra de 1.128 revisões sistemáticas publicadas até o ano de 2011, aleatoriamente obtida da Colaboração Cochrane, demonstrando que apenas uma pequena parcela (4,61%) das revisões sistemáticas publicadas não necessitavam de mais estudos, pois havia evidências suficientes para refutar ou comprovar determinada intervenção. Além disso, a porcentagem de revisões sistemáticas avaliadas como insuficiência de evidências foi de 44,2%. Embora se note uma redução de menos de 3% entre a porcentagem desta categoria nos estudos de 2007 e 2011, não houve significância estatística nesse quesito. Os pesquisadores reafirmam a necessidade da produção de estudos primários em massa e com maior qualidade[26].

Em relação à Anestesiologia, o panorama mundial não parece ser diferente. A especialidade é caracterizada por uma imensa variedade em número e diversidade de publicações científicas.

O grupo Anestesiologia da Colaboração Cochrane (*Cochrane Anaesthesia Review Group*) foi estabelecido no ano de 2000 e produz revisões sistemáticas na área de Anestesiologia, Medicina Intensiva, Medicina Perioperatória, Medicina Pré-hospitalar e Medicina de Emergência. Situada em Copenhagen, na Dinamarca, Utah, nos Estados Unidos e Oxford, no Reino Unido, tem alcance globalizado assim como todos os outros grupos da Colaboração Cochrane. São 15 editores em 10 países que auxiliam os autores no processo de produção de revisões sistemáticas da mais alta qualidade possível em todo o mundo[27].

Embora existam avanços nos últimos 10 anos, persistem ainda grandes desafios no que diz respeito ao mapeamento das evidências em Anestesiologia e as conclusões das revisões sistemáticas nesta área. Muitos assuntos e subáreas ainda não foram devidamente pesquisados por estudos com desenho apropriado e outros temas são provindos de estudos muito heterogêneos e/ou com presença de vieses, obscurecendo as conclusões e dificultando a tomada de decisões para a prática clínica[27].

1.5 Pergunta científica

Diante do cenário atual das revisões sistemáticas, a questão emergente é: qual a proporção de incertezas nas revisões sistemáticas do Grupo Anestesiologia da Colaboração Cochrane no que diz respeito à aplicabilidade clínica dos resultados e sua implicação para as pesquisas científicas?

1.6 Hipótese

Como já verificado em estudo contemplando todos os grupos de revisão da base de dados Cochrane, será testada a hipótese de que a maioria das revisões sistemáticas do Grupo Anestesiologia da Colaboração Cochrane apresenta ausência de evidências para recomendar ou refutar as determinadas intervenções, quando comparadas ao grupo controle, e os autores, em sua maioria, clamam pela realização de mais estudos clínicos aleatorizados.

2 OBJETIVOS

2.1 Objetivo geral

Mapear as revisões sistemáticas completas do Grupo Anestesiologia da Colaboração Cochrane para verificar sua validade externa, ou seja, se permitem ou não a aplicação prática dos resultados, cujos autores consideram reunir evidências suficientes para recomendá-las ou desestimulá-las, bem como se há recomendação para a realização de novos estudos na área.

2.2 Objetivos específicos

2.2.1 Verificar a proporção de revisões sistemáticas que definem recomendações específicas tanto benéficas como desfavoráveis em relação ao grupo controle.

2.2.2 Verificar a proporção de revisões sistemáticas que sugerem realização de novos estudos.

2.2.3 Verificar a quantidade de estudos existentes nestas revisões sistemáticas.

2.2.4 Verificar a quantidade de meta-análises existem nestas revisões sistemáticas.

3. MÉTODO

O presente estudo foi baseado em metodologia previamente descrita[25,26]. O Comitê de Ética em Pesquisa dispensou o parecer deste estudo conforme ofício 32/2014-CEP (Anexo 1).

3.1 Tipo de estudo

Estudo transversal.

3.2 Local do estudo

O estudo foi desenvolvido junto ao Programa de Pós-Graduação em Anestesiologia do Departamento de Anestesiologia da Faculdade de Medicina de Botucatu, Universidade Estadual Paulista (UNESP) e à Unidade de Medicina Baseada em Evidências da UNESP, grupo de pesquisa cadastrado no Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).

3.3 Critérios de inclusão

Foram incluídas todas as revisões sistemáticas completas do Grupo Anestesiologia da Colaboração Cochrane publicadas até 28 de fevereiro de 2014. Foram considerados apenas ensaios clínicos aleatorizados na computação dos dados dos estudos incluídos por revisão sistemática.

3.4 Critérios de exclusão

Foram excluídos protocolos e representações de meta-análises, ou seja, meta-análises com estudo único, conforme exemplificado na Figura 4. Excluiu-se qualquer revisão sistemática quando a mesma não analisasse diretamente os ensaios clínicos aleatórios.

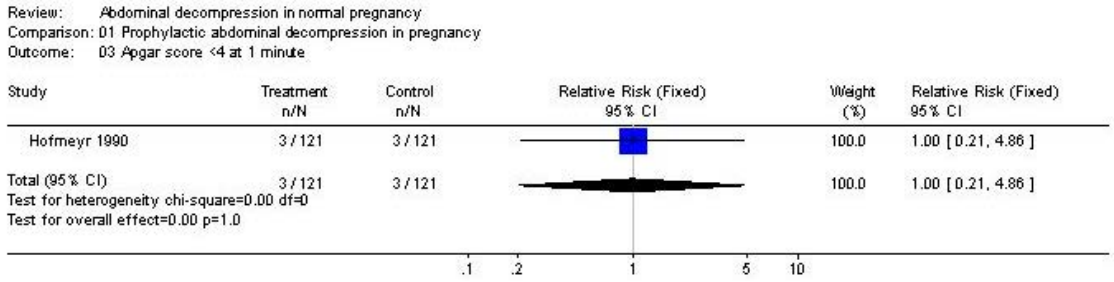

Figura 4. Exemplo de representação de meta-análise com apenas um estudo (Extraído de *Cochrane Database of Systematic Reviews*, 2000)[28].

3.5 Definições dos eventos a serem computados

3.5.1 Benefício

Define-se benefício como a evidência de que a intervenção testada é mais eficiente ou eficaz, superior nos resultados dos desfechos em análise, ou mais vantajosa do que nociva quando comparada ao grupo controle.

3.5.2 Malefício

Define-se malefício como a evidência de que a intervenção testada apresenta resultado inferior quanto aos desfechos em análise, é refutada pelo grupo controle, ou mesmo, traz mais prejuízo do que benefício quando comparada ao grupo controle.

3.6 Coleta dos dados

Dois investigadores avaliaram independentemente as revisões sistemáticas quanto aos desfechos e aos contextos analisados. Os dados foram extraídos das revisões sistemáticas e inseridos em uma tabela específica previamente realizada, contendo os objetivos específicos e relacionando-os com cada título da revisão sistemática. As informações obtidas foram especificamente decorrentes das conclusões dos autores das revisões sistemáticas, a partir da análise de quantas sessões fossem necessárias do manuscrito em questão. Em caso de dúvida na análise de algum estudo, avaliação minuciosa de todo o manuscrito foi novamente realizada e houve um consenso entre os investigadores.

3.6.1 Classificação das revisões sistemáticas conforme sua conclusão, favorável a intervenção (benefício, classificação A), contrária a intervenção (malefício, classificação B), ou inconclusiva (classificação C)

Os dados foram extraídos de acordo com uma tabela (Anexo 2). No caso de evidências favoráveis a intervenção, ou seja, quando as revisões sistemáticas permitiram fazer recomendações com benefícios significantes para a aplicação clínica, a coluna "evidências que apoiam a intervenção" foi preenchida com o número "1" e a coluna "evidências contra a intervenção" com o número "0". Na situação oposta, ou seja, quando as evidências contradiziam a intervenção ou sugeriram malefício, a coluna "evidências contra a intervenção" foi preenchida com o número "1" e a coluna "evidências que apoiam a intervenção" com o número "0".

No caso de dúvida persistente entre o preenchimento das duas colunas descritas previamente e impossibilidade de entender o posicionamento dos autores da revisão sistemática, optou-se por classificar a evidência como contrária a intervenção.

Quando um estudo demonstrou não haver diferença entre a intervenção e o grupo controle, ou seja, não houve evidências para responder a questão clínica, favorecendo ou desfavorecendo a intervenção (evidências inconclusivas), foram preenchidas as colunas "evidências que apoiam a intervenção" e "evidências contra a intervenção" com o número "0".

Sendo assim, foram três possíveis combinações nas colunas "evidências que apoiam a intervenção" e "evidências contra a intervenção" da tabela:

- **1 e 0** → Evidências que apoiam a intervenção testada (classificação A)
- **0 e 1** → Evidências contrárias a intervenção testada (classificação B)
- **0 e 0** → Evidências insuficientes para apoiar ou refutar a intervenção (classificação C)

A tabela 2 ilustra as três combinações possíveis (A, B ou C) com exemplos de títulos de revisões sistemáticas na área de Anestesiologia.

Tabela 2. Exemplo das três combinações possíveis como resultado para prática clínica

Classificação	Título da revisão sistemática	Evidências que apoiam a intervenção	Evidências contra a intervenção
A: evidências favoráveis ao uso da intervenção	Ventilação protetora *versus* convencional na Síndrome da Angústia Respiratória Aguda[13]	1	0
B: evidências contrárias ao uso da intervenção	Proteína C ativada em pacientes com sepse grave e choque séptico[29]	0	1
C: ausência de evidências	Elevada *versus* baixa pressão positiva ao final da expiração em pacientes com Síndrome da Angústia Respiratória Aguda[30]	0	0

3.6.2 Classificação das revisões sistemáticas conforme a sugestão de recomendação para a realização de futuros estudos científicos

Quando as revisões sistemáticas sugeriram recomendações de futuras pesquisas voltadas para a questão abordada, enfatizando a necessidade de mais estudos a fim de que fossem obtidas melhores evidências, foram completados na tabela (Anexo 2) a coluna “recomendações para futuros estudos” com o número “1”. Caso contrário, quando os autores não sugeriam a realização de mais estudos, essa mesma coluna foi preenchida com o número “0”. As repostas foram registradas no tópico “implicação para pesquisa científica”.

Sendo assim, tornaram-se possíveis seis combinações do cruzamento das colunas “evidências que apoiam a intervenção”, “evidências contra a intervenção”, “ausência de evidências ou evidências insuficientes” e “recomendação de futuros estudos”:

- **1 e 0 e 1** → Gerada a classificação **A1:** as evidências científicas favorecem a intervenção testada, mas os autores não estão plenamente convictos do seu benefício e, desse modo, recomendam a realização de mais estudos para tentar evidenciar o efeito da intervenção testada.

- **1 e 0 e 0 →** Gerada a classificação **A2:** as evidências científicas favorecem a intervenção testada, e os autores acham desnecessária a realização de mais estudos, estando confiantes do benefício da intervenção, quando comparada ao grupo controle.
- **0 e 1 e 1 →** Gerada a classificação **B1**: as evidências são contrárias a intervenção testada, mas os autores não estão plenamente convictos desse resultado e, desse modo, recomendam a realização de mais estudos para tentar evidenciar se o efeito da intervenção testada é desfavorável em relação ao grupo controle.
- **0 e 1 e 0 →** Gerada a classificação **B2**: as evidências são contrárias a intervenção e não há recomendação para a realização de mais estudos, estando os autores confiantes de que a intervenção é inferior ou traz prejuízo na análise do desfecho estudado, quando comparada ao grupo controle.
- **0 e 0 e 1 →** Gerada a classificação **C1**: há ausência de evidências ou estas são insuficientes para concluir probabilidade de benefício ou malefício da intervenção em comparação com o grupo controle, sendo que os autores recomendam a realização de mais estudos para possibilitar a resposta da questão abordada.
- **0 e 0 e 0 →** Gerada a classificação **C2**: há ausência de evidências ou estas são insuficientes para concluir probabilidade de benefício ou malefício da intervenção em comparação com o grupo controle, sendo que os autores entendem que não seria viável realizar mais estudos para tentar responder a questão clínica em análise, ou que a pergunta não tem relevância clínica e, portanto, não recomendam a produção de novos estudos para a mesma questão.

Resumindo, “A”, “B” e “C” são classificações das implicações para a prática clínica e “1” e “2” para a pesquisa científica. Com a combinação entre as letras e os números, são obtidas seis subclassificações possíveis.

A tabela 3 exemplifica as seis combinações possíveis de acordo com títulos de revisões sistemáticas na área de Anestesiologia e Medicina Intensiva.

Tabela 3. Exemplo das seis combinações possíveis nos quesitos implicações para a prática clínica e recomendação para a realização de mais estudos.

Classificação	Título da revisão sistemática	Evidências que apoiam a intervenção	Evidências contra a intervenção	Recomendação de futuros estudos
A1: **evidências que apoiam a intervenção, com recomendação para mais estudos**	Ventilação protetora *versus* convencional na Síndrome da Angústia Respiratória Aguda[13]	1	0	1
B1: **evidências contra a intervenção, com recomendação para mais estudos**	Analgesia venosa controlada pelo paciente *versus* analgesia epidural contínua em pós-operatório de cirurgia intra-abdominal[31]	0	1	1
C1: **ausência de evidências, com recomendação para mais estudos**	Elevada versus baixa pressão positiva ao final da expiração em pacientes com Síndrome da Angústia Respiratória Aguda[30]	0	0	1
A2: evidências que apoiam a intervenção, sem recomendação para mais estudo	Monoterapia com beta lactâmico versus combinação de beta lactâmico-aminoglicosídeo no tratamento da sepse[32]	1	0	0
B2: **evidências contra a intervenção, sem recomendação para mais estudos**	Proteína C ativada em pacientes com sepse grave e choque séptico[29]	0	1	0
C2:ausência de evidências, sem recomendação para mais estudos	Manipulação do sódio na dieta e asma[33]	0	0	0

3.6.3 Número de estudos existentes em cada revisão sistemática

A contagem dos estudos (ensaios clínicos) em cada revisão sistemática foi realizada tanto na sessão de resultados, como na tabela “características dos estudos incluídos”. Havendo discordância no relato da quantidade de ensaios clínicos, confrontaram-se também as referências dos estudos incluídos. Esses dados foram inseridos na penúltima coluna da tabela (Anexo 2), com o nome de “número de estudos incluídos”.

3.6.4 Número de meta-análises existentes em cada revisão sistemática

Foram computadas as meta-análises existentes em cada revisão sistemática, excluindo-se aquelas com apenas um estudo. As meta-análises foram extraídas do tópico “dados e análises” de cada revisão sistemática. Os dados foram inseridos na última coluna da tabela (Anexo 2), denominada “número de meta-análises”.

A figura 5 ilustra como se realizou a identificação e a contagem das meta-análises, além da exclusão daquelas com apenas um estudo.

Comparison 1. Double versus single-injection technique

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Primary anaesthesia failure (incomplete sensory block)	8	497	Risk Ratio (M-H, Random, 95% CI)	0.51 [0.30, 0.85]
1.1 Transarterial injection (for double injection)	4	237	Risk Ratio (M-H, Random, 95% CI)	0.72 [0.33, 1.58]
1.2 Location by neurostimulation (for double injection)	4	260	Risk Ratio (M-H, Random, 95% CI)	0.40 [0.22, 0.73]
2 Primary anaesthesia failure - subgrouped by outcome definition	8		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
2.1 Incomplete overall sensory block	4	238	Risk Ratio (M-H, Random, 95% CI)	0.43 [0.24, 0.76]
2.2 Supplemental blocks for surgical area	5	309	Risk Ratio (M-H, Random, 95% CI)	0.43 [0.17, 1.11]
3 Complete failure of block: general anaesthesia or new plexus block	6	338	Risk Ratio (M-H, Fixed, 95% CI)	1.29 [0.33, 5.01]
4 Incomplete motor block	4	229	Risk Ratio (M-H, Fixed, 95% CI)	0.78 [0.58, 1.03]
5 Secondary analgesia failure	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5.1 Pain in surgical site/operative field	3	160	Risk Ratio (M-H, Fixed, 95% CI)	0.56 [0.25, 1.25]
5.2 Tourniquet pain	2	104	Risk Ratio (M-H, Fixed, 95% CI)	0.58 [0.22, 1.52]
5.3 Intra-operative sedatives	2	129	Risk Ratio (M-H, Fixed, 95% CI)	0.64 [0.31, 1.31]
6 Timing (in minutes)	4		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
6.1 Time for block	1	60	Mean Difference (IV, Fixed, 95% CI)	1.65 [0.72, 2.58]
6.2 Duration of operation	1	50	Mean Difference (IV, Fixed, 95% CI)	9.0 [-8.19, 26.19]
6.3 Duration of tourniquet	3	154	Mean Difference (IV, Fixed, 95% CI)	2.44 [-5.24, 10.13]
6.4 Duration of block	2	129	Mean Difference (IV, Fixed, 95% CI)	11.98 [-6.73, 30.68
7 Complications during nerve block	3		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
7.1 Arterial puncture	2	110	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.2 Venous puncture	2	110	Risk Ratio (M-H, Fixed, 95% CI)	1.5 [0.17, 13.52]
7.3 Paraesthesia	2	110	Risk Ratio (M-H, Fixed, 95% CI)	2.5 [0.31, 19.99]
7.4 Tachycardia (intra-vascular injections)	1	60	Risk Ratio (M-H, Fixed, 95% CI)	5.86 [0.25, 137.66]
8 Adverse effects (> 24 hours)	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
9 Patient discomfort and dissatisfaction with method	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
9.1 Patient uncomfortable	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9.2 Patient would not have method again	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

Figura 5. Modelo de identificação e contagem das meta-análises (representada pelos círculos), além de exclusão das representações com apenas um estudo (representada pelo retângulo e identificada pela seta).

3.7 Análise estatística

As proporções de implicações para a prática clínica e para a pesquisa científica foram representadas por números reais, porcentagens e 95% de intervalo de confiança da totalidade das revisões sistemáticas. O número de meta-análises e estudos incluídos em cada revisão sistemática foi expresso em valor total, média, desvio-padrão, mediana e moda.

4 RESULTADOS

Neste estudo foram selecionadas 118 revisões sistemáticas publicadas no Grupo Anestesiologia da Colaboração Cochrane até 28 de fevereiro de 2014. Duas revisões sistemáticas foram excluídas por serem duplicatas[34,35] e, também, um sumário de revisões sistemáticas[36]. Desta forma, analisou-se um total de 115 revisões sistemáticas do grupo de Anestesiologia.

Foi identificada a média de 19,6 ensaios clínicos aleatórios por revisão sistemática (total de 2.258 estudos aleatórios) e 9,3 meta-análises por revisão sistemática (total de 1.072 meta-análises).

O evento mais comumente observado nesse estudo foi a ausência de evidências suficientes para dar suporte ou refutar a intervenção de interesse, quando comparado com o grupo controle. Apenas cinco das 115 revisões sistemáticas publicadas não julgaram ser necessária a realização de novos estudos. Dessas cinco revisões, uma esteve relacionada a anestesia tópica em cirurgia oftalmológica[37], outra referente a sintomas neurológicos com uso de lidocaína em bloqueio subaracnoideo[38], uma outra que analisou o uso da antibioticoterapia combinada *versus* monoterapia na sepse[32], uma quarta revisão referente a técnicas de bloqueios de plexo via axilar em adultos[39], e a última que avaliou o uso da Proteína C Reativa na sepse grave e choque séptico[29].

A proporção de evidências que apoiam a intervenção quando comparada ao grupo controle (desfecho A) foi de 34,8% correspondendo a 40 revisões sistemáticas. Os resultados compreendem a 32,2% de intervenções provavelmente benéficas com necessidade de mais estudos (A1) e 2,6% de intervenções benéficas sem recomendação para novos estudos (A2).

A proporção de evidências que contraindicam o uso de determinada intervenção (desfecho B) foi de 7,8%, perfazendo um total de nove revisões sistemáticas. Verifica-se que 6,1% das intervenções foram provavelmente menos eficientes ou efetivas que o grupo controle, com necessidade de novos estudos (B1) e que 1,7% das intervenções foram menos eficientes ou efetivas em relação ao grupo controle e sem a necessidade de realização de novos estudos (B2).

Todavia, o desfecho mais relevante foi a ausência de evidências suficientes para sugerir benefício ou malefício da intervenção em comparação com o grupo

controle, em um total de 66 estudos, correspondendo a 57,4% das revisões. Para todas essas, os autores sugeriram que houvesse realização de novos estudos (C1). Em nenhum desses casos os autores descartaram a sugestão de realização de mais estudos. (C2, 0%).

No geral, em 110 revisões, equivalendo a 95,7% do total, houve recomendação de realização de novas pesquisas, independentemente dos resultados obtidos (benefício, malefício ou ausência de evidência). A porcentagem dos desfechos que foram avaliados, assim como aqueles que recomendam a realização de novos estudos controlados e randomizados estão subdivididos nas seis categorias descritas na tabela 4 e na figura 6.

Tabela 4. Dados dos desfechos das 115 revisões sistemáticas analisadas

Implicações para a Prática clínica e para a Pesquisa Científica		Número	Percentual	Intervalo de confiança
A	Evidências que apoiam a intervenção	40	34,8	26,0 – 43,5
A1	Evidências que apoiam a intervenção, com recomendação para mais estudos	37	32,2	23,7 – 40,7
A2	Evidências que apoiam a intervenção, sem recomendação para mais estudos	3	2,6	0 – 5,5
B	Evidências contra a intervenção	9	7,8	2,9 – 12,7
B1	Evidências contra a intervenção, com recomendação para mais estudos	7	6,1	1,7 – 10,4
B2	Evidências contra a intervenção, sem recomendação para mais estudos	2	1,7	0 – 4,0
C	Ausência de evidências suficientes para sugerir benefício ou malefício	66	57,4	48,4 – 66,4
C1	Ausência de evidências, com recomendação para mais estudos	66	57,4	48,4 – 66,4
C2	Ausência de evidências, sem recomendação para mais estudos	0	0	-----
Número e porcentagem de revisões sistemáticas que recomendaram mais estudos (A1 + B1 + C1)		111	95,7	92,0 – 99,4

Figura 6. Percentagens de desfechos avaliados como benéficos, nocivos, inconclusivos com ou sem recomendação para novos estudos.

Observa-se na tabela 5 a média de 19,6 ensaios clínicos aleatórios por revisão sistemática. Entretanto, os dados demonstram uma variação considerável na quantidade de ensaios clínicos aleatórios (0-737) e com um número de quatro estudos primários incluídos por revisão, como o valor que mais se repete (moda). Observado portanto, uma grande disparidade na quantidade de estudos entre as revisões sistemáticas, sendo que a maioria delas são desprovidas de um volume elevado de estudos. Com relação às meta-análises, há uma quantidade considerável de revisões sistemáticas desprovidas de meta-análises: verifica-se média de meta-análises por revisão sistemática de 9,3 e grande faixa de variação em seus números, entre 0 e 92, com um valor de moda zero, que é ainda mais baixo do que em relação aos estudos incluídos.

Tabela 5. Dados estatísticos relacionados aos estudos incluídos e meta-análises nas revisões sistemáticas analisadas

	Estudos Incluídos	Meta-análises
Média $\pm$ desvio padrão	19,6 $\pm$ 68,8	9,3 $\pm$ 12,6
Mediana	9,5	6
Variação	0 a 737	0 a 92
Moda	4	0
Total	2.258	1.072

Em seguida foi realizada uma análise estratificada da distribuição anual de todas as revisões sistemáticas a partir do ano de 2000, ano da fundação do Grupo Anestesiologia da Colaboração Cochrane. Constata-se um aumento do número de publicações ao longo dos anos, conforme demonstrado na figura 7.

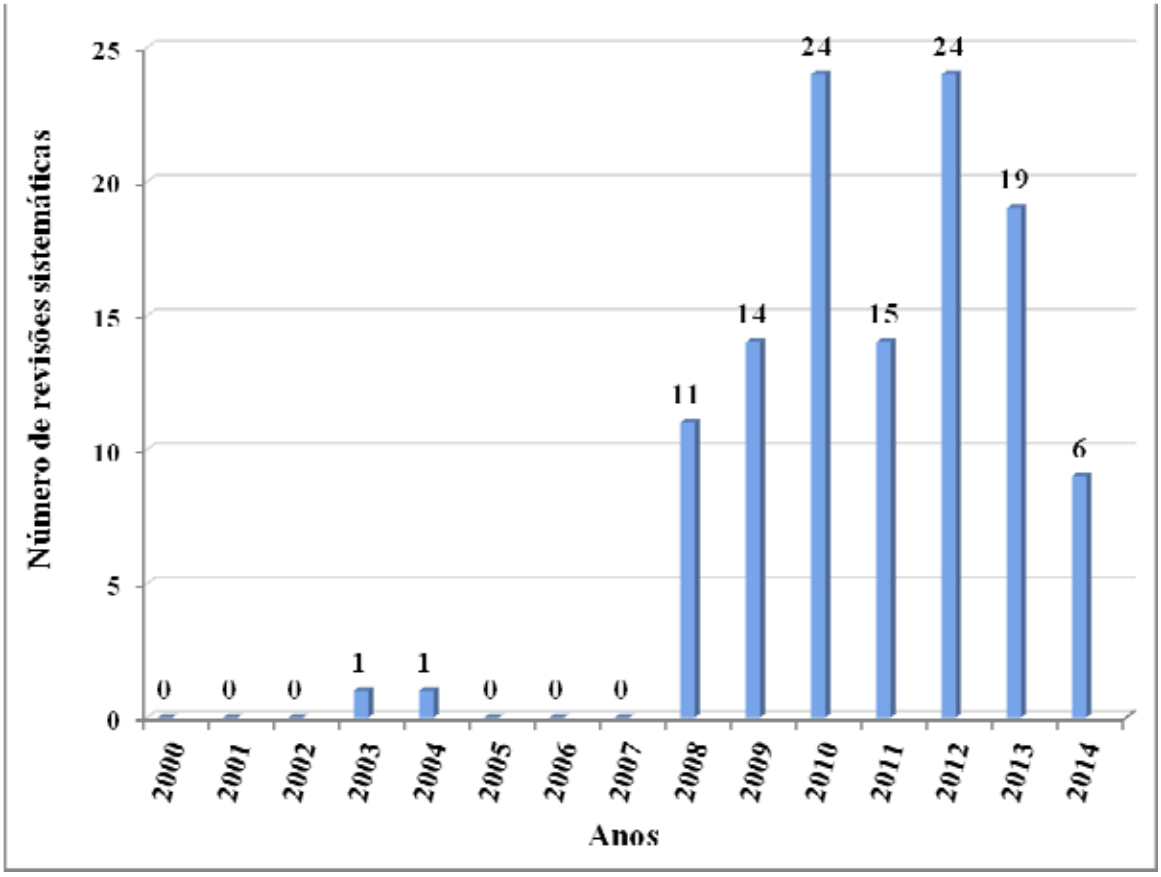

Figura 7. Número de revisões sistemáticas publicadas anualmente a partir de 2000, no Grupo Anestesiologia da Colaboração Cochrane.

Observou-se número baixo de publicações em 2003 e 2004, com apenas uma revisão sistemática publicada em cada ano, além da ausência de publicações em 2000, 2001, 2002, 2005, 2006 e 2007. Nos dois primeiros meses do ano de 2014 já é possível verificar quase 1/4 da totalidade de revisões sistemáticas publicadas nos anos de 2010 e 2012 somados, que registraram o maior número de publicações, 24 cada.

Em relação as meta-análises, também observa-se aumento do volume, apesar de inconstante e irregular, conforme demonstrado na figura 8. Em 2010, registra-se o ano de maior volume de publicações de meta-análises com um total de 233, seguido de queda significativa nos anos subsequentes. Em 2008, das 196 meta-análises computadas, 92 são de apenas um único estudo[40].

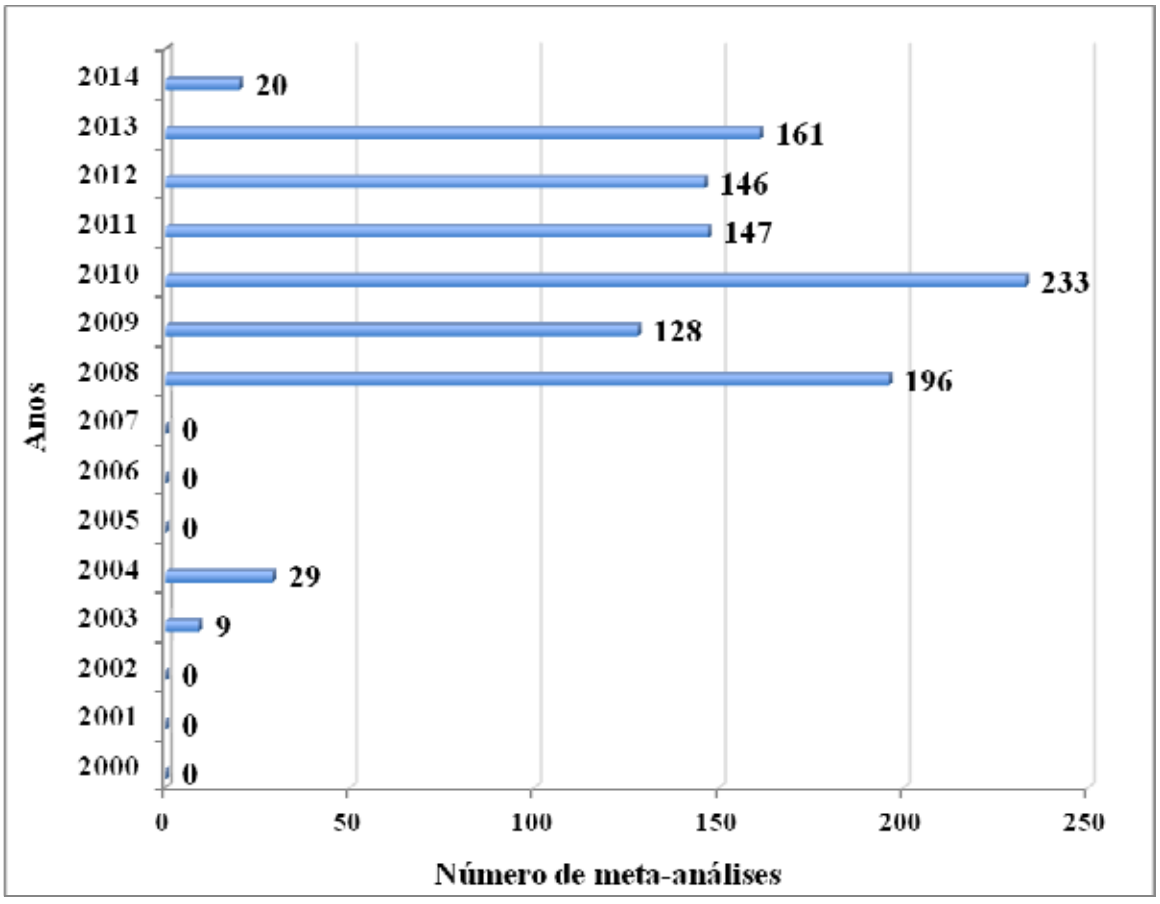

Figura 8. Número de meta-análises publicadas anualmente a partir de 2000, no Grupo Anestesiologia da Colaboração Cochrane.

A figura 9 revela a proporção e relação das revisões sistemáticas e meta-análises publicadas anualmente desde a concepção do Grupo Anestesiologia da Colaboração Cochrane. A despeito do aumento da quantidade de publicações, principalmente a partir do ano de 2008, ainda existe uma oscilação importante ao longo dos anos. Tal disparidade é ainda mais significativa quando consideradas as meta-análises.

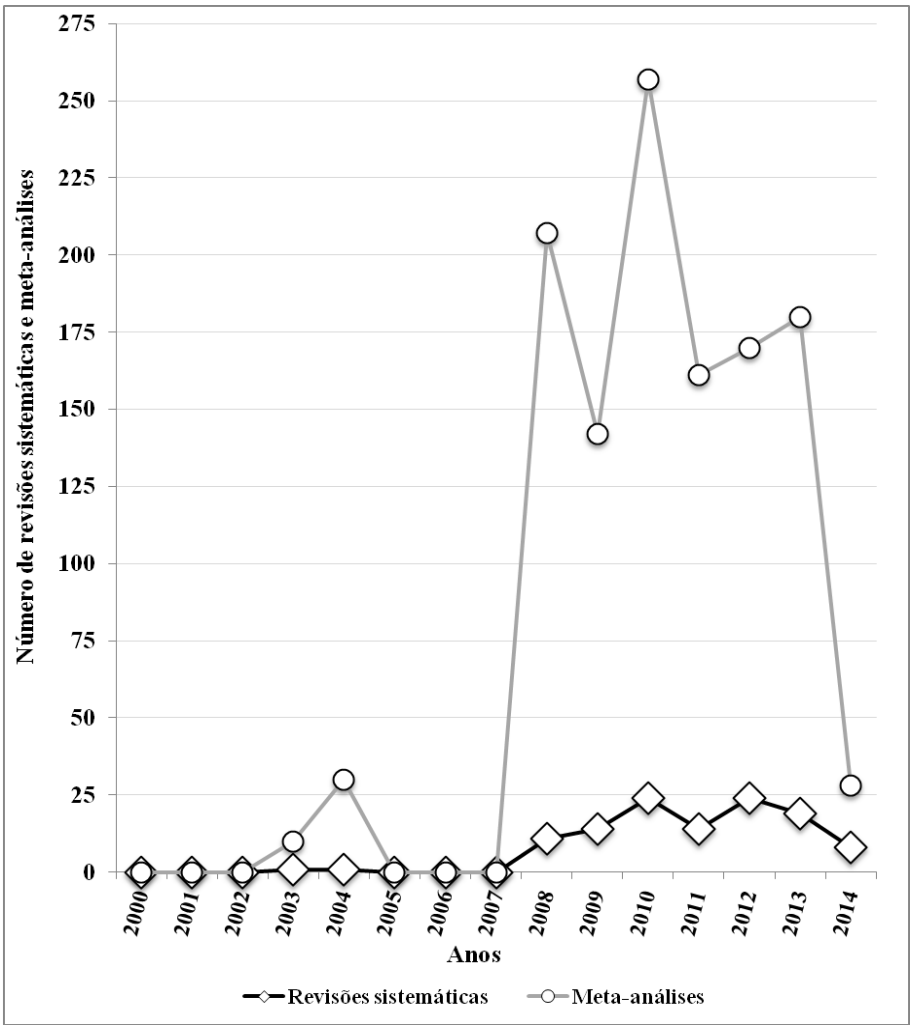

Figura 9. Revisões sistemáticas e meta-análises publicadas a cada ano, a partir de 2000, no Grupo Anestesiologia da Colaboração Cochrane.

A figura 10 representa o panorama das revisões sistemáticas publicadas pelo Grupo Anestesiologia da Colaboração Cochrane quando analisadas por subáreas.

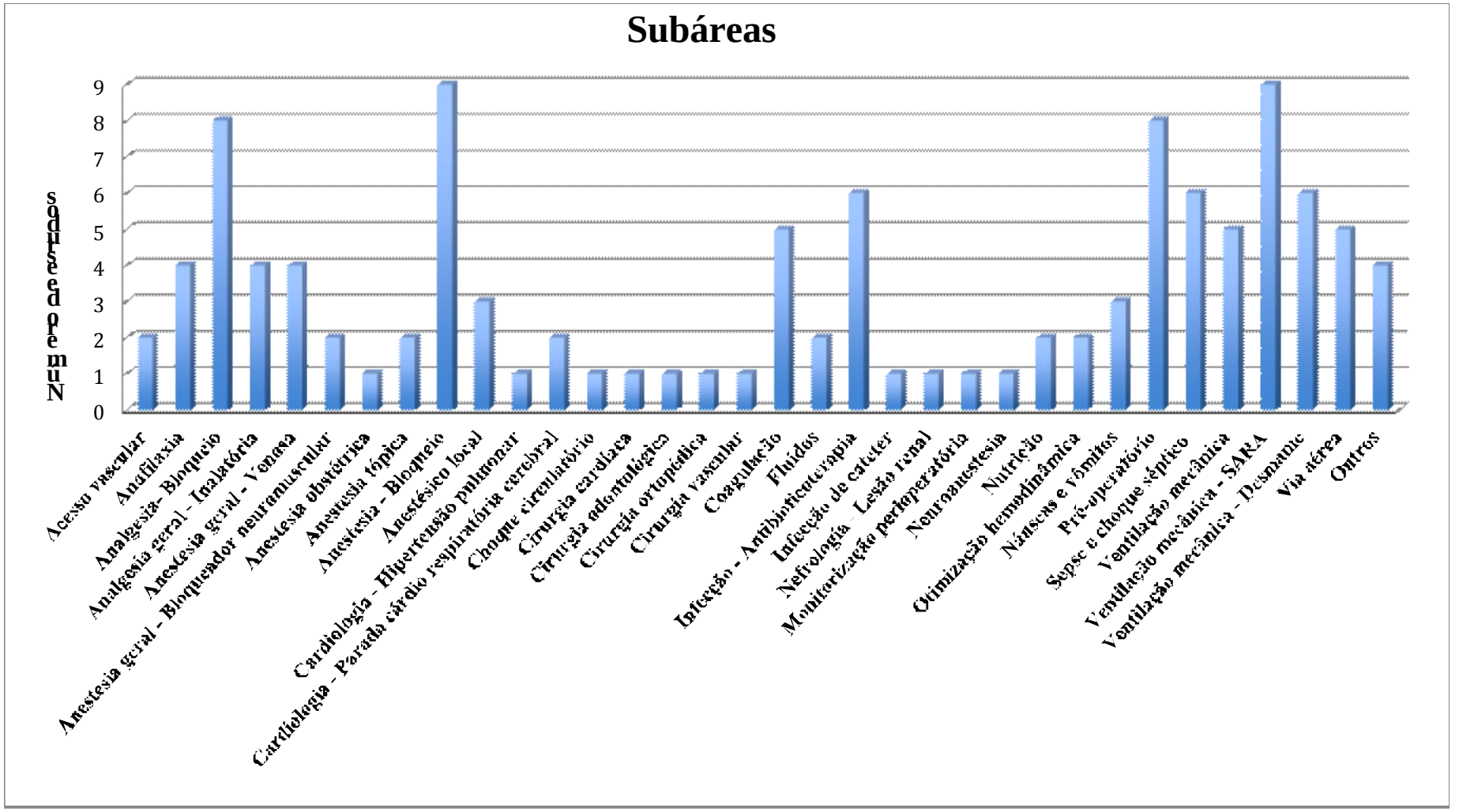

Figura 10. Número de revisões sistemáticas publicadas por categorias ou subáreas do grupo Anestesiologia da Colaboração Cochrane.

Constata-se uma diversidade muito grande no panorama das publicações abrangidas pelo Grupo Anestesiologia da Colaboração Cochrane, quando estratificadas por categorias ou subáreas. No quesito Ventilação mecânica, observa-se o maior número de publicações com um total de 20 estudos, sendo que destes, nove estão relacionados a Síndrome da Angústia Respiratória Aguda (SARA). As revisões sistemáticas incluídas na categoria “Outros”, compreendem pesquisas em anestesia para colecistectomia por videolaparoscopia, complicações por migração de bolhas de ar, pneumotórax espontâneo e uso do corticoide perioperatório em insuficiência adrenal.

5 DISCUSSÃO

5.1 Discussão do método

Este é um estudo transversal, mas que também poderia ser classificado como sistemático. Tal nomenclatura corresponde a um estudo transversal quando este se propõe a analisar a metodologia de estudos publicados. Essa denominação, embora não oficial, já é adotada por autoridades no assunto, inclusive pelo Dr. Gordon Guyatt, criador do termo Medicina Baseada em Evidências no Canadá na década de 80.

Foram excluídos protocolos e representações de meta-análises. Os protocolos não podem ser incluídos uma vez que representam apenas um planejamento do estudo, e portanto, são desprovidos de resultados para serem analisados. As representações de meta-análises não tem nenhuma significância para o exame, uma vez que são necessários no mínimo dois estudos para proceder com esta análise (análise estatística combinada de no mínimo dois estudos). Como foram consideradas apenas revisões que avaliaram diretamente os ensaios clínicos aleatórios, procedeu-se a exclusão de um estudo que examinou apenas revisões sistemáticas[36].

No quesito coleta de dados, quando ocorreu alguma dúvida persistente no preenchimento entre as colunas referentes a “evidências que apoiam a intervenção” e “evidências contra a intervenção”, face a impossibilidade de entender o posicionamento dos autores da revisão sistemática, optou-se por classificar a evidência como contrária a intervenção, uma vez que, sob o ponto de vista ético, é apropriado desaconselhar intervenções que ofereçam riscos de desfechos negativos os quais sejam observados de forma significante na população-alvo da intervenção testada.

Ainda com relação ao item coleta de dados, foram computados os estudos (ensaios clínicos) em cada revisão sistemática a fim de dar suporte para compreensão das diferentes implicações das revisões sistemáticas.

5.2 Discussão dos resultados

Este estudo demonstrou a escassez de evidências sólidas produzidas pela maioria das revisões sistemáticas do Grupo Anestesiologia da Colaboração Cochrane.

Foi constatado que 66 das 115 revisões sistemáticas publicadas até 28 de fevereiro de 2014 não tiveram poder para responder questões direcionadas para a prática clínica.

O termo Medicina Baseada em Evidências é retoricamente eficiente, mas infelizmente e de certa forma, ainda obscuro e indefinido[41]. De acordo com o Dr. Kathryn Stewart, diretor médico de gestão em cuidados do "*Sinai Health System*" em Chicago, a Medicina Baseada em Evidências não busca simplesmente a evidência nas publicações, mas evidência naquilo que é realmente importante. Antes de uma tomada de conduta, é interessante questionar: "Tal decisão irá mudar o prognóstico, resultado ou qualidade de vida dos pacientes?" Se a resposta for negativa nestes quesitos, principalmente se envolver elevação de custos do tratamento, a decisão pelo emprego da intervenção deve ser descartada. Os profissionais muitas vezes não reconhecem a importância da necessidade em considerar a evidência no contexto do paciente, e ter a certeza de que tal medida irá realmente fazer a diferença.

Sabe-se que a Medicina Baseada em Evidências representa o elo entre a boa pesquisa científica e a prática clínica, de forma que proporcione maior garantia para o uso correto e consistente das melhores evidências disponíveis, viabilizando condutas e decisões relacionadas aos cuidados dos pacientes[5]. A Medicina Baseada em Evidências não exclui a experiência do profissional, ao contrário, busca a integração entre a experiência clínica individual e os resultados das melhores pesquisas sistematizadas e com boa validade externa[5]. Entende-se por experiência clinica individual a proficiência e o julgamento que o médico adquire por meio de sua experiência e prática clínica. Quando se fala na melhor evidência clínica externa disponível, entende-se por publicações de pesquisas relevantes, frequentemente associadas e alicerçadas nas ciências básicas da medicina, especificamente em centros de referências em pesquisas. São considerados profissionais médicos de qualidade aqueles que utilizam sua experiência individual, agregada a melhor evidência disponível, uma vez que nenhuma delas, quando isoladas, são suficientes[5].

Portanto, é primordial esclarecer que a Medicina Baseada em Evidências não é um "livro de receitas" em medicina. A evidência clínica externa tem o poder de informar, mas nunca deverá substituir por completo a experiência do profissional, uma vez que é esta quem irá determinar e definir se tal evidência poderá ser aplicada ao paciente e, caso positivo, como tal decisão deverá ser integrada a decisão clínica. A validação interna e externa das publicações científicas é condição essencial para que

pesquisas de alta qualidade de amostras populacionais possam ser individualmente aplicadas no mundo real.

No topo da hierarquia das evidências estão as revisões sistemáticas, consideradas a melhor forma de documentar e mapear uma evidência científica[15]. Um estudo aleatório, e especialmente a revisão sistemática de vários ensaios clínicos aleatórios com realização de meta-análises, tem probabilidade muito maior de proporcionar uma visão mais verdadeira e próxima da realidade do que prestar uma informação enganosa. Por isso tornaram-se o "padrão ouro" da evidência científica para o julgamento do benefício de uma terapêutica[42,43]. Uma revisão sistemática pode concluir que uma intervenção testada é efetiva, ineficiente, nociva ou que não existem evidências suficientes para qualquer conclusão.

Infelizmente, a inconsistência nos resultados e a ausência de evidências suficientes para responder a uma pergunta são os desfechos mais frequentes encontrados, o que tem sido motivo de severas críticas e constantes controvérsias[27]. Em 2007, foi publicado um estudo que mapeou as revisões sistemáticas que integravam todos os grupos da Colaboração Cochrane até o ano de 2004 demonstrando que a imensa maioria das revisões clamava pela realização de mais estudos, segundo os autores dessas revisões[25]. Decorridos 4 anos, em uma nova publicação, analisou-se uma nova amostra de quase 25% de todas as revisões sistemáticas publicadas na Cochrane até o ano de 2011, tomando como base a metodologia do estudo anterior. Constatou-se que o cenário não havia sido alterado, demonstrando e enfatizando a urgência em novas pesquisas, com investimentos em estudos primários e de melhor qualidade[26].

Na tabela 6 é possível observar a semelhança dos resultados do presente estudo em anestesiologia, quando comparado com outras áreas da medicina e até mesmo no campo da odontologia.

Tabela 6. Classificação comparativa dos resultados das revisões sistemáticas da Colaboração Cochrane

Estudo	**Classificação das revisões sistemáticas**					
	A1	**A2**	**B1**	**B2**	**C1**	**C2**
El Dib et al., 2007[25] (Especialidades médicas)	43,0%	1,4%	5,1%	1,7%	47,8%	1,0%
Villas Boas et al., 2011[26] (Especialidades médicas)	43,3%	2,0%	7,9%	1,8%	44,2%	0,8%
Almeida, et al., 2013[44] (Doenças Infecciosas)	46,1%	1,7%	8,2%	2,6%	40,9%	0,4%
Furtado, et al., 2013[45] (Odontologia)	22,4%	0%	6,3%	0%	69,2%	2,1%
Presente estudo	32,2%	2,6%	6,1%	1,7%	57,4%	0%

A1: evidências que apoiam a intervenção, com recomendação para mais estudos.

