UNIVERSIDADE ESTADUAL PAULISTA "JÚLIO DE MESQUITA FILHO"
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ULTRASSONOGRAFIA BIDIMENSIONAL DA ANATOMIA, FUNCIONALIDADE E DIÁSTASE DO MÚSCULO RETO ABDOMINAL DE MULHERES COM *DIABETES MELLITUS* GESTACIONAL

ANATOMY, FUNCTIONALITY AND DIASTASIS OF THE RECTUS ABDOMINIS MUSCLE OF PREGNANT WOMEN WITH GESTATIONAL DIABETES MELLITUS BY TWO-DIMENSIONAL ULTRASOUND

Dissertação apresentada à Faculdade de Medicina, Universidade Estadual Paulista "Júlio de Mesquita Filho", Campus de Botucatu, para obtenção do título de Mestre em Tocoginecologia.

Orientadora: Profa. Dra. Angélica Mércia Pascon Barbosa
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Epígrafe

“Os que se encantam com a prática sem a ciência são como os timoneiros que entram no navio sem timão nem bússola, nunca tendo certeza do seu destino”.

Leonardo da Vinci

Sumário

Seção 1

Trajetória Acadêmica

Quando fui prestar vestibular em 1982, foi um turbilhão de dúvidas. Sou técnico mecânico. Mas tive uma certeza: de que queria mudar de área. Direito ou medicina? E não podia ter feito melhor escolha.

Após a graduação na Escola Paulista de Medicina, tive a felicidade de poder fazer residência médica em Ginecologia e Obstetrícia no Hospital Maternidade Leonor Mendes de Barros, onde trabalhei por mais 23 anos. Onde continuei em plantão, mesmo já estando na cidade de Marília.

Eu não sabia, mas devo a esta minha “casa” onde pude, ao trabalhar com residentes, ajudar na formação destes profissionais. Foi aliado a poder ensinar, o verdadeiro estímulo para novos voos.

Entretanto, ao mudar de rumo e vir trabalhar em Marília, uma guinada profissional. Tive que trabalhar em uma Unidade de Saúde de Família. Primeiro em Garça, em 2002, e logo depois um convite que me trouxe um estímulo inusitado que foi ser professor convidado pela Faculdade de Medicina de Marília (FAMEMA), mas tive que sair da querida USF Helena Muller em Garça para a USF de Lácio, em Marília, em 2004. Trabalhar com alunos de primeiro e segundo ano dos cursos de enfermagem e medicina na USF me fez enxergar que precisava me aperfeiçoar. Então fiz um curso de especialização em Saúde de Família pelo Ministério de Saúde e conquistei esse título de Especialização em Medicina de Saúde da Família e Comunidade do qual muito me orgulha.

Em 2010, devido ao Professor Doutor Donaldo Cerci da Cunha que me convidou a prestar concurso para a GO da FAMEMA, pude voltar a trabalhar com residentes e agora com alunos de quinto e sexto anos, nas enfermarias de GO.

Já em 2017 fui convidado a participar de um outro desafio. Prestei prova para ser professor na Faculdade de Medicina da Fundação Educacional do Município de Assis (FEMA).

O Professor Doutor Jairo Reis me apresentou à Prof. Dra. Angélica Mércia Pascon Barbosa, a quem devo a vontade de voltar a me preparar melhor para a vida acadêmica e ser apresentado a este fantástico mundo da pesquisa científica. E ainda mais, ser apresentado ao Grupo Diamater, liderado pela Prof.ª Marilza Vieira Cunha Rudge, onde cursei o Programa de Pós-graduação em Tocoginecologia, em nível de mestrado.

A minha mudança drástica de médico assistente para pesquisador, na minha fase de vida, parece uma loucura, mas me faz sonhar em ser melhor professor, pesquisar e poder publicar trabalhos que impactem em mudanças em condutas para melhorarmos a vida de nossa população e leva o nome da Faculdade de Medicina de Botucatu da UNESP que está me oferendo esta oportunidade. Ao longo destes 2 anos também foi possível colaborar e ser autor de 5 artigos (Anexo 1) de alto impacto.

