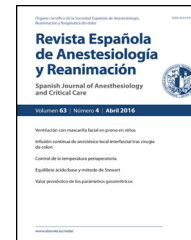




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EDITORIAL ARTICLE

Goal directed hemodynamic therapy: The time to implement is now



Terapia hemodinámica por objetivos: es el momento de ponerla en práctica

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In this month's issue of the Spanish Journal of Anesthesiology and Critical Care, Ripollés-Melchor and colleagues provide the reader with a well conducted systematic review and meta-analysis of the use of esophageal Doppler flow parameters to guide goal directed hemodynamic therapy (GDHT).¹ There has been substantial deliberation in the past 15 years, some of it providing more questions than answers, some of it unnecessarily repetitive, regarding this subject. The use of perioperative GDHT is not a novelty. This concept has been discussed and tested for more than 30 years. In 1999, Boyd and Bennett affirmed in an editorial paper that the refusal to use GDHT on the perioperative scenario in high risk patients might be considered unethical,² based on studies that suggested that there might be a significant reduction in mortality in high risk surgical patients if there is a deliberate attempt to increase tissue perfusion by increasing cardiac output and oxygen delivery.^{3–5} However, lack of standard criteria for perioperative fluid therapy results in significant clinical variability relative to its administration and there remains no consensus about the most effective goals for fluid therapy or the most appropriated monitoring methods. As such, despite evidences demonstrating potential benefit of this technique in several disease states,⁶ GDHT remains a well-accepted concept that has not yet translated to an established standard of care.⁷

It is clear that the prevention of perioperative morbidity is a crucial factor in providing high-quality, high-value health care, since the occurrence of one or more postoperative complications adversely affects postoperative survival and increases healthcare costs.^{8,9} One of the cornerstones of the medical care of surgical patients is the perioperative fluid therapy and hemodynamic management.

Up to 230 million major surgical procedures are performed each year around the world,¹⁰ and up to 4% of patients undergoing non-cardiac surgery may die,¹¹ and another significant number of patients will develop postoperative complications.¹² Early identification of these individuals, and proper perioperative management, may have an important impact on the perioperative outcomes. Pearce et al. stressed the high risk surgical patient's subgroup constitutes only 12% of the surgical population; however, this group of patients largely contributes to high rates of perioperative complications and more than 80% of perioperative mortality.¹³ In these scenario GDHT seems to be the better choice, as found by Ripollés-Melchor et al.¹ and other meta-analysis including high risk and GI surgeries.^{14–19} The Ripollés-Melchor and colleagues study and other analyses suggest that effort and focus of anesthesiologists is not best utilized for new research evaluating the hypothesis that GDHT is superior to less structured regimens of fluid care.¹ Rather, the emphasis and our efforts should be on implementing GDHT as the standard of perioperative fluid and drug therapy. Ideally, this would be done as a Quality Improvement (QI) program

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with tracked implementation (process) and impact on outcomes. Additionally, a cost-effectiveness analysis should be considered. Recent studies suggest that GDHT during high-risk surgery is cost-effective.²⁰⁻²² Legrand et al. additionally show that both esophageal Doppler or arterial pulse pressure waveform analysis had negligible costs compared with the reduction of in-hospital costs.²¹

Recently, the International Fluid Optimization Group presented a practical guide on the background, tools and an approach to implementation of perioperative fluid planning.²³ The meta-analysis by Ripollés-Melchor and colleagues focused on studies of esophageal Doppler monitoring,¹ a proven technology for assessing global perfusion and volume status.²⁴ Their results show that the use of this technology decreases overall postoperative complications mainly in patients undergoing colorectal surgery and in high risk patients.¹ However, there are a variety of non-invasive hemodynamic monitors based on pulse contour analysis and bioimpedance. All provide valuable insights and target variables for implementation of GDHT: albeit, all these monitors sometimes fail for a variety of technical issues. Corcoran et al. showed in their meta-analysis that, apart from a slightly more precise signal in the reduction of length of hospital stay with the use of esophageal Doppler, all forms of hemodynamic monitoring appeared to be equally effective in the reductions in perioperative complications.²⁵ As always the overall assessment of the patient's volume and perfusion status is one of the most important tasks of the expert anesthesiologist and no monitor or GDHT algorithm can replace the need for active assessment of the anesthesiologist with his or her hands on the patient. Accordingly, the final decision to administer or to stop the administration of fluids and drugs must be supported by the apparent need for hemodynamic improvement, the presence of fluid responsiveness, and the lack of associated risk for the patient.²³

Ripollés-Melchor et al. also found in their meta-analysis that the GDHT using esophageal Doppler monitoring decreases overall postoperative complications when it was compared with liberal fluid therapy.¹ Unfortunately, establishing what constitutes a restrictive or liberal amount of fluid from the literature is difficult because the absolute amounts of fluid administered vary substantially among trials making any conclusion difficult to implement in clinical practice.²⁶ Several studies have shown that the absolute amount of perioperative fluid administered may not be a major determinant of perioperative outcomes. Titration of fluid according to a hemodynamic goal is pivotal in improving perioperative outcomes.²⁵ Interestingly, the application of specific GDHT protocols has often been associated with increased delivery of fluids, especially colloids, and in some studies less.²³ Taken together, these data suggest that the benefit of fluid therapy is not primarily related to the volume infused, but rather how and when volume therapy is administered to a given patient.

In summary, we appreciated Ripollés-Melchor and colleagues for their insightful analysis. GDHT has been proven most effective in the high risk surgeries and may not be needed in routine surgeries where significant blood loss is not executed. When a routine case unexpectedly becomes major due to surgery or unanticipated co-morbidity, then the fluid plan should be changed. Accordingly, every

Anesthesiology team is encouraged to develop a priori plan for such scenarios. All Anesthesiology organizations and individual anesthesiologists should have their perioperative fluid therapy plans formalized by documentation, by training, and by implementation. The selection of the monitor device that will guide the GDHT should rely on clinical needs, invasiveness, accuracy, expertise, and precision. It is crucial to remind that fluids should be treated as any other intravenous drug therapy, thus, careful consideration of its timing and dose is fundamental for patient's outcomes. Determining both the need for augmented perfusion and fluid responsiveness is key factors when making hemodynamic optimization decisions to avoid unjustified fluid administration.

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