A2: evidências que apoiam a intervenção, sem recomendação para mais estudos.

B1: evidências contra a intervenção, com recomendação para mais estudos.

B2: evidências contra a intervenção, sem recomendação para mais estudos.

C1: ausência de evidências ou evidências insuficientes, com recomendação para mais estudos.

C2: ausência de evidências ou evidências insuficientes, sem recomendação para mais estudos.

Observa-se cenário amplamente desfavorável das revisões sistemáticas no que diz respeito as evidências geradas para a prática clínica e a necessidade de mais estudos. As classificações A2 e B2 que apoiam e contraindicam a intervenção, respectivamente, ambas sem recomendação de novas pesquisas, são achados comuns a todos os estudos prévios conforme claramente demonstrado. Da mesma forma, as revisões sistemáticas com ausência de evidências (C1 e C2), também manifestam resultados ainda mais críticos e semelhantes nas outras áreas.

Essa escassez de evidências é creditada a diversos fatores, dentre os quais a baixa qualidade metodológica de grande parte dos estudos[46], a falta de randomização[47], estudos sem ocultação da alocação e da avaliação dos dados[48], financiamento de indústrias farmacêuticas[49], pesquisas em centro único[50], diferentes tipos de heterogeneidade[51] e amostras pequenas[52].

A premissa de associação entre a qualidade de um estudo e a dimensão de sua veracidade é procedente de estudos metaepidemiológicos que investigam e quantificam o grau de influência dos vieses em relação a qualidade do estudo em um grupo de meta-análises[53]. Existe uma gama de estudos com esse perfil que são conduzidos na área médica na atualidade[54,55]. Recentemente, uma análise metaepidemiológica[52] com 93 meta-análises de 735 ensaios randomizados controlados, oriundos de revistas de diversas especialidades (incluindo a base de dados da Colaboração Cochrane), mostrou grande variação no tamanho dos estudos dentro das meta-análises, estando os menores com maior probabilidade de superestimar o efeito positivo do tratamento testado. Sabe-se que estudos com casuística menor estão mais sujeitos a viés de publicação[56], ao passo que os resultados dos ensaios clínicos com maior amostra populacional apresentarão resultados muito mais representativos de toda a população.

Outra questão que merece ser pontuada é a maior probabilidade de uma pesquisa científica com resultado positivo vir a ser publicada em uma revista de alto impacto científico e de maior circulação. Consequentemente e obviamente, tal fato também viabiliza a possibilidade de aumento de citações por outros autores. Sabe-se que estudos patrocinados por companhias farmacêuticas que não produziram os resultados desejados raramente são publicados quando comparados àqueles com resultados favoráveis ou positivos. É de conhecimento que os próprios autores e editores de jornais também preferem publicar os estudos com dados positivos[57], ou simplesmente publicar os achados favoráveis, ao invés de todos os resultados obtidos.

Consequentemente, a meta-análise realizada irá fornecer resultados tendenciosos e mais favoráveis, do que caso todos os estudos houvessem sido incluídos na revisão[58]. Em 2012, estudo que analisou 1.163 trabalhos em anestesiologia, evidenciou que o resultado positivo foi fator preditivo independente para publicação em revistas de anestesiologia de alto impacto (> 9,1) com um *odds ratio* de 2,32 ($p < 0,0005$)[59]. Além do mais, é de conhecimento geral que uma pesquisa com resultado negativo leva um tempo consideravelmente maior para ser aceita em publicação[60].

No presente estudo, mesmo sendo uma análise baseada apenas em revisões sistemáticas com ou sem meta-análises, consideradas o maior nível na hierarquia em evidências, verificou-se durante a fase de análise dos estudos para realizar sua classificação que havia heterogeneidade clínica, metodológica e estatística importante entre os vários estudos analisados, colocando-os sob alto risco de viés e comprometendo a qualidade e a confiabilidade dos resultados obtidos. Ressalta-se que a maioria das revisões esteve desprovida de meta-análises (moda = 0) e houve grande diversidade na quantidade de estudos por revisão sistemática (0-737), sendo que um dos achados mais expressivos foi a escassez de ensaios randomizados por revisão sistemática (moda = 4). No total, em 95,7% das publicações do Grupo de Anestesiologia até 28 de fevereiro do ano de 2014 houve recomendação para a realização de novos estudos. Em apenas cinco das 115 revisões publicadas, os autores não julgaram necessárias novas pesquisas. Tais achados foram muito similares a publicações prévias[25,26] que analisaram uma amostra aleatória das revisões sistemáticas de todos os grupos da Colaboração Cochrane, constatando necessidade de novas pesquisas em 96,0% e 95,4% dos casos, respectivamente[25,26].

O aumento do volume de publicações de revisões sistemáticas e ensaios clínicos do Grupo Anestesiologia da Colaboração Cochrane nos últimos três anos (Figura 7) pode estar associado ao reconhecimento da necessidade imperiosa de mais estudos no panorama mundial, como já demonstrado em publicações anteriores[25,26]. Entretanto, tal crescimento continua ocorrendo de forma desordenada e com baixa qualidade das publicações, como sugerido pelo baixo número de meta-análises associadas (Figuras 8 e 9).

Este estudo observacional reflete uma imagem pontual e verídica das evidências geradas pelas publicações científicas, consideradas do mais alto nível na hierarquia de evidências. Algumas análises desse estudo, embora técnicas e específicas,

estão sujeitas a vieses de interpretação, podendo gerar ideias equivocadas na análise dos dados. Por exemplo, em 2008 foram computadas 11 revisões sistemáticas e 196 meta-análises (Figuras 7 e 8, respectivamente), o que resultaria em uma relação positiva de 17,8 meta-análises por revisão sistemática. Entretanto, em apenas uma única revisão sistemática[40] foram contabilizadas 92 meta-análises, provenientes de 737 estudos incluídos. Se esse estudo fosse excluído da análise, ocorreria um declínio significativo na média para 10,4 meta-análises por revisão sistemática, sendo que o número dois foi a quantidade de meta-análises que mais se repetiu naquele ano (moda). Já em 2009, foram publicadas 14 revisões sistemáticas que produziram um total de 128 meta-análises. Em seis destas revisões sistemáticas registradas não houve dados para composição de meta-análises (moda igual a zero).

Os princípios gerais da Medicina Baseada em Evidências figuram como padrão-ouro na caracterização de qualidade e força de uma evidência atribuída a uma pesquisa científica. Entretanto, tais critérios já estão sendo até mesmo questionados por alguns autores, que sugerem possível reforma dos conceitos de mensuração de força e qualidade dos estudos, principalmente no que diz respeito a avaliação e classificação das evidências[61].

6 CONCLUSÃO

O mapeamento das revisões sistemáticas do Grupo Anestesiologia da Colaboração Cochrane evidenciou que estas carecem de boas e consistentes evidências para a tomada de decisão na prática clínica e que, na sua maioria, há recomendação para a realização de novas pesquisas científicas em Anestesiologia, de melhor qualidade e maior rigor metodológico.

Especificamente, do total das revisões sistemáticas, a menor parte (42,6%) define recomendações específicas, sejam essas benéficas ou desfavoráveis, em relação ao grupo controle. A grande maioria dessas revisões (95,7%) sugere a realização de novos estudos controlados e aleatorizados. Em geral, a quantidade de estudos existentes nestas revisões sistemáticas é bastante baixa (mediana igual a 9,5 e moda igual a quatro), bem como é o número de meta-análises existentes nestas revisões sistemáticas, com mediana igual a seis e moda igual a zero.

Portanto, conclui-se que a maioria das revisões sistemáticas do Grupo de Anestesiologia da Colaboração Cochrane (*Cochrane Anaesthesia Review Group)* carece de evidências consistentes para a tomada de decisão na prática clínica. A baixa proporção de evidências sólidas produzidas por essas revisões, reafirma a necessidade de investimento em novos ensaios clínicos controlados e aleatórios, ou seja, estudos primários com maior rigor metodológico e menor chance de vieses.

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8 APÊNDICE

8.1 Apêndice 1 - *Abstract* das revisões sistemáticas da Colaboração Cochrane com desfechos que apoiam a intervenção com recomendação de novos estudos **(A1)**.

Central venous access sites for the prevention of venous thrombosis, stenosis and infection

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Ge X, Cavallazzi R, Li C, Pan SM, Wang YW, Wang FL. Central venous access sites for the prevention of venous thrombosis, stenosis and infection. *Cochrane Database of Systematic Reviews* 2012, Issue 3. Art. No.: CD004084. DOI: 10.1002/14651858.CD004084.pub3.

ABSTRACT

Background

Central venous access (CVA) is widely used. However, its thrombotic, stenotic and infectious complications can be life-threatening and involve high-cost therapy. Research revealed that the risk of catheter-related complications varied according to the site of CVA. It would be helpful to find the preferred site of insertion to minimize the risk of catheter-related complications. This review was originally published in 2007 and was updated in 2011.

Objectives

1. Our primary objective was to establish whether the jugular, subclavian or femoral CVA routes resulted in a lower incidence of venous thrombosis, venous stenosis or infections related to CVA devices in adult patients.

2. Our secondary objective was to assess whether the jugular, subclavian or femoral CVA routes influenced the incidence of catheter-related mechanical complications in adult patients; and the reasons why patients left the studies early.

Search methods

We searched CENTRAL (*The Cochrane Library* 2011, Issue 9), MEDLINE, CINAHL, EMBASE (from inception to September 2011), four Chinese databases (CBM, WANFANG DATA, CAJD, VIP Database) (from inception to November 2011), Google Scholar and bibliographies of published reviews. The original search was performed in December 2006. We also contacted researchers in the field. There were no language restrictions.

Selection criteria

We included randomized controlled trials comparing central venous catheter insertion routes.

Data collection and analysis

Three authors assessed potentially relevant studies independently. We resolved disagreements by discussion. Dichotomous data on catheter-related complications were analysed. We calculated relative risks (RR) and their 95% confidence intervals (CI) based on a random-effects model.

Main results

We identified 5854 citations from the initial search strategy; 28 references were then identified as potentially relevant. Of these, we Included four studies with data from 1513 participants. We undertook a priori subgroup analysis according to the duration of catheterization, short-term (< one month) and long-term (> one month) defined according to the Food and Drug Administration (FDA).

No randomized controlled trial (RCT) was found comparing all three CVA routes and reporting the complications of venous stenosis.

Regarding internal jugular versus subclavian CVA routes, the evidence was moderate and applicable for long-term catheterization in cancer patients. Subclavian and internal jugular CVA routes had similar risks for catheter-related complications. Regarding femoral versus subclavian CVA routes, the evidence was high and applicable for short-term catheterization in critically ill patients. Subclavian CVA routes were preferable to femoral CVA routes in short-term catheterization because femoral CVA routes were associated with higher risks of catheter colonization (14.18% or 19/134 versus 2.21% or 3/136) (n = 270, one RCT, RR 6.43, 95% CI 1.95 to 21.21) and thrombotic complications (21.55% or 25/116 versus 1.87% or 2/107) (n = 223, one RCT, RR 11.53, 95% CI 2.80 to 47.52) than with subclavian CVA routes. Regarding femoral versus internal jugular routes, the evidence was moderate and applicable for short-term haemodialysis catheterization in critically ill patients. No significant differences were found between femoral and internal jugular CVA routes in catheter colonization, catheter-related bloodstream infection (CRBSI) and thrombotic complications, but fewer mechanical complications occurred in femoral CVA routes (4.86% or 18/370 versus 9.56% or 35/366) (n = 736, one RCT, RR 0.51, 95% CI 0.29 to 0.88).

Authors' conclusions

Subclavian and internal jugular CVA routes have similar risks for catheter-related complications in long-term catheterization in cancer patients. Subclavian CVA is preferable to femoral CVA in short-term catheterization because of lower risks of catheter colonization and thrombotic complications. In short-term haemodialysis catheterization, femoral and internal jugular CVA routes have similar risks for catheter-related complications except internal jugular CVA routes are associated with higher risks of mechanical complications.

Sugammadex, a selective reversal medication for preventing postoperative residual neuromuscular blockade

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 4, 2009.
Review content assessed as up-to-date: 16 August 2008.

Citation: Abrishami A, Ho J, Wong J, Yin L, Chung F. Sugammadex, a selective reversal medication for preventing postoperative residual neuromuscular blockade. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD007362. DOI: 10.1002/14651858.CD007362.pub2.

ABSTRACT

Background

Sugammadex is the first selective relaxant binding agent that has been studied for reversal of neuromuscular blockade induced by rocuronium and other steroidal non-depolarizing neuromuscular blocking agents (NMBAs).

Objectives

To assess the efficacy and safety of sugammadex in reversing neuromuscular blockade induced by steroidal non-depolarizing NMBAs and in preventing postoperative residual neuromuscular blockade.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2008, Issue 3), MEDLINE (1950 to August 2008), and EMBASE (1980 to August 2008). In addition, we handsearched reference lists of relevant articles and meeting abstracts. Furthermore, we contacted the medication's manufacturer for more information.

Selection criteria

All randomized controlled trials (RCTs) on adult patients (≥ 18 years old) in which sugammadex was compared with placebo or other medications, or in which different doses of sugammadex were compared with each other. We excluded non-randomized trials and studies on healthy volunteers.

Data collection and analysis

We independently performed determination of trial inclusion, quality assessment, and data extraction. We applied standard meta-analytic techniques.

Main results

We included18 RCTs (n = 1321 patients). Seven trials were published as full-text papers, and 11 trials only as meeting abstracts. All the included trials had adequate methods of randomization and allocation concealment. The results suggest that, compared with placebo or neostigmine, sugammadex can more rapidly reverse rocuronium-induced neuromuscular blockade regardless of the depth of the block.

We identified 2, 4, and 16 mg/kg of sugammadex for reversal of rocuronium-induced neuromuscular blockade at T_2 reappearance , 1 to 2 post-tetanic counts, and 3 to 5 minutes after rocuronium, respectively. The number of trials are very limited regarding vecuronium and pancuronium. Serious adverse events occurred in < 1% of all patients who received the medication. There was no significant difference between sugammadex and placebo in terms of the prevalence of drug-related adverse events (RR 1.20, 95% CI 0.61 to 2.37; P = 0.59, I^2 = 0%, 5 RCTs). Also, no significant difference was found between sugammadex and neostigmine for adverse events (RR 0.98, 95% CI 0.48 to1.98; P = 0.95, I^2 = 43%, 3 RCTs).

Authors' conclusions

Sugammadex was shown to be effective in reversing rocuronium-induced neuromuscular blockade. This review has found no evidence of a difference in the instance of unwanted effects between sugammadex, placebo or neostigmine. These results need to be confirmed by future trials on larger patient populations and with more focus on patient-related outcomes.

Sedative techniques for endoscopic retrograde cholangiopancreatography

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 6, 2012.
Review content assessed as up-to-date: 1 September 2011.

Citation: Garewal D, Powell S, Milan SJ, Nordmeyer J, Waikar P. Sedative techniques for endoscopic retrograde cholangiopancreatography. *Cochrane Database of Systematic Reviews* 2012, Issue 6. Art. No.: CD007274. DOI: 10.1002/14651858.CD007274.pub2.

ABSTRACT

Background

Endoscopic retrograde cholangiopancreatography (ERCP) is an uncomfortable therapeutic procedure that cannot be performed without adequate sedation or general anaesthesia. A considerable number of ERCPs are performed annually in the UK (at least 48,000) and many more worldwide.

Objectives

The primary objective of our review was to evaluate and compare the efficacy and safety of sedative or anaesthetic techniques used to facilitate the procedure of ERCP in adult (age > 18 years) patients.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 8); MEDLINE (1950 to September 2011); EMBASE (1950 to September 2011); CINAHL, Web of Science and LILACS (all to September 2011). We searched for additional studies drawn from reference lists of retrieved trial materials and review articles and conference proceedings.

Selection criteria

We considered all randomized or quasi-randomized controlled studies where the main procedures performed were ERCPs. The three interventions we searched for were (1) conscious sedation (using midazolam plus opioid) versus deep sedation (using propofol); (2) conscious sedation versus general anaesthesia; and (3) deep sedation versus general anaesthesia. We considered all studies regardless of which healthcare professional administered the sedation.

Data collection and analysis

We reviewed 124 papers and identified four randomized trials (with a total of 510 participants) that compared the use of conscious sedation using midazolam and meperidine with deep sedation using propofol in patients undergoing ERCP procedures. All sedation was administered by non-anaesthetic personnel. Due to the clinical heterogeneity of the studies we decided to review the papers from a

Main results

No immediate mortality was reported. There was no significant difference in serious cardio-respiratory complications suffered by patients in either sedation group. Failure to complete the procedure due to sedation-related problems was reported in one study. Three studies found faster and better recovery in patients receiving propofol for their ERCP procedures. Study protocols regarding use of supplemental oxygen, intravenous fluid administration and capnography monitoring varied considerably. The studies showed either moderate or high risk of bias.

Authors' conclusions

Results from individual studies suggested that patients have a better recovery profile after propofol sedation for ERCP procedures than after midazolam and meperidine sedation. As there was no difference between the two sedation techniques as regards safety, propofol sedation is probably preferred for patients undergoing ERCP procedures. However, in all of the studies that were identified only non-anaesthesia personnel were involved in administering the sedation. It would be helpful if further research was conducted where anaesthesia personnel were involved in the administration of sedation for ERCP procedures. This would clarify the extent to which anaesthesia personnel should be involved in the administration of propofol sedation.

Adjusting the pH of lidocaine for reducing pain on injection

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 12, 2010.
Review content assessed as up-to-date: 7 November 2010.

Citation: Cepeda MS, Tzortzopoulou A, Thackrey M, Hudcova J, Arora Gandhi P, Schumann R. Adjusting the pH of lidocaine for reducing pain on injection. *Cochrane Database of Systematic Reviews* 2010, Issue 12. Art. No.: CD006581. DOI: 10.1002/14651858.CD006581.pub2.

ABSTRACT

Background

Lidocaine administration produces pain due to its acidic pH.

Objectives

The objective of this review was to determine if adjusting the pH of lidocaine had any effect on pain resulting from non-intravascular injections in adults and children. We tested the hypothesis that adjusting the pH of lidocaine solution to a level closer to the physiologic pH reduces this pain.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, to June 2010); Ovid MEDLINE (1966 to June 2010); EMBASE (1988 to June 2010); LILACS (1982 to June 2010); CINAHL (1982 to June 2010); ISI Web of Science (1999 to June 2010); and abstracts of the meetings of the American Society of Anesthesiologists (ASA). We checked the full articles of selected titles. We did not apply any language restrictions.

Selection criteria

We included double-blinded, randomized controlled trials that compared pH-adjusted lidocaine with unadjusted lidocaine. We evaluated pain at the injection site, satisfaction and adverse events. We excluded studies in healthy volunteers.

Data collection and analysis

We separately analysed parallel-group and crossover trials; trials that evaluated lidocaine with or without epinephrine; and trials with pH-adjusted lidocaine solutions < 7.35 and ≥ 7.35. To explain heterogeneity, we separately analysed studies with a low and higher risk of bias due to the level of allocation concealment; studies that employed a low and a higher volume of injection; and studies that used lidocaine for different types of procedures.

Main results

We included 23 studies of which 10 had a parallel design and 13 were crossover studies. Eight of the 23 studies had moderate to high risk of bias due to the level of allocation concealment.

Pain associated with the infiltration of buffered lidocaine was less than the pain associated with infiltration of unbuffered lidocaine in both parallel and crossover trials. In the crossover studies, the difference was -1.98 units (95% confidence interval (CI) -2.62 to -1.34) and in the parallel-group studies it was -0.98 units (95% CI -1.49 to -0.47) on a 0 to 10 scale. The magnitude of the pain decrease associated with buffered lidocaine was larger when the solution contained epinephrine. The risk of bias, volume of injection, and type of procedure failed to explain the heterogeneity of the results.

Patients preferred buffered lidocaine (odds ratio 3.01, 95% CI 2.19 to 4.15). No adverse events or toxicity were reported.

Authors' conclusions

Increasing the pH of lidocaine decreased pain on injection and augmented patient comfort and satisfaction.

Lidocaine for preventing postoperative sore throat

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 3, 2009.
Review content assessed as up-to-date: 4 June 2007.

Citation: Tanaka Y, Nakayama T, Nishimori M, Sato Y, Furuya H. Lidocaine for preventing postoperative sore throat. *Cochrane Database of Systematic Reviews* 2009, Issue 3. Art. No.: CD004081. DOI: 10.1002/14651858.CD004081.pub2.

ABSTRACT

Background

Sore throat is a common side effect of general anaesthesia and is reported by between 30% and 70% of patients after tracheal intubation. The likelihood of a sore throat varies with the type, diameter, and cuff pressure of the endotracheal tube used. If intubation is essential, it may be helpful to give drugs prophylactically to alleviate postoperative sore throat. Local anaesthetics and steroids have been used for this purpose.

Objectives

The objective of this review was to evaluate the effectiveness and any harms of topical and systematic lidocaine for the prevention of postoperative sore throat in adults undergoing endotracheal intubation as part of general anaesthesia.

Search methods

We searched CENTRAL (*The Cochrane Library* 2007, Issue 3), MEDLINE (January 1966 to June 2007), and EMBASE (1980 to June 2007). We also contacted manufacturers and researchers in the field.

Selection criteria

We included randomized controlled trials of topical and systemic prophylactic lidocaine therapy versus control (using air or saline) that reported on the risk and severity of postoperative sore throat as an outcome.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. We contacted study authors for additional information, such as the risk of adverse effects.

Main results

We included 1232 patients from 15 studies; 672 patients received topical or systemic lidocaine therapy and 560 patients were allocated to the control group. Both the topical and systemic lidocaine therapy significantly reduced the risk of postoperative sore throat (risk ratio (RR) 0.58; 95% confidence interval (CI) 0.41 to 0.82). To evaluate the severity of sore throat on a visual analogue scale (VAS), 219 patients received topical or systemic lidocaine therapy and 152 patients were allocated to the control groups. The severity of sore throat was reduced (mean difference (MD) -11.9; 95% CI -16.44 to -7.32), an effect that neared statistical significance. The adverse effects of lidocaine were not reported in these studies.

Authors' conclusions

Our systematic review establishes the effectiveness of topical and systemic lidocaine for the prevention of postoperative sore throat resulting from intubation. The risk and severity of postoperative sore throat tended to be reduced. The effect size of lidocaine appeared to be affected by drug concentration and route of administration; management of cuff pressure during anaesthesia; the included population; and the type of outcome measured.

Epidural pain relief versus systemic opioid-based pain relief for abdominal aortic surgery

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 3, 2011.
Review content assessed as up-to-date: 16 January 2011.

Citation: Nishimori M, Ballantyne JC, Low JHS. Epidural pain relief versus systemic opioid-based pain relief for abdominal aortic surgery. *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD005059. DOI: 10.1002/14651858.CD005059.pub2.

ABSTRACT

Background

Epidural analgesia offers greater pain relief compared to systemic opioid-based medications, but its effect on morbidity and mortality is unclear.

Objectives

To assess the benefits and harms of postoperative epidural analgesia in comparison with postoperative systemic opioid-based pain relief for adult patients who underwent elective abdominal aortic surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials via OVID (CENTRAL) (*The Cochrane Library*, Issue 3, 2004); OVID MEDLINE (1966 to July 2004); and EMBASE (1980 to June 2004). We assessed non-English language reports and contacted researchers in the field. We did not seek unpublished data.

Selection criteria

We included all randomized controlled trials comparing postoperative epidural analgesia and postoperative systemic opioid-based analgesia for adult patients who underwent elective open abdominal aortic surgery.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. We contacted study authors for additional information and data.

Main results

Thirteen studies involving 1224 patients met our inclusion criteria; 597 patients received epidural analgesia and 627 received systemic opioid analgesia. The epidural analgesia group showed significantly lower visual analogue scale for pain on movement (up to postoperative day three), regardless of the site of epidural catheter and epidural formulation. Postoperative duration of tracheal intubation and mechanical ventilation was significantly shorter by about 20% in the epidural analgesia group. The overall incidence of cardiovascular complication; myocardial infarction; acute respiratory failure (defined as an extended need for mechanical ventilation); gastrointestinal complication; and renal insufficiency was significantly lower in the epidural analgesia group, especially in trials that used thoracic epidural analgesia.

Authors' conclusions

Epidural analgesia provides better pain relief (especially during movement) for up to three postoperative days. It reduces the duration of postoperative tracheal intubation by roughly 20%. The occurrence of prolonged postoperative mechanical ventilation, overall cardiac complication, myocardial infarction, gastric complication and renal complication was also reduced by epidural analgesia, especially thoracic. However, current evidence does not confirm the beneficial effect of epidural analgesia on postoperative mortality and other types of complications.

Infraclavicular brachial plexus block for regional anaesthesia of the lower arm

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Publication status and date: Edited (no change to conclusions), published in Issue 3, 2010.
Review content assessed as up-to-date: 14 February 2010.

Citation: Chin KJ, Singh M, Velayutham V, Chee V. Infraclavicular brachial plexus block for regional anaesthesia of the lower arm. *Cochrane Database of Systematic Reviews* 2010, Issue 2. Art. No.: CD005487. DOI: 10.1002/14651858.CD005487.pub2.

ABSTRACT

Background

Several approaches exist to produce local anaesthetic blockade of the brachial plexus. It is not clear which is the technique of choice for providing surgical anaesthesia of the lower arm although infraclavicular blockade (ICB) has several purported advantages. We therefore performed a systematic review of ICB compared to the other brachial plexus blocks (BPBs).

Objectives

To evaluate the efficacy and safety of ICB compared to other BPBs in providing regional anaesthesia of the lower arm.

Search methods

We searched CENTRAL (*The Cochrane Library* 2008, Issue 3), MEDLINE (1950 to September 22nd 2008) and EMBASE (1980 to September 22nd 2008). We also searched conference proceedings (from 2004 to 2008) and the www.clinicaltrials.gov registry. No language restriction was applied.

Selection criteria

We included any randomized controlled trials (RCTs) that compared ICB with other BPBs as the sole anaesthetic techniques for surgery on the lower arm.

Data collection and analysis

The primary outcome was adequate surgical anaesthesia within 30 minutes of block completion. Secondary outcomes included sensory block of individual nerves, tourniquet pain, onset time of sensory blockade, block performance time, block-associated pain and complications related to the block.

Main results

We identified 15 studies with 1020 participants, of whom 510 received ICB and 510 received other BPBs. The control group intervention was the axillary block in 10 studies, mid-humeral block in two studies, supraclavicular block in two studies and parascalene block in one study. Three studies employed ultrasound-guided ICB. The risk of failed surgical anaesthesia and of complications were low and similar for ICB and all other BPBs. Tourniquet pain was less likely with ICB (risk ratio (RR) 0.47, 95% CI 0.24 to 0.92, P = 0.03).

When compared to a single-injection axillary block, ICB was better at providing complete sensory block of the musculocutaneous nerve (RR for failure 0.46, 95% CI 0.27 to 0.60, P < 0.0001) and the axillary nerve (RR of failure 0.37, 95% CI 0.24 to 0.58, P < 0.0001). ICB was faster to perform than multiple-injection axillary (mean difference (MD) -2.7 min, 95% CI -4.2 to -1.1, P = 0.0006) or midhumeral blocks (MD -4.8 min, 95% CI -6.0 to -3.6, P < 0.00001) but this was offset by a longer sensory block onset time (MD 3.9 min, 95% CI 3.2 to 4.5, P < 0.00001).

Authors' conclusions

ICB is a safe and simple technique for providing surgical anaesthesia of the lower arm, with an efficacy comparable to other BPBs. The advantages of ICB include a lower likelihood of tourniquet pain during surgery, and more reliable blockade of the musculocutaneous and axillary nerves when compared to a single-injection axillary block. The efficacy of ICB is likely to be improved if adequate time is allowed for block onset (at least 30 minutes) and if a volume of at least 40 ml is injected. Since publication of many of the trials included in this review, it has become clear that a distal posterior cord motor response is the appropriate endpoint for electrostimulation-guided ICB; we recommend it be used in all future comparative studies. There is also a need for additional RCTs comparing ultrasound-guided ICB with other BPBs.

Single, double or multiple-injection techniques for axillary brachial plexus block for hand, wrist or forearm surgery in adults

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 7, 2011.
Review content assessed as up-to-date: 13 March 2011.

Citation: Chin KJ, Handoll HHG. Single, double or multiple-injection techniques for axillary brachial plexus block for hand, wrist or forearm surgery in adults. *Cochrane Database of Systematic Reviews* 2011, Issue 7. Art. No.: CD003842. DOI: 10.1002/14651858.CD003842.pub3.

ABSTRACT

Background

Regional anaesthesia comprising axillary block of the brachial plexus is a common anaesthetic technique for distal upper limb surgery. This is an update of a review first published in 2006.

Objectives

To compare the relative effects of single, double or multiple injections for axillary block of the brachial plexus for distal upper limb surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*), MEDLINE, EMBASE and reference lists of trials. We contacted trial authors. The date of the last search was March 2011 (updated from March 2005).

Selection criteria

We included randomized controlled trials that compared double with single-injection techniques, multiple with single-injection techniques, or multiple with double-injection techniques for axillary block in adults undergoing surgery of the distal upper limb. We excluded trials using ultrasound-guided techniques.

Data collection and analysis

We performed independent study selection, risk of bias assessment and data extraction. We undertook meta-analysis.

Main results

The 20 included trials involved a total of 2098 participants who received regional anaesthesia for hand, wrist, forearm or elbow surgery. The trial design and conduct were generally adequate although several trials failed to monitor longer-term effects.

Eight trials comparing double versus single injections showed a statistically significant decrease in primary anaesthesia failure (RR 0.51, 95% CI 0.30 to 0.85). Subgroup analysis by method of nerve location showed that the effect size was greater when neurostimulation was used rather than the transarterial technique.

Seven trials comparing multiple with single injections showed a statistically significant decrease in primary anaesthesia failure (RR 0.28, 95% CI 0.16 to 0.48) and of incomplete motor block (RR 0.61, 95% CI 0.39 to 0.96) in the multiple injection group.

Eleven trials comparing multiple with double injections showed a statistically significant decrease in primary anaesthesia failure (RR 0.28, 95% CI 0.20 to 0.40) and of incomplete motor block (RR 0.55, 95% CI 0.36 to 0.85) in the multiple injection group.

Tourniquet pain was significantly reduced with multiple injections compared with double injections (RR 0.53, 95% CI 0.33 to 0.84). Otherwise, there were no statistically significant differences between groups in any of the three comparisons on secondary analgesia failure, complications and patient discomfort. The time for block performance was significantly shorter for single and double injections compared with multiple injections.

Authors' conclusions

This review provides evidence that multiple injection techniques using nerve stimulation for axillary plexus block produce more effective anaesthesia than either double or single injection techniques. However, there was insufficient evidence for a significant difference in other outcomes, including safety.

Hypothermia for neuroprotection in adults after cardiopulmonary resuscitation

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Arrich J, Holzer M, Herkner H, Müllner M. Hypothermia for neuroprotection in adults after cardiopulmonary resuscitation. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD004128. DOI: 10.1002/14651858.CD004128.pub2.

ABSTRACT

Background

Good neurologic outcome after cardiac arrest is hard to achieve. Interventions during the resuscitation phase and treatment within the first hours after the event are critical. Experimental evidence suggests that therapeutic hypothermia is beneficial, and a number of clinical studies on this subject have been published.

Objectives

We performed a systematic review and meta-analysis to assess the effectiveness of therapeutic hypothermia in patients after cardiac arrest. Neurologic outcome, survival and adverse events were our main outcome parameters. We aimed to perform individual patient data analysis if data were available, and to from subgroups according to the cardiac arrest situation.

Search methods

We searched the following databases: the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, 2007 Issue 1); MEDLINE (1971 to January 2007); EMBASE (1987 to January 2007); CINAHL (1988 to January 2007); PASCAL (2000 to January 2007); and BIOSIS (1989 to January 2007).

Selection criteria

We included all randomized controlled trials assessing the effectiveness of the therapeutic hypothermia in patients after cardiac arrest without language restrictions. Studies were restricted to adult populations cooled with any cooling method applied within six hours of cardiac arrest.

Data collection and analysis

Validity measures, the intervention, outcome parameters and additional baseline variables were entered into the database. Meta-analysis was only done for a subset of comparable studies with negligible heterogeneity. For these studies individual patient data were available.

Antifibrinolytic agents for reducing blood loss in scoliosis surgery in children

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Editorial group: Cochrane Anaesthesia Group.
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Review content assessed as up-to-date: 1 September 2007.

Citation: Tzortzopoulou A, Cepeda MS, Schumann R, Carr DB. Antifibrinolytic agents for reducing blood loss in scoliosis surgery in children. *Cochrane Database of Systematic Reviews* 2008, Issue 3. Art. No.: CD006883. DOI: 10.1002/14651858.CD006883.pub2.

ABSTRACT

Background

Scoliosis surgery is often associated with substantial blood loss and potential detrimental effects in children. Antifibrinolytic agents are often used to reduce perioperative blood loss. Clinical trials have evaluated their effect in children undergoing surgical correction of scoliosis but no systematic review has been published. We performed a systematic review on the efficacy and safety of antifibrinolytic drugs in children undergoing scoliosis surgery.

Objectives

To assess the efficacy and safety of aprotinin, tranexamic acid and aminocaproic acid in reducing blood loss and transfusion requirements in children undergoing scoliosis surgery.

Search methods

We searched CENTRAL (*The Cochrane Library* 2007, Issue 3), OVID MEDLINE (1950 to September 3rd 2007), LILACS (1992 to June 20th 2007) and EMBASE (1980 to July 23rd 2007). We also searched conference proceedings from 2003 to 2007 and the clinicaltrials.gov registry. No language restriction was applied.

Selection criteria

We included blinded or unblinded randomized controlled trials that evaluated the effect of antifibrinolytics on perioperative blood loss in children that were 18 years of age or younger and undergoing scoliosis surgery.

Data collection and analysis

Two authors independently performed the data extraction. Primary outcomes were mortality and number of patients transfused. Secondary outcomes were number of patients transfused with allogeneic blood, amount of total blood transfused, total blood loss and adverse events. To assess heterogeneity we used the I^2 test and for the quantitative analysis we used a fixed-effect model.

Main results

Six studies fulfilled the inclusion criteria. The total number of participants was 254, of whom 127 were allocated to placebo and 127 to antifibrinolytic drugs. Aprotinin, tranexamic acid and aminocaproic acid were evaluated in two studies each. All studies had placebo as the control group intervention. There were no deaths or any serious adverse events in any study, in either the active or the control group. The risk of being transfused was similar in patients receiving antifibrinolytic drugs or placebo. Antifibrinolytics drugs decreased the amount of blood transfused by 327 ml (95% CI -469.04 to -185.78) and the amount of blood loss by 427 ml (95% CI -602.51 to -250.56). There was no indication of publication bias, however, we cannot rule it out due to the small number of studies included.

Authors' conclusions

The effect of antifibrinolytic drugs on mortality could not be assessed. Antifibrinolytic drugs reduced blood loss and the amount of blood transfused in children undergoing scoliosis surgery; however, their effect on the number of children requiring blood transfusion remains unclear. Aprotinin, tranexamic acid and aminocaproic acid seem to be similarly effective.

Alpha-2 adrenergic agonists for the prevention of cardiac complications among patients undergoing surgery

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Wijeysundera DN, Bender JS, Beattie WS. Alpha-2 adrenergic agonists for the prevention of cardiac complications among patients undergoing surgery. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD004126. DOI: 10.1002/14651858.CD004126.pub2.

ABSTRACT

Background

The surgical stress response plays an important role on the pathogenesis of perioperative cardiac complications. Alpha-2 adrenergic agonists attenuate this response and may thereby prevent cardiac complications.

Objectives

This review assessed the efficacy and safety of preoperative (within 24 hours), intraoperative, and postoperative (first 48 hours) α-2 adrenergic agonists for preventing mortality and cardiac complications after surgery performed under either general or neuraxial anaesthesia, or both.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2008, Issue 3), MEDLINE (1950 to August week 4 2008), EMBASE (1980 to week 36 2008), the Science Citation Index, and reference lists of articles.

Selection criteria

We included randomized controlled trials that compared α-2 adrenergic agonists (clonidine, dexmedetomidine, or mivazerol) against placebo or non-α-2 adrenergic agonists. Included studies had to report on mortality, myocardial infarction, myocardial ischaemia, or supraventricular tachyarrhythmia.

Data collection and analysis

Three authors independently assessed trial quality and extracted data. Two authors independently performed computer entry of abstracted data. We contacted study authors for additional information. Adverse event data were gathered from the trials.

Main results

We included 31 studies (4578 participants). Study quality was generally inadequate, with only six studies clearly reporting methods for blinding and allocation concealment. Overall, α-2 adrenergic agonists reduced mortality (relative risk (RR) 0.66; 95% CI 0.44 to 0.98; P = 0.04) and myocardial ischaemia (RR 0.68; 95% CI 0.57 to 0.81; P < 0.0001). However, their effects appeared to vary with the surgical procedure. The most encouraging data pertained to vascular surgery, where they reduced mortality (RR 0.47; 95% CI 0.25 to 0.90; P = 0.02), cardiac mortality (RR 0.36; 95% CI 0.16 to 0.79; P = 0.01), and myocardial infarction (RR 0.66; 95% CI 0.46 to 0.94; P = 0.02). With regard to adverse effects, α-2 adrenergic agonists significantly increased perioperative hypotension (RR 1.32; 95% CI 1.07 to 1.62; P = 0.009) and bradycardia (RR 1.66; 95% CI 1.14 to 2.41; P = 0.008).

Authors' conclusions

Our study provides encouraging evidence that α-2 adrenergic agonists may reduce cardiac risk, especially during vascular surgery. Nonetheless, these data remain insufficient to make firm conclusions about their efficacy and safety. A large randomized trial of α-2 adrenergic agonists is therefore warranted. Additionally, future research must determine which specific α-2 adrenergic agonist should be used, and whether it is safe to combine them with other perioperative interventions (for example β-adrenergic blockade).

Perioperative fluid volume optimization following proximal femoral fracture

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2008.
Review content assessed as up-to-date: 9 November 2003.

Citation: Price JD, Sear JJW, Venn RRM. Perioperative fluid volume optimization following proximal femoral fracture. *Cochrane Database of Systematic Reviews* 2004, Issue 1. Art. No.: CD003004. DOI: 10.1002/14651858.CD003004.pub2.

ABSTRACT

Background

Proximal Femoral Fracture (PFF) or 'hip fracture' is a frequent injury, and adverse outcomes are common. Several factors suggest the importance of developing techniques to optimize intravascular fluid volume. These may include protocols that enhance the efficacy of clinicians' assessments, invasive techniques such as oesophageal Doppler or central venous pressure monitoring, or advanced non-invasive techniques such as plethysmographic pulse volume determination.

Objectives

To determine the optimal method of fluid volume optimization for adult patients undergoing surgical repair of PFF. Comparisons of fluid types, of blood transfusion strategies or of pharmacological interventions are not considered in this review.

Search methods

We searched CENTRAL (*The Cochrane Library*, issue 4, 2003), MEDLINE (1985 to 2003), EMBASE (1985 to 2003), and bibliographies of retrieved articles. Relevant journals and conference proceedings were handsearched.

Selection criteria

Randomized controlled studies comparing a fluid optimization intervention with normal practice or with another fluid optimization intervention, in patients following PFF undergoing surgery of any type under anaesthesia of any type.

Data collection and analysis

Searches and exclusion of clearly irrelevant articles were performed by one reviewer. Two reviewers examined independently the remaining studies, extracting study quality and results data. A wide range of short- and long-term outcome data were sought. Studies were excluded if they did not meet selection criteria or if results were likely to be biased. Due to inconsistent data reporting, combination of data was not generally possible.

Main results

Searches identified four trials, of which two studies, randomizing a total of 130 patients, were of adequate quality and addressed the review question. Both studies were of invasive advanced haemodynamic monitoring, either oesophageal Doppler ultrasonography or central venous pressure monitoring, during the intraoperative period only. In both, invasive monitoring led to significant increases in fluid volumes infused and reductions in length of hospital stay. The pooled Peto odds ratio for in-hospital fatality was 1.44 (95% confidence interval 0.45-4.62). Neither study followed patients beyond hospital discharge or assessed functional outcomes. No serious complications were directly attributable to the interventions. There were no studies of protocol-guided fluid optimization or of advanced non-invasive techniques.

Authors' conclusions

Invasive methods of fluid optimization during surgery may shorten hospital stay, but their effects on other important, patient-centred, longer-term outcomes are uncertain. Adverse effects on fatality cannot be excluded. Other fluid optimization techniques have not been evaluated. The lack of randomized studies of adequate quality addressing this important question is disappointing. More research is needed.

Antibiotic prophylaxis for surgical introduction of intracranial ventricular shunts

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Publication status and date: Edited (no change to conclusions), published in Issue 1, 2009.
Review content assessed as up-to-date: 14 May 2006.

Citation: Ratilal BO, Costa J, Sampaio C. Antibiotic prophylaxis for surgical introduction of intracranial ventricular shunts. *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD005365. DOI: 10.1002/14651858.CD005365.pub2.

ABSTRACT

Background

Systemic antibiotics and antibiotic-impregnated shunt systems are often used to prevent shunt infection.

Objectives

To evaluate the effectiveness of either prophylactic systemic antibiotics or antibiotic-impregnated shunt systems for preventing infection in patients who underwent surgical introduction of intracranial ventricular shunts.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, LILACS and the meeting proceedings from the American Association of Neurological Surgeons and from the European Association of Neurosurgical Societies, until June 2005.

Selection criteria

We included randomized or quasi-randomized controlled trials comparing the use of prophylactic antibiotics (either systemic or antibiotic-impregnated shunt systems) in intracranial ventricular shunt procedures with placebo or no antibiotics.

Data collection and analysis

Two authors appraised quality and extracted data independently.

Main results

We included seventeen trials with overall 2134 participants. We performed two separate meta-analyses: one that evaluated the use of systemic prophylactic antibiotics and another that evaluated the use of antibiotic-impregnated systems. All studies included shunt infection in their primary outcome.

We could not analyse all-cause mortality regarding systemic antibiotics due to lack of data. No significant differences were found (odds ratio (OR): 1.47, 95% confidence intervals (CI) 0.83 to 2.62) for this outcome regarding the use of antibiotic-impregnated catheters compared with standard ones. The use of systemic antibiotic prophylaxis and the use of antibiotic-impregnated catheters were associated with a decrease in shunt infection (OR: 0.52, 95% CI 0.36 to 0.74 and OR: 0.21, 95% CI 0.08 to 0.55 respectively). We found no significant benefit for shunt revision in both meta-analyses that evaluated systemic antibiotics and impregnated-shunt systems. We found no significant differences between the subgroups evaluated: type of shunt (internal/external, ventriculoperitoneal/ventriculoatrial), age and duration of the administration of antibiotics.

Authors' conclusions

We could demonstrate a benefit of systemic prophylactic antibiotics for the first 24 hours postoperatively to prevent shunt infection, regardless of the patient's age and the type of internal shunt used. The benefit of its use after this period remains uncertain. However this data derives from the rate of shunt infection, which is an intermediary outcome. Future trials should evaluate the effectiveness of different regimens of systemic antibiotics rather than placebo, and should include all-cause mortality, shunt revision and adverse events as additional outcomes. Evidence suggests that antibiotic-impregnated catheters reduce the incidence of shunt infection although more well-designed clinical trials testing the effect of antibiotic-impregnated shunts are required to confirm their net benefit.

Antifungal agents for preventing fungal infections in non-neutropenic critically ill patients

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 1, 2009.
Review content assessed as up-to-date: 7 November 2005.

Citation: Playford EG, Webster AC, Sorrell TC, Craig JC. Antifungal agents for preventing fungal infections in non-neutropenic critically ill patients. *Cochrane Database of Systematic Reviews* 2006, Issue 1. Art. No.: CD004920. DOI: 10.1002/14651858.CD004920.pub2.

ABSTRACT

Background

Invasive fungal infections, important causes of morbidity and mortality in critically ill patients, may be preventable with the prophylactic administration of antifungal agents.

Objectives

This study aims to systematically identify and summarize the effects of antifungal prophylaxis in non-neutropenic critically ill adult patients on all-cause mortality and the incidence of invasive fungal infections.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL), (*The Cochrane Library*, Issue 3, 2005), MEDLINE (1966 to 2 September 2005), and EMBASE (1980 to week 36, 2005). We also handsearched reference lists, abstracts of conference proceedings and scientific meetings (1998 to 2004), and contacted authors of included studies and pharmaceutical manufacturers.

Selection criteria

We included randomized controlled trials in all languages comparing the prophylactic use of any antifungal agent or regimen with placebo, no antifungal, or another antifungal agent or regimen in non-neutropenic critically ill adult patients.

Data collection and analysis

Two authors independently applied selection criteria, performed quality assessment, and extracted data using an intention-to-treat approach. We resolved differences by discussion. We synthesized data using the random effects model and expressed results as relative risk with 95% confidence intervals.

Main results

We included 12 unique trials (eight comparing fluconazole and four ketoconazole with no antifungal or a nonabsorbable agent) involving 1606 randomized patients. For both outcomes of total mortality and invasive fungal infections, almost all trials of fluconazole and ketoconazole separately showed a non-significant risk reduction with prophylaxis. When combined, fluconazole/ketoconazole reduced total mortality by about 25% (relative risk 0.76, 95% confidence interval 0.59 to 0.97) and invasive fungal infections by about 50% (relative risk 0.46, 95% confidence interval 0.31 to 0.68). We identified no significant increase in the incidence of infection or colonization with the azole-resistant fungal pathogens *Candida glabrata* or *C. krusei*, although the confidence intervals of the summary effect measures were wide. Adverse effects were not more common amongst patients receiving prophylaxis. Results across all trials were homogeneous despite considerable heterogeneity in clinical and methodological characteristics.

Authors' conclusions

Prophylaxis with fluconazole or ketoconazole in critically ill patients reduces invasive fungal infections by one half and total mortality by one quarter. Although no significant increase in azole-resistant *Candida* species associated with prophylaxis was demonstrated, trials were not powered to exclude such an effect. In patients at increased risk of invasive fungal infections, antifungal prophylaxis with fluconazole should be considered.

Optimal timing for intravenous administration set replacement

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2008.
Review content assessed as up-to-date: 14 July 2005.

Citation: Gillies D, Wallen MM, Morrison AL, Rankin K, Nagy SA, O'Riordan E. Optimal timing for intravenous administration set replacement. *Cochrane Database of Systematic Reviews* 2005, Issue 4. Art. No.: CD003588. DOI: 10.1002/14651858.CD003588.pub2.

ABSTRACT

Background

Administration of intravenous therapy is a common occurrence within the hospital setting. Routine replacement of administration sets has been advocated to reduce intravenous infusion contamination. If decreasing the frequency of changing intravenous administration sets does not increase infection rates, a change in practice could result in considerable cost savings.

Objectives

The objective of this review was to identify the optimal interval for the routine replacement of intravenous administration sets when infusate or parenteral nutrition (lipid and non-lipid) solutions are administered to people in hospital via central or peripheral venous catheters.

Search methods

We searched The Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, CINAHL, EMBASE: all from inception to February 2004; reference lists of identified trials, and bibliographies of published reviews. We also contacted researchers in the field. We did not have a language restriction.

Selection criteria

We included all randomized or quasi-randomized controlled trials addressing the frequency of replacing intravenous administration sets when parenteral nutrition (lipid and non-lipid containing solutions) or infusions (excluding blood) were administered to people in hospital via a central or peripheral catheter.

Data collection and analysis

Two authors assessed all potentially relevant studies. We resolved disagreements between the two authors by discussion with a third author. We collected data for the outcomes; infusate contamination; infusate-related bloodstream infection; catheter contamination; catheter-related bloodstream infection; all-cause bloodstream infection and all-cause mortality.

Main results

We identified 23 references for review. We excluded eight of these studies; five because they did not fit the inclusion criteria and three because of inadequate data. We extracted data from the remaining 15 references (13 studies) with 4783 participants. We conclude that there is no evidence that changing intravenous administration sets more often than every 96 hours reduces the incidence of bloodstream infection. We do not know whether changing administration sets less often than

every 96 hours affects the incidence of infection. In addition, we found that there were no differences between participants with central versus peripheral catheters; nor between participants who did and did not receive parenteral nutrition, or between children and adults.

Authors' conclusions

It appears that administration sets that do not contain lipids, blood or blood products may be left in place for intervals of up to 96 hours without increasing the incidence of infection. There was no evidence to suggest that administration sets which contain lipids should not be changed every 24 hours as currently recommended.

Bispectral index for improving anaesthetic delivery and postoperative recovery

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 10, 2010.
Review content assessed as up-to-date: 2 September 2010.

Citation: Punjasawadwong Y, Phongchiewboon A, Bunchungmongkol N. Bispectral index for improving anaesthetic delivery and postoperative recovery. *Cochrane Database of Systematic Reviews* 2007, Issue 4. Art. No.: CD003843. DOI: 10.1002/14651858.CD003843.pub2.

ABSTRACT

Background

The use of clinical signs may not be reliable in measuring the hypnotic component of anaesthesia. The use of bispectral index to guide the dose of anaesthetics may have certain advantages over clinical signs. This is an update of a review originally published in 2007.

Objectives

The objective of this review was to assess whether bispectral index (BIS) reduced intraoperative recall awareness, anaesthetic use, recovery times and cost.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2009, Issue 2), MEDLINE (1990 to 21 May, 2009), EMBASE (1990 to 14 May, 2009) and reference lists of articles. The original search was performed in May 2007.

Selection criteria

We included randomized controlled trials comparing BIS with standard practice criteria for titration of anaesthetic agents.

Data collection and analysis

Two authors independently assessed trial quality, extracted data and analysed the data. We contacted study authors for further details.

Main results

We included 31 trials. In studies using clinical signs as control, the results demonstrated a significant effect of the BIS-guided anaesthesia in reducing the risk of intraoperative recall awareness among surgical patients with high risk of awareness (2493 participants; OR 0.24, 95% CI 0.08 to 0.69). This effect was not demonstrated in studies using end tidal anaesthetic gas monitoring as standard practice (1981 participants; OR 1.01, 95% CI 0.14 to 7.16). BIS-guided anaesthesia reduced the requirement for propofol by 1.44 mg/kg/hr (662 participants; 95% CI -1.95 to -0.93), and for volatile anaesthetics (desflurane, sevoflurane, isoflurane) by 0.14 minimal alveolar concentration equivalents (MAC) (95% CI -0.22 to -0.05) in 928 participants. Irrespective of the anaesthetics used, BIS reduced the following recovery times: time for eye opening (2446 participants; by 2.14 min, 95% CI -2.99 to -1.29), response to verbal command (777 participants; by 2.73 min, 95% CI -3.92 to -1.54), time to extubation (1488 participants; by 2.87 min, 95% CI -3.74 to -1.99), and orientation (316 participants; by 2.57 min, 95% CI -3.30 to -1.85). BIS shortened the duration of postanaesthesia care unit stay by 7.63 min (95% CI -12.50 to -2.76) in 1940 participants but did not significantly reduce time to home readiness (329 participants; -7.01 min, 95% CI -30.11 to 16.09).

Authors' conclusions

BIS-guided anaesthesia could reduce the risk of intraoperative recall in surgical patients with high risk of awareness in studies using clinical signs as a guide to anaesthetic practice but not in studies using end tidal anaesthetic gases as a guide. In addition, anaesthesia guided by the BIS within the recommended range could improve anaesthetic delivery and postoperative recovery from relatively deep anaesthesia.

Pulse oximetry for perioperative monitoring

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 12, 2010.
Review content assessed as up-to-date: 30 April 2009.

Citation: Pedersen T, Hovhannisyan K, Møller AM. Pulse oximetry for perioperative monitoring. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD002013. DOI: 10.1002/14651858.CD002013.pub2.

ABSTRACT

Background

Pulse oximetry is extensively used in the perioperative period and might improve patient outcomes by enabling an early diagnosis and, consequently, correction of perioperative events that might cause postoperative complications or even death. Only a few randomized clinical trials of pulse oximetry during anaesthesia and in the recovery room have been performed that describe perioperative hypoxaemic events, postoperative cardiopulmonary complications, and cognitive dysfunction.

Objectives

The objective of this review was to assess the effects of perioperative monitoring with pulse oximetry and to clearly identify the adverse outcomes that might be prevented or improved by the use of pulse oximetry.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2009, Issue 2), MEDLINE (1966 to May 2009), EMBASE (1980 to May 2009), CINAHL (1982 to May 2009), ISI Web of Science (1956 to May 2009), LILACS (1982 to May 2009), and databases of ongoing trials; and checked the reference lists of trials and review articles.

Selection criteria

We included all controlled trials that randomized patients to either pulse oximetry or no pulse oximetry during the perioperative period.

Data collection and analysis

Two authors independently assessed data in relation to events detectable by pulse oximetry, any serious complications that occurred during anaesthesia or in the postoperative period, and intra- or postoperative mortality.

Main results

Searching identified five reports. We considered the studies with data from a total of 22,992 patients that were eligible for analysis. Results indicated that hypoxaemia was reduced in the pulse oximetry group, both in the operating theatre and in the recovery room. During observation in the recovery room, the incidence of hypoxaemia in the pulse oximetry group was 1.5 to three times less. Postoperative cognitive function was independent of perioperative monitoring with pulse oximetry. The one study in general surgery showed that postoperative complications occurred in 10% of the patients in the oximetry group and in 9.4% in the control group. No statistically significant differences were detected in cardiovascular, respiratory, neurologic, or infectious complications in the two groups. The duration of hospital stay was a median of five days in both groups, and an equal number of in-hospital deaths was registered in the two groups. Continuous pulse oximetry has the potential to increase vigilance and decrease pulmonary complications after cardiothoracic surgery, however routine continuous monitoring did not reduce transfer to an intensive care unit (ICU) or overall mortality.

Authors' conclusions

The studies confirmed that pulse oximetry can detect hypoxaemia and related events. However, we have found no evidence that pulse oximetry affects the outcome of anaesthesia for patients. The conflicting subjective and objective results of the studies, despite an intense methodical collection of data from a relatively large general surgery population, indicate that the value of perioperative monitoring with pulse oximetry is questionable in relation to improved reliable outcomes, effectiveness, and efficiency. Routine continuous pulse oximetry monitoring did not reduce either transfer to ICU or mortality, and it is unclear if there is any real benefit from the application of this technology in patients who are recovering from cardiothoracic surgery in a general care area.

Aromatherapy for treatment of postoperative nausea and vomiting

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Hines S, Steels E, Chang A, Gibbons K. Aromatherapy for treatment of postoperative nausea and vomiting. *Cochrane Database of Systematic Reviews* 2012, Issue 4. Art. No.: CD007598. DOI: 10.1002/14651858.CD007598.pub2.

ABSTRACT

Background

Postoperative nausea and vomiting is a common and unpleasant phenomenon and current therapies are not always effective for all patients. Aromatherapy has been suggested as a possible addition to the available treatment strategies.

Objectives

This review sought to establish what effect the use of aromatherapy has on the severity and duration of established postoperative nausea and vomiting and whether aromatherapy can be used with safety and clinical effectiveness comparable to standard pharmacological treatments.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2011, Issue 3); MEDLINE; EMBASE; CINAHL; CAM on PubMed; Meditext; LILACS; and ISI Web of Science as well as grey literature sources and the reference lists of retrieved articles. We conducted database searches up to August 2011.

Selection criteria

We included all randomized controlled trials (RCTs) and controlled clinical trials (CCTs) where aromatherapy was used to treat postoperative nausea and vomiting. Interventions were all types of aromatherapy. Aromatherapy was defined as the inhalation of the vapours of any substance for the purposes of a therapeutic benefit. Primary outcomes were the severity and duration of postoperative nausea and vomiting. Secondary outcomes were adverse reactions, use of rescue anti-emetics and patient satisfaction with treatment.

Data collection and analysis

Two review authors assessed risk of bias in the included studies and extracted data. As all outcomes analysed were dichotomous, we used a fixed-effect model and calculated relative risk (RR) with associated 95% confidence interval (95% CI).

Main results

The nine included studies comprised six RCTs and three CCTs with a total of 402 participants. The mean age and range data for all participants were not reported for all studies. The method of randomization in four of the six included RCTs was explicitly stated and was adequate. Incomplete reporting of data affected the completeness of the analysis. Compared with placebo, isopropyl alcohol vapour inhalation was effective in reducing the proportion of participants requiring rescue anti-emetics (RR 0.30, 95% CI 0.09 to 1.00, P = 0.05). However, compared with standard anti-emetic treatment, isopropyl alcohol was not effective in reducing the proportion of participants requiring rescue anti-emetics (RR 0.66, 95% CI 0.39 to 1.13, P = 0.13) except when the data from a possibly confounded study were included (RR 0.66, 95% CI 0.45 to 0.98, P = 0.04). Where studies reported data on patient satisfaction with aromatherapy, there were no statistically significant differences between the groups (RR 1.12, 95% CI 0.62 to 2.03, P = 0.71).

Authors' conclusions

Isopropyl alcohol was more effective than saline placebo for reducing postoperative nausea and vomiting but less effective than standard anti-emetic drugs. There is currently no reliable evidence for the use of peppermint oil.

Drugs for preventing postoperative nausea and vomiting

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2008.
Review content assessed as up-to-date: 13 May 2004.

Citation: Carlisle J, Stevenson CA. Drugs for preventing postoperative nausea and vomiting. *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD004125. DOI: 10.1002/14651858.CD004125.pub2.

ABSTRACT

Background

Drugs can prevent postoperative nausea and vomiting, but their relative efficacies and side effects have not been compared within one systematic review.

Objectives

The objective of this review was to assess the prevention of postoperative nausea and vomiting by drugs and the development of any side effects.

Search methods

We searched The Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, Issue 2, 2004), MEDLINE (January 1966 to May 2004), EMBASE (January 1985 to May 2004), CINAHL (1982 to May 2004), AMED (1985 to May 2004), SIGLE (to May 2004), ISI WOS (to May 2004), LILAC (to May 2004) and INGENTA bibliographies.

Selection criteria

We included randomized controlled trials that compared a drug with placebo or another drug, or compared doses or timing of administration, that reported postoperative nausea or vomiting as an outcome.

Data collection and analysis

Two authors independently assessed trial quality and extracted outcome data.

Main results

We included 737 studies involving 103,237 people. Compared to placebo, eight drugs prevented postoperative nausea and vomiting: droperidol, metoclopramide, ondansetron, tropisetron, dolasetron, dexamethasone, cyclizine and granisetron. Publication bias makes evidence for differences among these drugs unreliable. The relative risks (RR) versus placebo varied between 0.60 and 0.80, depending upon the drug and outcome. Evidence for side effects was sparse: droperidol was sedative (RR 1.32) and headache was more common after ondansetron (RR 1.16).

Authors' conclusions

Either nausea or vomiting is reported to affect, at most, 80 out of 100 people after surgery. If all 100 of these people are given one of the listed drugs, about 28 would benefit and 72 would not. Nausea and vomiting are usually less common and, therefore, drugs are less useful. For 100 people, of whom 30 would vomit or feel sick after surgery if given placebo, 10 people would benefit from a drug and 90 would not. Between one to five patients out of every 100 people may experience a mild side effect, such as sedation or headache, when given an antiemetic drug. Collaborative research should focus on determining whether antiemetic drugs cause more severe, probably rare, side effects. Further comparison of the antiemetic effect of one drug versus another is not a research priority.

Stimulation of the wrist acupuncture point P6 for preventing postoperative nausea and vomiting

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 1, 2011.
Review content assessed as up-to-date: 18 November 2008.

Citation: Lee A, Fan LTY. Stimulation of the wrist acupuncture point P6 for preventing postoperative nausea and vomiting. *Cochrane Database of Systematic Reviews* 2009, Issue 2. Art. No.: CD003281. DOI: 10.1002/14651858.CD003281.pub3.

ABSTRACT

Background

Postoperative nausea and vomiting (PONV) are common complications following surgery and anaesthesia. Drugs to prevent PONV are only partially effective. An alternative approach is to stimulate the P6 acupoint on the wrist. This is an update of a Cochrane review first published in 2004.

Objectives

To determine the efficacy and safety of P6 acupoint stimulation in preventing PONV.

Search methods

We searched CENTRAL (*The Cochrane Library*, Issue 3, 2008), MEDLINE (January 1966 to September 2008), EMBASE (January 1988 to September 2008), ISI Web of Science (January 1965 to September 2008), the National Library of Medicine publication list of acupuncture studies, and reference lists of articles.

Selection criteria

All randomized trials of techniques that stimulated the P6 acupoint compared with sham treatment or drug therapy for the prevention of PONV. Interventions used in these trials included acupuncture, electro-acupuncture, transcutaneous nerve stimulation, laser stimulation, capsicum plaster, an acu-stimulation device, and acupressure in patients undergoing surgery. Primary outcomes were the risks of nausea and vomiting. Secondary outcomes were the need for rescue antiemetic therapy and adverse effects.

Data collection and analysis

Two review authors independently assessed trial quality and extracted the data. We collected adverse effect information from the trials. We used a random-effects model and reported relative risk (RR) with associated 95% confidence intervals (95% CI).

Main results

We included 40 trials involving 4858 participants; four trials reported adequate allocation concealment. Twelve trials did not report all outcomes. Compared with sham treatment P6 acupoint stimulation significantly reduced: nausea (RR 0.71, 95% CI 0.61 to 0.83); vomiting (RR 0.70, 95% CI 0.59 to 0.83), and the need for rescue antiemetics (RR 0.69, 95% CI 0.57 to 0.83). Heterogeneity among trials was moderate. There was no clear difference in the effectiveness of P6 acupoint stimulation for adults and children; or for invasive and noninvasive acupoint stimulation. There was no evidence of difference between P6 acupoint stimulation and antiemetic drugs in the risk of nausea (RR 0.82, 95% CI 0.60 to 1.13), vomiting (RR 1.01, 95% CI 0.77 to 1.31), or the need for rescue antiemetics (RR 0.82, 95% CI 0.59 to 1.13). The side effects associated with P6 acupoint stimulation were minor. There was no evidence of publication bias from contour-enhanced funnel plots.

Authors' conclusions

P6 acupoint stimulation prevented PONV. There was no reliable evidence for differences in risks of postoperative nausea or vomiting after P6 acupoint stimulation compared to antiemetic drugs.

Early extubation for adult cardiac surgical patients

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2012.
Review content assessed as up-to-date: 27 June 2003.

Citation: Hawkes CA, Dhileepan S, Foxcroft DR. Early extubation for adult cardiac surgical patients. *Cochrane Database of Systematic Reviews* 2003, Issue 4. Art. No.: CD003587. DOI: 10.1002/14651858.CD003587.

ABSTRACT

Background

Over 30 studies reported that early extubation (within eight hours) appears to be safe without an increased incidence of morbidity. A benefit of the practice may be cost savings associated with shorter Intensive Care Unit and hospital length of stays.

Objectives

To assess the effects of early extubation and the impact of the extubating clinician's profession on morbidity, mortality, intensive care unit and hospital length of stay, with a subgroup analysis for extubation within four hours or four to eight hours.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (issue 1, 2003), MEDLINE (January 1966 to June 2003), EMBASE (January 1980 to June 2003), CINAHL (January 1982 to December 2002), SIGLE (January 1980 to December 2002). We searched reference lists of articles and contacted researchers in the field.

Selection criteria

Randomized controlled trials and controlled clinical trials of adult cardiac surgical patients (coronary artery bypass grafts, aortic valve replacement, mitral valve replacement, aortic aneurysm repair).

Data collection and analysis

Two reviewers independently assessed trial quality and extracted data. Study authors were contacted for additional information. A meta-analysis for most outcomes was conducted.

Main results

Six trials were included in the review. There was no evidence of a difference between early and conventionally extubated patients shown in the relative risk and 95% confidence interval for the following outcomes: mortality in intensive care was 0.8 (0.42 to 1.52); thirty day mortality was 1.2 (0.63 to 2.27); myocardial ischaemia was 0.96 (0.71 to 1.30); reintubation within 24 hours of surgery was 5.93 (0.72 to 49.14). Time spent in intensive care and in hospital were significantly shorter for patients extubated early (7.02 hours (- 7.42 to - 6.61) and 1.08 days (- 1.35 to - 0.82) respectively).

Authors' conclusions

There is no evidence of a difference in mortality and morbidity rates between the study groups. Early extubation reduces intensive care unit and hospital length of stay. Studies were underpowered and designed to show differences between study groups rather than equivalence between the groups.

Suggested future areas of investigation: establishing the safety and efficacy of immediate extubation compared with early extubation; establishing the most effective means of pain control and reducing anxiety for patients; systematic reviews of the evidence for different parts of the patients journey through a cardiac surgery episode; and the impact of the profession of the clinician making the decision to extubate.

Noninvasive positive pressure ventilation as a weaning strategy for intubated adults with respiratory failure

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 8, 2010.
Review content assessed as up-to-date: 5 July 2010.

Citation: Burns KEA, Adhikari NKJ, Keenan SP, Meade MO. Noninvasive positive pressure ventilation as a weaning strategy for intubated adults with respiratory failure. *Cochrane Database of Systematic Reviews* 2010, Issue 8. Art. No.: CD004127. DOI: 10.1002/14651858.CD004127.pub2.

ABSTRACT

Background

Noninvasive positive pressure ventilation (NPPV) provides ventilatory support without the need for an invasive airway approach. Interest has emerged in using NPPV to facilitate earlier removal of an endotracheal tube and decrease complications associated with prolonged intubation.

Objectives

To summarize the evidence comparing NPPV and invasive positive pressure ventilation (IPPV) weaning on clinical outcomes in intubated adults with respiratory failure.

Search methods

We searched the Cochrane Central Register of Controlled Trials (*The Cochrane Library*, Issue 2, 2008), MEDLINE (January 1966 to April 2008), EMBASE (January 1980 to April 2008), proceedings from four conferences, and personal files; and contacted authors to identify randomized controlled trials comparing NPPV and IPPV weaning.

Selection criteria

Randomized and quasi-randomized studies comparing early extubation with immediate application of NPPV to IPPV weaning in intubated adults with respiratory failure.

Data collection and analysis

Two review authors independently assessed trial quality and abstracted data according to prespecified criteria. Sensitivity and subgroup analyses were planned to assess the impact of (i) excluding quasi-randomized trials, and (ii) the etiology of respiratory failure on selected outcomes.

Main results

We identified 12 trials of moderate to good quality that involved 530 participants with predominantly chronic obstructive pulmonary disease (COPD). Compared to the IPPV strategy, NPPV significantly decreased mortality (relative risk (RR) 0.55, 95% confidence Interval (CI) 0.38 to 0.79), ventilator associated pneumonia (RR 0.29, 95% CI 0.19 to 0.45), length of stay in an intensive care unit (weighted mean difference (WMD) -6.27 days, 95% CI -8.77 to -3.78) and hospital (WMD -7.19 days, 95% CI -10.80 to -3.58), total duration of ventilation (WVD) -5.64 days (95% CI -9.50 to -1.77) and duration of endotracheal mechanical ventilation (WMD - 7.81 days, 95% CI -11.31 to -4.31). Noninvasive weaning had no effect on weaning failures or the duration of ventilation related to weaning. Excluding a single quasi-randomized trial maintained the significant reduction in mortality and ventilator associated pneumonia. Subgroup analyses suggested that the benefits on mortality and weaning failures were nonsignificantly greater in trials enrolling exclusively COPD patients versus mixed populations.

Authors' conclusions

Summary estimates from 12 small studies of moderate to good quality that included predominantly COPD patients demonstrated a consistent, positive effect on mortality and ventilator associated pneumonia. The net clinical benefits associated with noninvasive weaning remain to be fully elucidated.

Lung protective ventilation strategy for the acute respiratory distress syndrome

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 2, 2009.
Review content assessed as up-to-date: 14 November 2006.

Citation: Petrucci N, Iacovelli W. Lung protective ventilation strategy for the acute respiratory distress syndrome. *Cochrane Database of Systematic Reviews* 2007, Issue 3. Art. No.: CD003844. DOI: 10.1002/14651858.CD003844.pub3.

ABSTRACT

Background

Patients with acute respiratory distress syndrome and acute lung injury require mechanical ventilatory support. Acute respiratory distress syndrome and acute lung injury are further complicated by ventilator-induced lung injury. Lung-protective ventilation strategies may lead to improved survival.

Objectives

To assess the effects of ventilation with lower tidal volume on morbidity and mortality in patients aged 16 years or older affected by acute respiratory distress syndrome and acute lung injury. A secondary objective was to determine whether the comparison between low and conventional tidal volume was different if a plateau airway pressure of greater than 30 to 35 cmH_20 was used.

Search methods

In our original review, we searched databases from inception until 2003. In this updated review, we searched The Cochrane Central Register of Controlled Trials (CENTRAL), (*The Cochrane Library* 2006, Issue 3). We updated our search of MEDLINE, EMBASE, CINAHL and the Web of Science from 2003 to 2006. We also updated our search of intensive care journals and conference proceedings; databases of ongoing research, reference lists and 'grey literature' from 2003 to 2006.

Selection criteria

We included randomized controlled trials comparing ventilation using either lower tidal volume (Vt) or low airway driving pressure (plateau pressure 30 cm H_2O or less), resulting in tidal volume of 7 ml/kg or less versus ventilation that uses Vt in the range of 10 to 15 ml/kg, in adults (16 years old or older).

Data collection and analysis

We independently assessed trial quality and extracted data. Wherever appropriate, results were pooled. We applied fixed- and random-effects models.

Main results

We found one new study in this update for a total of six trials, involving 1297 patients, which were eligible for inclusion. Mortality at day 28 was significantly reduced by lung-protective ventilation: relative risk (RR) 0.74 (95% confidence interval (CI) 0.61 to 0.88); hospital mortality was reduced: RR 0.80 (95% CI 0.69 to 0.92); overall mortality was not significantly different if a plateau pressure less than or equal to 31 cm H_2O in control group was used: RR 1.13 (95% CI 0.88 to 1.45). There was insufficient evidence about morbidity and long term outcomes.

Authors' conclusions

Clinical heterogeneity, such as different lengths of follow up and higher plateau pressure in control arms in two trials, make the interpretation of the combined results difficult. Mortality is significantly reduced at day 28 and at the end of hospital stay. The effects on long-term mortality are unknown, although the possibility of a clinically relevant benefit cannot be excluded.

Music interventions for mechanically ventilated patients

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 12, 2010.
Review content assessed as up-to-date: 2 November 2010.

Citation: Bradt J, Dileo C, Grocke D. Music interventions for mechanically ventilated patients. *Cochrane Database of Systematic Reviews* 2010, Issue 12. Art. No.: CD006902. DOI: 10.1002/14651858.CD006902.pub2.

ABSTRACT

Background

Mechanical ventilation often causes major distress and anxiety in patients. Music interventions have been used to reduce anxiety and distress and improve physiological functioning in medical patients; however its efficacy for mechanically ventilated patients needs to be evaluated.

Objectives

To examine the effects of music interventions with standard care versus standard care alone on anxiety and physiological responses in mechanically ventilated patients.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 1), MEDLINE, CINAHL, AMED, EMBASE, PsycINFO, LILACS, Science Citation Index, www.musictherapyworld.net, CAIRSS for Music, Proquest Digital Dissertations, ClinicalTrials.gov, Current Controlled Trials, the National Research Register, and NIH CRISP (all to January 2010). We handsearched music therapy journals and reference lists and contacted relevant experts to identify unpublished manuscripts. There was no language restriction.

Selection criteria

We included all randomized and quasi-randomized controlled trials that compared music interventions and standard care with standard care alone for mechanically ventilated patients.

Data collection and analysis

Two authors independently extracted the data and assessed the methodological quality. Additional information was sought from the trial researchers, when necessary. Results were presented using mean differences for outcomes measured by the same scale and standardized mean differences for outcomes measured by different scales. Post-test scores were used. In cases of significant baseline difference, we used change scores.

Main results

We included eight trials (213 participants). Music listening was the main intervention used, and seven of the studies did not include a trained music therapist. Results indicated that music listening may be beneficial for anxiety reduction in mechanically ventilated patients; however, these results need to be interpreted with caution due to the small sample size. Findings indicated that listening to music consistently reduced heart rate and respiratory rate, suggesting a relaxation response. No strong evidence was found for blood pressure reduction.

Music listening did not improve oxygen saturation level.

No studies could be found that examined the effects of music interventions on quality of life, patient satisfaction, post-discharge outcomes, mortality, or cost-effectiveness.

Authors' conclusions

Music listening may have a beneficial effect on heart rate, respiratory rate, and anxiety in mechanically ventilated patients. However, the quality of the evidence is not strong. Most studies examined the effects of listening to pre-recorded music. More research is needed on the effects of music offered by a trained music therapist.

High initial concentration versus low initial concentration sevoflurane for inhalational induction of anaesthesia

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 9, 2012.
Review content assessed as up-to-date: 8 September 2011.

Citation: Boonmak P, Boonmak S, Pattanittum P. High initial concentration versus low initial concentration sevoflurane for inhalational induction of anaesthesia. *Cochrane Database of Systematic Reviews* 2012, Issue 9. Art. No.: CD006837. DOI: 10.1002/14651858.CD006837.pub2.

ABSTRACT

Background

Sevoflurane induction for general anaesthesia has been reported to be safe, reliable and well accepted by patients. Sevoflurane induction uses either low or high initial concentrations. The low initial concentration technique involves initially administering a low concentration then gradually increasing the dose until the patient is anaesthetized. The high initial concentration technique involves administering high concentrations from the beginning, continuing until the patient is anaesthetized.

Objectives

We aimed to compare the induction times and complications between high and low initial concentration sevoflurane induction in patients who received inhalational induction for general anaesthesia. We defined 'high' as greater and 'low' as less than a 4% initial concentration.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2011, Issue 9); MEDLINE (1950 to September 2011); EMBASE (1980 to September 2011); LILACS (1982 to September 2011) and ISI Web of Science (1946 to September 2011). We also searched the reference lists of relevant articles, conference proceedings; and contacted the authors of included trials.

Selection criteria

We sought all published and unpublished, randomized controlled trials comparing high versus low initial sevoflurane concentration inhalational induction. Our primary outcomes were two measures of anaesthesia (time to loss of the eyelash reflex (LOER) and time until a weighted object held in the patient's hand was dropped), time to successful insertion of a laryngeal mask airway (LMA), and time to endotracheal intubation. Other outcomes were complications of the technique.

Data collection and analysis

We used the standardized methods for conducting a systematic review as described by the *Cochrane Handbook for Systematic Reviews of Interventions*. Two authors independently extracted details of trial methodology and outcome data from reports of all trials considered eligible for inclusion. All analyses were made on an intention-to-treat basis, where possible. The overall treatment effects were estimated by using a fixed-effect model when there was no substantial heterogeneity, whereas the random-effects model was applied in the presence of considerable heterogeneity.

Main results

We used data from 10 studies with 729 participants in the review, though most analyses were based on data from fewer participants. There was substantial heterogeneity in the trials. Thus, our results should be read with caution. It was not possible to combine the trials for the primary outcome (LOER) but individual trials found faster induction times (typically 24 to 82 seconds faster) with high initial concentration sevoflurane. Apnoea appeared to be more common in the high initial concentration sevoflurane group (two trials,160 participants). There was no evidence of a difference in the incidence of cough, laryngospasm, breath holding, bradycardia, salivation and hypotension between the two groups, with the overall incidence of complications being low.

Authors' conclusions

A high initial concentration sevoflurane technique probably offers more rapid induction of anaesthesia and a similar rate of complications except for apnoea, which may be more common with a high initial concentration. However, this conclusion is not definitive.

Sedative techniques for endoscopic retrograde cholangiopancreatography

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 6, 2012.
Review content assessed as up-to-date: 1 September 2011.

Citation: Garewal D, Powell S, Milan SJ, Nordmeyer J, Waikar P. Sedative techniques for endoscopic retrograde cholangiopancreatography. *Cochrane Database of Systematic Reviews* 2012, Issue 6. Art. No.: CD007274. DOI: 10.1002/14651858.CD007274.pub2.

ABSTRACT

Background

Endoscopic retrograde cholangiopancreatography (ERCP) is an uncomfortable therapeutic procedure that cannot be performed without adequate sedation or general anaesthesia. A considerable number of ERCPs are performed annually in the UK (at least 48,000) and many more worldwide.

Objectives

The primary objective of our review was to evaluate and compare the efficacy and safety of sedative or anaesthetic techniques used to facilitate the procedure of ERCP in adult (age > 18 years) patients.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 8); MEDLINE (1950 to September 2011); EMBASE (1950 to September 2011); CINAHL, Web of Science and LILACS (all to September 2011). We searched for additional studies drawn from reference lists of retrieved trial materials and review articles and conference proceedings.

Selection criteria

We considered all randomized or quasi-randomized controlled studies where the main procedures performed were ERCPs. The three interventions we searched for were (1) conscious sedation (using midazolam plus opioid) versus deep sedation (using propofol); (2) conscious sedation versus general anaesthesia; and (3) deep sedation versus general anaesthesia. We considered all studies regardless of which healthcare professional administered the sedation.

Data collection and analysis

We reviewed 124 papers and identified four randomized trials (with a total of 510 participants) that compared the use of conscious sedation using midazolam and meperidine with deep sedation using propofol in patients undergoing ERCP procedures. All sedation was administered by non-anaesthetic personnel. Due to the clinical heterogeneity of the studies we decided to review the papers from a narrative perspective as opposed to a full meta-analysis. Our primary outcome measures included mortality, major complications and inability to complete the procedure due to sedation-related problems. Secondary outcomes encompassed sedation efficacy and recovery.

Main results

No immediate mortality was reported. There was no significant difference in serious cardio-respiratory complications suffered by patients in either sedation group. Failure to complete the procedure due to sedation-related problems was reported in one study. Three studies found faster and better recovery in patients receiving propofol for their ERCP procedures. Study protocols regarding use of supplemental oxygen, intravenous fluid administration and capnography monitoring varied considerably. The studies showed either moderate or high risk of bias.

Authors' conclusions

Results from individual studies suggested that patients have a better recovery profile after propofol sedation for ERCP procedures than after midazolam and meperidine sedation. As there was no difference between the two sedation techniques as regards safety, propofol sedation is probably preferred for patients undergoing ERCP procedures. However, in all of the studies that were identified only non-anaesthesia personnel were involved in administering the sedation. It would be helpful if further research was conducted where anaesthesia personnel were involved in the administration of sedation for ERCP procedures. This would clarify the extent to which anaesthesia personnel should be involved in the administration of propofol sedation.

Local anaesthetics and regional anaesthesia for preventing chronic pain after surgery

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ABSTRACT

Background

Regional anaesthesia may reduce the rate of persistent (chronic) pain after surgery, a frequent and debilitating condition.

Objectives

To compare local anaesthetics and regional anaesthesia versus conventional analgesia for the prevention of persistent pain six or 12 months after surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2012, Issue 4), PubMed (1966 to April 2012), EMBASE (1966 to May 2012) and CINAHL (1966 to May 2012) without any language restriction. We used a combination of free text search and controlled vocabulary search. The results were limited to randomized controlled clinical trials (RCTs). We conducted a handsearch in reference lists of included trials, review articles and conference abstracts.

Selection criteria

We included RCTs comparing local anaesthetics or regional anaesthesia versus conventional analgesia with a pain outcome at six or 12 months after surgery.

Data collection and analysis

Two authors independently assessed trial quality and extracted data, including information on adverse events. We contacted study authors for additional information. Results are presented as pooled odds ratios (OR) with 95% confidence intervals (CI), based on random-effects models (inverse variance method). We grouped studies according to surgical interventions. We employed the Chi^2 test and calculated the I^2 statistic to investigate study heterogeneity.

Main results

We identified 23 RCTs studying local anaesthetics or regional anaesthesia for the prevention of persistent (chronic) pain after surgery. Data from a total of 1090 patients with outcomes at six months and of 441 patients with outcomes at 12 months were presented. No study included children. We pooled data from 250 participants after thoracotomy, with outcomes at six months. Data favoured regional anaesthesia for the prevention of chronic pain at six months after thoracotomy with an OR of 0.33 (95% CI 0.20 to 0.56). We pooled two studies on paravertebral block for breast cancer surgery; the pooled data of 89 participants with outcomes at five to six months favoured paravertebral block with an OR of 0.37 (95% CI 0.14 to 0.94).The methodological quality of the included studies was intermediate. Adverse effects were not studied systematically and were reported sparsely. Clinical heterogeneity, attrition and sparse outcome data hampered the assessment of effects, especially at 12 months.

Authors' conclusions

Epidural anaesthesia may reduce the risk of developing chronic pain after thoracotomy in about one patient out of every four patients treated. Paravertebral block may reduce the risk of chronic pain after breast cancer surgery in about one out of every five women treated. Our conclusions are significantly weakened by performance bias, shortcomings in allocation concealment, considerable attrition and incomplete outcome data. We caution that our evidence synthesis is based on only a few, small studies. More studies with high methodological quality, addressing various types of surgery and different age groups, including children, are needed.

Epidural analgesia for pain relief following hip or knee replacement

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Citation: Choi P, Bhandari M, Scott J, Douketis JD. Epidural analgesia for pain relief following hip or knee replacement. *Cochrane Database of Systematic Reviews* 2003, Issue 3. Art. No.: CD003071. DOI: 10.1002/14651858.CD003071.

ABSTRACT

Background

Hip and knee replacement are common operative procedures to improve mobility and quality of life. Adequate pain relief is essential in the postoperative period to enable ambulation and initiation of physiotherapy. Lumbar epidural analgesia is a common modality for pain relief following these procedures. As the use of epidural analgesia may delay the initiation of anticoagulant thromboprophylaxis due to the potential risk of epidural hematoma, a synthesis of the evidence is necessary to determine whether or not alternative analgesic modalities are worse, equivalent, or better than epidural analgesia.

Objectives

Is lumbar epidural analgesia more efficacious than systemic analgesia or long-acting spinal analgesia for postoperative pain relief in patients after elective hip or knee replacement?

Search methods

MEDLINE, EMBASE, CINAHL, LILACS, and the CENTRAL were searched from their inception to June 2001.

Selection criteria

A study was included if it was a randomized or pseudo randomized controlled clinical trial (RCT) of patients undergoing hip or knee replacement, in which postoperative lumbar epidural analgesia was compared to other methods for pain relief. Study selection was performed unblinded in duplicate.

Data collection and analysis

Data were collected unblinded in duplicate. Information on patients, methods, interventions, outcomes (pain relief, postoperative function, length of stay) and adverse events were recorded. Methodological quality was assessed using a validated 5-point scale. Meta-analysis was conducted when sufficient data existed from two or more studies. Heterogeneity testing was performed using the Breslow-Day method. The fixed-effect model was used unless heterogeneity was present, in which case, a random-effects model was used. Continuous data were summarized as weighted mean differences (WMD) or standardized mean differences (SMD) with 95% confidence intervals (CI). Dichotomous data were summarized as odds ratios (OR) and numbers-needed-to-treat-to-benefit (NNT) or numbers-needed-to-treat-to-harm (NNH) with their respective 95% CI.

Main results

In the first four to six hours after surgery, patients receiving epidural analgesia had less pain at rest, based on visual analog scores (VAS), than patients receiving systemic analgesia (SMD -0.77; 95% CI -1.24 to -0.31). This effect was not statistically significant by 18 to 24 hours (SMD -0.29; 95% CI -0.73 to 0.16). These observations were based only on studies evaluating populations consisting of total knee replacements alone or mixed populations of total hip or total knee replacements. For pain relief with movement after surgery, patients receiving epidural analgesia reported lower pain scores than patients receiving systemic analgesia in all four studies examining these outcomes. The choice of epidural agents may also influence the extent to which epidural analgesia differs from systemic analgesia. The differences between epidural analgesia and systemic analgesia in the frequency of nausea and vomiting (OR 0.95; 95% CI 0.60 to 1.49) or depression of breathing (OR 1.07; 95% CI 0.45 to 2.54) were not statistically significant. Sedation occurred less frequently with epidural analgesia (OR 0.30; 95% CI 0.09 to 0.97) with a number-needed-to-harm of 7.7 (95% CI 3.5 to 42.0) patients for the systemic analgesia group. Retention of urine (OR 3.50, 95% CI 1.63 to 7.51; NNH 4.5, 95% CI 2.3 to 12.2), itching (OR 4.74, 95% CI 1.76 to 12.78; NNH 6.8, 95% CI 4.4 to 15.8), and low blood pressure (OR 2.78, 95% CI 1.15 to 6.72; NNH 6.7, 95% CI 3.5 to 103) were more frequent with epidural analgesia compared to systemic analgesia. There were insufficient numbers to draw conclusions on the effect of epidural analgesia on serious postoperative complications, functional outcomes, or length of hospital stay.

Authors' conclusions

Epidural analgesia may be useful for postoperative pain relief following major lower limb joint replacements. However, the benefits may be limited to the early (four to six hours) postoperative period. An epidural infusion of local anaesthetic or local anaesthetic-narcotic mixture may be better than epidural narcotic alone. The magnitude of pain relief must be weighed against the frequency of adverse events. The current evidence is insufficient to draw conclusions on the frequency of rare complications from epidural analgesia, postoperative morbidity or mortality, functional outcomes, or length of hospital stay.

Epidural analgesia for cardiac surgery

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ABSTRACT

Background

A combination of general anaesthesia (GA) with thoracic epidural analgesia (TEA) may have a beneficial effect on clinical outcomes by reducing the risk of perioperative complications after cardiac surgery.

Objectives

The objective of this review was to determine the impact of perioperative epidural analgesia in cardiac surgery on perioperative mortality and cardiac, pulmonary or neurological morbidity. We performed a meta-analysis to compare the risk of adverse events and mortality in patients undergoing cardiac surgery under general anaesthesia with and without epidural analgesia.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (2012, Issue 12) in *The Cochrane Library*; MEDLINE (PubMed) (1966 to November 2012); EMBASE (1989 to November 2012); CINHAL (1982 to November 2012) and the Science Citation Index (1988 to November 2012).

Selection criteria

We included randomized controlled trials comparing outcomes in adult patients undergoing cardiac surgery with either GA alone or GA in combination with TEA.

Data collection and analysis

All publications found during the search were manually and independently reviewed by the two authors. We identified 5035 titles, of which 4990 studies did not satisfy the selection criteria or were duplicate publications, that were retrieved from the five different databases. We performed a full review on 45 studies, of which 31 publications met all inclusion criteria. These 31 publications reported on a total of 3047 patients, 1578 patients with GA and 1469 patients with GA plus TEA.

Main results

Through our search (November 2012) we have identified 5035 titles, of which 31 publications met our inclusion criteria and reported on a total of 3047 patients. Compared with GA alone, the pooled risk ratio (RR) for patients receiving GA with TEA showed an odds ratio (OR) of 0.84 (95% CI 0.33 to 2.13, 31 studies) for mortality; 0.76 (95% CI 0.49 to 1.19, 17 studies) for myocardial infarction; and 0.50 (95% CI 0.21 to 1.18, 10 studies) for stroke. The relative risks (RR) for respiratory complications and supraventricular arrhythmias were 0.68 (95% CI 0.54 to 0.86, 14 studies) and 0.65 (95% CI 0.50 to 0.86, 15 studies) respectively.

Authors' conclusions

This meta-analysis of studies, identified to 2010, showed that the use of TEA in patients undergoing coronary artery bypass graft surgery may reduce the risk of postoperative supraventricular arrhythmias and respiratory complications. There were no effects of TEA with GA on the risk of mortality, myocardial infarction or neurological complications compared with GA alone.

Fast-track cardiac care for adult cardiac surgical patients

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ABSTRACT

Background

Fast-track cardiac care is a complex intervention involving several components of care during cardiac anaesthesia and in the postoperative period, all with the ultimate aim of early extubation after surgery, to reduce the length of stay in the intensive care unit and in the hospital. Safe and effective fast-track cardiac care may reduce hospital costs. This is an update of a Cochrane review published in 2003.

Objectives

To update the evidence on the safety and effectiveness of fast-track cardiac care compared to conventional (not fast-track) care in adult patients undergoing cardiac surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (2012, Issue 3), MEDLINE (January 1966 to April 2012), EMBASE (January 1980 to April 2012), CINAHL (January 1982 to April 2012), and ISI Web of Science (January 2003 to April 2012). We searched reference lists of articles and contacted experts in the field.

Selection criteria

All randomized controlled trials of adult cardiac surgical patients (coronary artery bypass grafts, aortic valve replacement, mitral valve replacement) that compared fast-track cardiac care and conventional (not fast-track) care groups were included. We focused on the following fast-track interventions that were designed for early extubation after surgery, administration of low-dose opioid based general anaesthesia during cardiac surgery and the use of a time-directed extubation protocol after surgery. The primary outcome was the risk of mortality. Secondary outcomes included postoperative complications, reintubation within 24 hours of surgery, time to extubation, length of stay in the intensive care unit and in the hospital, quality of life after surgery and hospital costs.

Data collection and analysis

Two review authors independently assessed trial quality and extracted the data. Study authors were contacted for additional information. We used a random-effects model and reported relative risk (RR), mean difference (MD) and 95% confidence intervals (95% CI).

Main results

Twenty-five trials involving 4118 patients were included in the review. There were two studies with a low risk of bias and nine studies with a high risk of bias. There were no differences in the risk of mortality within the first year after surgery between low-dose versus high-dose opioid based general anaesthesia groups (RR 0.58, 95% CI 0.28 to 1.18) and between early extubation protocol versus usual care groups (RR 0.84, 95% CI 0.40 to 1.75).

There were no significant differences between low-dose versus high-dose opioid based anaesthesia groups for postoperative complications: myocardial infarction (RR 0.98, 95% CI 0.48 to 1.99), reintubation (RR 1.77, 95% CI 0.38 to 8.27), acute renal failure (RR 1.19, 95% CI 0.33 to 4.33), major bleeding (RR 0.48, 95% CI 0.16 to 1.44), and stroke (RR 1.17, 95% CI 0.36 to 3.78). Compared to the usual care, there were no significant differences in the risk of postoperative complications associated with early extubation: myocardial infarction (RR 0.94, 95% CI 0.55 to 1.60), reintubation (RR 1.91, 95% CI 0.90 to 4.07), acute renal failure (RR 0.77, 95% CI 0.19 to 3.10), major bleeding (RR 0.80, 95% CI 0.45 to 1.44), stroke (RR 0.87, 95% CI 0.31 to 2.46), major sepsis (RR 1.25, 95% CI 0.08 to 19.75) and wound infection (RR 0.67, 95% CI 0.25 to 1.83).

Although there were high levels of heterogeneity, both low-dose opioid anaesthesia and the use of time-directed extubation protocols were associated with reductions in the time to extubation (3.0 to 10.5 hours) and in the length of stay in the intensive care unit (0.4 to 8.7 hours). However, these fast-track care interventions were not associated with reductions in the total length of stay in hospital. One high quality cost-effectiveness analysis included in a randomized controlled trial showed that early extubation was likely to be cost-effective.

Authors' conclusions

The use of low-dose opioid based general anaesthesia and time-directed protocols for fast-track interventions have similar risks of mortality and major postoperative complications to conventional (not fast-track) care, and therefore appear to be safe in patients considered to be at low to moderate risk. These fast-track interventions reduced the time to extubation and shortened the length of stay in the intensive care unit, but did not reduce the length of stay in the hospital.

Dexmedetomidine for the management of awake fibreoptic intubation

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ABSTRACT

Background

Awake fibreoptic intubation (AFOI) frequently requires sedation, anxiolysis and relief of discomfort without impairing ventilation and depressing cardiovascular function. The goal is to allow the patient to be responsive and co-operative. Medications such as fentanyl, remifentanil, midazolam and propofol have been reported to assist AFOI; however,these agents are associated with cardiovascular or respiratory adverse effects. Dexmedetomidine has been proposed as an alternative to facilitate AFOI.

Objectives

The primary objective of this review is to evaluate and compare the efficacy and safety of dexmedetomidine in the management of patients with a difficult or unstable airway undergoing awake fibreoptic intubation (AFOI).

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL; 2012, Issue 5), MEDLINE (1966 to May 2012) through Ovid, EMBASE (1980 to May 2012) and Web of Science (1945 to May 2012); we screened the reference lists of all eligible trials and reviews to look for further trials and contacted authors of trials to ask for additional information. We searched for ongoing trials at http://www.controlledtrials.com/ and http://clinicaltrials.gov/ . We reran our search of all databases listed above on 21 November 2013.

Selection criteria

We included published and unpublished randomized controlled trials, regardless of blinding or language of publication, in participants 18 years of age or older who were scheduled for an elective AFOI because of an anticipated difficult airway. Participants received dexmedetomidine or control medications.

Data collection and analysis

Three review authors independently extracted data on study design, participants, interventions and outcomes. We assessed risk of bias using The Cochrane Collaboration's tool. We estimated risk ratios (RRs) or mean differences (MDs) with 95% confidence internals (CIs) for outcomes with sufficient data; for other outcomes, we performed a qualitative analysis.

Main results

We identified four randomized controlled trials (RCTs), which included 211 participants. The four trials compared dexmedetomidine with midazolam, fentanyl, propofol or a sodium chloride placebo, respectively. The trials showed low or unclear risk of bias primarily because information provided on allocation concealment and other potential sources of bias was inadequate. Owing to clinical heterogeneity and potential methodological heterogeneity, it was impossible to conduct a full meta-analysis. We described findings from individual studies or presented them in tabular form. Limited evidence was available for assessment of the outcomes of interest for this review. Results of the limited included trials showed that dexmedetomidine significantly reduced participants' discomfort with no significant differences in airway obstruction, low oxygen levels or treatment-emergent cardiovascular adverse events noted during AFOI compared with control groups. When the search was rerun (from May 2012 to November 2013), it was noted that four studies are awaiting assessment. We will deal with these studies when we update the review.

Authors' conclusions

Small, limited trials provide weak evidence to support dexmedetomidine as an option for patients with an anticipated difficult airway who undergo AFOI. The findings of this review should be further corroborated by additional controlled investigations.

Clonidine premedication for postoperative analgesia in children

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ABSTRACT

Background

Postoperative pain remains a significant problem following paediatric surgery. Premedication with a suitable agent may improve its management. Clonidine is an alpha-2 adrenergic agonist which has sedative, anxiolytic and analgesic properties. It may therefore be a useful premedication for reducing postoperative pain in children.

Objectives

To evaluate the evidence for the effectiveness of clonidine, when given as a premedication, in reducing postoperative pain in children less than 18 years of age. We also sought evidence of any clinically significant side effects.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) in *The Cochrane Library* (Issue 12, 2012), Ovid MEDLINE (1966 to 21 December 2012) and Ovid EMBASE (1982 to 21 December 2012), as well as reference lists of other relevant articles and online trial registers.

Selection criteria

We included all randomized (or quasi-randomized), controlled trials comparing clonidine premedication to placebo, a higher dose of clonidine, or another agent when used for surgical or other invasive procedures in children under the age of 18 years and where pain or a surrogate (principally the need for supplementary analgesia) was reported.

Data collection and analysis

Two authors independently performed the database search, decided on the inclusion eligibility of publications, ascertained study quality and extracted data. They then resolved any differences between their results by discussion. The data were entered into RevMan 5 for analyses and presentation. Sensitivity analyses were performed, as appropriate, to exclude studies with a high risk of bias.

Main results

We identified 11 trials investigating a total of 742 children in treatment arms relevant to our study question. Risks of bias in the studies were mainly low or unclear, but two studies had aspects of their methodology that had a high risk of bias. Overall, the quality of the evidence from pooled studies was low or had unclear risk of bias. Four trials compared clonidine with a placebo or no treatment, six trials compared clonidine with midazolam, and one trial compared clonidine with fentanyl. There was substantial methodological heterogeneity between trials; the dose and route of clonidine administration varied as did the patient populations, the types of surgery and the outcomes measured. It was therefore difficult to combine the outcomes of some trials for meta-analysis.

When clonidine was compared to placebo, pooling studies of low or unclear risk of bias, the need for additional analgesia was reduced when clonidine premedication was given orally at 4 μg/kg (risk ratio (RR) 0.24, 95% confidence interval (CI) 0.11 to 0.51). Only one small trial (15 patients per arm) compared clonidine to midazolam for the same outcome; this also found a reduction in the need for additional postoperative analgesia (RR 0.25, 95% CI 0.09 to 0.71) when clonidine premedication was given orally at 2 or 4 μg/kg compared to oral midazolam at 0.5 mg/kg. A trial comparing oral clonidine at 4 μg/kg with intravenous fentanyl at 3 μg/kg found no statistically significant difference in the need for rescue analgesia (RR 0.89, 95% CI 0.56 to 1.42). When clonidine 4 μg/kg was compared to clonidine 2 μg/kg, there was a statistically significant difference in the number of patients requiring additional analgesia, in favour of the higher dose, as reported by a single, higher-quality trial (RR 0.38, 95% CI 0.23 to 0.65).

The effect of clonidine on pain scores was hard to interpret due to differences in study methodology, the doses and route of drug administration, and the pain scale used. However, when given at a dose of 4 μg/kg, clonidine may have reduced analgesia requirements after surgery. There were no significant side effects of clonidine that were reported such as severe hypotension, bradycardia, or excessive sedation requiring intervention. However, several studies used atropine prophylactically with the aim of preventing such adverse effects.

Authors' conclusions

There were only 11 relevant trials studying 742 children having surgery where premedication with clonidine was compared to placebo or other drug treatment. Despite heterogeneity between trials, clonidine premedication in an adequate dosage (4 μg/kg) was likely to have a beneficial effect on postoperative pain in children. Side effects were minimal, but some of the studies used atropine prophylactically with the intention of preventing bradycardia and hypotension. Further research is required to determine under what conditions clonidine premedication is most effective in providing postoperative pain relief in children.

Catheter impregnation, coating or bonding for reducing central venous catheter-related infections in adults

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ABSTRACT

Background

The central venous catheter (CVC) is a commonly used device in managing acutely ill patients in the hospital. Bloodstream infections are major complications in patients who require a CVC. Several infection control measures have been developed to reduce bloodstream infections, one of which is CVC impregnated with various forms of antimicrobials (either with an antiseptic or with antibiotics).

Objectives

We aimed to assess the effects of antimicrobial CVCs in reducing clinically diagnosed sepsis, established catheter-related bloodstream infection (CRBSI) and mortality.

Search methods

We used the standard search strategy of the Cochrane Anaesthesia Review Group (CARG). We searched MEDLINE (OVID SP) (1950 to March 2012), the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, Issue 3, 2012), EMBASE (1980 to March 2012), CINAHL (1982 to March 2012) and other Internet resources using a combination of keywords and MeSH headings.

Selection criteria

We included randomized controlled trials that assessed any type of impregnated catheter against either non-impregnated catheters or catheters with another impregnation. We excluded cross-over studies.

Data collection and analysis

We extracted data using the standard methods of the CARG. Two authors independently assessed the relevance and risk of bias of the retrieved records. We expressed our results using risk ratio (RR), absolute risk reduction (ARR) and number need to treat to benefit (NNTB) for categorical data and mean difference (MD) for continuous data where appropriate with their 95% confidence intervals (CIs).

Main results

We included 56 studies with 16,512 catheters and 11 types of antimicrobial impregnations. The total number of participants enrolled was unclear as some studies did not provide this information. There were low or unclear risks of bias in the included studies, except for blinding, which was impossible in most studies due to different appearances between the catheters assessed. Overall, catheter impregnation significantly reduced CRBSI, with an ARR of 2% (95% CI 3% to 1%), RR of 0.61 (95% CI 0.51 to 0.73) and NNTB of 50. Catheter impregnation also reduced catheter colonization, with an ARR of 10% (95% CI 13% to 7%), RR of 0.66 (95% CI 0.58 to 0.75) and NNTB of 10. However, catheter impregnation made no significant difference to the rates of clinically diagnosed sepsis (RR 1.0 (95% CI 0.88 to 1.13)) and all-cause mortality (RR 0.88 (95% CI 0.75 to 1.05)).

In our subgroup analyses, we found that the magnitudes of benefits for impregnated CVCs varied in studies that enrolled different types of participants. For the outcome of catheter colonization, catheter impregnation conferred significant benefit in studies conducted in intensive care units (ICUs) (RR 0.68 (95% CI 0.59 to 0.78)) but not in studies conducted in haematological and oncological units (RR 0.75 (95% CI 0.51 to 1.11)) or studies that assessed predominantly patients who required CVCs for long-term total parenteral nutrition (TPN)(RR 0.99 (95% CI 0.74 to 1.34)). However, there was no such variation for the outcome of CRBSI. The magnitude of the effects was also not affected by the participants' baseline risks.

There were no significant differences between the impregnated and non-impregnated groups in the rates of adverse effects, including thrombosis/thrombophlebitis, bleeding, erythema and/or tenderness at the insertion site.

Authors' conclusions

This review confirms the effectiveness of antimicrobial CVCs in improving such outcomes as CRBSI and catheter colonization. However, the magnitude of benefits in catheter colonization varied according to the setting, with significant benefits only in studies conducted in ICUs. Limited evidence suggests that antimicrobial CVCs do not appear to significantly reduce clinically diagnosed sepsis or mortality. Our findings call for caution in routinely recommending the use of antimicrobial-impregnated CVCs across all settings. Further randomized controlled trials assessing antimicrobial CVCs should include important clinical outcomes like the overall rates of sepsis and mortality.

Preoperative alcohol cessation prior to elective surgery

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Oppedal K, Møller AM, Pedersen B, Tønnesen H. Preoperative alcohol cessation prior to elective surgery. *Cochrane Database of Systematic Reviews* 2012, Issue 7. Art. No.: CD008343. DOI: 10.1002/14651858.CD008343.pub2.

ABSTRACT

Background

Hazardous drinking has been associated with an increased postoperative complication rate after surgery. Common complications include postoperative infections, cardiopulmonary complications, and bleeding episodes. Preoperative abstinence may to some degree reverse alcohol-induced pathophysiological processes and thus prevent postoperative complications.

Objectives

To assess the effect of preoperative alcohol cessation interventions on the rate of postoperative complications including mortality in hazardous drinkers. To assess the effect of preoperative alcohol cessation interventions for hazardous drinkers on alcohol use in the postoperative period and in the long term.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2011, Issue 9); Ovid MEDLINE (1966 to September 2011); Ovid EMBASE (1966 to September 2011); CINAHL via EBSCOhost (1982 to September 2011). We combined the MEDLINE search strategy with the Cochrane highly sensitive search strategy, as contained in the *Cochrane Handbook for Systematic Reviews of Interventions*, to identify randomized controlled trials (RCTs).

Selection criteria

We included all randomized controlled trials (RCTs) that evaluated the effects of a preoperative alcohol cessation intervention on postoperative complications or postoperative alcohol consumption, or both, in the short and long term in hazardous drinkers . We excluded intraoperative and postoperative alcohol interventions.

Data collection and analysis

Three authors independently assessed studies to determine eligibility and extracted data using a tool based on guidance in the *Cochrane Handbook for Systematic Reviews of Interventions*. Where required, we obtained additional information through collaboration with the original author. We presented the main outcomes as dichotomous variables. Where data were available, we planned to conduct subgroup analyses as well as a sensitivity analysis to explore risk of bias.

Main results

We included two studies which involved 69 patients. Both studies were RCTs evaluating the effect of intensive alcohol cessation interventions including pharmacological strategies for alcohol withdrawal and relapse prophylaxis.

Our primary outcome measure was postoperative complications and in-hospital and 30-day mortality. Meta-analysis showed an effect on the overall complication rates (odds ratio (OR) 0.22; 95% confidence interval (CI) 0.08 to 0.61; P = 0.004). There was no significant reduction of in-hospital and 30-day mortality (OR 0.39; 95% CI 0.06 to 2.83; P = 0.35).

Secondary outcomes included length of stay and postoperative alcohol use. No significant reduction was found.

Authors' conclusions

Based on the finding of two studies, it appears that intensive preoperative alcohol cessation interventions, including pharmacological strategies for relapse prophylaxis and withdrawal symptoms, may significantly reduce postoperative complication rates. No effect was found on mortality rates and length of stay.

The effect of preoperative alcohol cessation intervention should be further explored in an effort to reduce the adverse effect of alcohol use on surgical outcomes. The number needed to screen to identify eligible patients for alcohol intervention studies in surgical settings seems to be extremely high. This may indicate that these studies are difficult to perform. Nevertheless, timing, duration and intensity of alcohol cessation interventions need to be subject to further investigation.

Music interventions for preoperative anxiety

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Bradt J, Dileo C, Shim M. Music interventions for preoperative anxiety. *Cochrane Database of Systematic Reviews* 2013, Issue 6. Art. No.: CD006908. DOI: 10.1002/14651858.CD006908.pub2.

ABSTRACT

Background

Patients awaiting surgical procedures often experience significant anxiety. Such anxiety may result in negative physiological manifestations, slower wound healing, increased risk of infection, and may complicate the induction of anaesthesia and impede postoperative recovery. To reduce patient anxiety, sedatives and anti-anxiety drugs are regularly administered before surgery. However, these often have negative side effects and may prolong patient recovery. Therefore, increasing attention is being paid to a variety of non-pharmacological interventions for reduction of preoperative anxiety such as music therapy and music medicine interventions. Interventions are categorized as 'music medicine' when passive listening to pre-recorded music is offered by medical personnel. In contrast, music therapy requires the implementation of a music intervention by a trained music therapist, the presence of a therapeutic process, and the use of personally tailored music experiences. A systematic review was needed to gauge the efficacy of both music therapy and music medicine interventions for reduction of preoperative anxiety.

Objectives

To examine the effects of music interventions with standard care versus standard care alone on preoperative anxiety in surgical patients.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2012, Issue 7), MEDLINE (1950 to August 2012), CINAHL (1980 to August 2012), AMED (1985 to April 2011; we no longer had access to AMED after this date), EMBASE (1980 to August 2012), PsycINFO (1967 to August 2012), LILACS (1982 to August 2012), Science Citation Index (1980 to August 2012), the specialist music therapy research database (March 1 2008; database is no longer functional), CAIRSS for Music (to August 2012), Proquest Digital Dissertations (1980 to August 2012), ClinicalTrials.gov (2000 to August 2012), Current Controlled Trials (1998 to August 2012), and the National Research Register (2000 to September 2007). We handsearched music therapy journals and reference lists, and contacted relevant experts to identify unpublished manuscripts. There was no language restriction.

Selection criteria

We included all randomized and quasi-randomized trials that compared music interventions and standard care with standard care alone for reducing preoperative anxiety in surgical patients.

Data collection and analysis

Two review authors independently extracted the data and assessed the risk of bias. We contacted authors to obtain missing data where needed. Where possible, results were presented in meta analyses using mean differences and standardized mean differences. Post-test scores were used. In cases of significant baseline differences, we used change scores.

Main results

We included 26 trials (2051 participants). All studies used listening to pre-recorded music. The results suggested that music listening may have a beneficial effect on preoperative anxiety. Specifically, music listening resulted, on average, in an anxiety reduction that was 5.72 units greater (95% CI -7.27 to -4.17, $P < 0.00001$) than that in the standard care group as measured by the Stait-Trait Anxiety Inventory (STAI-S), and -0.60 standardized units (95% CI -0.90 to -0.31, $P < 0.0001$) on other anxiety scales. The results also suggested a small effect on heart rate and diastolic blood pressure, but no support was found for reductions in systolic blood pressure, respiratory rate, and skin temperature. Most trials were assessed to be at high risk of bias because of lack of blinding. Blinding of outcome assessors is often impossible in music therapy and music medicine studies that use subjective outcomes, unless in studies in which the music intervention is compared to another treatment intervention. Because of the high risk of bias, these results need to be interpreted with caution.

None of the studies included wound healing, infection rate, time to discharge, or patient satisfaction as outcome variables. One large study found that music listening was more effective than the sedative midazolam in reducing preoperative anxiety and equally effective in reducing physiological responses. No adverse effects were identified.

Authors' conclusions

This systematic review indicates that music listening may have a beneficial effect on preoperative anxiety. These findings are consistent with the findings of three other Cochrane systematic reviews on the use of music interventions for anxiety reduction in medical patients. Therefore, we conclude that music interventions may provide a viable alternative to sedatives and anti-anxiety drugs for reducing preoperative anxiety.

Perioperative increase in global blood flow to explicit defined goals and outcomes following surgery

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 7, 2013.
Review content assessed as up-to-date: 1 March 2012.

Citation: Grocott MPW, Dushianthan A, Hamilton MA, Mythen MG, Harrison D, Rowan K, Optimisation Systematic Review Steering Group. Perioperative increase in global blood flow to explicit defined goals and outcomes following surgery. *Cochrane Database of Systematic Reviews* 2012, Issue 11. Art. No.: CD004082. DOI: 10.1002/14651858.CD004082.pub5.

ABSTRACT

Background

Studies have suggested that increasing whole body blood flow and oxygen delivery around the time of surgery reduces mortality, morbidity and the expense of major operations.

Objectives

To describe the effects of increasing perioperative blood flow using fluids with or without inotropes or vasoactive drugs. Outcomes were mortality, morbidity, resource utilization and health status.

Search methods

We searched CENTRAL (*The Cochrane Library* 2012, Issue 1), MEDLINE (1966 to March 2012) and EMBASE (1982 to March 2012). We manually searched the proceedings of major conferences and personal reference databases up to December 2011. We contacted experts in the field and pharmaceutical companies for published and unpublished data.

Selection criteria

We included randomized controlled trials with or without blinding. We included studies involving adult patients (aged 16 years or older) undergoing surgery (patients having a procedure in an operating room). The intervention met the following criteria. 'Perioperative' was defined as starting up to 24 hours before surgery and stopping up to six hours after surgery. 'Targeted to increase global blood flow' was defined by explicit measured goals that were greater than in controls, specifically one or more of cardiac index, oxygen delivery, oxygen consumption, stroke volume (and the respective derived indices), mixed venous oxygen saturation (SVO_2), oxygen extraction ratio (O_2ER) or lactate.

Data collection and analysis

Two authors independently extracted the data. We contacted study authors for additional data. We used Review Manager software.

Main results

We included 31 studies of 5292 participants. There was no difference in mortality: 282/2615 (10.8%) died in the control group and 238/2677 (8.9%) in the treatment group, RR of 0.89 (95% CI 0.76 to 1.05, P = 0.18). However, the results were sensitive to analytical methods and the intervention was better than control when inverse variance or Mantel-Haenszel random-effects models were used, RR of 0.72 (95% CI 0.55 to 0.95, P = 0.02). The results were also sensitive to withdrawal of studies with methodological limitations. The rates of three morbidities were reduced by increasing global blood flow: renal failure, RR of 0.71 (95% CI 0.57 to 0.90); respiratory failure, RR of 0.51 (95% CI 0.28 to 0.93); and wound infections, RR of 0.65 (95% CI 0.51 to 0.84). There were no differences in the rates of nine other morbidities: arrhythmia, pneumonia, sepsis, abdominal infection, urinary tract infection, myocardial infarction, congestive cardiac failure or pulmonary oedema, or venous thrombosis. The number of patients with complications was reduced by the intervention, RR of 0.68 (95% CI 0.58 to 0.80). Hospital length of stay was reduced in the treatment group by a mean of 1.16 days (95% CI 0.43 to 1.89, P = 0.002). There was no difference in critical care length of stay. There were insufficient data to comment on quality of life and cost effectiveness.

Authors' conclusions

It remains uncertain whether increasing blood flow using fluids, with or without inotropes or vasoactive drugs, reduces mortality in adults undergoing surgery. The primary analysis in this review (mortality at longest follow-up) showed no difference between the intervention and control, but this result was sensitive to the method of analysis, the withdrawal of studies with methodological limitations, and is dominated by a single large RCT. Overall, for every 100 patients in whom blood flow is increased perioperatively to defined goals, one can expect 13 in 100 patients (from 40/100 to 27/100) to avoid a complication, 2/100 to avoid renal impairment (from 8/100 to 6/100), 5/100 to avoid respiratory failure (from 10/100 to 5/100), and 4/100 to avoid postoperative wound infection (from 10/100 to 6/100). On average, patients receiving the intervention stay in hospital one day less. It is unlikely that the intervention causes harm. The balance of current evidence does not support widespread implementation of this approach to reduce mortality but does suggest that complications and duration of hospital stay are reduced.

Automated versus non-automated weaning for reducing the duration of mechanical ventilation for critically ill adults and children

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Rose L, Schultz MJ, Cardwell CR, Jouvet P, McAuley DF, Blackwood B. Automated versus non-automated weaning for reducing the duration of mechanical ventilation for critically ill adults and children. *Cochrane Database of Systematic Reviews* 2013, Issue 6. Art. No.: CD009235. DOI: 10.1002/14651858.CD009235.pub2.

ABSTRACT

Background

Automated closed loop systems may improve adaptation of the mechanical support to a patient's ventilatory needs and facilitate systematic and early recognition of their ability to breathe spontaneously and the potential for discontinuation of ventilation.

Objectives

To compare the duration of weaning from mechanical ventilation for critically ill ventilated adults and children when managed with automated closed loop systems versus non-automated strategies. Secondary objectives were to determine differences in duration of ventilation, intensive care unit (ICU) and hospital length of stay (LOS), mortality, and adverse events.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2011, Issue 2); MEDLINE (OvidSP) (1948 to August 2011); EMBASE (OvidSP) (1980 to August 2011); CINAHL (EBSCOhost) (1982 to August 2011); and the Latin American and Caribbean Health Sciences Literature (LILACS). In addition we received and reviewed auto-alerts for our search strategy in MEDLINE, EMBASE, and CINAHL up to August 2012. Relevant published reviews were sought using the Database of Abstracts of Reviews of Effects (DARE) and the Health Technology Assessment Database (HTA Database). We also searched the Web of Science Proceedings; conference proceedings; trial registration websites; and reference lists of relevant articles.

Selection criteria

We included randomized controlled trials comparing automated closed loop ventilator applications to non-automated weaning strategies including non-protocolized usual care and protocolized weaning in patients over four weeks of age receiving invasive mechanical ventilation in an intensive care unit (ICU).

Data collection and analysis

Two authors independently extracted study data and assessed risk of bias. We combined data into forest plots using random-effects modelling. Subgroup and sensitivity analyses were conducted according to a priori criteria.

Main results

Pooled data from 15 eligible trials (14 adult, one paediatric) totalling 1173 participants (1143 adults, 30 children) indicated that automated closed loop systems reduced the geometric mean duration of weaning by 32% (95% CI 19% to 46%, P = 0.002), however heterogeneity was substantial (I^2 = 89%, P < 0.00001). Reduced weaning duration was found with mixed or medical ICU populations (43%, 95% CI 8% to 65%, P = 0.02) and Smartcare/PS™ (31%, 95% CI 7% to 49%, P = 0.02) but not in surgical populations or using other systems. Automated closed loop systems reduced the duration of ventilation (17%, 95% CI 8% to 26%) and ICU length of stay (LOS) (11%, 95% CI 0% to 21%). There was no difference in mortality rates or hospital LOS. Overall the quality of evidence was high with the majority of trials rated as low risk.

Authors' conclusions

Automated closed loop systems may result in reduced duration of weaning, ventilation, and ICU stay. Reductions are more likely to occur in mixed or medical ICU populations. Due to the lack of, or limited, evidence on automated systems other than Smartcare/PS™ and Adaptive Support Ventilation no conclusions can be drawn regarding their influence on these outcomes. Due to substantial heterogeneity in trials there is a need for an adequately powered, high quality, multi-centre randomized controlled trial in adults that excludes 'simple to wean' patients. There is a pressing need for further technological development and research in the paediatric population.

8.2 Apêndice 2 - *Abstract* das revisões sistemáticas da Colaboração Cochrane com desfechos que apoiam a intervenção sem recomendação de novos estudos **(A2)**

Topical anaesthesia alone versus topical anaesthesia with intracameral lidocaine for phacoemulsification

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 12, 2010.
Review content assessed as up-to-date: 22 April 2007.

Citation: Ezra DG, Allan BDS. Topical anaesthesia alone versus topical anaesthesia with intracameral lidocaine for phacoemulsification. *Cochrane Database of Systematic Reviews* 2007, Issue 3. Art. No.: CD005276. DOI: 10.1002/14651858.CD005276.pub2.

ABSTRACT

Background

Cataract is defined as loss of transparency of the natural lens and is usually an age-related phenomenon. The only recognized treatment available for cataract involves surgery. An ideal anaesthetic should allow for pain-free surgery with no systemic or local complications. It should be cost effective and should facilitate a stress-free procedure for surgeon and patient alike. Topical anaesthesia involves applying anaesthetic eye drops to the surface of the eye prior to and during surgery. This has found large acceptance especially in the USA where it is used by 61% of cataract surgeons. Many surgeons who perform cataract surgery under topical anaesthesia also use intraoperative supplementary intracameral lidocaine (injected directly into the anterior chamber of the eye). The benefits and possible risks of intracameral lidocaine have been assessed by a number of randomized controlled trials, but the results have been conflicting and many of the endpoints have been heterogeneous.

Objectives

The primary objective of this systematic review was to assess pain during surgery and patient satisfaction with topical anaesthesia alone compared to topical anaesthesia with intracameral anaesthesia for phacoemulsification. The secondary objectives were to assess adverse effects and complications attributable to choice of anaesthesia and the need for additional anaesthesia during surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2006, Issue 2), MEDLINE (1966 to May 2006), EMBASE (1980 to May 2006) and LILACs (1982 to 3 May 2006). We also searched the reference lists of the identified studies and the Science Citation Index. We did not have any language restriction.

Selection criteria

We included only randomized controlled trials (RCTs) comparing topical anaesthesia alone to topical anaesthesia with intracameral lidocaine.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. For dichotomous outcomes data were presented as odds ratios. For continuous outcomes the weighted mean difference was employed. A random-effects model was used unless there were fewer than three trials in a comparison, where a fixed-effect model was used. We explored heterogeneity between trial results using a chi-squared test.

Main results

A total of eight trials comprising of 1281 patients were identified for analysis. Our data comparison showed a significantly lower intraoperative pain perception in patient groups using supplementary intracameral lidocaine, although the difference was small. No significant difference was demonstrated between the groups receiving topical anaesthesia alone and topical combined with intracameral anaesthesia in terms of the need for supplemental anaesthesia, intraoperative adverse events or corneal toxicity.

Authors' conclusions

The use of intracameral unpreserved 1% lidocaine is an effective and safe adjunct to topical anaesthesia for phacoemulsification cataract surgery.

Beta lactam antibiotic monotherapy versus beta lactam-aminoglycoside antibiotic combination therapy for sepsis

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 1, 2009.
Review content assessed as up-to-date: 10 November 2005.

Citation: Paul M, Grozinsky S, Soares-Weiser K, Leibovici L. Beta lactam antibiotic monotherapy versus beta lactam-aminoglycoside antibiotic combination therapy for sepsis. *Cochrane Database of Systematic Reviews* 2006, Issue 1. Art. No.: CD003344. DOI: 10.1002/14651858.CD003344.pub2.

ABSTRACT

Background

Optimal antibiotic treatment for sepsis is imperative. Combining a beta-lactam antibiotic with an aminoglycoside antibiotic may have certain advantages over beta-lactam monotherapy.

Objectives

We compared clinical outcomes for beta lactam-aminoglycoside combination therapy versus beta lactam monotherapy for sepsis.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL), (*The Cochrane Library*, Issue 3, 2004); MEDLINE (1966 to July 2004); EMBASE (1980 to March 2003); LILACS (1982 to July 2004); and conference proceedings of the Interscience Conference of Antimicrobial Agents and Chemotherapy (1995 to 2003). We scanned citations of all identified studies and contacted all corresponding authors.

Selection criteria

We included randomized and quasi-randomized trials comparing any beta-lactam monotherapy to any combination of one beta-lactam and one aminoglycoside for sepsis.

Data collection and analysis

The primary outcome was all-cause fatality. Secondary outcomes included treatment failure, superinfections, colonization, and adverse events. Two authors independently collected data. We pooled relative risks (RR) with their 95% confidence intervals (CI) using the fixed effect model. We extracted outcomes by intention-to-treat analysis whenever possible.

Main results

We included 64 trials, randomizing 7586 patients. Twenty trials compared the same beta-lactam in both study arms, while the remaining compared different beta-lactams using a broader spectrum beta-lactam in the monotherapy arm. In studies comparing the same beta-lactam, we observed no difference between study groups with regard to all-cause fatality, RR 1.01 (95% CI 0.75-1.35) and clinical failure, RR 1.11 (95% CI 0.95-1.29). In studies comparing different beta-lactams, we observed an advantage to monotherapy: all cause fatality RR 0.85 (95% CI 0.71-1.01), clinical failure RR 0.77 (95% CI 0.69-0.86). No significant disparities emerged from subgroup and sensitivity analyses, including the assessment of patients with Gram-negative and *Pseudomonas aeruginosa* infections. We detected no differences in the rate of resistance development. Adverse events rates did not differ significantly between the study groups overall, although nephrotoxicity was significantly more frequent with combination therapy, RR 0.30 (95% CI 0.23-0.39). We found no heterogeneity for all comparisons. We included a small subset of studies addressing patients with Gram-positive infections, mainly endocarditis. We identified no difference between monotherapy and combination therapy in these studies.

Authors' conclusions

The addition of an aminoglycoside to beta-lactams for sepsis should be discouraged. All-cause fatality rates are unchanged. Combination treatment carries a significant risk of nephrotoxicity.

Single, double or multiple-injection techniques for non-ultrasound guided axillary brachial plexus block in adults undergoing surgery of the lower arm

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 8, 2013.
Review content assessed as up-to-date: 5 March 2013.

Citation: Chin KJ, Alakkad H, Cubillos JE. Single, double or multiple-injection techniques for non-ultrasound guided axillary brachial plexus block in adults undergoing surgery of the lower arm. *Cochrane Database of Systematic Reviews* 2013, Issue 8. Art. No.: CD003842. DOI: 10.1002/14651858.CD003842.pub4.

ABSTRACT

Background

Regional anaesthesia comprising axillary block of the brachial plexus is a common anaesthetic technique for distal upper limb surgery. This is an update of a review first published in 2006 and updated in 2011.

Objectives

To compare the relative effects (benefits and harms) of three injection techniques (single, double and multiple) of axillary block of the brachial plexus for distal upper extremity surgery. We considered these effects primarily in terms of anaesthetic effectiveness; the complication rate (neurological and vascular); and pain and discomfort caused by performance of the block.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*), MEDLINE, EMBASE and reference lists of trials. We contacted trial authors. The date of the last search was March 2013 (updated from March 2011).

Selection criteria

We included randomized controlled trials that compared double with single-injection techniques, multiple with single-injection techniques, or multiple with double-injection techniques for axillary block in adults undergoing surgery of the distal upper limb. We excluded trials using ultrasound-guided techniques.

Data collection and analysis

Independent study selection, risk of bias assessment and data extraction were performed by at least two investigators. We undertook meta-analysis.

Main results

The 21 included trials involved a total of 2148 participants who received regional anaesthesia for hand, wrist, forearm or elbow surgery. Risk of bias assessment indicated that trial design and conduct were generally adequate; the most common areas of weakness were in blinding and allocation concealment.

Eight trials comparing double versus single injections showed a statistically significant decrease in primary anaesthesia failure (risk ratio (RR 0.51), 95% confidence interval (CI) 0.30 to 0.85). Subgroup analysis by method of nerve location showed that the effect size was greater when neurostimulation was used rather than the transarterial technique.

Eight trials comparing multiple with single injections showed a statistically significant decrease in primary anaesthesia failure (RR 0.25, 95% CI 0.14 to 0.44) and of incomplete motor block (RR 0.61, 95% CI 0.39 to 0.96) in the multiple injection group.

Eleven trials comparing multiple with double injections showed a statistically significant decrease in primary anaesthesia failure (RR 0.28, 95% CI 0.20 to 0.40) and of incomplete motor block (RR 0.55, 95% CI 0.36 to 0.85) in the multiple injection group.

Tourniquet pain was significantly reduced with multiple injections compared with double injections (RR 0.53, 95% CI 0.33 to 0.84). Otherwise there were no statistically significant differences between groups in any of the three comparisons on secondary analgesia failure, complications and patient discomfort. The time for block performance was significantly shorter for single and double injections compared with multiple injections.

Authors' conclusions

This review provides evidence that multiple-injection techniques using nerve stimulation for axillary plexus block produce more effective anaesthesia than either double or single-injection techniques. However, there was insufficient evidence for a significant difference in other outcomes, including safety.

8.3 Apêndice 3 - *Abstract* das revisões sistemáticas da Colaboração Cochrane com desfechos que não apoiam a intervenção com recomendação de novos estudos **(B1)**

Rocuronium versus succinylcholine for rapid sequence induction intubation

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (conclusions changed), published in Issue 2, 2008.
Review content assessed as up-to-date: 20 August 2007.

Citation: Perry JJ, Lee JS, Sillberg VAH, Wells GA. Rocuronium versus succinylcholine for rapid sequence induction intubation. *Cochrane Database of Systematic Reviews* 2008, Issue 2. Art. No.: CD002788. DOI: 10.1002/14651858.CD002788.pub2.

ABSTRACT

Background

Patients requiring emergency endotracheal intubation often require a rapid sequence induction (RSI) intubation technique to protect against aspiration or increased intracranial pressure, or to facilitate intubation. Succinylcholine is the most commonly used muscle relaxant because of its fast onset and short duration; unfortunately, it can have serious side effects. Rocuronium has been suggested as an alternative to succinylcholine for intubation. This meta-analysis is an update since our initial Cochrane systematic review in 2003.

Objectives

To determine if rocuronium creates comparable intubating conditions to succinylcholine during RSI intubation. Comparisons were made based on dose of rocuronium, narcotic use, emergency versus elective intubation, age and induction agent. The primary outcome was excellent intubation conditions. The secondary outcome was acceptable conditions.

Search methods

In our initial systematic review we searched all databases until March 2000. We have updated that search and searched the Cochrane Central Register of Controlled Trials (*The Cochrane Library*, 2007 issue 3), MEDLINE (1966 to June Week 3 2007), EMBASE (1988 to 2007 Week 26) for randomized controlled trials or controlled clinical trials relating to the use of rocuronium and succinylcholine. We included foreign language journals and handsearched the references of identified studies for additional citations.

Selection criteria

We included all trials meeting the inclusion criteria (comparison of rocuronium and succinylcholine, main outcomes of intubation conditions).

Data collection and analysis

Two authors (JP, JL or VS) independently extracted data and assessed methodological quality for allocation concealment. We combined the outcomes in RevMan using relative risk (RR) with a random-effects model.

Main results

In our initial systematic review we identified 40 studies and included 26. In this update we identified a further 18 studies and included 11. In total, we identified 58 potential studies; 37 were combined for meta-analysis. Overall, succinylcholine was superior to rocuronium, RR 0.86 (95% confidence interval (95% CI) 0.80 to 0.92) (n = 2690). In the group that used propofol for induction, the intubation conditions were superior with succinylcholine (RR 0.88, 95% CI 0.80 to 0.97) (n = 1183). This is contrary to our previous meta-analysis results where we reported that intubation conditions were superior in the rocuronium group when propofol was used. We found no statistical difference in intubation conditions when succinylcholine was compared to 1.2mg/kg rocuronium; however, succinylcholine was clinically superior as it has a shorter duration of action.

Authors' conclusions

Succinylcholine created superior intubation conditions to rocuronium when comparing both excellent and clinically acceptable intubating conditions.

Patient controlled intravenous opioid analgesia versus continuous epidural analgesia for pain after intra-abdominal surgery

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2008.
Review content assessed as up-to-date: 13 October 2004.

Citation: Werawatganon T, Charuluxananan S. Patient controlled intravenous opioid analgesia versus continuous epidural analgesia for pain after intra-abdominal surgery. *Cochrane Database of Systematic Reviews* 2005, Issue 1. Art. No.: CD004088. DOI: 10.1002/14651858.CD004088.pub2.

ABSTRACT

Background

There are two common techniques for postoperative pain control after intra-abdominal surgery: patient-controlled analgesia (PCA) with intravenous opioids and continuous epidural analgesia (CEA). It is uncertain which method has better pain control and fewer adverse effects.

Objectives

The objective of this review was to compare PCA opioid therapy with CEA for pain control after intra-abdominal surgery in terms of analgesic efficacy, side effects, patient satisfaction and surgical outcome by meta-analysis of the relevant trials.

Search methods

We searched CENTRAL (*The Cochrane Library* Issue 4, 2002), MEDLINE (January 1966 to October 2002), EMBASE (January 1988 to October 2002), and reference lists of articles. We also contacted researchers in the field.

Selection criteria

Randomized controlled trials of adult patients after intra-abdominal surgery comparing the effect of two pain control regimens in terms of analgesic efficacy and side effects. In the patient-controlled analgesia (PCA) group the patient should be able to operate the device himself. In the continuous epidural analgesia group there was no PCA device.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. Study authors were contacted for additional information. Adverse effects information was collected from the trials.

Main results

Nine studies involving 711 participants were included. The PCA group had a higher pain visual analogue scale than the CEA group during 6, 24 and 72 hour periods. The weighted mean difference and 95% confidence interval of resting pain was 1.74 (95% CI 1.30 to 2.19), 0.99 (95% CI 0.65 to 1.33), and 0.63 (95% CI 0.24 to 1.01), respectively. The length of hospital stay and other adverse effects were not statistically different except that the incidence of pruritus was lower in the PCA group, odds ratio of 0.27 (95% CI 0.11 to 0.64).

Authors' conclusions

CEA is superior to opioid PCA in relieving postoperative pain for up to 72 hours in patients undergoing intra-abdominal surgery, but it is associated with a higher incidence of pruritus. There is insufficient evidence to draw comparisons about the other advantages and disadvantages of these two methods of pain relief.

Sub-Tenon's anaesthesia versus topical anaesthesia for cataract surgery

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 6, 2010.
Review content assessed as up-to-date: 28 July 2006.

Citation: Davison M, Padroni S, Bunce C, Rüschen H. Sub-Tenon's anaesthesia versus topical anaesthesia for cataract surgery. *Cochrane Database of Systematic Reviews* 2007, Issue 3. Art. No.: CD006291. DOI: 10.1002/14651858.CD006291.pub2.

ABSTRACT

Background

Local anaesthesia for cataract surgery can be provided by either sub-Tenon or topical anaesthesia. Although there is some work suggesting advantages to both techniques, there has been no recent systematic attempt to compare both techniques for all relevant outcomes.

Objectives

To compare the effectiveness of topical anaesthesia (with or without the addition of intracameral local anaesthetic) and sub-Tenon's anaesthesia in providing pain relief during cataract surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (*The Cochrane Library*, 2006, Issue 2); MEDLINE (1990 to July 2006); EMBASE (1990 to July 2006) and reference lists of articles. There were no constraints based on language or publication status.

Selection criteria

We included all randomized or quasi-randomized studies comparing sub-Tenon anaesthesia with topical anaesthesia for cataract surgery.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. We contacted study authors for additional information. We also collected adverse effects information from the trials.

Main results

Seven studies involving 617 patients with 742 eyes operated on were examined. Five studies used unpaired data, with a single eye operated on; two studies used paired data with both eyes operated on. The surgical technique was clear corneal incision in five studies and scleral tunnel in two. The overall quality of the studies was not high, with one study triple blind (patient, surgeon and assessor blinded to treatment group) and three others single blind. The allocation of concealment and methods of randomization were only described in two studies. Three unpaired studies showed that sub-Tenon anaesthesia provided better intra-operative pain relief than topical anaesthesia (pooled weighted mean difference (fixed) 1.28, 95% CI 0.83

to 1.72). The differences in the pain scores are not necessarily clinically significant although statistically significant. The differences are not large in magnitude and are skewed to the low end of the visual analogue scale but the studies are consistent throughout in reporting more pain in the topical anaesthesia group. This was also supported by the one paired study which showed that the mean pain score in the topical group was 1.13 (SD 1.57) compared with 0.57 (SD 1.28) in the sub-Tenon group ($P < 0.001$). Three of the studies used a 10-point visual analogue scale, while one used a novel 5-point scale. Further support was provided by other outcome measures. Sub-Tenon anaesthesia caused more chemosis and sub-conjunctival haemorrhage although this was purely aesthetic. The more serious complication of posterior capsule tear and vitreous loss occurred twice as much in the topical group than with sub-Tenon anaesthesia (4.3% versus 2.1%).

Authors' conclusions

Sub-Tenon anaesthesia provides better pain relief than topical anaesthesia for cataract surgery.

Antithrombin III for critically ill patients

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 12, 2010.
Review content assessed as up-to-date: 3 November 2006.

Citation: Afshari A, Wetterslev J, Brok J, Møller AM. Antithrombin III for critically ill patients. *Cochrane Database of Systematic Reviews* 2008, Issue 3. Art. No.: CD005370. DOI: 10.1002/14651858.CD005370.pub2.

ABSTRACT

Background

Critical illness is associated with uncontrolled inflammation and vascular damage which can result in multiple organ failure and death. Antithrombin III (AT III) is an anticoagulant with anti-inflammatory properties but the efficacy and any harmful effects of AT III supplementation in critically ill patients are unknown.

Objectives

To assess the benefits and harms of AT III in critically ill patients.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*); MEDLINE; EMBASE; Science Citation Index Expanded; International Web of Science; CINAHL; LILACS; and the Chinese Biomedical Literature Database (up to November 2006). We contacted authors and manufacturers in the field.

Selection criteria

We included all randomized clinical trials, irrespective of blinding or language, that compared AT III with no intervention or placebo in critically ill patients.

Data collection and analysis

Our primary outcome measure was mortality. We each independently abstracted data and resolved any disagreements by discussion. We presented pooled estimates of the intervention effects on dichotomous outcomes as relative risks (RR) with 95% confidence intervals (CI). We performed subgroup analyses to assess risk of bias, the effect of AT III in different populations (sepsis, trauma, obstetric, and paediatric patients), and the effect of AT III in patients with or without the use of concomitant heparin. We assessed the adequacy of the available number of participants and performed a trial sequential analysis to establish the implications for further research.

Main results

We included 20 randomized trials with a total of 3458 participants; 13 of these trials had high risk of bias. When we combined all trials, AT III did not statistically significantly reduce overall mortality compared with the control group (RR 0.96, 95% CI 0.89 to 1.03; no heterogeneity between trials). A total of 32 subgroup and sensitivity analyses were carried out. Analyses based on risk of bias, different populations, and the role of adjuvant heparin gave insignificant differences. AT III reduced the multiorgan failure score among survivors in an analysis involving very few patients. AT III increased bleeding events (RR 1.52, 95% CI 1.30 to 1.78).

Authors' conclusions

AT III cannot be recommended for critically ill patients based on the available evidence. A randomized controlled trial of AT III, without adjuvant heparin, with prespecified inclusion criteria and good bias protection is needed.

Inhaled nitric oxide for acute respiratory distress syndrome (ARDS) and acute lung injury in children and adults

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 12, 2010.
Review content assessed as up-to-date: 7 June 2010.

Citation: Afshari A, Brok J, Møller AM, Wetterslev J. Inhaled nitric oxide for acute respiratory distress syndrome (ARDS) and acute lung injury in children and adults. *Cochrane Database of Systematic Reviews* 2010, Issue 7. Art. No.: CD002787. DOI: 10.1002/14651858.CD002787.pub2.

ABSTRACT

Background

Acute hypoxaemic respiratory failure (AHRF), defined as acute lung injury (ALI) and acute respiratory distress syndrome (ARDS), are critical conditions. AHRF results from a number of systemic conditions and is associated with high mortality and morbidity in all ages. Inhaled nitric oxide (INO) has been used to improve oxygenation but its role remains controversial.

Objectives

To systematically assess the benefits and harms of INO in critically ill patients with AHRF.

Search methods

Randomized clinical trials (RCTs) were identified from electronic databases: the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 1); MEDLINE; EMBASE; Science Citation Index Expanded; International Web of Science; CINAHL; LILACS; and the Chinese Biomedical Literature Database (up to 31st January 2010). We contacted trial authors, authors of previous reviews, and manufacturers in the field.

Selection criteria

We included all RCTs, irrespective of blinding or language, that compared INO with no intervention or placebo in children or adults with AHRF.

Data collection and analysis

Two authors independently abstracted data and resolved any disagreements by discussion. We presented pooled estimates of the intervention effects on dichotomous outcomes as relative risks (RR) with 95% confidence intervals (CI). Our primary outcome measure was all cause mortality. We performed subgroup and sensitivity analyses to assess the effect of INO in adults and children and on various clinical and physiological outcomes. We assessed the risk of bias through assessment of trial methodological components and the risk of random error through trial sequential analysis.

Main results

We included 14 RCTs with a total of 1303 participants; 10 of these trials had a high risk of bias. INO showed no statistically significant effect on overall mortality (40.2% versus 38.6%) (RR 1.06, 95% CI 0.93 to 1.22; $I^2 = 0$) and in several subgroup and sensitivity analyses, indicating robust results. Limited data demonstrated a statistically insignificant effect of INO on duration of ventilation, ventilator-free days, and length of stay in the intensive care unit and hospital. We found a statistically significant but transient improvement in oxygenation in the first 24 hours, expressed as the ratio of partial pressure of oxygen to fraction of inspired oxygen and the oxygenation index (MD 15.91, 95% CI 8.25 to 23.56; $I^2 = 25\%$). However, INO appears to increase the risk of renal impairment among adults (RR 1.59, 95% CI 1.17 to 2.16; $I^2 = 0$) but not the risk of bleeding or methaemoglobin or nitrogen dioxide formation.

Authors' conclusions

INO cannot be recommended for patients with AHRF. INO results in a transient improvement in oxygenation but does not reduce mortality and may be harmful.

Human recombinant activated protein C for severe sepsis

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Martí-Carvajal AJ, Solà I, Lathyris D, Cardona AF. Human recombinant activated protein C for severe sepsis. *Cochrane Database of Systematic Reviews* 2012, Issue 3. Art. No.: CD004388. DOI: 10.1002/14651858.CD004388.pub5.

ABSTRACT

Background

Sepsis is a common and frequently fatal condition. Human recombinant activated protein C (APC) has been used to reduce the high rate of death by severe sepsis or septic shock. This is an update of a Cochrane review (originally published in 2007 and updated in 2008).

Objectives

We assessed the clinical effectiveness and safety of APC for the treatment of patients with severe sepsis or septic shock.

Search methods

For this updated review we searched CENTRAL (*The Cochrane Library* 2010, Issue 6); MEDLINE (1966 to June 2010); EMBASE (1980 to July 1, 2010); BIOSIS (1965 to July 1, 2010); CINAHL (1982 to 16 June 2010) and LILACS (1982 to 16 June 2010). There was no language restriction.

Selection criteria

We included randomized controlled trials (RCTs) assessing the effects of APC for severe sepsis in adults and children. We excluded studies on neonates. We considered all-cause mortality at day 28, at the end of study follow up, and hospital mortality as the primary outcomes.

Data collection and analysis

We independently performed study selection, risk of bias assessment and data extraction. We estimated relative risks (RR) for dichotomous outcomes. We measured statistical heterogeneity using the I^2 statistic. We used a random-effects model.

Main results

We identified one new RCT in this update. We included a total of five RCTs involving 5101 participants. For 28-day mortality, APC did not reduce the risk of death in adult participants with severe sepsis (pooled RR 0.97, 95% confidence interval (CI) 0.78 to 1.22; P = 0.82, I^2 = 68%). APC use was associated with an increased risk of bleeding (RR 1.47, 95% CI 1.09 to 2.00; P = 0.01, I^2 = 0%). In paediatric patients, APC did not reduce the risk of death (RR 0.98, 95% CI 0.66 to 1.46; P = 0.93). Although the included trials had no major limitations most of them modified their original completion or recruitment protocols.

Authors' conclusions

This updated review found no evidence suggesting that APC should be used for treating patients with severe sepsis or septic shock. Additionally, APC is associated with a higher risk of bleeding. Unless additional RCTs provide evidence of a treatment effect, policy-makers, clinicians and academics should not promote the use of APC.

Warning: On October 25th 2011, the European Medicines Agency issued a press release on the worldwide withdrawal of Xigris (activated protein C / drotrecogin alfa) from the market by Eli Lilly due to lack of beneficial effect on 28-day mortality in the PROWESS-SHOCK study. Furthermore, Eli Lily has announced the discontinuation of all other ongoing clinical trials. The final results of the PROWESS-SHOCK study are expected to be published in 2012. This systematic review will be updated when results of the PROWESS-SHOCK or other trials are published.

N-acetylcysteine for sepsis and systemic inflammatory response in adults

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 9, 2012.
Review content assessed as up-to-date: 2 January 2012.

Citation: Szakmany T, Hauser B, Radermacher P. N-acetylcysteine for sepsis and systemic inflammatory response in adults. *Cochrane Database of Systematic Reviews* 2012, Issue 9. Art. No.: CD006616. DOI: 10.1002/14651858.CD006616.pub2.

ABSTRACT

Background

Death is common in systemic inflammatory response syndrome (SIRS) or sepsis-induced multisystem organ failure and it has been thought that antioxidants such as N-acetylcysteine could be beneficial.

Objectives

We assessed the clinical effectiveness of intravenous N-acetylcysteine for the treatment of patients with SIRS or sepsis.

Search methods

We searched the following databases: Cochrane Central Register of Clinical Trials (CENTRAL) (*The Cochrane Library* 2011, Issue 12); MEDLINE (January 1950 to January 2012); EMBASE (January 1980 to January 2012); CINAHL (1982 to January 2012); the NHS Trusts Clinical Trials Register and Current Controlled Trials (www.controlled-trials.com); LILACS; KoreaMED; MEDCARIB; INDMED; PANTELEIMON; Ingenta; ISI Web of Knowledge and the National Trials Register to identify all relevant randomized controlled trials available for review.

Selection criteria

We included only randomized controlled trials (RCTs) in the meta-analysis.

Data collection and analysis

We independently performed study selection, quality assessment and data extraction. We estimated risk ratios (RR) for dichotomous outcomes. We measured statistical heterogeneity using the I^2 statistic.

Main results

We included 41 fully published studies (2768 patients). Mortality was similar in the N-acetylcysteine group and the placebo group (RR 1.06, 95% CI 0.79 to 1.42; I^2 = 0%). Neither did N-acetylcysteine show any significant effect on length of stay, duration of mechanical ventilation or incidence of new organ failure. Early application of N-acetylcysteine to prevent the development of an oxidato-inflammatory response did not affect the outcome, nor did late application that is after 24 hours of developing symptoms. Late application was associated with cardiovascular instability.

Authors' conclusions

Overall, this meta-analysis puts doubt on the safety and utility of intravenous N-acetylcysteine as an adjuvant therapy in SIRS and sepsis. At best, N-acetylcysteine is ineffective in reducing mortality and complications in this patient population. At worst, it can be harmful, especially when administered later than 24 hours after the onset of symptoms, by causing cardiovascular depression. Unless future RCTs provide evidence of treatment effect, clinicians should not routinely use intravenous N-acetylcysteine in SIRS or sepsis and academics should not promote its use.

8.4 Apêndice 4 - *Abstract* das revisões sistemáticas da Colaboração Cochrane com desfechos que não apoiam a intervenção, sem recomendação de novos estudos **(B2)**.

Transient neurologic symptoms (TNS) following spinal anaesthesia with lidocaine versus other local anaesthetics

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 2, 2009.
Review content assessed as up-to-date: 14 August 2008.

Citation: Zaric D, Pace NL. Transient neurologic symptoms (TNS) following spinal anaesthesia with lidocaine versus other local anaesthetics. *Cochrane Database of Systematic Reviews* 2009, Issue 2. Art. No.: CD003006. DOI: 10.1002/14651858.CD003006.pub3.

ABSTRACT

Background

Spinal anaesthesia has been in use since 1898. During the last decade there has been an increase in the number of reports implicating lidocaine as a possible cause of temporary and permanent neurologic complications after spinal anaesthesia. Follow up of patients who received uncomplicated spinal anaesthesia revealed that some of them developed pain in the lower extremities after an initial full recovery. This painful condition that occurs in the immediate postoperative period was named 'transient neurologic symptoms' (TNS).

Objectives

To study the frequency of TNS and neurologic complications after spinal anaesthesia with lidocaine compared to other local anaesthetics.

Search methods

We searched the Cochrane Central Register of Controlled Trials Register (CENTRAL) (*The Cochrane Library*, Issue 4, 2008); MEDLINE (1966 to August 2008); EMBASE (1980 to week 35, 2008); LILACS (August 2008); and handsearched the reference lists of trials and review articles.

Selection criteria

We included all randomized and quasi-randomized studies comparing the frequency of TNS and neurologic complications after spinal anaesthesia with lidocaine as compared to other local anaesthetics.

Data collection and analysis

Two authors independently evaluated the quality of the relevant studies and extracted the data from the included studies.

Main results

Sixteen trials reporting on 1467 patients, 125 of whom developed TNS, were included in the analysis. The use of lidocaine for spinal anaesthesia increased the risk of developing TNS. There was no evidence that this painful condition was associated with any neurologic pathology; the symptoms disappeared spontaneously by the fifth postoperative day. The relative risk (RR) for developing TNS after spinal anaesthesia with lidocaine as compared to other local anaesthetics (bupivacaine, prilocaine, procaine, levobupivacaine, ropivacaine, and 2-chloroprocaine) was 7.31 (95% confidence interval (CI) 4.16 to 12.86). Mepivacaine was found to give similar results as lidocaine and was therefor omitted from the overall comparison to diminish the heterogeneity.

Authors' conclusions

The risk of developing TNS after spinal anaesthesia with lidocaine was significantly higher than when bupivacaine, prilocaine, or procaine were used. The term 'transient neurological symptoms' implies neurologic pathology. Failing identification of the pathogenesis of TNS, consideration should be given to choosing a neutral descriptive term which does not imply a particular causation. One study about the impact of TNS on patient satisfaction and functional impairment demonstrated that non-TNS patients were more satisfied and had less functional impairment after surgery than TNS patients, but this did not influence their willingness to recommend spinal anaesthesia.

Human recombinant protein C for severe sepsis and septic shock in adult and paediatric patients

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Editorial group: Cochrane Anaesthesia Group.
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Review content assessed as up-to-date: 26 June 2012.

Citation: Martí-Carvajal AJ, Solà I, Gluud C, Lathyris D, Cardona AF. Human recombinant protein C for severe sepsis and septic shock in adult and paediatric patients. *Cochrane Database of Systematic Reviews* 2012, Issue 12. Art. No.: CD004388. DOI: 10.1002/14651858.CD004388.pub6.

ABSTRACT

Background

Sepsis is a common and frequently fatal condition. Human recombinant activated protein C (APC) has been introduced to reduce the high risk of death associated with severe sepsis or septic shock. This systematic review is an update of a Cochrane review originally published in 2007.

Objectives

We assessed the benefits and harms of APC for patients with severe sepsis or septic shock.

Search methods

We searched CENTRAL (*The Cochrane Library* 2012, Issue 6); MEDLINE (2010 to June 2012); EMBASE (2010 to June 2012); BIOSIS (1965 to June 2012); CINAHL (1982 to June 2012) and LILACS (1982 to June 2012). There was no language restriction.

Selection criteria

We included randomized clinical trials assessing the effects of APC for severe sepsis or septic shock in adults and children. We excluded studies on neonates. We considered all-cause mortality at day 28 and at the end of study follow up, and hospital mortality as the primary outcomes.

Data collection and analysis

We independently performed trial selection, risk of bias assessment, and data extraction in duplicate. We estimated relative risks (RR) for dichotomous outcomes. We measured statistical heterogeneity using the I^2 statistic. We used a random-effects model.

Main results

We identified one new randomized clinical trial in this update which includes six randomized clinical trials involving 6781 participants in total, five randomized clinical trials in adult (N = 6307) and one randomized clinical trial in paediatric (N = 474) participants. All trials had high risk of bias and were sponsored by the pharmaceutical industry. APC compared with placebo did not significantly affect all-cause mortality at day 28 compared with placebo (780/3435 (22.7%) versus 767/3346 (22.9%); RR 1.00, 95% confidence interval (CI) 0.86 to 1.16; I^2 = 56%). APC did not significantly affect in-hospital mortality (393/1767 (22.2%) versus 379/1710 (22.1%); RR 1.01, 95% CI 0.87 to 1.16; I^2 = 20%). APC was associated with an increased risk of serious bleeding (113/3424 (3.3%) versus 74/3343 (2.2%); RR 1.45, 95% CI 1.08 to 1.94; I^2 = 0%). APC did not significantly affect serious adverse events (463/3334 (13.9%) versus 439/3302 (13.2%); RR 1.04, 95% CI 0.92 to 1.18; I^2 = 0%). Trial sequential analyses showed that more trials do not seem to be needed for reliable conclusions regarding these outcomes.

Authors' conclusions

This updated review found no evidence suggesting that APC should be used for treating patients with severe sepsis or septic shock. APC seems to be associated with a higher risk of bleeding. The drug company behind APC, Eli Lilly, has announced the discontinuation of all ongoing clinical trials using this drug for treating patients with severe sepsis or septic shock. APC should not be used for sepsis or septic shock outside randomized clinical trials.

8.5 Apêndice 5 - *Abstract* das revisões sistemáticas da Colaboração Cochrane com ausência de evidências ou evidências insuficientes, com recomendação de novos estudos **(C1)**.

Interventions for restoring patency of occluded central venous catheter lumens

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 4, 2012.
Review content assessed as up-to-date: 10 September 2011.

Citation: van Miert C, Hill R, Jones L. Interventions for restoring patency of occluded central venous catheter lumens. *Cochrane Database of Systematic Reviews* 2012, Issue 4. Art. No.: CD007119. DOI: 10.1002/14651858.CD007119.pub2.

ABSTRACT

Background

Central venous catheters (CVCs) facilitate the administration of intravenous drugs, fluids, blood products and parenteral nutrition to patients with either chronic disease or critical illness. Despite a pivotal role within medical management, a common complication associated with CVC use is occlusion of the CVC lumen(s). CVC occlusion can interrupt and cause serious delays in administration of treatment interventions.

Objectives

The primary objective of this review was to assess the efficacy and safety of different interventions used to restore patency of occluded CVC lumens, in adults and children.

Search methods

We identified trials by searching the Cochrane Central Register of Clinical Trials (CENTRAL) (*The Cochrane Library* 2011, Issue 9); OvidSP MEDLINE (1950 to September 2011); OvidSP EMBASE (1980 to September 2011) and NHS Evidence CINAHL (1982 to September 2011). We also searched clinical trial registers, handsearched reference lists, contacted pharmaceutical companies and authors of publications that met the inclusion criteria to identify trials.

Selection criteria

We selected randomized controlled trials which investigated the efficacy of an intervention (chemical, surgical or drug) used to restore patency to an occluded CVC lumen, in either adults or children.

Data collection and analysis

Three authors independently assessed those studies that met the inclusion criteria for quality and extracted the relevant data using a standardized form.

Main results

No studies were found that investigated the efficacy and safety of either chemical or surgical interventions.

Seven studies (eight papers) with a total of 632 participants were identified from the search. They investigated different comparisons, strengths of thrombolytic or anticoagulant drug interventions for treating CVC lumen occlusion thought to be caused by a thrombus.

There was low quality evidence from a meta-analysis of two studies suggesting that urokinase (various strengths) was more effective than placebo for restoring patency to occluded CVC lumens in adults and children with underlying medical conditions (relative risk (RR) 2.09, 95% confidence interval (CI) 1.47 to 2.95), with a number needed to treat of 4 (95% CI 2 to 8). There was insufficient evidence to draw conclusions on the safety of urokinase.

The overall quality of the evidence provided by these studies was low to very low due to one or more domains being assessed as either at 'unclear risk of bias' or 'high risk of bias'. Furthermore, the total number of participants in these studies was small and consequently may lead to spurious results.

Authors' conclusions

There is inadequate evidence to draw strong conclusions on the efficacy or safety of the drug interventions included in this review. There is some low quality evidence from a meta-analysis of two studies investigating urokinase (various strengths) and some very low evidence from two single studies investigating alteplase 2 mg/2 mL that suggest that these two drug interventions may be effective in treating withdrawal or total occlusion of CVC lumens caused by thrombosis. Further high quality, sufficiently powered research is still required to look at the efficacy and safety of urokinase, alteplase and other chemical, surgical and drug interventions for treating CVC lumen occlusion. Research studies which exclusively include child participants are especially warranted.

Non-pharmacological interventions for assisting the induction of anaesthesia in children

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Citation: Yip P, Middleton P, Cyna AM, Carlyle AV. Non-pharmacological interventions for assisting the induction of anaesthesia in children. *Cochrane Database of Systematic Reviews* 2009, Issue 3. Art. No.: CD006447. DOI: 10.1002/14651858.CD006447.pub2.

ABSTRACT

Background

Induction of general anaesthesia can be distressing for children. Non-pharmacological methods for reducing anxiety and improving co-operation may avoid the adverse effects of preoperative sedation.

Objectives

To assess the effects of non-pharmacological interventions in assisting induction of anaesthesia in children by reducing their anxiety, distress or increasing their co-operation.

Search methods

We searched CENTRAL (*The Cochrane Library* 2009, Issue 1). We searched the following databases from inception to 14th December 2008: MEDLINE, PsycINFO, CINAHL, DISSERTATION ABSTRACTS, Web of Science and EMBASE.

Selection criteria

We included randomized controlled trials of a non-pharmacological intervention implemented on the day of surgery or anaesthesia.

Data collection and analysis

Two authors independently extracted data and assessed risk of bias in trials.

Main results

We included 17 trials, all from developed countries, involving 1796 children, their parents or both. Eight trials assessed parental presence. None showed significant differences in anxiety or co-operation of children during induction, except for one where parental presence was significantly less effective than midazolam in reducing children's anxiety at induction. Six trials assessed interventions for children. Preparation with a computer package improved co-operation compared with parental presence (one trial). Children playing hand-held video games before induction were significantly less anxious than controls or premedicated children (one trial). Compared with controls, clown doctors reduced anxiety in children (modified Yale Preoperative Anxiety Scale (mYPAS): mean difference (MD) 30.75 95% CI 15.14 to 46.36; one trial). In children undergoing hypnosis, there was a nonsignificant trend towards reduced anxiety during induction (mYPAS < 24: risk ratio (RR) 0.59 95% CI 0.33 to 1.04 - 39% versus 68%: one trial) compared with midazolam. A low sensory environment improved children's co-operation at induction (RR 0.66, 95% CI 0.45 to 0.95; one trial) and no effect on children's anxiety was found for music therapy (one trial).

Parental interventions were assessed in three trials. Children of parents having acupuncture compared with parental sham-acupuncture were less anxious during induction (mYPAS MD 17, 95% CI 3.49 to 30.51) and more children were co-operative (RR 0.63, 95% CI 0.4 to 0.99). Parental anxiety was also significantly reduced in this trial. In two trials, a video viewed preoperatively did not show effects on child or parental outcomes.

Authors' conclusions

This review shows that the presence of parents during induction of general anaesthesia does not reduce their child's anxiety. Promising non-pharmacological interventions such as parental acupuncture; clown doctors; hypnotherapy; low sensory stimulation; and hand-held video games needs to be investigated further.

Premedication for anxiety in adult day surgery

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 3, 2011.
Review content assessed as up-to-date: 31 December 2008.

Citation: Walker KJ, Smith AF. Premedication for anxiety in adult day surgery. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD002192. DOI: 10.1002/14651858.CD002192.pub2.

ABSTRACT

Background

Since the early 1980s, it has become more and more common to carry out surgical procedures on a day case basis. Many patients are anxious before surgery yet there is sometimes a reluctance to provide sedative medication because it is believed to delay discharge from hospital.This is an updated version of the review first published in 2000 (previous updates 2003; 2006).

Objectives

To assess the effect of anxiolytic premedication on time to discharge in adult patients undergoing day case surgery under general anaesthesia.

Search methods

We identified trials by computerized searches of the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, 2009 Issue 1); MEDLINE (1980 to January 2009); EMBASE (1980 to January 2009). We also checked the reference lists of trials and review articles and handsearched three main anaesthesia journals.

Selection criteria

We included all identified randomized controlled trials comparing anxiolytic drug(s) with placebo before general anaesthesia in adult day case surgical patients.

Data collection and analysis

We collected data on anaesthetic drugs used; results of psychomotor function tests where these were used to assess residual effect of premedication; and on times from end of anaesthesia to ability to walk unaided or readiness for discharge from hospital. Formal statistical synthesis of individual trials was not performed in view of the variety of drugs studied.

Main results

We included 17 studies. Methodological quality of included studies was poor. Of these 17, only seven studies specifically addressed the discharge question; none found any delay in premedicated patients. Two other studies used clinical criteria to assess fitness for discharge, though times were not given. Again, there was no difference from placebo. Eleven studies used tests of psychomotor function with or without clinical measures as indicators of recovery from anaesthesia. In none of these studies did the premedication appear to delay discharge, although performance on tests of psychomotor function was sometimes still impaired. Three studies showed no impairment in psychomotor function, six showed some impairment which had resolved by three hours or time of discharge and two showed significant impairment.

Authors' conclusions

We found no evidence of a difference in time to discharge from hospital, assessed by clinical criteria, in patients who received anxiolytic premedication. However, in view of the age and variety of anaesthetic techniques used and clinical heterogeneity between studies, inferences for current day case practice should be made with caution.

Sedation versus general anaesthesia for provision of dental treatment in under 18 year olds

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 1, 2009.
Review content assessed as up-to-date: 20 October 2008.

Citation: Ashley PF, Williams CECS, Moles DR, Parry J. Sedation versus general anaesthesia for provision of dental treatment in under 18 year olds. *Cochrane Database of Systematic Reviews* 2009, Issue 1. Art. No.: CD006334. DOI: 10.1002/14651858.CD006334.pub2.

ABSTRACT

Background

A significant proportion of children have caries requiring restorations or extractions, and some of these children will not accept this treatment under local anaesthetic. Historically this has been managed in children by use of a general anaesthetic; however use of sedation may lead to reduced morbidity and cost. The aim of this review is to compare the efficiency of sedation versus general anaesthesia for the provision of dental treatment for children and adolescents under 18 years.

Objectives

We evaluated the intra- and post-operative morbidity, effectiveness and cost effectiveness of sedation versus general anaesthesia for the provision of dental treatment for under 18 year olds.

Search methods

We searched The Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library;* Issue 4, 2008); MEDLINE (OVID) (1950 to October Week 2, 2008); EMBASE (OVID) (1974 to Week 42, 2008); System for information on Grey Literature in Europe (SIGLE) (1980 to October 2008), Latin American & Caribbean Health Sciences Literature (LILACS) (1982 to October 2008), ISI Web of Science (1945 to October 2008).

We also carried out handsearching of relevant journals. There was no language restriction.

Selection criteria

We included randomized controlled clinical trials of sedative agents compared to general anaesthesia in children and adolescents aged up to 18 years having dental treatment. We excluded complex surgical procedures and pseudo-randomized trials.

Data collection and analysis

Two authors assessed titles and abstracts for inclusion in the review. We recorded information relevant to the objectives and outcome measures into a specially designed 'data extraction form'.

Main results

We identified 15 studies for potential inclusion after searching the available databases and screening the titles and abstracts. We identified a further study through personal contacts. Following full text retrieval of the studies, we found none to be eligible

Authors' conclusions

Randomized controlled studies comparing the use of dental general anaesthesia with sedation to quantify differences such as morbidity and cost are required.

Target-controlled infusion versus manually-controlled infusion of propofol for general anaesthesia or sedation in adults

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Editorial group: Cochrane Anaesthesia Group.
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Review content assessed as up-to-date: 13 July 2007.

Citation: Leslie K, Clavisi O, Hargrove J. Target-controlled infusion versus manually-controlled infusion of propofol for general anaesthesia or sedation in adults. *Cochrane Database of Systematic Reviews* 2008, Issue 3. Art. No.: CD006059. DOI: 10.1002/14651858.CD006059.pub2.

ABSTRACT

Background

Continuous infusions of the intravenous anaesthetic propofol are commonly used to induce and maintain sedation and general anaesthesia. Infusion devices can be manually controlled (MCI) where the anaesthetist makes each change to the infusion rate or target-controlled (TCI) where the anaesthetist sets a target blood or effect-site concentration and the computerised infusion device makes the necessary changes to the infusion rate. Randomized trials have explored the differences in quality of anaesthesia, adverse event rate and cost between TCI and MCI but the effectiveness of TCI compared with MCI remains controversial. As TCI is in widespread international use, and potentially may be more expensive without added benefit, a systematic review of randomized controlled trials comparing TCI and MCI is warranted.

Objectives

To assess whether TCI of propofol is as effective as MCI of propofol with respect to quality of anaesthesia or sedation, adverse events and propofol drug cost.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2007, Issue 3); PubMED (1950 to July week 2 2007); and EMBASE via OVID (1980 to week 28 2007). We also searched LILACS, CINAHL, ISI Web Knowledge, Panteleimon, KoreaMed and IndMed. We searched for ongoing trials via the National Research Register and metaRegister of Controlled Trials.

Selection criteria

We planned to include all published and unpublished randomized controlled trials that compared TCI of propofol with MCI of propofol for general anaesthesia or sedation in adult surgical patients. Only published studies were included as no unpublished studies were identified.

Data collection and analysis

Two authors independently assessed trial quality and extracted outcome data. We contacted study authors and the pharmaceutical industry for additional information.

Main results

Twenty trials of poor quality that involved 1759 patients were included. Heterogeneity was high (that is the trials were not comparing the same things). TCI was associated with higher total doses of propofol than was MCI resulting in marginally higher propofol drug costs. However, fewer interventions were required by the anaesthetist during the use of TCI compared with MCI. No clinically significant differences were demonstrated in terms of quality of anaesthesia or adverse events.

Authors' conclusions

This systematic review does not provide sufficient evidence for us to make firm recommendations about the use of TCI versus MCI in clinical anaesthetic practice.

Intra-articular lignocaine versus intravenous analgesia with or without sedation for manual reduction of acute anterior shoulder dislocation in adults

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 9, 2011.
Review content assessed as up-to-date: 2 March 2011.

Citation: Wakai A, O'Sullivan R, McCabe A. Intra-articular lignocaine versus intravenous analgesia with or without sedation for manual reduction of acute anterior shoulder dislocation in adults. *Cochrane Database of Systematic Reviews* 2011, Issue 4. Art. No.: CD004919. DOI: 10.1002/14651858.CD004919.pub2.

ABSTRACT

Background

There is conflicting evidence regarding the use of intra-articular lignocaine injection for the closed manual reduction of acute anterior shoulder dislocations. A systematic review may help cohere the conflicting evidence.

Objectives

To compare the clinical efficacy and safety of intra-articular lignocaine and intravenous analgesia (with or without sedation) for reduction of acute anterior shoulder dislocation.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 1), MEDLINE (1950 to March 2010), and EMBASE (1980 to March 2010). We searched Current Controlled Trials metaRegister of Clinical Trials (compiled by Current Science) (March 2010). We imposed no language restriction.

Selection criteria

Randomized controlled trials comparing intra-articular lignocaine (IAL) with intravenous analgesia with or without sedation (IVAS) in adults aged 18 years and over for reduction of acute anterior shoulder dislocation.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. Where possible, data were pooled and relative risks (RR) and mean differences (MD), each with 95% confidence intervals (CI), were computed using the Cochrane Review Manager statistical package (RevMan).

Main results

Of 1041 publications obtained from the search strategy, we examined nine studies. Four studies were excluded, and five studies with 211 participants were eligible for inclusion. There was no difference in the immediate success rate of IAL when compared with IVAS in the closed manual reduction of acute anterior shoulder dislocation (RR 0.95; 95% CI 0.83 to 1.10). There were significantly fewer adverse effects associated with IAL compared with IVAS (RR 0.16; 95% CI 0.06 to 0.43). The mean time spent in the emergency department was significantly less with IAL compared with IVAS (MD 109.46 minutes; 95% CI 84.60 to 134.32). One trial reported significantly less time for reduction with IVAS (105 seconds; 95% CI 84.0 to 126.1) compared with IAL (284.6 seconds; 95% CI 185.3 to 383.9). One trial reported no joint infection associated with intra-articular lignocaine injection and no mortality associated with either IAL or IVAS.

Authors' conclusions

We observed no significant difference between IAL and IVAS with regard to the immediate success rate of reduction, pain during reduction, post-reduction pain relief and reduction failure. Compared to IVAS, IAL may be less expensive and may be associated with fewer adverse effects and a shorter recovery time.

Topical anaesthetics for repair of dermal laceration

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 2, 2012.
Review content assessed as up-to-date: 22 March 2011.

Citation: Eidelman A, Weiss JM, Baldwin CL, Enu IK, McNicol ED, Carr DB. Topical anaesthetics for repair of dermal laceration. *Cochrane Database of Systematic Reviews* 2011, Issue 6. Art. No.: CD005364. DOI: 10.1002/14651858.CD005364.pub2.

ABSTRACT

Background

Topical local anaesthetics are recognized as providing effective analgesia for numerous superficial procedures, including repair of dermal lacerations. The need for cocaine in topical anaesthetic formulations has been questioned due to concern about adverse effects, and so novel preparations of cocaine-free anaesthetics have been developed.

Objectives

To compare the efficacy and safety of infiltrated local anaesthetics with those of topical local anaesthetics for repair of dermal lacerations and to evaluate the efficacy and safety of various single or multi-component topical anaesthetics to identify cocaine-free topically applied local anaesthetics that may provide equivalent analgesia to those containing cocaine.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 10); MEDLINE (1966 to November 2010); EMBASE (1980 to November 2010); CINAHL (1982 to November 2010); and reference lists of articles. We also handsearched selected journals, reviewed abstracts presented at international society meetings, reviewed metaregisters of ongoing trials and contacted manufacturers and researchers in the field.

Selection criteria

We included randomized controlled trials (RCTs) that evaluated the efficacy and safety of topical anaesthetics for repair of torn skin in adult and paediatric patients.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. We contacted study authors for additional information. We collected adverse event information from the trials.

Main results

We included 23 RCTs involving 3128 patients. The small number of trials in each comparison group and the heterogeneity of outcome measures precluded quantitative analysis of data in all but one outcome, pain scores using a visual analogue scale. The majority of trials that compared infiltrated and topical anaesthetics are at high risk of bias, which is likely to affect the interpretation of the results. Several cocaine-free topical anaesthetics were found to provide effective analgesic efficacy. However, the data regarding the efficacy of each topical agent is mostly based upon single comparisons, in trials that have unclear or high risk of bias. Mild, self-limited erythematous skin induration occurred in one case after application of topical tetracaine-adrenaline-cocaine (TAC) where a total of 1042 patients were exposed. No serious complications were reported in any of the patients treated with either cocaine-based or cocaine-free topical anaesthetics.

Authors' conclusions

Based on mostly descriptive analysis, topical anaesthetics are possibly an efficacious, non-invasive means of providing analgesia prior to suturing of dermal lacerations. However, additional well designed RCTs with low risk of bias are necessary before definitive conclusions can be made.

Caudal epidural block versus other methods of postoperative pain relief for circumcision in boys

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 11, 2010.
Review content assessed as up-to-date: 13 April 2008.

Citation: Cyna AM, Middleton P. Caudal epidural block versus other methods of postoperative pain relief for circumcision in boys. *Cochrane Database of Systematic Reviews* 2008, Issue 4. Art. No.: CD003005. DOI: 10.1002/14651858.CD003005.pub2.

ABSTRACT

Background

Techniques to minimize the postoperative discomfort of penile surgery, such as circumcision, include caudal block; penile block; systemic opioids and topical local anaesthetic cream, emulsion or gel.

Objectives

To compare the effects of caudal epidural analgesia with other forms of postoperative analgesia following circumcision in boys.

Search methods

We searched CENTRAL (*The Cochrane Library* 2008, Issue 1), MEDLINE (to April 2008) and EMBASE (to April 2008).

Selection criteria

Randomized and quasi-randomized trials of postoperative analgesia by caudal epidural block compared with non-caudal analgesia in boys, aged between 28 days and 16 years, having elective surgery for circumcision.

Data collection and analysis

Two review authors independently carried out assessment of study eligibility, data extraction and assessment of the risk of bias in included studies.

Main results

We included 10 trials involving 721 boys. No difference was seen between caudal and parenteral analgesia in the need for rescue or other analgesia (relative risk (RR) 0.41, 95% confidence interval (CI) 0.12 to 1.43; 4 trials, 235 boys; random-effects model) or on the incidence of nausea and vomiting (RR 0.61, 95% CI 0.36 to 1.05; 4 trials, 235 boys). No difference in the need for rescue or other analgesia was seen for caudal compared with dorsal nerve penile block (DNPB) (RR 1.25, 95% CI 0.64 to 2.44; 4 trials, 336 boys; random-effects model). No differences were seen between caudal block and DNPB in the incidence of nausea and vomiting (RR 1.88, 95% CI 0.70 to 5.04; 4 trials, 334 boys; random effects model) or individual complications except for motor block (RR 17.00, 95% CI 1.01 to 286.82; 1 trial, 100 boys) and motor or leg weakness (RR 10.67, 95% CI 1.32 to 86.09; 2 trials, 107 boys). These were significantly more common in the caudal block groups than with DNPB. No differences were seen between caudal and rectal or intravenous analgesia in the need for rescue analgesia or any other outcomes (2 trials, 162 boys).

Authors' conclusions

Differences in the need for rescue or other analgesia could not be detected between caudal, parenteral and penile block methods. In day-case surgery, penile block may be preferable to caudal block in children old enough to walk due to the possibility of temporary leg weakness after caudal block. Evidence from trials is limited by small numbers and poor methodology. There is a need for properly designed trials comparing caudal epidural block with other methods such as morphine, simple analgesics and topical local anaesthetic creams, emulsions or gels.

Neuraxial anaesthesia for lower-limb revascularization

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 7, 2011.
Review content assessed as up-to-date: 9 February 2011.

Citation: Barbosa FT, Jucá MJ, Castro AA, Cavalcante JC. Neuraxial anaesthesia for lower-limb revascularization. *Cochrane Database of Systematic Reviews* 2010, Issue 1. Art. No.: CD007083. DOI: 10.1002/14651858.CD007083.pub2.

ABSTRACT

Background

Lower-limb revascularization surgery is used to reduce pain and sometimes to improve lower-limb function. This review was originally published in 2010 and was updated in 2011.

Objectives

To determine the rates of death and major complications with spinal and epidural anaesthesia compared with other types of anaesthesia for lower-limb revascularization.

Search methods

We searched CENTRAL (*The Cochrane Library* 2011, Issue 2); MEDLINE (1960 to February 2011); EMBASE (1982 to February 2011); LILACS (1982 to February 2011); CINAHL (1982 to February 2011) and ISI Web of Science (1900 to February 2011). The original search was performed in June 2008.

Selection criteria

We included randomized controlled trials that evaluated the effect of anaesthetic type in adults aged 18 years or older undergoing lower-limb revascularization surgery.

Data collection and analysis

Two authors independently performed the data extraction. The primary outcomes were mortality, cerebral stroke, myocardial infarction, nerve dysfunction and postoperative lower-limb amputation rate. The secondary outcome was pneumonia. We judged the risk of bias according to randomization and allocation concealment methods, blinding of assessment and completeness of follow up. The I^2 statistic was used to assess heterogeneity. We summarized dichotomous data as odds ratio (OR) with 95% confidence interval (CI) using a random-effects model.

Main results

In this updated version we found no new studies that met our inclusion criteria. We included in this review four studies that compared neuraxial anaesthesia with general anaesthesia. The total number of participants was 696, of whom 417 were allocated to neuraxial anaesthesia and 279 to general anaesthesia. Participants allocated to neuraxial anaesthesia had a mean age of 67 years and 59% were men. Participants allocated to general anaesthesia had a mean age of 67 years and 66% were men. There was no difference between participants allocated to neuraxial or general anaesthesia in: mortality rate (OR 0.89, 95% CI 0.38 to 2.07; 696 participants, four trials); myocardial infarction (OR 1.23, 95% CI 0.56 to 2.70; 696 participants, four trials); and lower-limb amputation rate (OR 0.84, 95% CI 0.38 to 1.84; 465 participants, three trials). Pneumonia was less common following neuraxial anaesthesia than general anaesthesia (OR 0.37, 95% CI 0.15 to 0.89; 201 participants, two trials).

Authors' conclusions

There was insufficient evidence available from the included trials that compared neuraxial anaesthesia with general anaesthesia to rule out clinically important differences for most clinical outcomes. Neuraxial anaesthesia may reduce pneumonia. No conclusions can be drawn with regard to mortality, myocardial infarction and rate of lower-limb amputation, or less common outcomes.

Ultrasound guidance for peripheral nerve blockade

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 3, 2011.
Review content assessed as up-to-date: 29 July 2008.

Citation: Walker KJ, McGrattan K, Aas-Eng K, Smith AF. Ultrasound guidance for peripheral nerve blockade. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD006459. DOI: 10.1002/14651858.CD006459.pub2.

ABSTRACT

Background

Peripheral nerve blocks can be performed using ultrasound guidance. It is not yet clear whether this method of nerve location has benefits over other existing methods.

Objectives

To assess whether the use of ultrasound to guide peripheral nerve blockade has any advantages over other methods of peripheral nerve location.

Search methods

We searched the following databases for relevant published trials: the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2008, Issue 3); MEDLINE (1966 to July 2008); EMBASE (1974 to July 2008); ISI Web of Science (1945 to 2008); CINAHL (1982 to July 2008); and LILACS (1980 to July 2008). We also handsearched meeting supplements.

Selection criteria

We included all identified randomized controlled trials (RCTs) comparing ultrasound-guided peripheral nerve block with at least one other method of nerve location.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. We attempted to contact study authors for additional information, where necessary.

Main results

We included 18 trials containing data from 1344 patients. Ten trials assessed upper limb blocks and eight assessed lower limb blocks. Most compared ultrasound with peripheral nerve stimulation. All trials were assessed as having a moderate risk of bias due to inability to blind the practitioner. Meta-analysis was not performed because of the variety of blocks, techniques, and outcomes, and the review was based on the authors' assessment of the trials. Ultrasound guidance produced similar success rates in providing surgical anaesthesia (72% to 98.8%) when compared with peripheral nerve stimulation (58% to 93.1%). Major complication rates were low in all studies; however, the use of ultrasound appeared to reduce the incidence of vascular puncture or haematoma formation. Differences in study methodology made it difficult to compare block characteristics, however ultrasound improved quality of sensory block in six studies and motor block in four studies. Block onset time was found to be improved in six out of the 10 studies where this was assessed. Two studies assessed volume of local anaesthetic required and both found a significant reduction was possible when ultrasound was used. Ten studies assessed block performance time and five found a significant reduction with ultrasound, the mean difference in time taken was 1.5 to 4.8 minutes.

Authors' conclusions

In experienced hands, ultrasound provides at least as good success rates as other methods of peripheral nerve location. Individual studies have demonstrated that ultrasound may reduce complication rates and improve quality, performance time, and time to onset of blocks. Due to wide variations in study outcomes we chose not to combine the studies in our analysis.

Corticosteroids for treating severe sepsis and septic shock

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Annane D, Bellissant E, Bollaert PE, Briegel J, Keh D, Kupfer Y. Corticosteroids for treating severe sepsis and septic shock. *Cochrane Database of Systematic Reviews* 2004, Issue 1. Art. No.: CD002243. DOI: 10.1002/14651858.CD002243.pub2.

ABSTRACT

Background

Sepsis may be complicated by impaired corticosteroid production. Giving corticosteroids may benefit patients.

Objectives

To examine the effects of corticosteroids on death at one month in sepsis.

Search methods

We searched CENTRAL (*The Cochrane Library* Issue 3, 2009), MEDLINE (October 2009), EMBASE (October 2009), LILACS (October 2009), reference lists of articles, and also contacted trial authors.

Selection criteria

We included randomized and quasi-randomized controlled trials of corticosteroids versus placebo or supportive treatment in severe sepsis and septic shock.

Data collection and analysis

All review authors agreed the eligibility of trials. One review author extracted data, which was checked by the other review authors and the primary author of the paper whenever possible. We obtained some missing data from the trial authors. We assessed the methodological quality of the trials.

Main results

We identified 25 trials, of which 20 (17 randomized and three quasi-randomized trials) could be pooled in a meta-analysis.

Corticosteroids did not change 28-day mortality (20 trials, n = 2138, relative risk (RR) 0.87, 95% confidence interval (CI) 0.74 to 1.01; random-effects model). There was significant heterogeneity that was partly related to the dosing strategy. Treatment with a long course of low dose corticosteroids significantly reduced 28-day mortality (RR 0.84, 95% CI 0.72 to 0.97; P = 0.02), increased the proportion of shock reversal by day seven (six trials, n = 965, RR 1.35, 95% CI 1.16 to 1.57; random-effects model) and day 28 (six trials, n = 952, RR 1.12, 95% CI 1.02 to 1.23), reduced the sepsis-related organ failure assessment (SOFA) score by day seven (five trials, n = 916, RR -1.47, (95% CI -2.01 to -0.92), and survivors' length of stay in the intensive care unit (eight trials, n= 622, RR -4.49, 95% CI -7.04 to -1.94), without inducing gastroduodenal bleeding (13 trials, n = 1594, RR 11.12, 95% CI 0.81 to 1.53), superinfection (14 trials, n = 1917, RR 1.01, 95% CI 0.82 to 1.25), or neuromuscular weakness (three trials, n = 811, RR 0.63, 95% CI 0.12 to 3.35). Corticosteroid increased the risk of hyperglycaemia (nine trials, n = 1434, RR 1.16, 95% 1.07 to 1.25) and hypernatraemia (three trials, n= 805, RR 1.61, 95% CI 1.26 to 2.06).

Authors' conclusions

Overall, corticosteroids did not change mortality in severe sepsis and septic shock. A long course of low dose corticosteroids reduced 28-day mortality without inducing major complications; metabolic disorders were increased.

Vasopressors for hypotensive shock

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (conclusions changed), published in Issue 5, 2011.
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Citation: Havel C, Arrich J, Losert H, Gamper G, Müllner M, Herkner H. Vasopressors for hypotensive shock. *Cochrane Database of Systematic Reviews* 2011, Issue 5. Art. No.: CD003709. DOI: 10.1002/14651858.CD003709.pub3.

ABSTRACT

Background

Initial goal directed resuscitation for shock usually includes the administration of intravenous fluids, followed by initiating vasopressors. Despite obvious immediate effects of vasopressors on haemodynamics their effect on patient relevant outcomes remains controversial. This review was originally published in 2004 and was updated in 2011.

Objectives

Our primary objective was to assess whether particular vasopressors reduce overall mortality, morbidity, and health-related quality of life.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 2), MEDLINE, EMBASE, PASCAL BioMed, CINAHL, BIOSIS, and PsycINFO (from inception to March 2010). The original search was performed in November 2003. We also asked experts in the field and searched meta-registries for ongoing trials.

Selection criteria

Randomized controlled trials comparing various vasopressor regimens for hypotensive shock.

Data collection and analysis

Two authors abstracted data independently. Disagreement between the authors was discussed and resolved with a third author. We used a random-effects model for combining quantitative data.

Main results

We identified 23 randomized controlled trials involving 3212 patients, with 1629 mortality outcomes. Six different vasopressors, alone or in combination, were studied in 11 different comparisons.

All 23 studies reported mortality outcomes; length of stay was reported in nine studies. Other morbidity outcomes were reported in a variable and heterogeneous way. No data were available on quality of life or anxiety and depression outcomes. We classified 10 studies as being at low risk of bias for the primary outcome mortality; only four studies fulfilled all trial quality items.

In summary, there was no difference in mortality in any of the comparisons between different vasopressors or combinations. More arrhythmias were observed in patients treated with dopamine compared to norepinephrine. Norepinephrine versus dopamine, as the largest comparison in 1400 patients from six trials, yielded almost equivalence (RR 0.95, 95% confidence interval 0.87 to 1.03). Vasopressors used as add-on therapy in comparison to placebo were not effective either. These findings were consistent among the few large studies as well as in studies with different levels of within-study bias risk.

Authors' conclusions

There is some evidence of no difference in mortality between norepinephrine and dopamine. Dopamine appeared to increase the risk for arrhythmia. There is not sufficient evidence of any difference between any of the six vasopressors examined. Probably the choice of vasopressors in patients with shock does not influence the outcome, rather than any vasoactive effect per se. There is not sufficient evidence that any one of the investigated vasopressors is clearly superior over others.

Hypertonic saline for peri-operative fluid management

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 1, 2010.
Review content assessed as up-to-date: 31 July 2009.

Citation: McAlister V, Burns KEA, Znajda T, Church B. Hypertonic saline for peri-operative fluid management. *Cochrane Database of Systematic Reviews* 2010, Issue 1. Art. No.: CD005576. DOI: 10.1002/14651858.CD005576.pub2.

ABSTRACT

Background

Fluid excess may place patients undergoing surgery at risk for various complications. Hypertonic saline (HS) maintains intravascular volume with less intravenous fluid than isotonic salt (IS) solutions, but may increase serum sodium.

Objectives

To determine the benefits and harms of HS versus IS solutions administered to patients undergoing surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL), (*The Cochrane Library*) Issue 1, 2009; MEDLINE (1966 to 2009); EMBASE (1980 to 2009); LILACS (to August 2009) and CINAHL (1982 to 2009) without language restrictions.

Selection criteria

We included randomized clinical trials where HS was compared to IS in patients undergoing surgery, irrespective of blinding, language, and publication status.

Data collection and analysis

We assessed the impact of HS administration on mortality, organ failure, fluid balance, serum sodium, serum osmolarity, diuresis and physiologic measures of cardiovascular function. We pooled data using odds ratio or mean difference (MD) for binary and continuous outcomes, respectively, using random-effects models.

Main results

We included 15 studies with 614 participants. One death in each group and no other serious adverse events were reported. While all patients were in a positive fluid balance postoperatively, the excess was significantly less in HS patients (standardized mean difference (SMD) -1.43L, 95% confidence interval (CI) 0.8 to 2.1 L less; $P < 0.00001$). Patients treated with HS received significantly less fluid than IS-treated patients (MD -2.4L 95% (CI) 1.5 to 3.2 L less; $P < 0.00001$) without differences in diuresis between the groups. Maximum intraoperative cardiac index was significantly increased with HS (SMD 0.6 L/min/M2 higher, 95% CI 0.1 to 1.0, $P = 0.02$) but Intraoperative pulmonary artery wedge pressure remained unchanged. While the maximum serum sodium and the serum sodium at the end of the study were significantly higher in HS patients, the level remained within normal limits (136 to 146 meq/L).

Authors' conclusions

HS reduces the volume of intravenous fluid required to maintain patients undergoing surgery but transiently increases serum sodium. It is not known if HS effects patient survival and morbidity but it should be tested in randomized clinical trials that are designed and powered to test these outcomes.

De-escalation of antimicrobial treatment for adults with sepsis, severe sepsis or septic shock

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Editorial group: Cochrane Anaesthesia Group.
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Review content assessed as up-to-date: 2 November 2010.

Citation: Gomes Silva BN, Andriolo RB, Atallah ÁN, Salomão R. De-escalation of antimicrobial treatment for adults with sepsis, severe sepsis or septic shock. *Cochrane Database of Systematic Reviews* 2010, Issue 12. Art. No.: CD007934. DOI: 10.1002/14651858.CD007934.pub2.

ABSTRACT

Background

Mortality rates among patients with sepsis, severe sepsis or septic shock ranges from 27% to 54%. Empirical broad-spectrum antimicrobial treatment is aimed at achieving adequate antimicrobial therapy and thus reducing mortality. However, there is a risk that empirical broad-spectrum antimicrobial treatment can expose patients to overuse of antimicrobials. De-escalation has been proposed as a strategy to replace empirical broad-spectrum antimicrobial treatment with a narrower antimicrobial therapy. This is done by either changing the pharmacological agent or discontinuing a pharmacological combination according to the patient's microbial culture results.

Objectives

To evaluate the effectiveness and safety of de-escalation antimicrobial treatment for adult patients diagnosed with sepsis, severe sepsis or septic shock caused by any micro-organism.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2008, Issue 8); MEDLINE via PubMed (from inception to August 2010); EMBASE (from inception to August 2010); LILACS (from inception to August 2010); Current Controlled Trials and bibliographic references of relevant studies. We also contacted the main authors in the area. We applied no language restriction.

Selection criteria

We planned to include randomized controlled trials comparing de-escalation (based on culture results) versus standard therapy for adults with sepsis, severe sepsis or septic shock. The primary outcome was mortality (at 28 days, hospital discharge or the end of the follow-up period). Studies including patients initially treated with an empirical but not adequate antimicrobial therapy were not considered for inclusion.

Data collection and analysis

Two authors planned to independently select and extract data and evaluate methodological quality of all studies. We planned to use relative risk (risk ratio) for dichotomous data and mean difference (MD) for continuous data, with 95% confidence intervals. We planned to use the random-effects statistical model when the estimate effects of two or more studies could be combined in a meta-analysis.

Main results

We retrieved 436 references via the search strategy. No randomized controlled trials testing de-escalation antimicrobial treatment for adult patients diagnosed with sepsis, severe sepsis or septic shock could be included in this review.

Authors' conclusions

There is no adequate, direct evidence as to whether de-escalation of antimicrobial agents is effective and safe for adults with sepsis, severe sepsis or septic shock. Therefore, it is not possible to either recommend or not recommend the de-escalation of antimicrobial agents in clinical practice for septic patients. This uncertainty warrants further research via randomized controlled trials or cohort studies.

Early versus late pre-intensive care unit admission broad spectrum antibiotics for severe sepsis in adults

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Editorial group: Cochrane Anaesthesia Group.
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Review content assessed as up-to-date: 18 August 2010.

Citation: Siddiqui S, Razzak J. Early versus late pre-intensive care unit admission broad spectrum antibiotics for severe sepsis in adults. *Cochrane Database of Systematic Reviews* 2010, Issue 10. Art. No.: CD007081. DOI: 10.1002/14651858.CD007081.pub2.

ABSTRACT

Background

Severe sepsis and septic shock have recently emerged as particularly acute and lethal challenges amongst critically ill patients presenting to the emergency department (ED). There are no existing data on the current practices of management of patients with severe sepsis comparing early versus late administration of appropriate broad spectrum antibiotics as part of the early goal-directed therapy that is commenced in the first few hours of presentation.

Objectives

To assess the difference in outcomes with early compared to late administration of antibiotics in patients with severe sepsis in the pre-intensive care unit (ICU) admission period. We defined early as within one hour of presentation to the ED.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* Issue 1, 2009); MEDLINE (1990 to February 2010); EMBASE (1990 to February 2010); and ISI web of Science (February 2010). We also searched for relevant ongoing trials in specific websites such as www.controlled-trials.com; www.clinicalstudyresults.org; and www.update-software.com. We searched the reference lists of articles. There were no constraints based on language or publication status.

Selection criteria

We planned to include randomized controlled trials of early versus late broad spectrum antibiotics in adult patients with severe sepsis in the ED, prior to admission to the intensive care unit.

Data collection and analysis

Two authors independently assessed articles for inclusion.

Main results

We found no studies that satisfied the inclusion criteria.

Authors' conclusions

Based on this review we are unable to make a recommendation on the early or late use of broad spectrum antibiotics in adult patients with severe sepsis in the ED pre-ICU admission. There is a need to do large prospective double blinded randomized controlled trials on the efficacy of early (within one hour) versus late broad spectrum antibiotics in adult severe sepsis patients. Since it makes sense to start antibiotics as soon as possible in this group of seriously ill patients, administering such antibiotics earlier as opposed to later is based on anecdotal suboptimal evidence.

Incentive spirometry for prevention of postoperative pulmonary complications in upper abdominal surgery

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2012.
Review content assessed as up-to-date: 14 July 2006.

Citation: Guimarães MMF, El Dib RP, Smith AF, Matos D. Incentive spirometry for prevention of postoperative pulmonary complications in upper abdominal surgery. *Cochrane Database of Systematic Reviews* 2009, Issue 3. Art. No.: CD006058. DOI: 10.1002/14651858.CD006058.pub2.

ABSTRACT

Background

Upper abdominal surgical procedures are associated with a high risk of postoperative pulmonary complications. The risk and severity of postoperative pulmonary complications can be reduced by the judicious use of therapeutic manoeuvres that increase lung volume. Our objective was to assess the effect of incentive spirometry (IS) compared to no therapy, or physiotherapy including coughing and deep breathing, on all-cause postoperative pulmonary complications and mortality in adult patients admitted for upper abdominal surgery.

Objectives

To assess the effects of incentive spirometry compared to no such therapy (or other therapy) on all-cause postoperative pulmonary complications (atelectasis, acute respiratory inadequacy) and mortality in adult patients admitted for upper abdominal surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2006, Issue 3), MEDLINE, EMBASE, and LILACS (from inception to July 2006). There were no language restrictions.

Selection criteria

We included randomized controlled trials of incentive spirometry in adult patients admitted for any type of upper abdominal surgery, including patients undergoing laparoscopic procedures.

Data collection and analysis

Two authors independently assessed trial quality and extracted data.

Main results

We included 11 studies with a total of 1754 participants. Many trials were of only moderate methodological quality and did not report on compliance with the prescribed therapy. Data from only 1160 patients could be included in the meta-analysis. Three trials (120 patients) compared the effects of incentive spirometry with no respiratory treatment. Two trials (194 patients) compared incentive spirometry with deep breathing exercises. Two trials (946 patients) compared incentive spirometry with other chest physiotherapy. All showed no evidence of a statistically significant effect of incentive spirometry. There was no evidence that incentive spirometry is effective in the prevention of pulmonary complications.

Authors' conclusions

We found no evidence regarding the effectiveness of the use of incentive spirometry for prevention of postoperative pulmonary complications in upper abdominal surgery. This review underlines the urgent need to conduct well-designed trials in this field. There is a case for large randomized trials of high methodological rigour in order to define any benefit from the use of incentive spirometry regarding mortality.

Inhaled nitric oxide for the postoperative management of pulmonary hypertension in infants and children with congenital heart disease

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2008.
Review content assessed as up-to-date: 5 November 2007.

Citation: Bizzarro M, Gross I. Inhaled nitric oxide for the postoperative management of pulmonary hypertension in infants and children with congenital heart disease. *Cochrane Database of Systematic Reviews* 2005, Issue 4. Art. No.: CD005055. DOI: 10.1002/14651858.CD005055.pub2.

ABSTRACT

Background

Nitric oxide (NO) is a prevalent molecule in humans responsible for many physiologic activities including pulmonary vasodilation. An exogenous, inhaled form (iNO) exists that mimics this action without affecting systemic blood pressure. This therapy has been implemented in the treatment of pulmonary hypertension. This review examines the efficacy of iNO in the postoperative management of infants and children with congenital heart disease (CHD).

Objectives

To compare the effects of postoperative iNO versus placebo or conventional management , or both, on infants and children with CHD. The primary outcome was mortality. Secondary outcomes included length of hospital stay; neurodevelopmental disability; number of pulmonary hypertensive crises (PHTC); changes in mean pulmonary arterial pressure (MPAP), mean arterial pressure (MAP), and heart rate (HR); changes in oxygenation measured as the ratio of arterial oxygen tension (PaO2) to fraction of inspired oxygen (FiO2); and measurement of maximum methaemoglobin level as a marker of toxicity.

Search methods

We originally searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2004, Issue 3), MEDLINE (1966 to 2004), and EMBASE (1980 to 2004). In this updated version we extended the CENTRAL search to 2007, Issue 4 of *The Cochrane Library*, and MEDLINE and EMBASE through to November 1, 2007. We included abstracts and all languages.

Selection criteria

We included randomized and quasi-randomized controlled trials comparing iNO with placebo or conventional management, or both. Trials included only children with CHD requiring surgery complicated by pulmonary hypertension.

Data collection and analysis

Data were collected on mortality; number of PHTC; changes in MPAP, MAP, HR, and PaO_2:FiO_2; and maximum methaemoglobin level. Data on long-term mortality, neurodevelopmental disability, and length of hospital stay were unavailable. We performed subgroup analysis by method of control (placebo or conventional management).

Main results

We included four randomized trials and observed no differences in mortality (P = 0.50); PHTC (P = 0.79); changes in MPAP (P = 0.36), MAP (P = 0.40), HR (P = 1.00), or PaO_2:FiO_2 (P = 0.46). There was a significant increase in the methaemoglobin level (P < 0.00001) in patients treated with iNO, although levels did not reach toxicity.

Authors' conclusions

We observed no differences with the use of iNO in the outcomes reviewed. No data were available for several clinical outcomes including long-term mortality and neurodevelopmental outcome. We found it difficult to draw valid conclusions given concerns regarding methodologic quality, sample size, and heterogeneity.

Simple aspiration versus intercostal tube drainage for primary spontaneous pneumothorax in adults

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 1, 2011.
Review content assessed as up-to-date: 11 November 2006.

Citation: Wakai A, O'Sullivan R, McCabe G. Simple aspiration versus intercostal tube drainage for primary spontaneous pneumothorax in adults. *Cochrane Database of Systematic Reviews* 2007, Issue 1. Art. No.: CD004479. DOI: 10.1002/14651858.CD004479.pub2.

ABSTRACT

Background

In the management of primary spontaneous pneumothorax, simple aspiration is technically easier to perform. A systematic review may better define the clinical effectiveness and safety of simple aspiration compared to intercostal tube drainage in the management of primary spontaneous pneumothorax.

Objectives

To compare the clinically efficacy and safety of simple aspiration and intercostal tube drainage in the management of primary spontaneous pneumothorax.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, Issue 2, 2006), MEDLINE (1966 to August 2006), and EMBASE (1980 to August 2006). We searched Current Controlled Trials metaRegister of Clinical Trials (compiled by Current Science) (August 2006). We checked the reference lists of trials and contacted trial authors . We imposed no language restriction.

Selection criteria

Randomized controlled trials comparing simple aspiration with intercostal tube drainage in adults aged 18 and over with primary spontaneous pneumothorax.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. No statistical methods were necessary because only one study met the inclusion criteria.

Main results

Of the 1239 publications obtained from the search strategy, we examined six studies. Five studies were excluded, and one study of 60 participants was eligible for inclusion. There was no difference in immediate success rate of simple aspiration when compared with intercostal tube drainage in the management of primary spontaneous pneumothorax (relative risk (RR) = 0.93; 95% confidence interval (CI) 0.62 to 1.40). There was no significant difference in the early failure rate between the two interventions: RR 1.12 (95% CI 0.59 to 2.13). Simple aspiration reduced the proportion of patients hospitalized (RR = 0.52; 95% CI 0.36 to 0.75). There was no significant difference between the two interventions with regard to the following outcome measures: duration of hospitalization (weighted mean difference = 1.09; 95% CI 2.18 to 0.00); number of participants undergoing any procedure for lung pleurodesis within one year (RR = 0.95; 95% CI 0.41 to 2.22);and one year success rate (RR = 1.02; 95% CI 0.75 to 1.38).

Authors' conclusions

There is no significant difference between simple aspiration and intercostal tube drainage with regard to: immediate success rate, early failure rate, duration of hospitalisation, one year success rate and number of patients requiring pleurodesis at one year. Simple aspiration is associated with a reduction in the per cent of patients hospitalized when compared with intercostal tube drainage.

Aerosolized prostacyclin for acute lung injury (ALI) and acute respiratory distress syndrome (ARDS)

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 12, 2010.
Review content assessed as up-to-date: 22 June 2010.

Citation: Afshari A, Brok J, Møller AM, Wetterslev J. Aerosolized prostacyclin for acute lung injury (ALI) and acute respiratory distress syndrome (ARDS). *Cochrane Database of Systematic Reviews* 2010, Issue 8. Art. No.: CD007733. DOI: 10.1002/14651858.CD007733.pub2.

ABSTRACT

Background

Acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) are critical conditions that are associated with high mortality and morbidity. Aerosolized prostacyclin has been used to improve oxygenation despite the limited evidence available so far.

Objectives

To systematically assess the benefits and harms of aerosolized prostacyclin in critically ill patients with ALI and ARDS.

Search methods

We identified randomized clinical trials (RCTs) from electronic databases: the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 1); MEDLINE; EMBASE; Science Citation Index Expanded; International Web of Science; CINAHL; LILACS; and the Chinese Biomedical Literature Database (to 31st January 2010). We contacted trial authors and manufacturers in the field.

Selection criteria

We included all RCTs, irrespective of blinding or language, that compared aerosolized prostacyclin with no intervention or placebo in either children or adults with ALI or ARDS.

Data collection and analysis

Two authors independently abstracted data and resolved any disagreements by discussion. We presented pooled estimates of the intervention effects as relative risks (RR) with 95% confidence intervals (CI) for dichotomous outcomes. Our primary outcome measure was all cause mortality. We planned to perform subgroup and sensitivity analyses to assess the effect of aerosolized prostacyclin in adults and children, and on various clinical and physiological outcomes. We assessed the risk of bias through assessment of methodological trial components and the risk of random error through trial sequential analysis.

Main results

We included one paediatric RCT with low risk of bias and involving a total of 14 critically ill children with ALI or ARDS. Aersosolized prostacyclin over less than 24 hours did not reduce overall mortality at 28 days (RR 1.50, 95% CI 0.17 to 12.94) compared with aerosolized saline (a total of three deaths). The authors did not encounter any adverse events such as bleeding or organ dysfunction. We were unable to perform the prespecified subgroups and sensitivity analyses or trial sequential analysis due to the limited number of RCTs. We were also not able to assess the safety and efficacy of aerosolized prostacyclin for ALI and ARDS. We found two ongoing trials, one involving adults and the other paediatric participants. The adult trial has been finalized but the data are not yet available.

Authors' conclusions

There is no current evidence to support or refute the routine use of aerosolized prostacyclin for patients with ALI and ARDS. There is an urgent need for more randomized clinical trials.

Pharmacologic therapies for adults with acute lung injury and acute respiratory distress syndrome

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 7, 2010.
Review content assessed as up-to-date: 22 August 2004.

Citation: Adhikari NKJ, Burns KEA, Meade MO, Ratnapalan M. Pharmacologic therapies for adults with acute lung injury and acute respiratory distress syndrome. *Cochrane Database of Systematic Reviews* 2004, Issue 4. Art. No.: CD004477. DOI: 10.1002/14651858.CD004477.pub2.

ABSTRACT

Background

Multiple pharmacologic treatments have been studied for acute lung injury (ALI) and acute respiratory distress syndrome (ARDS).

Objectives

Our objective was to determine the effects of pharmacologic treatments on clinical outcomes in adults with ALI or ARDS.

Search methods

We searched OVID versions of CENTRAL (*The Cochrane Library* Issue 3, 2003), MEDLINE (1966 to week 2, January 2004), EMBASE (1980 to week 4, 2004), CINAHL (1982 to week 2, January 2004), and HEALTHSTAR (1995 to December 2003); proceedings from four conferences (1994 to 2003); and bibliographies of review articles and included studies.

Selection criteria

Randomized controlled trials of pharmacologic treatments compared to no therapy or placebo for established ALI or ARDS in adults admitted to an intensive care unit, with measurement of early mortality (primary outcome), late mortality, duration of mechanical ventilation, ventilator-free days to day 28, or adverse events. We excluded trials of nitric oxide, partial liquid ventilation, fluid and nutritional interventions, oxygen, and trials in other populations reporting outcomes in subgroups of patients with ALI or ARDS.

Data collection and analysis

Two reviewers independently screened titles and abstracts, rated studies for inclusion, extracted data and assessed methodologic quality of included studies. Disagreements were resolved by consensus in consultation with a third reviewer. For each pharmacologic therapy, we quantitatively pooled the results of studies using random effects models where permitted by the available data. We contacted study authors when clarification of the primary outcome was required.

Main results

Thirty three trials randomizing 3272 patients met our inclusion criteria. Pooling of results showed no effect on early mortality of prostaglandin E_1 (seven trials randomizing 697 patients; relative risk [RR] 0.95, 95% confidence interval [CI] 0.77 to 1.17), N-acetylcysteine (five trials randomizing 239 patients; RR 0.89, 95% CI 0.65 to 1.21), early high-dose corticosteroids (two trials randomizing 187 patients; RR 1.12, 95% CI 0.72 to 1.74), or surfactant (nine trials randomizing 1441 patients; RR 0.93, 95% CI 0.77 to 1.12). Two interventions were beneficial in single small trials; corticosteroids given for late phase ARDS reduced hospital mortality (24 patients; RR 0.20, 95% CI 0.05 to 0.81), and pentoxifylline reduced one-month mortality (RR 0.67, 95% CI 0.47 to 0.95) in 30 patients with metastatic cancer and ARDS. Individual trials of nine additional interventions failed to show a beneficial effect on prespecified outcomes.

Authors' conclusions

Effective pharmacotherapy for ALI and ARDS is extremely limited, with insufficient evidence to support any specific intervention.

Interventions for protecting renal function in the perioperative period

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 4, 2008.
Review content assessed as up-to-date: 24 June 2007.

Citation: Zacharias M, Conlon NP, Herbison GP, Sivalingam P, Walker RJ, Hovhannisyan K. Interventions for protecting renal function in the perioperative period. *Cochrane Database of Systematic Reviews* 2008, Issue 4. Art. No.: CD003590. DOI: 10.1002/14651858.CD003590.pub3.

ABSTRACT

Background

A number of methods have been used to try to protect kidney function in patients undergoing surgery. These include the administration of dopamine and its analogues, diuretics, calcium channel blockers, angiotensin converting enzyme inhibitors and hydration fluids.

Objectives

For this review, we selected randomized controlled trials which employed different methods to protect renal function during the perioperative period. In examining these trials, we looked at outcomes that included renal failure and mortality as well as changes in renal function tests, such as urine output, creatinine clearance, free water clearance, fractional excretion of sodium and renal plasma flow.

Search methods

We searched the Cochrane Central register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2007, Issue 2), MEDLINE (1966 to June, 2007), and EMBASE (1988 to June, 2007); and handsearched six journals (*Anesthesia and Analgesia, Anesthesiology, Annals of Surgery, British Journal of Anaesthesia, Journal of Thoracic and Cardiovascular Surgery,* and *Journal of Vascular Surgery*).

Selection criteria

We selected all randomized controlled trials in adults undergoing surgery where a treatment measure was used for the purpose of renal protection in the perioperative period.

Data collection and analysis

We selected 53 studies for inclusion in this review. As well as data analysis from all the studies, we performed subgroup analysis for type of intervention, type of surgical procedure, and pre-existing renal dysfunction. We undertook sensitivity analysis on studies with high and moderately good methodological quality.

Main results

The review included data from 53 studies, comprising a total of 2327 participants. Of these, 1293 received some form of treatment and 1034 acted as controls. The interventions mostly consisted of different pharmaceutical agents, such as dopamine and its analogues, diuretics, calcium channel blockers, ACE inhibitors, or selected hydration fluids. The results indicated that certain interventions showed minimal benefits. All the results suffered from significant heterogeneity. Hence we cannot draw conclusions about the effectiveness of these interventions in protecting patients' kidneys during surgery.

Authors' conclusions

There is no reliable evidence from the available literature to suggest that interventions during surgery can protect the kidneys from damage. There is a need for more studies with high methodological quality. One particular area for further study may be patients with pre-existing renal dysfunction undergoing surgery.

Pulmonary artery catheters for adult patients in intensive care

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 2, 2012.
Review content assessed as up-to-date: 15 May 2006.

Citation: Harvey S, Young D, Brampton W, Cooper A, Doig GS, Sibbald W, Rowan K. Pulmonary artery catheters for adult patients in intensive care. *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD003408. DOI: 10.1002/14651858.CD003408.pub2.

ABSTRACT

Background

Pulmonary artery catheterization was adopted about 30 years ago and widely disseminated without rigorous evaluation as to whether it benefited critically ill patients. The technique is used to measure cardiac output and pressures in the pulmonary circulation to guide diagnosis and treatment. Clinicians believe these data can improve patients' outcomes, even in the absence of consensus about the specific interpretation of the data.

Objectives

To assess the effect of pulmonary artery catheterization on mortality and cost of care in adult intensive care patients.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, Issue 2, 2006); MEDLINE (all records to April 2006); EMBASE (all records to April 2006); CINAHL (all records to April 2006) and reference lists of articles. We contacted manufacturers and researchers in the field.

Selection criteria

We included all randomized controlled trials in adults, comparing management with and without a pulmonary artery catheter (PAC).

Data collection and analysis

We screened the titles and abstracts of the electronic search results and obtained the full text of studies of possible relevance for independent review. We determined the final results of the literature search by consensus between the authors. We did not contact study authors for additional information.

Main results

We identified 12 studies. Mortality was reported as hospital, 28-day, 30-day, or intensive care unit. We considered studies of high-risk surgery patients (eight studies) and general intensive care patients (four studies) separately for the meta-analysis. The pooled odds ratio for the studies of general intensive care patients was 1.05 (95% confidence interval (CI) 0.87 to 1.26) and for the studies of high-risk surgery patients 0.99 (95% CI 0.73 to 1.24). Of the eight studies of high-risk surgery patients, five evaluated the effectiveness of pre-operative optimization but there was no difference in mortality when these studies were examined separately. Pulmonary artery catheterization did not affect intensive care unit (reported by 10 studies) or hospital (reported by nine studies) length of stay. Four studies, conducted in the United States, measured costs based on hospital charges billed to patients, which on average were higher in the PAC groups.

Authors' conclusions

To date, there have been two multi-centre trials of the effectiveness of PACs for managing critically ill patients admitted to intensive care, although only one was adequately powered. Efficacy studies are needed to determine optimal management protocols and patient groups who could benefit from management with a PAC.

Cooling for cerebral protection during brain surgery

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 10, 2011.
Review content assessed as up-to-date: 5 November 2010.

Citation: Milani WRO, Antibas PL, Prado GF. Cooling for cerebral protection during brain surgery. *Cochrane Database of Systematic Reviews* 2011, Issue 10. Art. No.: CD006638. DOI: 10.1002/14651858.CD006638.pub2.

ABSTRACT

Background

The brain is at risk of ischaemia during a variety of neurosurgical procedures, and this can lead to devastating results. Induced hypothermia is the controlled lowering of core body temperature for therapeutic purposes. This remains the current practice during neurosurgery for the prevention or minimization of ischaemic brain injury. Brain surgery may lead to severe complications due to factors such as requirement for brain retraction, vessel occlusion, and intraoperative haemorrhage. Many anaesthesiologists believe that induced hypothermia is indicated to protect the central nervous system during surgery. Although hypothermia is often used during brain surgery, clinical efficacy has not yet been established.

Objectives

To evaluate the effectiveness and safety of induced hypothermia versus normothermia for neuroprotection in patients undergoing brain surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 10), MEDLINE, LILACS, EMBASE and Current Controlled Trials (from inception to November 2010), reference lists of identified trials, and bibliographies of published reviews. We also contacted researchers in the field. There were no language restrictions.

Selection criteria

We included randomized controlled trials and quasi-randomized controlled trials of induced hypothermia versus normothermia for neuroprotection in patients undergoing brain surgery.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. We contacted study authors for additional information.

Main results

We included four trials of cooling for cerebral protection during brain surgery, involving a total of 1219 patients. We did not find any evidence that hypothermia for neuroprotection in patients undergoing brain surgery is either effective or unsafe when compared to normothermia.

Authors' conclusions

Although there is some evidence that mild hypothermia is safe, its effectiveness is not clear when compared with normothermia. We need to perform more clinical trials in order to establish the benefit, if any, of hypothermia for cerebral protection during brain surgery before making firm recommendations for the routine use of this intervention.

Nutritional support for critically ill children

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 2, 2009.
Review content assessed as up-to-date: 15 February 2007.

Citation: Joffe A, Anton N, Lequier L, Vandermeer B, Tjosvold L, Larsen B, Hartling L. Nutritional support for critically ill children. *Cochrane Database of Systematic Reviews* 2009, Issue 2. Art. No.: CD005144. DOI: 10.1002/14651858.CD005144.pub2.

ABSTRACT

Background

Nutritional support in the critically ill child has not been well investigated and is a controversial topic within paediatric intensive care. There are no clear guidelines as to the best form or timing of nutrition in critically ill infants and children.

Objectives

To assess the impact of enteral and total parenteral nutrition on clinically important outcomes for critically ill children.

Search methods

We searched: the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2007, Issue 1); Ovid MEDLINE (1966 to February 2007); Ovid EMBASE (1988 to February 2007); OVID Evidence-Based Medicine Reviews; ISI Web of Science - Science Citation Index Expanded (1965 to February 2007); WebSPIRS Biological Abstracts (1969 to February 2007); and WebSPIRS CAB Abstracts (1972 to February 2007). We also searched trial registries; reviewed reference lists of all potentially relevant studies; handsearched relevant conference proceedings; and contacted experts in the area and manufacturers of enteral and parenteral nutrition products. We did not limit the search by language or publication status.

Selection criteria

We included studies if they were randomized controlled trials; involved paediatric patients, aged one day to 18 years of age, cared for in a paediatric intensive care unit setting (PICU) and received nutrition within the first seven days of admission; and reported data for at least one of the pre-specified outcomes (30-day or PICU mortality; length of stay in PICU or hospital; number of ventilator days; and morbid complications, such as nosocomial infections). We excluded studies if they only reported nutritional outcomes, quality of life assessments, or economic implications. Furthermore, other areas of paediatric nutrition, such as immunonutrition and different routes of delivering enteral nutrition, were not addressed in this review.

Data collection and analysis

Two authors independently screened searches, applied inclusion criteria, and performed quality assessments. We resolved discrepancies through discussion and consensus. One author extracted data and a second checked data for accuracy and completeness.

Main results

Only one trial was identified as relevant. Seventy-seven children in intensive care with burns involving > 25% of the total body surface area were randomized to either enteral nutrition within 24 hours or after at least 48 hours. No statistically significant differences were observed for mortality, sepsis, ventilator days, length of stay, unexpected adverse events, resting energy expenditure, nitrogen balance, or albumin levels. The trial was assessed as of low methodological quality (based on the Jadad scale) with an unclear risk of bias.

Authors' conclusions

There was only one randomized trial relevant to the review question. Research is urgently needed to identify best practices regarding the timing and forms of nutrition for critically ill infants and children.

Selenium supplementation for critically ill adults

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2008.
Review content assessed as up-to-date: 16 August 2007.

Citation: Avenell A, Noble DW, Barr J, Engelhardt T. Selenium supplementation for critically ill adults. *Cochrane Database of Systematic Reviews* 2004, Issue 4. Art. No.: CD003703. DOI: 10.1002/14651858.CD003703.pub2.

ABSTRACT

Background

Selenium is a trace mineral essential to health and has an important role in immunity, defence against tissue damage and thyroid function. Improving selenium status could help protect against overwhelming tissue damage and infection in critically ill adults.

Objectives

This review assessed the effects of selenium supplementation, including the selenium-containing compound ebselen, on adults recovering from critical illness.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2007, Issue 3), MEDLINE, EMBASE, CAB NAR, BIOSIS, CINAHL, Current Controlled Trials and reference lists. We contacted investigators and handsearched four journals. The date of the most recent search was August 2007.

Selection criteria

Randomized trials of selenium or ebselen supplementation by any route in adults with critical illness (including patients with burns, head injury, brain haemorrhage, cerebrovascular accident) and after surgery.

Data collection and analysis

Two authors independently extracted data and assessed trial quality. We sought additional information as required from trialists. We undertook pooling of data for outcomes and selected exploratory analyses were undertaken.

Main results

Ten randomized trials involving 1172 participants were included. The quality of trials, as reported, was poor, particularly for allocation concealment. The availability of outcome data was limited and trials involving selenium supplementation were mostly small. Thus the results must be interpreted with caution.

Seven trials of intravenous sodium selenite showed no statistically significant difference in mortality (relative risk (RR) 0.75, 95% confidence interval (CI) 0.53 to 1.06). In general intensive care patients the RR for selenium supplementation was 0.75 (95% CI 0.59 to 0.96). Three trials of ebselen showed no statistically significant difference in mortality (RR 0.83, 95% CI 0.51 to 1.35).

Three trials of intravenous sodium selenite found no statistically significant difference between groups for participants developing infection (RR 1.22, 95% CI 0.67 to 2.23). Three trials of ebselen provided data for participants developing infections (pyrexia, respiratory infections or meningitis), which were not statistically significant (RR 0.60, 95% CI 0.36 to 1.02).

No clear evidence emerged for the benefits of selenium or ebselen supplementation for the outcomes of days on a ventilator, length of intensive care unit stay, length of hospital stay or quality of life.

Authors' conclusions

There is limited evidence to recommend supplementation of critically ill patients with selenium or ebselen. Trials are required which overcome the defects of the reviewed studies, particularly inadequate size and methodology.

Adrenaline (epinephrine) for the treatment of anaphylaxis with and without shock

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2012.
Review content assessed as up-to-date: 30 November 2010.

Citation: Sheikh A, Shehata YA, Brown SGA, Simons FER. Adrenaline (epinephrine) for the treatment of anaphylaxis with and without shock. *Cochrane Database of Systematic Reviews* 2008, Issue 4. Art. No.: CD006312. DOI: 10.1002/14651858.CD006312.pub2.

ABSTRACT

Background

Anaphylaxis is a serious hypersensitivity reaction that is rapid in onset and may cause death. Adrenaline is recommended as the initial treatment of choice for anaphylaxis.

Objectives

To assess the benefits and harms of adrenaline (epinephrine) in the treatment of anaphylaxis.

Search methods

In the previous version of our review, we searched the databases until March 2007. In this version we searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 11), MEDLINE (1966 to November 2010), EMBASE (1966 to November 2010), CINAHL (1982 to November 2010), BIOSIS (to November 2010), ISI Web of Knowledge (to November 2010 and LILACS (1982 to November 2010). We also searched websites listing ongoing trials and contacted pharmaceutical companies and international experts in anaphylaxis in an attempt to locate unpublished material.

Selection criteria

We included randomized and quasi-randomized controlled trials comparing adrenaline with no intervention, placebo or other adrenergic agonists were eligible for inclusion.

Data collection and analysis

Two authors independently assessed articles for inclusion.

Main results

We found no studies that satisfied the inclusion criteria.

Authors' conclusions

Based on this review, we are unable to make any new recommendations on the use of adrenaline for the treatment of anaphylaxis. Although there is a need for randomized, double-blind, placebo-controlled clinical trials of high methodological quality in order to define the true extent of benefits from the administration of adrenaline in anaphylaxis, such trials are unlikely to be performed in individuals with anaphylaxis. Indeed, they might be unethical because prompt treatment with adrenaline is deemed to be critically important for survival in anaphylaxis. Also, such studies would be difficult to conduct because anaphylactic episodes usually occur without warning, often in a non-medical setting, and differ in severity both among individuals and from one episode to another in the same individual. Consequently, obtaining baseline measurements and frequent timed measurements might be difficult, or impossible, to obtain. In the absence of appropriate trials, we recommend, albeit on the basis of less than optimal evidence, that adrenaline administration by intramuscular (i.m.) injection should still be regarded as first-line treatment for the management of anaphylaxis.

Glucocorticoids for the treatment of anaphylaxis

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 5, 2012.
Review content assessed as up-to-date: 30 September 2011.

Citation: Choo KJL, Simons FER, Sheikh A. Glucocorticoids for the treatment of anaphylaxis. *Cochrane Database of Systematic Reviews* 2012, Issue 4. Art. No.: CD007596. DOI: 10.1002/14651858.CD007596.pub3.

ABSTRACT

Background

Anaphylaxis is a serious hypersensitivity reaction that is rapid in onset and may result in death. Anaphylaxis guidelines recommend glucocorticoids for the treatment of people experiencing anaphylaxis.

Objectives

We sought to assess the benefits and harms of glucocorticoid treatment during episodes of anaphylaxis.

Search methods

In our previous version we searched the literature until September 2009. In this version we searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2011, Issue 3), MEDLINE (Ovid) (1956 to September 2011), EMBASE (Ovid) (1982 to September 2011), CINAHL (EBSCOhost) (to September 2011). We also searched the UK National Research Register and websites listing ongoing trials, and contacted international experts in anaphylaxis in an attempt to locate unpublished material.

Selection criteria

We planned to include randomized and quasi-randomized controlled trials comparing glucocorticoids with any control (either placebo, adrenaline (epinephrine), an antihistamine, or any combination of these).

Data collection and analysis

Two authors independently assessed articles for inclusion.

Main results

We found no studies that satisfied the inclusion criteria.

Authors' conclusions

We are, based on this review, unable to make any recommendations for the use of glucocorticoids in the treatment of anaphylaxis.

H1-antihistamines for the treatment of anaphylaxis with and without shock

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2012.
Review content assessed as up-to-date: 30 November 2010.

Citation: Sheikh A, ten Broek VM, Brown SGA, Simons FER. H1-antihistamines for the treatment of anaphylaxis with and without shock. *Cochrane Database of Systematic Reviews* 2007, Issue 1. Art. No.: CD006160. DOI: 10.1002/14651858.CD006160.pub2.

ABSTRACT

Background

Anaphylaxis is an acute systemic allergic reaction, which can be life-threatening. H1-antihistamines are commonly used as an adjuvant therapy in the treatment of anaphylaxis.

Objectives

To assess the benefits and harm of H1-antihistamines in the treatment of anaphylaxis.

Search methods

In our previous version we searched until June 2006. In this version we searched the Cochrane Central Register of Controlled Trials (CENTRAL), (*The Cochrane Library* 2010, Issue 11), MEDLINE (1966 to November 2010); EMBASE (1966 to November 2010); CINAHL (1982 to Nobember 2010) and ISI Web of Science (1945 to November 2010). We also contacted pharmaceutical companies and international experts in anaphylaxis in an attempt to locate unpublished material.

Selection criteria

We planned to include randomized and quasi-randomized controlled trials comparing H1-antihistamines with placebo or no intervention.

Data collection and analysis

Two authors independently assessed articles for inclusion.

Main results

We found no studies that satisfied the inclusion criteria.

Authors' conclusions

Based on this review, we are unable to make any recommendations for clinical practice. Randomized controlled trials are needed, although these are likely to prove challenging to design and execute.

Intravenous immunoglobulin for treating sepsis, severe sepsis and septic shock

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Editorial group: Cochrane Anaesthesia Group.
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Review content assessed as up-to-date: 3 January 2010.

Citation: Alejandria MM, Lansang MAD, Dans LF, Mantaring III JB. Intravenous immunoglobulin for treating sepsis, severe sepsis and septic shock. *Cochrane Database of Systematic Reviews* 2002, Issue 1. Art. No.: CD001090. DOI: 10.1002/14651858.CD001090.

ABSTRACT

Background

Mortality from sepsis and septic shock remains high. Results of trials on intravenous immunoglobulins (IVIG) as adjunctive therapy for sepsis have been conflicting. This is an update of a Cochrane review (2002).

Objectives

To estimate the effects of IVIG on mortality and duration of hospitalization in patients with sepsis or septic shock.

Search methods

We searched the Cochrane Central Register of Controlled Trials (*The Cochrane Library* 2008, Issue 4), MEDLINE (1966 to October 2008), and EMBASE (1988 to October 2008). We contacted investigators in the field for unpublished data.

Selection criteria

We included randomized controlled trials comparing IVIG (monoclonal or polyclonal) with placebo or no intervention in patients with bacterial sepsis or septic shock.

Data collection and analysis

Two reviewers independently assessed the studies for inclusion, methodologic quality and data abstraction. We conducted pre-specified subgroup analyses by type of immunoglobulin preparation.

Main results

Forty-two of 84 potentially eligible studies met our inclusion criteria. Pooled analysis of polyclonal and monoclonal IVIG was not done due to clinical heterogeneity. Subgroup analysis of 10 polyclonal IVIG trials in adults (n = 1430) and seven trials on IgM-enriched polyclonal IVIG (n = 528) showed significant reductions in mortality compared to placebo or no intervention (RR 0.81; 95% CI 0.70 to 0.93 and RR 0.66; 95% CI 0.51 to 0.85, respectively). Subgroup analysis of polyclonal IVIG in neonates showed no significant reduction in mortality for standard (RR 0.90; 95% CI 0.46 to 1.76; 4 trials, n = 174) and IgM-enriched polyclonal IVIG (RR 0.57; 95% CI 0.31 to 1.04; 3 trials, n = 164). Sensitivity analysis of trials with low risk of bias showed no reduction in mortality with polyclonal IVIG in adults (RR 0.97; 95% CI 0.81 to 1.15; 5 trials, n = 945) and neonates (RR 0.41; 95% CI 0.16 to 1.08; 3 trials, n = 128). Mortality was not reduced among patients (8 trials, n = 4671) who received anti-endotoxin antibodies (RR 0.99; 95% CI 0.91 to1.06) while anti-cytokines (9 trials, n = 7893) demonstrated a marginal reduction in mortality (RR 0.92; 95% CI 0.86 to 0.97).

Authors' conclusions

Polyclonal IVIG reduced mortality among adults with sepsis but this benefit was not seen in trials with low risk of bias. Among neonates, no reduction in mortality was seen with polyclonal IVIG. Most of the trials were small and the totality of the evidence is insufficient to support a robust conclusion of benefit. Adjunctive therapy with monoclonal IVIGs remains experimental.

Closed tracheal suction systems versus open tracheal suction systems for mechanically ventilated adult patients

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Subirana M, Solà I, Benito S. Closed tracheal suction systems versus open tracheal suction systems for mechanically ventilated adult patients. *Cochrane Database of Systematic Reviews* 2007, Issue 4. Art. No.: CD004581. DOI: 10.1002/14651858.CD004581.pub2.

ABSTRACT

Background

Ventilator-associated pneumonia is a common complication in ventilated patients. Endotracheal suctioning is a procedure that may constitute a risk factor for ventilator-associated pneumonia. It can be performed with an open system or with a closed system. In view of suggested advantages being reported for the closed system, a systematic review comparing both techniques was warranted.

Objectives

To compare the closed tracheal suction system and the open tracheal suction system in adults receiving mechanical ventilation for more than 24 hours.

Search methods

We searched CENTRAL (*The Cochrane Library* 2006, Issue 1) MEDLINE, CINAHL, EMBASE and LILACS from their inception to July 2006. We handsearched the bibliographies of relevant identified studies, and contacted authors and manufacturers.

Selection criteria

The review included randomized controlled trials comparing closed and open tracheal suction systems in adult patients who were ventilated for more than 24 hours.

Data collection and analysis

We included the relevant trials fitting the selection criteria. We assessed methodological quality using method of randomization, concealment of allocation, blinding of outcome assessment and completeness of follow up. Effect measures used for pooled analyses were relative risk (RR) for dichotomous data and weighted mean differences (WMD) for continuous data. We assessed heterogeneity prior to meta-analysis.

Main results

Of the 51 potentially eligible references, the review included 16 trials (1684 patients), many with methodological weaknesses. The two tracheal suction systems showed no differences in risk of ventilator-associated pneumonia (11 trials; RR 0.88; 95% CI 0.70 to 1.12), mortality (five trials; RR 1.02; 95% CI 0.84 to 1.23) or length of stay in intensive care units (two trials; WMD 0.44; 95% CI -0.92 to 1.80). The closed tracheal suction system produced higher bacterial colonization rates (five trials; RR 1.49; 95% CI 1.09 to 2.03).

Authors' conclusions

Results from 16 trials showed that suctioning with either closed or open tracheal suction systems did not have an effect on the risk of ventilator-associated pneumonia or mortality. More studies of high methodological quality are required, particularly to clarify the benefits and hazards of the closed tracheal suction system for different modes of ventilation and in different types of patients.

Protocolized versus non-protocolized weaning for reducing the duration of mechanical ventilation in critically ill adult patients

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Editorial group: Cochrane Anaesthesia Group.
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Review content assessed as up-to-date: 29 January 2010.

Citation: Blackwood B, Alderdice F, Burns KEA, Cardwell CR, Lavery G, O'Halloran P. Protocolized versus non-protocolized weaning for reducing the duration of mechanical ventilation in critically ill adult patients. *Cochrane Database of Systematic Reviews* 2010, Issue 5. Art. No.: CD006904. DOI: 10.1002/14651858.CD006904.pub2.

ABSTRACT

Background

Reducing weaning time is desirable in minimizing potential complications from mechanical ventilation. Standardized weaning protocols are purported to reduce time spent on mechanical ventilation. However, evidence supporting their use in clinical practice is inconsistent.

Objectives

To assess the effects of protocolized weaning from mechanical ventilation on the total duration of mechanical ventilation for critically ill adults; ascertain differences between protocolized and non-protocolized weaning in terms of mortality, adverse events, quality of life, weaning duration, intensive care unit (ICU) and hospital length of stay (LOS); and explore variation in outcomes by type of ICU, type of protocol and approach to delivering the protocol.

Search methods

We searched the Cochrane Central Register of Controlled Trials (*The Cochrane Library* Issue 1, 2010), MEDLINE (1950 to 2010), EMBASE (1988 to 2010), CINAHL (1937 to 2010), LILACS (1982 to 2010), ISI Web of Science and ISI Conference Proceedings (1970 to 2010), Cambridge Scientific Abstracts (inception to 2010) and reference lists of articles. We did not apply language restrictions.

Selection criteria

We included randomized and quasi-randomized controlled trials of protocolized weaning versus non-protocolized weaning from mechanical ventilation in critically ill adults.

Data collection and analysis

Three authors independently assessed trial quality and extracted data. A priori subgroup and sensitivity analyses were performed. We contacted study authors for additional information.

Main results

Eleven trials that included 1971 patients met the inclusion criteria. The total duration of mechanical ventilation geometric mean in the protocolized weaning group was on average reduced by 25% compared with the usual care group (N = 10 trials, 95% CI 9% to 39%, P = 0.006); weaning duration was reduced by 78% (N = 6 trials, 95% CI 31% to 93%, P = 0.009); and ICU LOS by 10% (N = 8 trials, 95% CI 2% to 19%, P = 0.02). There was significant heterogeneity among studies for total duration of mechanical ventilation (I^2 = 76%, P < 0.01) and weaning duration (I^2 = 97%, P < 0.01), which could not be explained by subgroup analyses based on type of unit or type of approach.

Authors' conclusions

There is some evidence of a reduction in the duration of mechanical ventilation, weaning duration and ICU LOS with use of standardized protocols, but there is significant heterogeneity among studies and an insufficient number of studies to investigate the source of this heterogeneity. Although some study authors suggest that organizational context may influence outcomes, these factors were not considered in all included studies and therefore could not be evaluated.

Heated humidification versus heat and moisture exchangers for ventilated adults and children

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Kelly M, Gillies D, Todd DA, Lockwood C. Heated humidification versus heat and moisture exchangers for ventilated adults and children. *Cochrane Database of Systematic Reviews* 2010, Issue 4. Art. No.: CD004711. DOI: 10.1002/14651858.CD004711.pub2.

ABSTRACT

Background

Humidification by artificial means must be provided when the upper airway is bypassed during mechanical ventilation. Heated humidification (HH) and heat and moisture exchangers (HME) are the most commonly used types of artificial humidification in this situation.

Objectives

To determine whether HHs or HMEs are more effective in preventing mortality and other complications in people who are mechanically ventilated.

Search methods

We searched the Cochrane Central Register of Controlled Trials (*The Cochrane Library* 2010, Issue 4) and MEDLINE, EMBASE and CINAHL (January, 2010) to identify relevant randomized controlled trials (RCTs).

Selection criteria

We included RCTs comparing heat and moisture exchangers (HMEs) to heated humidifiers (HHs) in mechanically ventilated adults and children. We included randomized crossover studies.

Data collection and analysis

We assessed the quality of each study and extracted the relevant data. Where appropriate, results from relevant studies were meta-analysed for individual outcomes.

Main results

We included 33 trials with 2833 participants, 25 studies were parallel group design (n = 2710) and eight crossover design (n = 123). Only three included studies reported data for infants or children. There was no overall effect on artificial airway occlusion, mortality, pneumonia, or respiratory complications; however, the $PaCO_2$ and minute ventilation were increased when HMEs were compared to HHs and body temperature was lower. The cost of HMEs was lower in all studies that reported this outcome. There was some evidence that hydrophobic HMEs may reduce the risk of pneumonia and that blockages of artificial airways may be increased with the use of HMEs in certain subgroups of patients.

Authors' conclusions

There is little evidence of an overall difference between HMEs and HHs. However, hydrophobic HMEs may reduce the risk of pneumonia and the use of an HME may increase artificial airway occlusion in certain subgroups of patients. Therefore, HMEs may not be suitable for patients with limited respiratory reserve or prone to airway blockage. Further research is needed relating to hydrophobic versus hygroscopic HMEs and the use of HMEs in the paediatric and neonatal populations. As the design of HMEs evolves, evaluation of new generation HMEs will also need to be undertaken.

High-frequency ventilation versus conventional ventilation for treatment of acute lung injury and acute respiratory distress syndrome

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Editorial group: Cochrane Anaesthesia Group.
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Review content assessed as up-to-date: 25 October 2003.

Citation: Wunsch H, Mapstone J. High-frequency ventilation versus conventional ventilation for treatment of acute lung injury and acute respiratory distress syndrome. *Cochrane Database of Systematic Reviews* 2004, Issue 1. Art. No.: CD004085. DOI: 10.1002/14651858.CD004085.pub2.

ABSTRACT

Background

High-frequency ventilation is often used to treat patients with acute lung injury (ALI) or acute respiratory distress syndrome (ARDS) but the effect of this treatment on clinical outcomes has not been well established.

Objectives

The objective of this review is to examine the effect of high-frequency ventilation compared with conventional ventilation as a therapy for ALI or ARDS in children (1 to 17 years old) and adults in order to quantify its effect on patient outcome (mortality, morbidity and other relevant outcomes).

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, issue 4, 2002), MEDLINE (1966 to October Week 5, 2002), EMBASE (1980 to Week 51, 2002), World Wide Web (www.controlled-trials.com, ARDS clinical network), and used Cited Reference Search (Web of Science 1988 to 2002, for specific reference lists of articles). We also contacted authors from each included trial, as well as manufacturers of high-frequency ventilators and other researchers in the field.

Selection criteria

Randomized controlled clinical trials of children and adults comparing treatment using high-frequency ventilation with conventional ventilation for patients diagnosed with ALI or ARDS.

Data collection and analysis

Two reviewers independently assessed trial quality and extracted data. Study authors were contacted for additional information.

Main results

Two trials met the inclusion criteria for this review. One trial recruited children (including some children less than one year old) (n = 58) and the other recruited adults (n = 148). Both trials used a high-frequency oscillatory ventilator as the intervention and included variable use of lung-volume recruitment strategies. The intervention groups showed a trend towards lower 30 day mortality (children relative risk (RR) 0.83, 95% confidence interval (CI) 0.43 to 1.62; adults RR 0.72, 95% CI 0.50 to 1.03), although neither study showed a statistically significant difference. Similarly, there was no statistically significant difference between the intervention and control groups for 'Total length of ventilator days' (WMD) -2.00, 95% CI -18.36 to 14.36; and WMD 2.00, 95% CI -6.55 to 10.55 for the child and adult trials respectively). The studies used only proxies to measure long-term quality of life. There was a statistically significant reduction in the risk of requiring supplemental oxygen amongst survivors at 30 days in the paediatric study (RR 0.36, 95% CI 0.14 to 0.93).

Authors' conclusions

There is not enough evidence to conclude whether high-frequency ventilation reduces mortality or long-term morbidity in patients with ALI or ARDS; further trials are needed.

Intravenous versus inhalation anaesthesia for one-lung ventilation

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 4, 2012.
Review content assessed as up-to-date: 29 June 2006.

Citation: Bassi A, Milani WRO, El Dib RP, Matos D. Intravenous versus inhalation anaesthesia for one-lung ventilation. *Cochrane Database of Systematic Reviews* 2008, Issue 2. Art. No.: CD006313. DOI: 10.1002/14651858.CD006313.pub2.

ABSTRACT

Background

The technique called one-lung ventilation can confine bleeding or infection to one lung, prevent rupture of a lung cyst or, more commonly, facilitate surgical exposure of the unventilated lung. During one-lung ventilation, anaesthesia is maintained either by delivering a volatile anaesthetic to the ventilated lung or by infusing an intravenous anaesthetic. It is possible that the method chosen to maintain anaesthesia may affect patient outcomes.

Objectives

The objective of this review was to evaluate the effectiveness and safety of intravenous versus inhalation anaesthesia for one-lung ventilation.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2006, Issue 3), MEDLINE, LILACS, EMBASE (from inception to June 2006), ISI web of Science (1945 to June 2006), reference lists of identified trials, and bibliographies of published reviews. We also contacted researchers in the field. There were no language restrictions.

Selection criteria

We included randomized controlled trials and quasi-randomized controlled trials of intravenous versus inhalation anaesthesia for one-lung ventilation.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. We contacted study authors for additional information.

Main results

We included nine studies that enrolled 291 participants. We could not perform meta-analyses as the included studies did not report the outcomes listed in the protocol for this review.

Authors' conclusions

There is no evidence from randomized controlled trials of differences in patient outcomes for anaesthesia maintained by intravenous versus inhalational anaesthesia during one-lung ventilation. This review highlights the need for continued research into the use of intravenous versus inhalation anaesthesia for one-lung ventilation. Future trials should have standardized outcome measures such as death, adverse postoperative outcomes and intraoperative awareness. Dropouts and losses to follow up should be reported.

Partial liquid ventilation for preventing death and morbidity in adults with acute lung injury and acute respiratory distress syndrome

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Editorial group: Cochrane Anaesthesia Group.
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Review content assessed as up-to-date: 24 August 2004.

Citation: Davies MW, Fraser JF. Partial liquid ventilation for preventing death and morbidity in adults with acute lung injury and acute respiratory distress syndrome. *Cochrane Database of Systematic Reviews* 2004, Issue 4. Art. No.: CD003707. DOI: 10.1002/14651858.CD003707.pub2.

ABSTRACT

Background

Acute lung injury (ALI), and acute respiratory distress syndrome (ARDS), are syndromes of severe respiratory failure. Adults with ALI or ARDS have high mortality and significant morbidity. Partial liquid ventilation (PLV) may be better (i.e., cause less lung damage) for these patients than other forms of respiratory support. Uncontrolled studies in adults have shown improvement in gas exchange and lung compliance with partial liquid ventilation.

Objectives

To assess whether partial liquid ventilation reduces morbidity and mortality in adults with ALI or ARDS.

Search methods

We searched The Cochrane Central Register of Controlled Trials (CENTRAL), *The Cochrane Library* Issue 2, 2004; MEDLINE (1966 to May 2004); and CINAHL (1982 to May 2004); intensive care journals and conference proceedings; reference lists and unpublished literature.

Selection criteria

Randomized controlled trials which compared partial liquid ventilation with other forms of ventilation, in adults (16 years old or greater) with ALI or ARDS, reporting one or more of the following: mortality; duration of mechanical ventilation, respiratory support, oxygen therapy, stay in the intensive care unit, or stay in hospital; infection; long term cognitive impairment or health related quality of life; long term lung function; or cost.

Data collection and analysis

Two reviewers independently evaluated the quality of the relevant studies and extracted the data from the included studies.

Main results

Problems with the inadequacy of the primary report of the one included study do not allow us to report any quantitative results for patients with ALI or ARDS. The only outcome we considered to be of clinical significance and reported for all enrolled patients (i.e., patients with ALI and ARDS and less severe respiratory insufficiency) was 28 day mortality. There was no statistically significant difference between groups for this outcome with a relative risk for 28 day mortality in the PLV group of 1.15 (95% confidence intervals of 0.64 to 2.10).

Authors' conclusions

There is no evidence from randomized controlled trials to support or refute the use of partial liquid ventilation in adults with ALI or ARDS; adequately powered, high quality randomized controlled trials are still needed to assess its efficacy. Clinically relevant outcome measures should be assessed (especially mortality at discharge and later, duration of respiratory support and hospital stay, and long term cognitive and quality of life outcomes) and the studies should be published in full.

Partial liquid ventilation for the prevention of mortality and morbidity in paediatric acute lung injury and acute respiratory distress syndrome

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 2, 2009.
Review content assessed as up-to-date: 26 August 2008.

Citation: Davies MW, Sargent PH. Partial liquid ventilation for the prevention of mortality and morbidity in paediatric acute lung injury and acute respiratory distress syndrome. *Cochrane Database of Systematic Reviews* 2004, Issue 4. Art. No.: CD003845. DOI: 10.1002/14651858.CD003845.pub2.

ABSTRACT

Background

Acute lung injury and acute respiratory distress syndrome are syndromes of severe respiratory failure. Children with acute lung injury or acute respiratory distress syndrome have high mortality and significant morbidity. Partial liquid ventilation is proposed as a less injurious form of respiratory support for these children. Uncontrolled studies in adults have shown improvements in gas exchange and lung compliance with partial liquid ventilation. A single uncontrolled study in six children with acute respiratory syndrome showed some improvement in gas exchange during three hours of partial liquid ventilation.

Objectives

To assess whether partial liquid ventilation reduces mortality or morbidity, or both, in children with acute lung injury or acute respiratory distress syndrome.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2008, Issue 3); CINAHL (Cumulative Index to Nursing & Allied Health Literature) via Ovid (1982 to August 2008); Ovid EMBASE (1982 to August 2008); and Ovid MEDLINE (1950 to August 2008) with Daily Update.

Selection criteria

We included randomized controlled trials (RCTs) which compared partial liquid ventilation with other forms of ventilation in children (28 days to 18 years) with acute lung injury or acute respiratory distress syndrome. Trials had to report one or more of the following: mortality; duration of mechanical ventilation, respiratory support, oxygen therapy, stay in the intensive care unit, or stay in hospital; infection; long-term cognitive impairment, neurodevelopmental progress, or other long-term morbidities.

Data collection and analysis

We independently evaluated the quality of the relevant studies and extracted the data from the included studies.

Main results

Only one study enrolling 182 patients (only reported as an abstract in conference proceedings) was identified and found eligible for inclusion; the authors reported only limited results. The trial was stopped prematurely and was, therefore, under-powered to detect any significant differences. The only available outcome of clinical significance was 28-day mortality. There was no statistically significant difference between groups, with a relative risk for 28-day mortality in the partial liquid ventilation group of 1.54 (95% confidence interval 0.82 to 2.9).

Authors' conclusions

There is no evidence from RCTs to support or refute the use of partial liquid ventilation in children with acute lung injury or acute respiratory distress syndrome. Adequately powered, high quality RCTs are still needed to assess its efficacy. Clinically relevant outcome measures should be assessed (mortality at discharge and later, duration of both respiratory support and hospital stay, and long-term neurodevelopmental outcomes). The studies should be published in full.

Positive end-expiratory pressure (PEEP) during anaesthesia for the prevention of mortality and postoperative pulmonary complications

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Editorial group: Cochrane Anaesthesia Group.
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Review content assessed as up-to-date: 1 August 2010.

Citation: Imberger G, McIlroy D, Pace NL, Wetterslev J, Brok J, Møller AM. Positive end-expiratory pressure (PEEP) during anaesthesia for the prevention of mortality and postoperative pulmonary complications. *Cochrane Database of Systematic Reviews* 2010, Issue 9. Art. No.: CD007922. DOI: 10.1002/14651858.CD007922.pub2.

ABSTRACT

Background

General anaesthesia causes atelectasis which can lead to impaired respiratory function. Positive end-expiratory pressure (PEEP) is a mechanical manoeuvre which increases functional residual capacity (FRC) and prevents collapse of the airways thereby reducing atelectasis. It is not known whether intra-operative PEEP alters the risk of postoperative mortality and pulmonary complications.

Objectives

To assess the benefits and harms of intraoperative PEEP, for all adult surgical patients, on postoperative mortality and pulmonary outcomes.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2009, Issue 4), MEDLINE (via Ovid) (1966 to January 2010), EMBASE (via Ovid) (1980 to January 2010), CINAHL (via EBSCOhost) (1982 to January 2010), ISI Web of Science (1945 to January 2010) and LILACS (via BIREME interface) (1982 to January 2010).

Selection criteria

We included randomized clinical trials that evaluated the effect of PEEP versus no PEEP, during general anaesthesia, on postoperative mortality and postoperative respiratory complications. We included studies irrespective of language and publication status.

Data collection and analysis

Two investigators independently selected papers, extracted data that fulfilled our outcome criteria and assessed the quality of all included trials. We undertook pooled analyses, where appropriate. For our primary outcome (mortality) and two secondary outcomes (respiratory failure and pneumonia), we calculated the number of further patients needed (information size) in order to make reliable conclusions.

Main results

We included eight randomized trials with a total of 330 patients. Two trials had a low risk of bias. There was no difference demonstrated for mortality (relative risk (RR) 0.95, 95% CI 0.14 to 6.39). Two statistically significant results were found: the PEEP group had a higher PaO_2/FiO_2 on day 1 postoperatively (mean difference (MD) 22.98, 95% CI 4.40 to 41.55) and postoperative atelectasis (defined as an area of collapsed lung, quantified by computerized tomography (CT) scan) was less in the PEEP group (SMD -1.2, 95% CI -1.78 to -0.79). There were no adverse events reported in the three trials that adequately measured these outcomes (barotrauma and cardiac complications). Using information size calculations, we estimated that a further 21,200 patients would need to be randomized in order to make a reliable conclusion about PEEP and mortality.

Authors' conclusions

There is currently insufficient evidence to make conclusions about whether intraoperative PEEP alters the risk of postoperative mortality and respiratory complications among undifferentiated surgical patients.

Recruitment manoeuvres for adults with acute lung injury receiving mechanical ventilation

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 1, 2011.
Review content assessed as up-to-date: 7 May 2008.

Citation: Hodgson C, Keating JL, Holland AE, Davies AR, Smirneos L, Bradley SJ, Tuxen D. Recruitment manoeuvres for adults with acute lung injury receiving mechanical ventilation. *Cochrane Database of Systematic Reviews* 2009, Issue 2. Art. No.: CD006667. DOI: 10.1002/14651858.CD006667.pub2.

ABSTRACT

Background

Recruitment manoeuvres are often used to treat patients with acute lung injury (ALI) or acute respiratory distress syndrome (ARDS) but the effect of this treatment on clinical outcomes has not been well established.

Objectives

The objective of this review was to examine recruitment manoeuvres compared to standard care as therapy for adults with acute lung injury in order to quantify the effects on patient outcomes (mortality, length of ventilation, and other relevant outcomes).

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2008, Issue 2); MEDLINE (January 1966 to May 2008); EMBASE (January 1980 to May 2008); LILACS (1982 to May 2008); CINAHL (1982 to May 2008); and Current Controlled Trials (www.controlled-trials.com).

Selection criteria

We included randomized controlled trials of adults who were mechanically ventilated comparing recruitment manoeuvres to standard care for those patients diagnosed with ALI or ARDS.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. We contacted study authors for additional information.

Main results

Seven trials met the inclusion criteria for this review (the total number of included participants was 1170). All trials included a recruitment manoeuvre as part of the treatment strategy for patients on mechanical ventilation for ARDS or ALI. However, two of the trials included a package of ventilation that was different from the control ventilation in aspects other than the recruitment manoeuvre.

The intervention group showed no significant difference on 28-day mortality (RR 0.73, 95% CI 0.46 to 1.17, P = 0.2). Similarly there was no statistical difference for risk of barotrauma (RR 0.50, 95% CI 0.07 to 3.52, P = 0.5) or blood pressure (MD 0.9 mm Hg, 95% CI -4.28 to 6.08, P = 0.73). Recruitment manoeuvres significantly increased oxygenation above baseline levels for a short period of time in four of the five studies that measured oxygenation. There were insufficient data on length of ventilation or hospital stay to pool results.

Authors' conclusions

There is not evidence to make conclusions on whether recruitment manoeuvres reduce mortality or length of ventilation in patients with ALI or ARDS.

Early versus late tracheostomy for critically ill patients

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 3, 2012.
Review content assessed as up-to-date: 14 December 2010.

Citation: Gomes Silva BN, Andriolo RB, Saconato H, Atallah ÁN, Valente O. Early versus late tracheostomy for critically ill patients. *Cochrane Database of Systematic Reviews* 2012, Issue 3. Art. No.: CD007271. DOI: 10.1002/14651858.CD007271.pub2.

ABSTRACT

Background

Long-term mechanical ventilation is the most common situation where tracheostomy is indicated for patients in intensive care units (ICU). 'Early' and 'late' tracheostomies are two categories of the timing of tracheostomy. The evidence on the advantages attributed to early over late tracheostomy is somewhat conflicting but includes shorter hospital stays and lower mortality rates.

Objectives

To evaluate the effectiveness and safety of early (≤ 10 days after intubation) versus late tracheostomy (> 10 days after intubation) in critically ill adult patients predicted to be on prolonged mechanical ventilation and with different clinical conditions.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2010, Issue 12); MEDLINE (via PubMed) (1966 to December 2010); EMBASE (via Ovid) (from 1974 to December 2010); LILACS (1986 to December 2010); PEDro (Physiotherapy Evidence Database) at www.pedro.fhs.usyd.edu.au (1999 to December 2010) and CINAHL (1982 to December 2010).

Selection criteria

We included all randomized or quasi-randomized controlled trials which compared early tracheostomy (two to10 days after intubation) against late tracheostomy (> 10 days after intubation) for critically ill adult patients expected to be on prolonged mechanical ventilation. There was no language restriction.

Data collection and analysis

Two authors extracted data and conducted a quality assessment. Meta-analyses using the random-effects model were conducted for mortality and pneumonia.

Main results

We included four studies, with a high risk of bias, in which a total of 673 patients were randomized to either early or late tracheostomy. We could not pool data in a meta-analysis because of clinical, methodological and statistical heterogeneity between the included studies. There is no strong evidence for real differences between early and late tracheostomy in the primary outcome of mortality. In one study a statistically significant result favouring early tracheostomy was observed in the outcome measuring time spent on ventilatory support (mean difference (MD) -9.80 days, 95% CI -11.48 to -8.12, P < 0.001).

Authors' conclusions

Updated evidence is of low quality, and potential differences between early and late tracheostomy need to be better investigated by means of randomized controlled trials. At present there is no specific information about any subgroup or individual characteristics potentially associated with better outcomes with either early or late tracheostomy.

Recompression and adjunctive therapy for decompression illness

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 1, 2010.
Review content assessed as up-to-date: 4 November 2009.

Citation: Bennett MH, Lehm JP, Mitchell SJ, Wasiak J. Recompression and adjunctive therapy for decompression illness. *Cochrane Database of Systematic Reviews* 2007, Issue 2. Art. No.: CD005277. DOI: 10.1002/14651858.CD005277.pub2.

ABSTRACT

Background

Decompression illness (DCI) is due to bubble formation in the blood or tissues following the breathing of compressed gas. Clinically, DCI may range from a trivial illness to loss of consciousness, death or paralysis. Recompression is the universally accepted standard for the treatment of DCI. When recompression is delayed, a number of strategies have been suggested in order to improve the outcome.

Objectives

To examine the effectiveness and safety of both recompression and adjunctive therapies in the treatment of DCI.

Search methods

We searched CENTRAL (*The Cochrane Library* 2009, Issue 3); MEDLINE (1966 to October 2009); CINAHL (1982 to October 2009); EMBASE (1980 to October 2009); the Database of Randomised Controlled Trials in Hyperbaric Medicine (October 2009), and hand-searched journals and texts.

Selection criteria

We included randomized controlled trials that compared the effect of any recompression schedule or adjunctive therapy with a standard recompression schedule. We applied no language restrictions.

Data collection and analysis

Three authors extracted the data independently. We assessed each trial for internal validity and resolved differences by discussion. Data was entered into RevMan 4.2.

Main results

Two randomized controlled trials satisfied the inclusion criteria. Pooling of data was not possible. In one study there was no evidence of improved effectiveness with the addition of a non-steroidal anti-inflammatory drug (tenoxicam) to routine recompression therapy (at six weeks: relative risk (RR) 1.04, 95% confidence interval (CI) 0.90 to 1.20, P = 0.58) but there was a reduction in the number of compressions required when tenoxicam was added (P = 0.01, 95% CI 0 to 1). In the other study, the odds of multiple recompressions was lower with a helium and oxygen (heliox) table compared to an oxygen treatment table (RR 0.56, 95% CI 0.31 to 1.00, P = 0.05).

Authors' conclusions

Recompression therapy is standard for the treatment of DCI, but there is no randomized controlled trial evidence. Both the addition of an NSAID or the use of heliox may reduce the number of recompressions required, but neither improves the odds of recovery. The application of either of these strategies may be justified. The modest number of patients studied demands a cautious interpretation. Benefits may be largely economic and an economic analysis should be undertaken. There is a case for large randomized trials of high methodological rigour in order to define any benefit from the use of different breathing gases and pressure profiles during recompression therapy.

Supplemental perioperative steroids for surgical patients with adrenal insufficiency

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 4, 2009.
Review content assessed as up-to-date: 28 January 2009.

Citation: Yong SL, Marik P, Esposito M, Coulthard P. Supplemental perioperative steroids for surgical patients with adrenal insufficiency. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD005367. DOI: 10.1002/14651858.CD005367.pub2.

ABSTRACT

Background

Adrenal crisis is a life threatening condition which can be induced by stress during surgery in patients with adrenal insufficiency. This may be prevented by perioperative administration of high doses of steroids. There is disagreement on whether supplemental perioperative steroids are required and, when administered, on the amount and frequency of doses.

Objectives

To assess whether it is necessary to administer supplemental perioperative steroids in adult patients on maintenance doses of glucocorticoids because of adrenal insufficiency.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2009, Issue 1); MEDLINE (1966 to January 2009); EMBASE (1980 to January 2009); LILACS (1982 to January 2009); and the databases of ongoing trials. We handsearched the Journal of Clinical Endocrinology and Metabolism (1982 to 1997), Clinical Endocrinology (1972 to 1997), Surgery (1948 to 1994), Annals of Surgery (1948 to 1994), and Anaesthesia (1948 to 2000).

Selection criteria

Randomized, controlled trials that compared the use of supplemental perioperative steroids to placebo in adult patients on maintenance doses of steroids who required surgery.

Data collection and analysis

Two review authors independently assessed trial quality and extracted data. Study authors were contacted for missing information. We used mean differences and standard deviations to summarize the data for each group.

Main results

Two trials involving 37 patients were included. These studies reported that supplemental perioperative steroids were not required during surgery for patients with adrenal insufficiency. Neither study reported any adverse effects or complications in the intervention and control groups.

Authors' conclusions

Owing to the small number of patients, the results may not be representative. Based on current available evidence, we are unable to support or refute the use of supplemental perioperative steroids for patients with adrenal insufficiency during surgery.

Adrenaline auto-injectors for the treatment of anaphylaxis with and without cardiovascular collapse in the community

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 8, 2012.
Review content assessed as up-to-date: 20 January 2012.

Citation: Sheikh A, Simons FER, Barbour V, Worth A. Adrenaline auto-injectors for the treatment of anaphylaxis with and without cardiovascular collapse in the community. *Cochrane Database of Systematic Reviews* 2012, Issue 8. Art. No.: CD008935. DOI: 10.1002/14651858.CD008935.pub2.

ABSTRACT

Background

Anaphylaxis is a serious hypersensitivity reaction that is rapid in onset and may cause death. Adrenaline (epinephrine) auto-injectors are recommended as the initial, potentially life-saving treatment of choice for anaphylaxis in the community, but they are not universally available and have limitations in their use.

Objectives

To assess the effectiveness of adrenaline (epinephrine) auto-injectors in relieving respiratory, cardiovascular, and other symptoms during episodes of anaphylaxis that occur in the community.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2012, Issue 1), MEDLINE (Ovid SP) (1950 to January 2012), EMBASE (Ovid SP) (1980 to January 2012), CINAHL (EBSCO host) (1982 to January 2012), AMED (EBSCO host) (1985 to January 2012), LILACS, (BIREME) (1980 to January 2012), ISI Web of Science (1950 to January 2012). We adapted our search terms for other databases. We also searched websites listing on-going trials: the World Health Organization International Clinical Trials Registry Platform, the UK Clinical Research Network Study Portfolio, and the meta Register of Controlled Trials; and contacted pharmaceutical companies who manufacture adrenaline auto-injectors in an attempt to locate unpublished material.

Selection criteria

Randomized and quasi-randomized controlled trials comparing auto-injector administration of adrenaline with any control including no intervention, placebo, or other adrenergic agonists were eligible for inclusion.

Data collection and analysis

Two authors independently assessed articles for inclusion.

Main results

None of the 1328 studies that were identified satisfied the inclusion criteria.

Authors' conclusions

Based on this review, we cannot make any new recommendations on the effectiveness of adrenaline auto-injectors for the treatment of anaphylaxis. Although randomized, double-blind, placebo-controlled clinical trials of high methodological quality are necessary to define the true extent of benefits from the administration of adrenaline in anaphylaxis via an auto-injector, such trials are unlikely to be performed in individuals experiencing anaphylaxis because of ethical concerns associated with randomization to placebo. There is, however, a need to consider trials in which, for example, auto-injectors of different doses of adrenaline and differing devices are compared in order to provide greater clarity on the dose and device of choice. Such trials would be practically challenging to conduct. In the absence of appropriate trials, we recommend that adrenaline administration by auto-injector should still be regarded as the most effective first-line treatment for the management of anaphylaxis in the community. In countries where auto-injectors are not commonly used, it may be possible to conduct trials to compare administration of adrenaline via auto-injector with adrenaline administered by syringe and ampoule, or comparing the effectiveness of two different types of auto-injector.

Deliberate hypotension with propofol under anaesthesia for functional endoscopic sinus surgery (FESS)

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 6, 2013.
Review content assessed as up-to-date: 17 April 2012.

Citation: Boonmak S, Boonmak P, Laopaiboon M. Deliberate hypotension with propofol under anaesthesia for functional endoscopic sinus surgery (FESS). *Cochrane Database of Systematic Reviews* 2013, Issue 6. Art. No.: CD006623. DOI: 10.1002/14651858.CD006623.pub2.

ABSTRACT

Background

Functional endoscopic sinus surgery (FESS) is a minimally invasive technique that is used to treat chronic sinusitis. Small bleeding areas can reduce operative visibility and result in destruction of surrounding structures. Deliberate hypotension (lowering the mean arterial blood pressure to between 50 and 65 mm Hg in normotensive patients) using a range of pharmacological agents during general anaesthesia reduces blood loss in many operations.

Objectives

We aimed to compare the use of the intravenous anaesthetic agent propofol versus other techniques for deliberate hypotension during FESS with regard to blood loss and operative conditions.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2012, Issue 1), MEDLINE (1950 to April 2012), EMBASE (1980 to April 2012), LILACS (1982 to April 2012) and ISI Web of Science (1946 to April 2012). We also searched the reference lists of relevant articles and conference proceedings and contacted the authors of included trials.

Selection criteria

We sought all randomized controlled trials (RCTs) conducted to compare propofol with other techniques. Our primary outcome was total blood loss (TBL). Other outcomes included surgical field quality, operation time, mortality within 24 hour, complications and failure to reach target blood pressure.

Data collection and analysis

Two review authors independently extracted details of trial methodology and outcome data from reports of all trials considered eligible for inclusion. All analyses were made on an intention-to-treat basis where possible. When I^2 was < 40% and the P value from the Chi ^{2} test was > 0.10, we pooled data by using the fixed-effect model. Otherwise we pooled data by using the random-effects model.

Main results

We included four studies with 278 participants in the review. Deliberate hypotension with propofol did not decrease TBL (millilitres) when compared with inhalation anaesthetics in either children or adults. Propofol improved the quality of the surgical field by less than one category on a scale from 0 (no bleeding) to 5 (severe bleeding) (mean difference (MD) 0.64 better with propofol, 95% confidence interval (CI) 0.37 to 0.91 better), but no difference in operation time was reported. Failure to lower blood pressure to target was less common in the propofol group (relative risk of failure with propofol (RR) 0.24, 95% CI 0.09 to 0.66).

Authors' conclusions

Using propofol to achieve deliberate hypotension may improve the surgical field, but the effect is small. Deliberate hypotension with propofol did not decrease TBL and operation time. RCTs with good quality methodology and large sample size are required to investigate the effectiveness of deliberate hypotension with propofol for FESS.

Intravenous versus inhalation anaesthesia for one-lung ventilation

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: Edited (no change to conclusions), published in Issue 11, 2013.
Review content assessed as up-to-date: 19 November 2012.

Citation: Módolo NSP, Módolo MP, Marton MA, Volpato E, Monteiro Arantes V, do Nascimento Junior P, El Dib R. Intravenous versus inhalation anaesthesia for one-lung ventilation. *Cochrane Database of Systematic Reviews* 2013, Issue 7. Art. No.: CD006313. DOI: 10.1002/14651858.CD006313.pub3.

ABSTRACT

Background

This is an update of a Cochrane Review first published in *The Cochrane Library*, Issue 2, 2008.

The technique called *one-lung ventilation* can confine bleeding or infection to one lung, prevent rupture of a lung cyst or, more commonly, facilitate surgical exposure of the unventilated lung. During one-lung ventilation, anaesthesia is maintained either by delivering an inhalation anaesthetic to the ventilated lung or by infusing an intravenous anaesthetic. It is possible that the method chosen to maintain anaesthesia may affect patient outcomes. Inhalation anaesthetics may impair hypoxic pulmonary vasoconstriction (HPV) and increase intrapulmonary shunt and hypoxaemia.

Objectives

The objective of this review was to evaluate the effectiveness and safety of intravenous versus inhalation anaesthesia for one-lung ventilation.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL); *The Cochrane Library* (2012, Issue 11); MEDLINE (1966 to November 2012); EMBASE (1980 to November 2012); Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS, 1982 to November 2012) and ISI web of Science (1945 to November 2012), reference lists of identified trials and bibliographies of published reviews. We also contacted researchers in the field. No language restrictions were applied. The date of the most recent search was 19 November 2012. The original search was performed in June 2006.

Selection criteria

We included randomized controlled trials and quasi-randomized controlled trials of intravenous (e.g. propofol) versus inhalation (e.g. isoflurane, sevoflurane, desflurane) anaesthesia for one-lung ventilation in both surgical and intensive care participants. We excluded studies of participants who had only one lung (i.e. pneumonectomy or congenital absence of one lung).

Data collection and analysis

Two review authors independently assessed trial quality and extracted data. We contacted study authors for additional information.

Main results

We included in this updated review 20 studies that enrolled 850 participants, all of which assessed surgical participants- no studies investigated one-lung ventilation performed outside the operating theatre. No evidence indicated that the drug used to maintain anaesthesia during one-lung ventilation affected participant outcomes. The methodological quality of the included studies was difficult to assess as it was reported poorly, so the predominant classification of bias was 'unclear'.

Authors' conclusions

Very little evidence from randomized controlled trials suggests differences in participant outcomes with anaesthesia maintained by intravenous versus inhalational anaesthesia during one-lung ventilation. If researchers believe that the type of drug used to maintain anaesthesia during one-lung ventilation is important, they should design randomized controlled trials with appropriate participant outcomes, rather than report temporary fluctuations in physiological variables.

Intravenous versus inhalational anaesthesia for paediatric outpatient surgery

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 2, 2014.
Review content assessed as up-to-date: 1 October 2013.

Citation: Ortiz AC, Atallah ÁN, Matos D, da Silva EMK. Intravenous versus inhalational anaesthesia for paediatric outpatient surgery. *Cochrane Database of Systematic Reviews* 2014, Issue 2. Art. No.: CD009015. DOI: 10.1002/14651858.CD009015.pub2.

ABSTRACT

Background

Ambulatory or outpatient anaesthesia is performed in patients who are discharged on the same day as their surgery. Perioperative complications such as postoperative nausea and vomiting (PONV), postoperative behavioural disturbances and cardiorespiratory complications should be minimized in ambulatory anaesthesia. The choice of anaesthetic agents and techniques can influence the occurrence of these complications and thus delay in discharge.

Objectives

The objective of this review was to evaluate the risk of complications (the risk of postoperative nausea and vomiting (PONV), admission or readmission to hospital, postoperative behavioural disturbances and perioperative respiratory and cardiovascular complications) and recovery times (time to discharge from recovery ward and time to discharge from hospital) comparing the use of intravenous to inhalational anaesthesia for paediatric outpatient surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) in *The Cochrane Library* (2013, Issue 8); MEDLINE (1948 to 1 October 2013); EMBASE (1974 to 1 October 2013); Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS) (1982 to 1 October 2013). We also handsearched relevant journals and searched the reference lists of the articles identified.

Selection criteria

We included randomized controlled trials comparing paediatric outpatient surgery using intravenous versus inhalational anaesthesia.

Data collection and analysis

Two review authors independently assessed trial quality and extracted the data. When necessary, we requested additional information and clarification of published data from the authors of individual trials.

Main results

We included 16 trials that involved 900 children in this review. Half of all the studies did not describe the generation of randomized sequence and most studies did not describe adequate allocation sequence concealment. The included studies showed variability in the types and combinations of drugs and the duration of anaesthesia, limiting the meta-analysis and interpretation of the results.

For the induction and maintenance of anaesthesia there was a significant difference favouring intravenous anaesthesia with propofol; the incidence of PONV was 32.6% for sevoflurane and 16.1% for propofol (odds ratio (OR) 2.96; 95% confidence interval (CI) 1.35 to 6.49, four studies, 176 children, low quality evidence). The risk of postoperative behavioural disturbances also favoured intravenous anaesthesiaas the incidence was 24.7% for sevoflurane and 11.5% for propofol (OR 2.67; 95% CI 1.14 to 6.23, four studies, 176 children, very low quality evidence). There were no differences between groups in the risk of intraoperative and postoperative respiratory and cardiovascular complications (OR 0.75; 95% CI 0.27 to 2.13, three studies,130 children, very low quality evidence) and there was no difference in the time to recovery from anaesthesia and discharge from hospital. These results should be interpreted with caution due to heterogeneity between studies in the type and duration of operations, types of reported complications and the high risk of bias in almost all studies. Two studies (105 participants) compared halothane to propofol and showed heterogeneity in duration of anaesthesia and in the type of ambulatory procedure. For the risk of PONV the results of the studies were conflicting, and for the risks of intraoperative and postoperative complications there were no significant differences between the groups.

For the maintenance of anaesthesia there was a significant difference favouring anaesthesia with propofol, with or without nitrous oxide (N_2O), when compared to thiopentone and halothane + N_2O (OR 3.23; 95% CI 1.49 to 7.02, four studies, 176 children, low quality evidence; and OR 7.44; 95% CI 2.60 to 21.26, two studies, 87 children, low quality evidence), respectively. For the time to discharge from the recovery room, there were no significant differences between groups. The studies were performed with different ambulatory surgeries and a high risk of bias.

Four studies (250 participants) compared the induction of anaesthesia by the inhalational or intravenous route, with inhalational anaesthesia for maintenance, and found no significant differences between groups in all outcomes (the risk of PONV, behavioural disturbances, respiratory and cardiovascular complications and time to discharge from recovery room). Meta-analysis was not done in this comparison because of significant clinical heterogeneity.

Readmission to hospital was not reported in any of the included studies. No other adverse effects were reported.

Authors' conclusions

There is insufficient evidence to determine whether intravenous anaesthesia with propofol for induction and maintenance of anaesthesia in paediatric outpatients undergoing surgery reduces the risk of postoperative nausea and vomiting and the risk of behavioural disturbances compared with inhaled anaesthesia. This evidence is of poor quality. More high-quality studies are needed to compare the different types of anaesthesia in different subsets of children undergoing ambulatory surgery.

Use of hyperbaric versus isobaric bupivacaine for spinal anaesthesia for caesarean section

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Editorial group: Cochrane Anaesthesia Group.
Publication status and date: New, published in Issue 5, 2013.
Review content assessed as up-to-date: 2 May 2011.

Citation: Sia AT, Tan KH, Sng BL, Lim Y, Chan ESY, Siddiqui FJ. Use of hyperbaric versus isobaric bupivacaine for spinal anaesthesia for caesarean section. *Cochrane Database of Systematic Reviews* 2013, Issue 5. Art. No.: CD005143. DOI: 10.1002/14651858.CD005143.pub2.

ABSTRACT

Background

Bupivacaine is an amide local anaesthetic used in hyperbaric and isobaric forms. These are administered intrathecally into the spine to provide regional anaesthesia for caesarean section. Several trials have compared hyperbaric and isobaric bupivacaine but none have conclusively shown benefit of either.

Objectives

This systematic review aimed to summarize the effectiveness and safety of hyperbaric versus isobaric bupivacaine in providing anaesthesia for caesarean section. We considered the adequacy of anaesthesia for completion of caesarean section and the need for interventions to treat complications.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2011, Issue 4), MEDLINE (January 1966 to May 2011) and EMBASE (January 1980 to May 2011). We handsearched journals. We imposed no language restriction. We reran our search in the above databases from January 2011 to January 2013; the studies are awaiting assessment and will be dealt with when we update the review.

Selection criteria

We included all randomized controlled trials involving parturients undergoing spinal anaesthesia for elective caesarean section that compared the use of hyperbaric with isobaric bupivacaine.

Data collection and analysis

Two authors independently extracted the data. The data that were extracted included the number of events and the sample sizes in both the intervention and control groups. For continuous outcomes, we extracted mean and standard deviation.

We reported odds ratios and risk ratios (RR) for binary outcomes and mean differences (MD) for continuous outcomes.

Main results

We included six studies with a total of 394 patients in this review. Anaesthesia performed with hyperbaric bupivacaine appeared to be less likely to need conversion to general anaesthesia (two studies, 158 patients included in meta-analysis; RR 0.17, 95% confidence interval (CI) 0.03 to 0.94). There was no difference in the need for supplemental analgesics. The time till sensory block to the T4 level was also shorter with hyperbaric bupivacaine (two studies, 126 patients; MD -1.06 minutes, 95% CI -1.80 to -0.31). There were no other significant differences between the two anaesthetics.

Authors' conclusions

The criteria for conversion to general anaesthesia should be clearly defined in future research. This review found that intrathecal hyperbaric bupivacaine had a more rapid onset of sensory blockade at the T4 level than isobaric bupivacaine. It may also result in less need for conversion to general anaesthesia and supplemental analgesia. However, due to the rarity of this outcome, variability in the dose, use of adjuvant drugs and differences in the technique used for regional anaesthesia the evidence is weak. Any apparent advantage of hyperbaric bupivacaine needs to be confirmed in larger randomized trials. There were no differences in the adverse effects studied.

Continuous interscalene brachial plexus block versus parenteral analgesia for postoperative pain relief after major shoulder surgery

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ABSTRACT

Background

Postoperative pain may lead to adverse effects on the body, which might result in an increase in morbidity. Its management therefore poses a unique challenge for the clinician. Major shoulder surgery is associated with severe postoperative pain, and different modalities are available to manage such pain, including opioid and non-opioid analgesics, local anaesthetics infiltrated into and around the shoulder joint and regional anaesthesia. All of these techniques, alone or in combination, have been used to treat the postoperative pain of major shoulder surgery but with varying success.

Objectives

The objective of this review was to compare the analgesic efficacy of continuous interscalene brachial plexus block (ISBPB) with parenteral opioid analgesia for pain relief after major shoulder surgery.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (2012, Issue 12), MEDLINE (1950 to December 2012), EMBASE (1980 to December 2012), Web of Science (1954 to December 2012), CINAHL (1982 to December 2012) and bibliographies of published studies.

Selection criteria

We included randomized controlled trials assessing the effectiveness of continuous ISBPB compared with different forms of parenteral opioid analgesia in relieving pain in adult participants undergoing elective major shoulder surgery.

Data collection and analysis

Two review authors independently assessed trial quality and extracted outcome data.

Main results

We included two randomized controlled trials (147 participants). A total of 17 participants were excluded from one trial because of complications related to continuous ISBPB (16) or parenteral opioid analgesia (one). Thus we have information on 130 participants (66 in the continuous ISBPB group and 64 in the parenteral opioid group). The studies were clinically heterogeneous. No meta-analysis was undertaken. However, results of the two included studies showed better pain relief with continuous ISBPB following major shoulder surgery and a lower incidence of complications when interscalene block is performed under ultrasound guidance rather than without it.

Authors' conclusions

Because of the small number of studies (two) relevant to the subject and the high risk of bias of the selected studies, no reasonable conclusion can be drawn.

Hypothermia for neuroprotection in children after cardiopulmonary arrest

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ABSTRACT

Background

Cardiopulmonary arrest in paediatric patients often results in death or survival with severe brain injury. Therapeutic hypothermia, lowering of the core body temperature to 32 °C to 34 °C, may reduce injury to the brain in the period after the circulation has been restored. This therapy has been effective in neonates with hypoxic ischaemic encephalopathy and adults after witnessed ventricular fibrillation cardiopulmonary arrest. The effect of therapeutic hypothermia after cardiopulmonary arrest in paediatric patients is unknown.

Objectives

To assess the clinical effectiveness of therapeutic hypothermia after paediatric cardiopulmonary arrest.

Search methods

We searched the Cochrane Anaesthesia Review Group Specialized Register; Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2011, Issue 11); Ovid MEDLINE (1966 to December 2011); Ovid EMBASE (1980 to December 2011); Ovid CINAHL (1982 to December 2011); Ovid BIOSIS (1923 to December 2011); and Web of Science (1945 to December 2011). We searched the trials registry databases for ongoing trials. We also contacted international experts in therapeutic hypothermia and paediatric critical care to locate further published and unpublished studies.

Selection criteria

We planned to include randomized and quasi-randomized controlled trials comparing therapeutic hypothermia with normothermia or standard care in children, aged 24 hours to 18 years, after paediatric cardiopulmonary arrest.

Data collection and analysis

Two authors independently assessed articles for inclusion.

Main results

We found no studies that satisfied the inclusion criteria. We found four on-going randomized controlled trials which may be available for analysis in the future. We excluded 18 non-randomized studies. Of these 18 non-randomized studies, three compared therapeutic hypothermia with standard therapy and demonstrated no difference in mortality or the proportion of children with a good neurological outcome; a narrative report was presented.

Authors' conclusions

Based on this review, we are unable to make any recommendations for clinical practice. Randomized controlled trials are needed and the results of on-going trials will be assessed when available.

Perioperative statin therapy for improving outcomes during and after noncardiac vascular surgery

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ABSTRACT

Background

Patients undergoing vascular surgery are a high-risk population with widespread atherosclerosis, an adverse cardiovascular risk profile and often multiple co-morbidities. Postoperative cardiovascular complications, including myocardial infarct (MI), are common. Statins are the medical treatment of choice to reduce high cholesterol levels. Evidence is accumulating that patients taking statins at the time of surgery are protected against a range of perioperative complications, but the specific benefits for patients undergoing noncardiac vascular surgery are not clear.

Objectives

We examined whether short-term statin therapy, commenced before or on the day of noncardiac vascular surgery and continuing for at least 48 hours afterwards, improves patient outcomes including the risk of complications, pain, quality of life and length of hospital stay. We also examined whether the effect of statin therapy on these outcomes changes depending on the dose of statin received.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2012, Issue 7), MEDLINE via Ovid SP (1966 to August 2012), EMBASE via Ovid SP (1966 to August 2012), CINAHL via EBSCO host (1966 to August 2012) and ISI Web of Science (1946 to July 2012) without any language restriction. We used a combination of free text search and controlled vocabulary search. The results were limited to randomized controlled clinical trials (RCTs). We conducted forwards and backwards citation of key articles and searched two clinical trial Websites for ongoing trials (www.clinicaltrials.gov and http://www.controlled-trials.com).

Selection criteria

We included RCTs that had compared short-term statin therapy, either commenced de novo or with existing users randomly assigned to different dosages, in adult participants undergoing elective and emergency noncardiac arterial surgery, including both open and endovascular procedures. We defined *short-term* as commencing before or on the day of surgery and continuing for at least 48 hours afterwards.

Data collection and analysis

Two authors independently assessed trial quality and extracted data, including information on adverse events. We contacted study authors for additional information. We performed separate analyses for the comparisons of statin with placebo/no treatment and between different doses of statin. We presented results as pooled risk ratios (RRs) with 95% confidence intervals (CIs) based on random-effects models (inverse variance method). We employed the Chi^2 test and calculated the I^2 statistic to investigate study heterogeneity.

Main results

We identified six eligible studies in total. The six Included studies were generally of high quality, but the largest eligible study was excluded because of concerns about its validity. Study populations were statin naive, which led to a considerable loss of eligible participants.

Five RCTs compared statin use with placebo or standard care. We pooled results from three studies, with a total of 178 participants, for mortality and non-fatal event outcomes. In the statin group, 7/105 (6.7%) participants died within 30 days of surgery, as did 10/73 (13.7%) participants in the control group. Only one death in each group was from cardiovascular causes, with an incidence of 0.95% in statin participants and 1.4% in control participants, respectively. All deaths occurred in a single study population, and so effect estimates were derived from one study only. The risk ratio (RR) of all-cause mortality in statin users showed a non-significant decrease in risk (RR 0.73, 95% CI 0.31 to 1.75). For cardiovascular death, the risk ratio was 1.05 (95% CI 0.07 to 16.20). Non-fatal MI within 30 days of surgery was reported in three studies and occurred in 4/105 (3.8%) participants in the statin group and 8/73 (11.0%) participants receiving placebo, for a non-significant decrease in risk (RR 0.47, 95% CI 0.15 to 1.52). Several studies reported muscle enzyme levels as safety measures, but only three (with a total of 188 participants) reported explicitly on clinical muscle syndromes, with seven events reported and no significant difference found between statin users and controls (RR 0.94, 95% CI 0.24 to 3.63). The only participant-reported outcome was nausea in one small study,with no significant difference in risk between groups.

Two studies compared different doses of atorvastatin, with a total of 145 participants, but reported data were not sufficient to allow us to determine the effect of higher doses on any outcome.

Authors' conclusions

Evidence was insufficient to allow review authors to conclude that statin use resulted in either a reduction or an increase in any of the outcomes examined. The existing body of evidence leaves questions about the benefits of perioperative use of statins for vascular surgery unanswered. Widespread use of statins in the target population means that it may now be difficult for researchers to undertake the large RCTs needed to demonstrate any effect on the incidence of postoperative cardiovascular events. However, participant-reported outcomes have been neglected and warrant further study.

Anaesthesia for hip fracture surgery in adults

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ABSTRACT

Background

The majority of people with hip fracture are treated surgically, requiring anaesthesia.

Objectives

To compare different types of anaesthesia for surgical repair of hip fractures (proximal femoral fractures) in adults.

Search methods

We searched the Cochrane Bone, Joint and Muscle Trauma Group specialised register (November 2003), MEDLINE (1996 to February week 2 2004), EMBASE (1988 to 2004 week 10) and reference lists of relevant articles.

Selection criteria

Randomised and quasi-randomised trials comparing different methods of anaesthesia for hip fracture surgery in adults. The primary focus of this review was the comparison of regional (spinal or epidural) anaesthesia versus general anaesthesia. The use of nerve blocks preoperatively or in conjunction with general anaesthesia is evaluated in another review. The primary outcome was mortality.

Data collection and analysis

Two reviewers independently assessed trial quality and extracted data.

Main results

Twenty two trials, involving 2567 predominantly female and elderly patients, comparing regional anaesthesia with general anaesthesia were included. All trials had methodological flaws and many do not reflect current anaesthetic practice. Pooled results from eight trials showed regional anaesthesia to be associated with a decreased mortality at one month (56/811 (6.9%) versus 86/857 (10.0%)); however, this was of borderline statistical significance (relative risk (RR) 0.69, 95% confidence interval (CI) 0.50 to 0.95). The results from six trials for three month mortality were not statistically significant, although the confidence interval does not exclude the possibility of a clinically relevant reduction (86/726 (11.8%) versus 98/765 (12.8%), RR 0.92, 95% CI 0.71 to 1.21). The reduced numbers of trial participants at one year, coming exclusively from two trials, preclude any useful conclusions for long-term mortality (80/354 (22.6%) versus 78/372 (21.0%), RR 1.07, 95% CI 0.82 to 1.41).

Regional anaesthesia was associated with a reduced risk of deep venous thrombosis (39/129 (30%) versus 61/130 (47%); RR 0.64, 95% CI 0.48 to 0.86). However, this finding is insecure due to possible selection bias in the subgroups in whom this outcome was measured. Regional anaesthesia was also associated with a reduced risk of acute postoperative confusion (11/117 (9.4%) versus 23/120 (19.2%), RR 0.50, 95% CI 0.26 to 0.95).

There was insufficient evidence to draw any conclusions from a further four included trials, involving a total of 179 participants, which compared other methods of anaesthesia (a 'light' general with spinal anaesthesia; intravenous ketamine; nerve blocks).

Authors' conclusions

Overall, there was insufficient evidence available from trials comparing regional versus general anaesthesia to rule out clinically important differences. Regional anaesthesia may reduce acute postoperative confusion but no conclusions can be drawn for mortality or other outcomes.

Fibrinogen concentrate in bleeding patients

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ABSTRACT

Background

Hypofibrinogenaemia is associated with increased morbidity and mortality, but the optimal treatment level, the use of preemptive treatment and the preferred source of fibrinogen remain disputed. Fibrinogen concentrate is increasingly used and recommended for bleeding with acquired haemostatic deficiencies in several countries, but evidence is lacking regarding indications, dosing, efficacy and safety.

Objectives

We assessed the benefits and harms of fibrinogen concentrate compared with placebo or usual treatment for bleeding patients.

Search methods

We searched the following electronic databases: the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2013, Issue 8); MEDLINE (1950 to 9 August 2013); EMBASE (1980 to 9 August 2013); International Web of Science (1964 to 9 August 2013); CINAHL (1980 to 9 August 2013); LILACS (1982 to 9 August 2013); and the Chinese Biomedical Literature Database (up to 10 November 2011), together with databases of ongoing trials. We contacted trial authors, authors of previous reviews and manufacturers in the field.

Selection criteria

We included all randomized controlled trials (RCTs), irrespective of blinding or language, that compared fibrinogen concentrate with placebo/other treatment or no treatment in bleeding patients, excluding neonates and patients with hereditary bleeding disorders.

Data collection and analysis

Three review authors independently abstracted data; we resolved any disagreements by discussion. Our primary outcome measure was all-cause mortality. We performed subgroup and sensitivity analyses to assess the effects of fibrinogen concentrate in adults and children in terms of various clinical and physiological outcomes. We presented pooled estimates of the effects of intervention on dichotomous outcomes as risk ratios (RRs) and on continuous outcomes as mean differences, with 95% confidence intervals (CIs). We assessed the risk of bias through assessment of trial methodological components and the risk of random error through trial sequential analysis.

Main results

We included six RCTs with a total of 248 participants; none of the trials were determined to have overall low risk of bias. We found 12 ongoing trials, from which we were unable to retrieve any data. Only two trials provided data on mortality, and one was a zero event study; thus the meta-analysis showed no statistically significant effect on overall mortality (2.6% vs 9.5%, RR 0.28, 95% CI 0.03 to 2.33). Our analyses on blood transfusion data suggest a beneficial effect of fibrinogen concentrate in reducing the incidence of allogenic transfusions (RR 0.47, 95% CI 0.31 to 0.72) but show no effect on other predefined outcomes, including adverse events such as thrombotic episodes.

Authors' conclusions

In the six available RCTs of elective surgery, fibrinogen concentrate appears to reduce transfusion requirements, but the included trials are of low quality with high risk of bias and are underpowered to detect mortality, benefit or harm. Furthermore, data on mortality are lacking, heterogeneity is high and acute or severe bleeding in a non-elective surgical setting remains unexplored. Currently, weak evidence supports the use of fibrinogen concentrate in bleeding patients, as tested here in primarily elective cardiac surgery. More research is urgently needed.

Perioperative buffered versus non-buffered fluid administration for surgery in adults

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Editorial group: Cochrane Anaesthesia Group.
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ABSTRACT

Background

Perioperative fluid therapy influences clinical outcomes following major surgery. Fluid preparations may be based on a simple non-buffered salt solution, such as normal saline, or may be modified with bicarbonate or bicarbonate precursor buffers, such as maleate, gluconate, lactate or acetate, to better reflect the human physiological state. These latter fluids have theoretical advantages over normal saline in preventing hyperchloraemic acidosis. A number of clinical studies have now compared fluid preparations with and without a buffer to achieve a balanced electrolyte solution for perioperative fluid resuscitation.

Objectives

To review the safety and efficacy of perioperative administration of buffered versus non-buffered fluids for plasma volume expansion or maintenance in adult patients undergoing surgery.

Search methods

We electronically searched the Cochrane Central Register of Controlled Trials (CENTRAL) (2011, Issue 4), MEDLINE (1966 to May 2011), EMBASE (1980 to May 2011), and CINAHL (1982 to May 2011). We handsearched conference abstracts and where possible, contacted leaders in the field.

Selection criteria

We only included randomized trials of buffered versus non-buffered intravenous fluids for perioperative fluid resuscitation. The trials with other forms of comparisons such as crystalloids versus colloids and colloids versus different colloids were excluded. We also excluded trials using hypertonic fluids and dextrose-based fluids.

Data collection and analysis

Two authors independently extracted data and assessed the methodological quality of clinical trials. We resolved any disagreements by discussion. We contacted the trial authors to provide additional information where appropriate. We presented pooled estimates of the dichotomous outcomes as odds ratios (OR) and on continuous outcomes as mean differences, with 95% confidence intervals (CI). We analysed data on Review Manager 5.1 using fixed-effect models, and when heterogeneity was high ($I^2 > 40\%$) random-effect models were used.

Main results

We identified 14 publications reporting 13 trials or comparisons with a total of 706 participants. For many of the outcomes reported, there was significant clinical and statistical heterogeneity. The primary outcome of mortality at any time was reported in only three studies with a total of 267 patients. The mortality rate was 2.9% for the buffered fluids group and 1.5% for the non-buffered fluids group but this difference was not statistically significant. The Peto OR was 1.85 (95% CI 0.37 to 9.33, P = 0.45, I^2 = 0%). Organ dysfunction was only presented for renal impairment. There was no difference in renal insufficiency leading to renal replacement therapy between the buffered and non-buffered groups (OR 0.61, 95% CI 0.23 to 1.63, P = 0.32, I^2 = 0%). Markers of organ system failure as assessed by urine output, creatinine and its variables (for renal function), $PaCO_2$ (respiratory function) and postoperative nausea and vomiting (gastro-intestinal function) showed a statistically significant difference only in $PaCO_2$ levels. The mean difference was 1.18 with lower $PaCO_2$ levels in the non-buffered fluid group (95% CI 0.09 to 2.28, P = 0.03, I^2 = 0%) compared to the buffered fluid group.

There was no difference in intraoperative blood loss nor the volumes of intraoperative red cell or fresh frozen plasma transfused between groups. There was an increase in platelet transfusion in the non-buffered group which was statistically significant after analysing the transformed data (log transformation because the data were highly skewed).

A number of metabolic differences were noted. There was a difference in postoperative pH of 0.06 units, lower in the non-buffered fluid group (95% CI 0.04 to 0.08, P < 0.00001, I^2 = 74%). However, this difference was not maintained on postoperative day one. The non-buffered fluid group also had significantly greater base deficit, serum sodium and chloride levels.

There was no difference demonstrated in length of hospital stay and no data were reported on cost or quality of life.

Authors' conclusions

The administration of buffered fluids to adult patients during surgery is equally safe and effective as the administration of non-buffered saline-based fluids. The use of buffered fluids is associated with less metabolic derangement, in particular hyperchloraemia and metabolic acidosis. Larger studies are needed to assess robust outcomes such as mortality.

Nurse-led versus doctor-led preoperative assessment for elective surgical patients requiring regional or general anaesthesia

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ABSTRACT

Background

The organization of elective surgical services has changed in recent years, with increasing use of day surgery, reduced hospital stay and preoperative assessment (POA) performed in an outpatient clinic rather than by a doctor in a hospital ward after admission. Nurse specialists often lead these clinic-based POA services and have responsibility for assessing a patient's fitness for anaesthesia and surgery and organizing any necessary investigations or referrals. These changes offer many potential benefits for patients, but it is important to demonstrate that standards of patient care are maintained as nurses take on these responsibilities.

Objectives

We wished to examine whether a nurse-led service rather than a doctor-led service affects the quality and outcome of preoperative assessment (POA) for elective surgical participants of all ages requiring regional or general anaesthesia. We considered the evidence that POA led by nurses is equivalent to that led by doctors for the following outcomes: cancellation of the operation for clinical reasons; cancellation of the operation by the participant; participant satisfaction with the POA; gain in participant knowledge or information; perioperative complications within 28 days of surgery, including mortality; and costs of POA. We planned to investigate whether there are differences in quality and outcome depending on the age of the participant, the training of staff or the type of surgery or anaesthesia provided.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE and two trial registers on 13 February 2013, and performed reference checking and citation searching to identify additional studies.

Selection criteria

We included randomized controlled trials (RCTs) of participants (adults or children) scheduled for elective surgery requiring general, spinal or epidural anaesthesia that compared POA, including assessment of physical status and anaesthetic risk, undertaken or led by nursing staff with that undertaken or led by doctors. This assessment could have taken place in any setting, such as on a ward or in a clinic. We included studies in which the comparison assessment had taken place in a different setting. Because of the variation in service provision, we included two separate comparison groups: specialist doctors, such as anaesthetists; and non-specialist doctors, such as interns.

Data collection and analysis

We used standard methodological approaches as expected by The Cochrane Collaboration, including independent review of titles, data extraction and risk of bias assessment by two review authors.

Main results

We identified two eligible studies, both comparing nurse-led POA with POA led by non-specialist doctors, with a total of 2469 participants. One study was randomized and the other quasi-randomized. Blinding of staff and participants to allocation was not possible. In both studies, all participants were additionally assessed by a specialist doctor (anaesthetist in training), who acted as the reference standard. In neither study did participants proceed from assessment by nurse or junior doctor to surgery. Neither study reported on cancellations of surgery, gain in participant information or knowledge or perioperative complications. Reported outcomes focused on the accuracy of the assessment. One study undertook qualitative assessment of participant satisfaction with the two forms of POA in a small number of non-randomly selected participants (42 participant interviews), and both groups of participants expressed high levels of satisfaction with the care received. This study also examined economic modelling of costs of the POA as performed by the nurse and by the non-specialist doctor based on the completeness of the assessment as noted in the study and found no difference in cost.

Authors' conclusions

Currently, no evidence is available from RCTs to allow assessment of whether nurse-led POA leads to an increase or a decrease in cancellations or perioperative complications or in knowledge or satisfaction among surgical participants. One study, which was set in the UK, reported equivalent costs from economic models. Nurse-led POA is now widespread, and it is not clear whether future RCTs of this POA strategy are feasible. A diagnostic test accuracy review may provide useful information.

High-volume haemofiltration for sepsis

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ABSTRACT

Background

Severe sepsis and septic shock are leading causes of death in the intensive care unit (ICU). This is despite advances in the management of patients with severe sepsis and septic shock including early recognition, source control, timely and appropriate administration of antimicrobial agents, and goal directed haemodynamic, ventilatory and metabolic therapies. High-volume haemofiltration (HVHF) is a blood purification technique which may improve outcomes in critically ill patients with severe sepsis or septic shock. The technique of HVHF has evolved from renal replacement therapies used to treat acute kidney injury (AKI) in critically ill patients in the ICU.

Objectives

This review assessed whether HVHF improves clinical outcome in adult critically ill patients with sepsis in an ICU setting.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, 2011, Issue 7); MEDLINE (1990 to August 2011), EMBASE (1990 to August 2011); LILACS (1982 to August 2011), Web of Science (1990 to August 2011), CINAHL (1982 to August 2011) and specific websites.

Selection criteria

We included randomized controlled trials (RCTs) and quasi-randomized trials comparing HVHF or high-volume haemodiafiltration to standard or usual dialysis therapy; and RCTs and quasi-randomized trials comparing HVHF or high-volume haemodiafiltration to no similar dialysis therapy. The studies involved adults in critical care units.

Data collection and analysis

Three review authors independently extracted data and assessed trial quality. We sought additional information as required from trialists.

Main results

We included three randomized trials involving 64 participants. Due to the small number of studies and participants, it was not possible to combine data or perform sub-group analyses. One trial reported ICU and 28-day mortality, one trial reported hospital mortality and in the third, the number of deaths stated did not match the quoted mortality rates. No trials reported length of stay in ICU or hospital and one reported organ dysfunction. No adverse events were reported. Overall, the included studies had a low risk of bias.

Authors' conclusions

There were no adverse effects of HVHF reported.There is insufficient evidence to recommend the use of HVHF in critically ill patients with severe sepsis and or septic shock except as interventions being investigated in the setting of a randomized clinical trial. These trials should be large, multi-centred and have clinically relevant outcome measures. Financial implications should also be assessed.

Tracheal intubation with a flexible intubation scope versus other intubation techniques for obese patients requiring general anaesthesia

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ABSTRACT

Background

The prevalence of obesity (body mass index (BMI) > 30 kg/m^2) is increasing in both developed and developing countries, leading to a rise in the numbers of obese patients requiring general anaesthesia. Obese patients are at increased risk of anaesthetic complications, and tracheal intubation can be more difficult. Flexible intubation scopes (FISs) are recommended as an alternative method of intubation in these patients. Intubation with an FIS is considered an advanced method, requiring training and experience; therefore it may be underused in clinical practice. Patient outcomes following intubation with these scopes compared with other devices have not been systematically reviewed.

Objectives

We wished to compare the safety and effectiveness of a flexible intubation scope (FIS) used for tracheal intubation in obese patients (BMI > 30 kg/m^2) with other methods of intubation, including conventional direct laryngoscopy, non-standard laryngoscopy and the use of intubating supraglottic airway devices. We aimed to compare the frequency of complications, as well as process indicators, such as time taken for intubation and the proportion of first attempts that were successful, between groups using the different methods of intubation.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE and two trial registers on 18 January 2013, and performed reference checking and citation searching and contacted study authors to identify additional studies.

Selection criteria

We included randomized controlled trials (RCTs) of participants aged 16 years and older with a BMI > 30 kg/m^2 that had compared the use of an FIS for tracheal intubation ***with*** any one of three comparison groups: direct laryngoscopy; non-standard laryngoscopy (including indirect laryngoscopy using a videolaryngoscope (VLS) or a rigid or semi-rigid stylet); or intubation of supraglottic airway devices (SADs).

Data collection and analysis

We used standard methodological approaches expected by The Cochrane Collaboration, including independent review of titles, data extraction and risk of bias assessment by two investigators.

Main results

Three eligible studies were identified, all comparing the use of an FIS with a VLS. All studies were small, with only 131 participants in total across all trials. It was impossible for the intubators to be unaware of the device used, so all studies were at high risk of performance and detection bias for outcomes related to intubation. Because of substantial differences in design between the studies, we did not combine their results in meta-analyses. The results for all outcomes were inconclusive, with no differences noted between FIS and VLS. Two studies with experienced intubators reported first attempt success rates greater than 70% in both groups and less than 5% of participants requiring a change of intubation device. No evidence was found of any difference in difficulty or time taken between FIS and VLS intubation. No serious complications or airway trauma was reported, so we were unable to address these outcomes. Bleeding was uncommon, occurring in less than 5% of participants, and we found no evidence that it was more likely in the FIS group. One small study with a novice intubator reported no successful intubations using an FIS and compared with the use of an intubating SAD and stylet, as well as with a VLS. With only five participants in each group, no conclusions can be drawn from these additional comparisons.

Authors' conclusions

The evidence base is sparse, and the existing literature does not address the clinical questions of patient safety posed by this review. We are therefore unable to draw any conclusions on safety or effectiveness. More primary research is needed to investigate optimal intubation techniques in obese patients, and new studies should be powered to detect differences in complications and in success rates rather than process measures such as speed, which are of limited clinical importance.

Supraglottic airway devices versus tracheal intubation for airway management during general anaesthesia in obese patients

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ABSTRACT

Background

The number of obese patients requiring general anaesthesia is likely to increase in coming years, and obese patients pose considerable challenges to the anaesthetic team. Tracheal intubation may be more difficult and risk of aspiration of gastric contents into the lungs is increased in obese patients. Supraglottic airway devices (SADs) offer an alternative airway to traditional tracheal intubation with potential benefits, including ease of fit and less airway disturbance. Although SADs are now widely used, clinical concerns remain that their use for airway management in obese patients may increase the risk of serious complications.

Objectives

We wished to examine whether supraglottic airway devices can be used as a safe and effective alternative to tracheal intubation in securing the airway during general anaesthesia in obese patients (with a body mass index (BMI) > 30 kg/m^2).

Search methods

We searched for eligible trials in the following databases: Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, Issue 8, 2012), MEDLINE via Ovid (from 1985 to 9 September 2012) and EMBASE via Ovid (from 1985 to 9 September 2012). The Cochrane highly sensitive filter for randomized controlled trials was applied in MEDLINE and EMBASE. We also searched trial registers such as www.clinicaltrials.gov and the Current Controlled Clinical Trials Website (http://www.controlled-trials.com/) for ongoing trials. The start date of these searches was limited to 1985, shortly before the first SAD was introduced, in 1988. We undertook forward and backward citation tracing for key review articles and eligible articles identified through the electronic resources.

Selection criteria

We considered all randomized controlled trials of participants aged 16 years and older with a BMI > 30 kg/m^2 undergoing general anaesthesia. We compared the use of any model of SAD with the use of tracheal tubes (TTs) of any design.

Data collection and analysis

We used standard methodological procedures expected by The Cochrane Collaboration. Two review authors independently assessed trial quality and extracted data, including information on adverse events. We contacted study authors for additional information. If sufficient data were available, results were presented as pooled risk ratios (RRs) with 95% confidence intervals (CIs) based on random-effects models (inverse variance method). We employed the Chi^2 test and calculated the I^2 statistic to investigate study heterogeneity.

Main results

We identified two eligible studies, both comparing the use of one model of SAD, the ProSeal laryngeal mask airway (PLMA) with a TT, with a total study population of 232. One study population underwent laparoscopic surgery. The included studies were generally of high quality, but there was an unavoidable high risk of bias in the main airway variables, such as change of device or laryngospasm, as the intubator could not be blinded. Many outcomes included data from one study only.

A total of 5/118 (4.2%) participants randomly assigned to PLMA across both studies were changed to TT insertion because of failed or unsatisfactory placement of the device. Postoperative episodes of hypoxaemia (oxygen saturation < 92% whilst breathing air) were less common in the PLMA groups (RR 0.27, 95% CI 0.10 to 0.72). We found a significant postoperative difference in mean oxygen saturation, with saturation 2.54% higher in the PLMA group (95% CI 1.09% to 4.00%). This analysis showed high levels of heterogeneity between results (I^2 = 71%). The leak fraction was significantly higher in the PLMA group, with the largest difference seen during abdominal insufflation- a 6.4% increase in the PLMA group (95% CI 3.07% to 9.73%).

No cases of pulmonary aspiration of gastric contents, mortality or serious respiratory complications were reported in either study. We are therefore unable to present effect estimates for these outcomes.

In all, 2/118 participants with a PLMA suffered laryngospasm or bronchospasm compared with 4/114 participants with a TT. The pooled estimate shows a non-significant reduction in laryngospasm in the PLMA group (RR 0.48, 95% CI 0.09 to 2.59).

Postoperative coughing was less common in the PLMA group (RR 0.10, 95% CI 0.03 to 0.31), and there was no significant difference in the risk of sore throat or dysphonia (RR 0.25, 95% CI 0.03 to 2.13). On average, PLMA placement took 5.9 seconds longer than TT placement (95% CI 3 seconds to 8.8 seconds). There was no significant difference in the proportion of successful first placements of a device, with 33/35 (94.2%) first-time successes in the PLMA group and 32/35 (91.4%) in the TT group.

Authors' conclusions

We have inadequate information to draw conclusions about safety, and we can only comment on one design of SAD (the PLMA) in obese patients. We conclude that during routine and laparoscopic surgery, PLMAs may take a few seconds longer to insert, but this is unlikely to be a matter of clinical importance. A failure rate of 3% to 5% can be anticipated in obese patients. However, once fitted, PLMAs provide at least as good oxygenation, with the caveat that the leak fraction may increase, although in the included studies, this did not affect ventilation. We found significant improvement in oxygenation during and after surgery, indicating better pulmonary performance of the PLMA, and reduced postoperative coughing, suggesting better recovery for patients.

Pharmacological agents for preventing morbidity associated with the haemodynamic response to tracheal intubation

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ABSTRACT

Background

Several drugs have been used in attenuating or obliterating the response associated with laryngoscopy and tracheal intubation. These changes are of little concern in relatively healthy patients but can lead to morbidity and mortality in the high risk patient population.

Objectives

The primary objective of this review was to determine the effectiveness of pharmacological agents in preventing the morbidity and mortality resulting from the haemodynamic changes in response to laryngoscopy and tracheal intubation in adult patients aged 18 years and above who were undergoing elective surgery in the operating room setting.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (2011, Issue 6), MEDLINE (1950 to June 2011), EMBASE (1980 to June 2011), and the bibliographies of published studies. We reran our search from June 2011 to December 2012 and will deal with these studies when we update the review.

Selection criteria

We included randomized controlled trials (RCTs) that compared a drug used as an intervention for preventing or attenuating the haemodynamic response to tracheal intubation to a control group, and that mentioned mortality, major morbidity, arrhythmia or electrocardiogram (ECG) evidence of ischaemia in the methodology, results, or discussion section of the reports.

Data collection and analysis

Two authors independently assessed trial quality and extracted the outcome data.

Main results

We included 72 RCTs. The included trials studied the effects of 32 drugs belonging to different pharmacological groups. Only two trials mentioned the primary outcome of morbidity and mortality related to the haemodynamic response to tracheal intubation. Of the secondary outcomes, 40 of the included trials observed arrhythmia only, 11 observed myocardial ischaemia only and 20 observed both arrhythmias and myocardial ischaemia. Arrhythmias were observed in 2932 participants and myocardial ischaemia in 1616 participants. Arrhythmias were observed in 134 out of 993 patients in the control group compared to 80 out of 1939 in the intervention group. The risk of arrhythmias was significantly reduced with pharmacological interventions in the pooled data (Peto odds ratio (OR) 0.19, 95% CI 0.14 to 0.26, P < 0.00001, I^2 = 47%). Local anaesthetics, calcium channel blockers, beta blockers and narcotics reduced the risk of arrhythmia in the intervention group compared to the control group. Myocardial ischaemia was observed in 21 out of 604 patients in the control group compared to 10 out of 1012 in the treatment group; the result was statistically significant (Peto OR 0.45, 95% CI 0.22 to 0.92, P = 0.03, I^2 = 19%). However, in subgroup analysis only local anaesthetics significantly reduced the ECG changes indicating ischaemia, but this evidence came from one study. The majority of the studies had a negative outcome. Hypotension and bradycardia were reported with 40 μg kg^{-1} intravenous alfentanil, chest rigidity with 75 ug kg^{-1} alfentanil, and increased bronchomotor tone with sympathetic blockers.

There were 17 studies which included high risk patients. Pharmacological treatment in this group resulted in the reduction of arrhythmias when the data from nine trials looking at arrhythmias were pooled (Peto OR 0.18, 95% CI 0.05 to 0.59, P = 0.005, I^2 = 80%). The analysis from four studies was not included. Three of these trials looked at the effect of sympathetic blockers but arrhythmias or myocardial ischaemia was observed throughout the perioperative period in two studies and some patients had arrhythmias due to atropine premedication in the third study. In the fourth study the authors mentioned myocardial ischaemia in the objectives section but did not report it in the results.

Authors' conclusions

The risk of arrhythmias associated with tracheal intubation was significantly reduced with pre-induction administration of local anaesthetics, calcium channel blockers, beta blockers and narcotics compared to placebo. Pharmacological intervention also reduced the risk of ECG evidence of myocardial ischaemia in the pooled data. Lignocaine pretreatment showed a significant effect but evidence came from one study only. The data suggested that there may be a reduction in ECG evidence of myocardial ischaemia with beta blocker pretreatment but this difference was not statistically significant. There is a need to focus on outcomes rather than haemodynamic measurements alone when studying this response in future trials.

High versus low positive end-expiratory pressure (PEEP) levels for mechanically ventilated adult patients with acute lung injury and acute respiratory distress syndrome

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ABSTRACT

Background

Mortality in patients with acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) remains high. These patients require mechanical ventilation, but this modality has been associated with ventilator-induced lung injury. High levels of positive end-expiratory pressure (PEEP) could reduce this condition and improve patient survival.

Objectives

To assess the benefits and harms of high versus low levels of PEEP in patients with ALI and ARDS.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, 2013, Issue 4), MEDLINE (1950 to May 2013), EMBASE (1982 to May 2013), LILACS (1982 to May 2013) and SCI (Science Citation Index). We used the Science Citation Index to find references that have cited the identified trials. We did not specifically conduct manual searches of abstracts of conference proceedings for this review. We also searched for ongoing trials (www.trialscentral.org; www.clinicaltrial.gov and www.controlled-trials.com).

Selection criteria

We included randomized controlled trials that compared the effects of two levels of PEEP in ALI and ARDS participants who were intubated and mechanically ventilated in intensive care for at least 24 hours.

Data collection and analysis

Two review authors assessed the trial quality and extracted data independently. We contacted investigators to identify additional published and unpublished studies.

Main results

We included seven studies that compared high versus low levels of PEEP (2565 participants). In five of the studies (2417 participants), a comparison was made between high and low levels of PEEP with the same tidal volume in both groups, but in the remaining two studies (148 participants), the tidal volume was different between high- and low-level groups. We saw evidence of risk of bias in three studies, and the remaining studies fulfilled all criteria for adequate trial quality.

In the main analysis, we assessed mortality occurring before hospital discharge only in those studies that compared high versus low PEEP with the same tidal volume in both groups. With the three studies that were included, the meta-analysis revealed no statistically significant differences between the two groups (relative risk (RR) 0.90, 95% confidence interval (CI) 0.81 to 1.01), nor was any statistically significant difference seen in the risk of barotrauma (RR 0.97, 95% CI 0.66 to 1.42). Oxygenation was improved in the high-PEEP group, although data derived from the studies showed a considerable degree of statistical heterogeneity. The number of ventilator-free days showed no significant difference between the two groups. Available data were insufficient to allow pooling of length of stay in the intensive care unit (ICU). The subgroup of participants with ARDS showed decreased mortality in the ICU, although it must be noted that in two of the three included studies, the authors used a protective ventilatory strategy involving a low tidal volume and high levels of PEEP.

Authors' conclusions

Available evidence indicates that high levels of PEEP, as compared with low levels, did not reduce mortality before hospital discharge. The data also show that high levels of PEEP produced no significant difference in the risk of barotrauma, but rather improved participants' oxygenation to the first, third, and seventh days. This review indicates that the included studies were characterized by clinical heterogeneity.

Protocolized versus non-protocolized weaning for reducing the duration of invasive mechanical ventilation in critically ill paediatric patients

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ABSTRACT

Background

Mechanical ventilation is a critical component of paediatric intensive care therapy. It is indicated when the patient's spontaneous ventilation is inadequate to sustain life. Weaning is the gradual reduction of ventilatory support and the transfer of respiratory control back to the patient. Weaning may represent a large proportion of the ventilatory period. Prolonged ventilation is associated with significant morbidity, hospital cost, psychosocial and physical risks to the child and even death. Timely and effective weaning may reduce the duration of mechanical ventilation and may reduce the morbidity and mortality associated with prolonged ventilation. However, no consensus has been reached on criteria that can be used to identify when patients are ready to wean or the best way to achieve it.

Objectives

To assess the effects of weaning by protocol on invasively ventilated critically ill children. To compare the total duration of invasive mechanical ventilation of critically ill children who are weaned using protocols versus those weaned through usual (non-protocolized) practice. To ascertain any differences between protocolized weaning and usual care in terms of mortality, adverse events, intensive care unit length of stay and quality of life.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL: *The Cochrane Library*, Issue 10, 2012), MEDLINE (1966 to October 2012), EMBASE (1988 to October 2012), CINAHL (1982 to October 2012), ISI Web of Science and LILACS. We identified unpublished data in the Web of Science (1990 to October 2012), ISI Conference Proceedings (1990 to October 2012) and Cambridge Scientific Abstracts (earliest to October 2012). We contacted first authors of studies included in the review to obtain further information on unpublished studies or work in progress. We searched reference lists of all identified studies and review papers for further relevant studies. We applied no language or publication restrictions.

Selection criteria

We included randomized controlled trials comparing protocolized weaning (professional-led or computer-driven) versus non-protocolized weaning practice conducted in children older than 28 days and younger than 18 years.

Data collection and analysis

Two review authors independently scanned titles and abstracts identified by electronic searching. Three review authors retrieved and evaluated full-text versions of potentially relevant studies, independently extracted data and assessed risk of bias.

Main results

We included three trials at low risk of bias with 321 children in the analysis. Protocolized weaning significantly reduced total ventilation time in the largest trial (260 children) by a mean of 32 hours (95% confidence interval (CI) 8 to 56; P = 0.01). Two other trials (30 and 31 children, respectively) reported non-significant reductions with a mean difference of -88 hours (95% CI -228 to 52; P = 0.2) and -24 hours (95% CI -10 to 58; P = 0.06). Protocolized weaning significantly reduced weaning time in these two smaller trials for a mean reduction of 106 hours (95% CI 28 to 184; P = 0.007) and 21 hours (95% CI 9 to 32; P < 0.001). These studies reported no significant effects for duration of mechanical ventilation before weaning, paediatric intensive care unit (PICU) and hospital length of stay, PICU mortality or adverse events.

Authors' conclusions

Limited evidence suggests that weaning protocols reduce the duration of mechanical ventilation, but evidence is inadequate to show whether the achievement of shorter ventilation by protocolized weaning causes children benefit or harm.

Automated weaning and spontaneous breathing trial systems versus non-automated weaning strategies for discontinuation time in invasively ventilated postoperative adults

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ABSTRACT

Background

Automated systems use closed-loop control to enable ventilators to perform basic and advanced functions while supporting respiration. Selected automated systems can now not only measure selected respiratory variables and adapt ventilator output to individual patient needs by operationalizing predetermined algorithms but also automate the conduct of spontaneous breathing trials (SBTs).

Objectives

To summarize the evidence comparing automated weaning and SBT systems to non-automated mechanical ventilation strategies on time to mechanical ventilation discontinuation in adult postoperative patients. In secondary objectives we ascertained differences between automated weaning and SBT systems and non-automated mechanical ventilation discontinuation strategies on clinical outcomes (time to successful extubation, time to first SBT and first successful SBT, mortality, total duration of ventilation, intensive care unit (ICU) and hospital lengths of stay, use of non-invasive ventilation (NIV) following extubation, and adverse events).

Search methods

We searched CENTRAL (*The Cochrane Library* 2013, Issue 5); MEDLINE (OvidSP) (1966 to May 2013); EMBASE (OvidSP) (1988 to May 2013); CINAHL (EBSCOhost) (1982 to May 2013), Evidence Based Medicine Reviews and Ovid Health Star (1999 to May 2013), conference proceedings, trial registration websites, and contacted authors and content experts to identify potentially eligible trials.

Selection criteria

Randomized and quasi-randomized trials comparing automated weaning and SBT systems to non-automated mechanical ventilation discontinuation strategies in intubated adults in the postoperative setting.

Data collection and analysis

Two review authors independently assessed trial quality and abstracted data according to prespecified criteria. Sensitivity and subgroup analyses were planned to assess the impact of the type of (i) clinician primarily involved in implementing the automated weaning and SBT systems, (ii) intensive care unit (ICU), and (iii) non-automated discontinuation (control) strategy utilized on selected outcomes.

Main results

We identified one randomized controlled trial of high quality, involving 300 patients , comparing SmartCare™ to a written protocol. In this trial, SmartCare™ had no effect on discontinuation time. While SmartCare™ significantly reduced the time to the first SBT (mean difference (MD) -0.34 days, 95% CI -0.60 to -0.08; P = 0.01) it did not reduce the time to the first successful SBT (MD -0.25 days, 95% CI -0.55 to 0.05; P = 0.10) and other clinically important outcomes. SmartCare™ did not demonstrate beneficial effects on most clinically important outcomes including time to successful extubation, total duration of mechanical ventilation, ICU and hospital lengths of stay, and the requirement for tracheostomy. Moreover, SmartCare™ did not favourably impact reintubation, mortality, self-extubation, and the proportion of patients undergoing protracted mechanical ventilation, with a small numbers of events in this single trial.

Authors' conclusions

There is a paucity of evidence from randomized controlled trials to support or refute use of automated weaning and SBT systems in discontinuing invasive mechanical ventilation in adult postoperative patients. In a single large trial of high methodologic quality, while the use of SmartCare™ to adjust ventilator settings and conduct SBTs shortened the time to undergoing the first SBT, it did not reduce the time to the first successful SBT or the rate of tracheostomy compared to a written protocol implemented by physicians. SmartCare™ did not demonstrate beneficial effects on clinically important outcomes including time to mechanical ventilation discontinuation, time to successful discontinuation, total duration of mechanical ventilation, and ICU and hospital lengths of stay. Additional well-designed, adequately powered randomized controlled trials are needed to clarify the role for SmartCare™ on important outcomes in patients who predominantly require short term ventilation and in specific postoperative patient populations.

Supplemental oxygen for caesarean section during regional anaesthesia

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ABSTRACT

Background

Supplementary oxygen is routinely administered to low-risk pregnant women during an elective caesarean section under regional anaesthesia; however, maternal and foetal outcomes have not been well established.

Objectives

The primary objective was to determine whether supplementary oxygen given to low-risk term pregnant women undergoing elective caesarean section under regional anaesthesia can prevent maternal and neonatal desaturation. The secondary objective was to compare the mean values of maternal and neonatal blood gas levels between mothers who received supplementary oxygen and those who did not (control group).

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, Issue 2, 2012), MEDLINE (1948 to February 2012) and EMBASE (1980 to February 2012). We did not apply language restrictions.

Selection criteria

We included randomized controlled trials of low-risk pregnant women undergoing an elective caesarean section under regional anaesthesia and compared outcomes with, and without, oxygen supplementation.

Data collection and analysis

Two review authors independently extracted data, assessed methodological quality and performed subgroup and sensitivity analyses.

Main results

We included 10 trials with a total of 683 participants. Supplementary oxygen administration varied widely in dose and duration between trials. No cases of maternal desaturation were reported, although none of the 10 trials focused on maternal desaturation. Significant differences were noted in maternal oxygen saturation (higher with oxygen, N = three trials; mean difference (MD) 1.6%, 95% confidence interval (CI) 0.8 to 2.3, P < 0.0001), maternal PaO_2 (oxygen pressure in the blood; higher with oxygen, N = six trials; MD 141.8 mm Hg, 95% CI 109.3 to 174.3, P < 0.00001), neonatal $UaPO_2$ (foetal umbilical arterial blood; higher with oxygen, N = eight trials; MD 3.3 mm Hg, 95% CI 1.8 to 4.9, P < 0.0001) and $UvPO_2$ (foetal umbilical venous blood; higher with oxygen, N = 10 trials; MD 5.9 mm Hg, 95% CI 3.2 to 8.5, P < 0.0001). No significant differences were reported in neonatal UapH (N = eight trials; MD 0.00, 95% CI -0.01 to 0.00, P = 0.26) and in average Apgar scores at one minute (N = five trials; MD 0.07, 95% CI -0.20 to 0.34, P = 0.6) and at five minutes (N = five trials; MD 0.00, 95% CI -0.06 to 0.05, P = 0.91).

Only two out of 10 trials had a low risk of bias in all categories. When we separated the studies into low risk and high risk for bias, we found substantial statistical heterogeneity. None of the low-risk studies showed a significant difference in neonatal $UaPO_2$ between the two intervention groups, whereas the high-risk studies showed a benefit for the neonatal oxygen group.

The level of oxygen free radicals (malondialdehyde (MDA) and 8-isoprostane) was higher in participants who received supplementary oxygen (N = two trials; MD 0.2 µmol/L, 95% CI 0.1 to 0.4, P = 0.0002; MD 64.3 pg/mL, 95% CI 51.7 to 76.8, P < 0.00001, respectively).

Authors' conclusions

Current evidence suggests that supplementary oxygen given to healthy term pregnant women during elective caesarean section under regional anaesthesia is associated with higher maternal and neonatal oxygen levels (maternal SpO_2, PaO_2, $UaPO_2$ and $UvPO_2$) and higher levels of oxygen free radicals. However, the intervention was neither beneficial nor harmful to the neonate's short-term clinical outcome as assessed by Apgar scores.

Metered dose inhalers versus nebulizers for aerosol bronchodilator delivery for adult patients receiving mechanical ventilation in critical care units

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ABSTRACT

Background

Nebulizers and metered dose inhalers (MDI) have both been adapted for delivering aerosol bronchodilation to mechanically ventilated patients, but there is incomplete knowledge as to the most effective method of delivery.

Objectives

To compare the effectiveness of nebulizers and MDIs for bronchodilator delivery in invasively ventilated, critically ill adults.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2012, Issue 5); Ovid MEDLINE (1950 to Week 19 2012); Ovid EMBASE (1980 to Week 19 2012); CINAHL via EBSCOhost (1982 to Week 19 2012) and reference lists of articles. We searched conference proceedings and reference lists of articles. We also contacted manufacturers and researchers in this field. There were no constraints based on language or publication status.

Selection criteria

Randomized controlled trials (RCTs), including randomized cross-over trials where the order of the intervention was randomized, comparing the nebulizer and MDI for aerosol bronchodilation in mechanically ventilated adult patients in critical care units.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. We contacted study authors for additional information where required. We collected information about adverse effects from the trials.

Main results

This review included three trials, two addressing the primary outcome measure of a reduction of airway resistance (measured as a reduction in interrupter and additional airway resistance) with a total of 28 patients (n =10, n =18) and two addressing adverse changes to haemodynamic observations with a total of 36 patients (n =18, n =18). Limitations in data availability and reporting in the included trials precluded meta-analysis and therefore the present review consisted of a descriptive analysis. Risk of bias in the included trials was judged as low or of unknown risk across the majority of items in the 'Risk of bias' tool.

Cautious interpretation of the included study results suggests that nebulizers could be a more effective method of bronchodilator administration than MDI in terms of a change in resistance. No apparent changes to haemodynamic observations (measured as an increase in heart rate) were associated with either mode of delivery. Due to missing data issues, meta analyses were not possible. Additionally, small sample sizes and variability between the studies with regards to patient diagnoses, bronchodilator agent and administration technique mean that it would be speculative to infer definitive recommendations based on these results at this time. This is insufficient evidence to determine which is the most effective delivery system between nebuliser and MDI for aerosol bronchodilation in adult patients receiving mechanical ventilation.

Authors' conclusions

Existing randomized controlled trials, including randomized cross-over trials where the order of the intervention was randomized, comparing nebulizer and MDI for aerosol bronchodilation in mechanically ventilated adult patients do not provide sufficient evidence to support either delivery method at this time.

Anaesthetic regimens for day-procedure laparoscopic cholecystectomy

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Editorial group: Cochrane Anaesthesia Group.
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Citation: Vaughan J, Nagendran M, Cooper J, Davidson BR, Gurusamy KS. Anaesthetic regimens for day-procedure laparoscopic cholecystectomy. *Cochrane Database of Systematic Reviews* 2014, Issue 1. Art. No.: CD009784. DOI: 10.1002/14651858.CD009784.pub2.

ABSTRACT

Background

Day surgery involves admission of selected patients to hospital for a planned surgical procedure with the patients returning home on the same day. An anaesthetic regimen usually involves a combination of an anxiolytic, an induction agent, a maintenance agent, a method of maintaining the airway (laryngeal mask versus endotracheal intubation), and a muscle relaxant. The effect of anaesthesia may continue after the completion of surgery and can delay discharge. Various regimens of anaesthesia have been suggested for day-procedure laparoscopic cholecystectomy.

Objectives

To compare the benefits and harms of different anaesthetic regimens (risks of mortality and morbidity, measures of recovery after surgery) in patients undergoing day-procedure laparoscopic cholecystectomy.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) in *The Cochrane Library* (Issue 10, 2013), MEDLINE (PubMed) (1987 to November 2013), EMBASE (OvidSP) (1987 to November 2013), Science Citation Index Expanded (ISI Web of Knowledge) (1987 to November 2013), LILACS (Virtual Health Library) (1987 to November 2013), metaRegister of Controlled Trials (http://www.controlled-trials.com/mrct/) (November 2013), World Health Organization (WHO) International Clinical Trials Registry Platform (ICTRP) portal (November 2013), and ClinicalTrials.gov (November 2013).

Selection criteria

We included randomized clinical trials comparing different anaesthetic regimens during elective day-procedure laparoscopic cholecystectomy (irrespective of language or publication status).

Data collection and analysis

Two authors independently assessed trials for inclusion and independently extracted the data. We calculated the risk ratio, rate ratio or mean difference with 95% confidence intervals based on intention-to-treat or available data analysis.

Main results

We included 11 trials involving 1069 participants at low anaesthetic risk. The sample size varied from 40 to 300 participants. We included 23 comparisons. All trials were at a high risk of bias. We were unable to perform a meta-analysis because there were no two trials involving the same comparison. Primary outcomes included perioperative mortality, serious morbidity and proportion of patients who were discharged on the same day. There were no perioperative deaths or serious adverse events in either group in the only trial that reported this information (0/60). There was no clear evidence of a difference in the proportion of patients who were discharged on the same day between any of the comparisons. Overall, 472/554 patients (85%) included in this review were discharged as day-procedure laparoscopic cholecystectomy patients. Secondary outcomes included hospital readmissions, health-related quality of life, pain, return to activity and return to work. There was no clear evidence of a difference in hospital readmissions within 30 days in the only comparison in which this outcome was reported. One readmission was reported in the 60 patients (2%) in whom this outcome was assessed. Quality of life was not reported in any of the trials. There was no clear evidence of a difference in the pain intensity, measured by a visual analogue scale, between comparators in the only trial which reported the pain intensity at between four and eight hours after surgery. Times to return to activity and return to work were not reported in any of the trials.

Authors' conclusions

There is currently insufficient evidence to conclude that one anaesthetic regimen for day-procedure laparoscopic cholecystectomy is to be preferred over another. However, the data are sparse (that is, there were few trials under each comparison and the trials had few participants) and further well designed randomized trials at low risk of bias and which are powered to measure differences in clinically important outcomes are necessary to determine the optimal anaesthetic regimen for day-procedure laparoscopic cholecystectomy, one of the commonest procedures performed in the western world.

8.6 Apêndice 6 - *Abstract* das revisões sistemáticas da Colaboração Cochrane com ausência de evidências ou evidências insuficientes, sem recomendação de novos estudos **(C2)**.

Ausência de estudos

9 ANEXOS

9.1 Anexo 1. Parecer do Comitê de Ética

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Ética

Registrado no Ministério da Saúde
em 30 de abril de 1997

Botucatu, 21 de Março de 2014 Of. 32/2014-CEP

Ilustríssimo Senhor
Prof. Adjunto Paulo do Nascimento Junior
Departamento de Anestesiologia da
Faculdade de Medicina de Botucatu.

Ilustríssimo Prof. Paulo,

Informo que a Pesquisa "Mapeamento das evidências das revisões sistemáticas do Grupo Anestesiologia da Colaboração Cochrane: entendendo seu valor para a prática clínica.", conduzido por Reinaldo da Silva Santos Junior, orientado por Vossa Senhoria e co-orientado pela Profª. Drª. Regina Paolucci El Dib, trata-se de Revisão Sistemática da Literatura, portanto não necessita de parecer ético.

Atenciosamente,

Prof. Dr. Trajano Sardenberg
Coordenador do CEP

9.2 Anexo 2. Tabela utilizada para coleta de dados

Título da revisão sistemática	Evidências que apóiam a intervenção "A"	Evidências contra a intervenção "B"	Recomendação de futuros estudos "1" ou "0"	Número de estudos incluídos	Número de metanálises

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Manual de apresentação de trabalho científico: tese, dissertação e monografia / Enilze de Souza Nogueira Volpato, Rosemary Cristina da Silva, Luciana Pizzani. - Botucatu: Divisão Técnica de Biblioteca e Documentação, 2012. 35p. CDD 001.42