Agradeço imensamente a Deus por mais essa etapa que se finaliza. Agradeço de maneira especial a minha orientadora e amiga Prof.ª Dra. Angélica Barbosa que caminhou comigo até aqui. Os desafios e adversidades são grandes, mas o crescimento profissional e pessoal muito maior. Que eu continue movido na busca pelo conhecimento…sempre!!!!

Seção 2
Contextualização

Avanços do conhecimento sobre o impacto do *Diabetes Mellitus* Gestacional no Músculo Reto Abdominal

Investigações sobre a tríade *Diabetes Mellitus* Gestacional (DMG), miopatia diabética e incontinência urinária e seus biomarcadores, são realizadas pelo *Grupo de pesquisa Diabete e Gravidez: Clínico e experimental,* desde 2006. O DMG, definido como hiperglicemia identificada pela primeira vez no segundo ou terceiro trimestre de gravidez e não anteriormente à gestação (*overt diabetes*) (1), mesmo tratado de acordo com padrões internacionais da *American Diabetes Association* (1) institucionalizado no Centro de Investigação do Diabete Perinatal (CIDPN) não foi suficiente para evitar o efeito deletério da hiperglicemia gestacional controlada sobre a Incontinência Urinária Específica da Gestação (IU-EG) e Disfunção Muscular do Assoalho Pélvico (DMAP) (2). A procura de marcadores dessa miopatia caracteriza o Projeto Temático (2016/01743-5). O *Conceptual Model* (Figura 1) (3), estabelecido da integração entre DMG, IU-EG e miopatia hiperglicêmica tem a funcionalidade dos Músculos do Assoalho Pélvico (MAP) e Músculos Reto Abdominais (MRA) como variáveis moderadoras e precisa ser investigado (Figura 2).

O diagnóstico do DMG realizado entre 24ª e 28ª semana, é definido pelos limites do TOTG-75 g com glicose em jejum de ≥ 92 mg/dL, glicose de 1h pós-sobrecarga ≥ 180 mg/dL ou glicose de 2h ≥ 153 mg/dL e < 200 mg/dL (4–6). Prévio a 20ª semana gestacional, o DMG é diagnosticado por GJ ≥ 92 mg/dL e < 126 mg/dL e o overt na gestação por GJ ≥ 126 mg/dL.

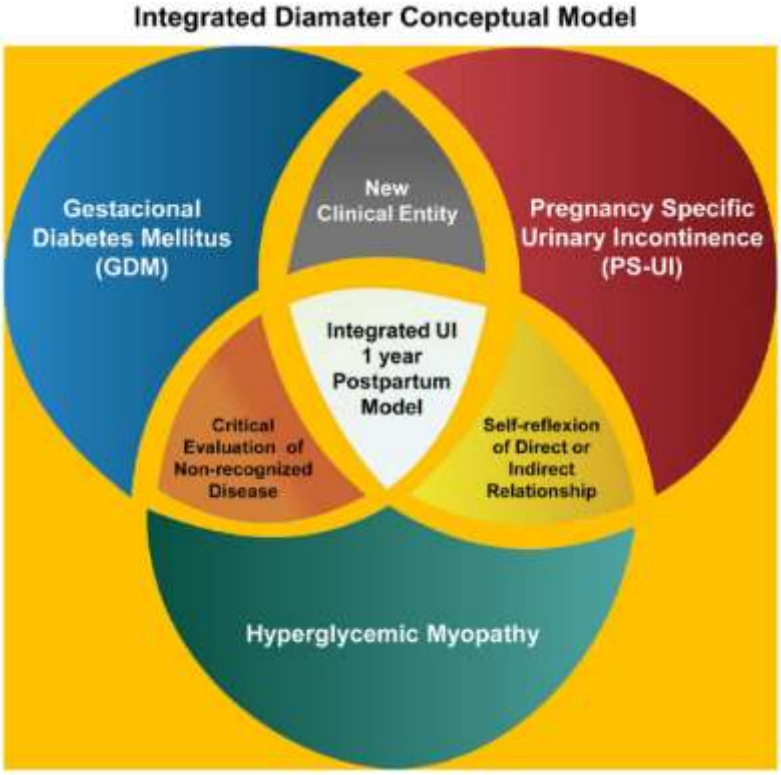

Figura 1 - Modelo conceitual do papel da integração entre DMG, IU-EG e MRA-MAP miopatia como nova tríade na determinação da prevalência de IU e DMAP a longo prazo (3).

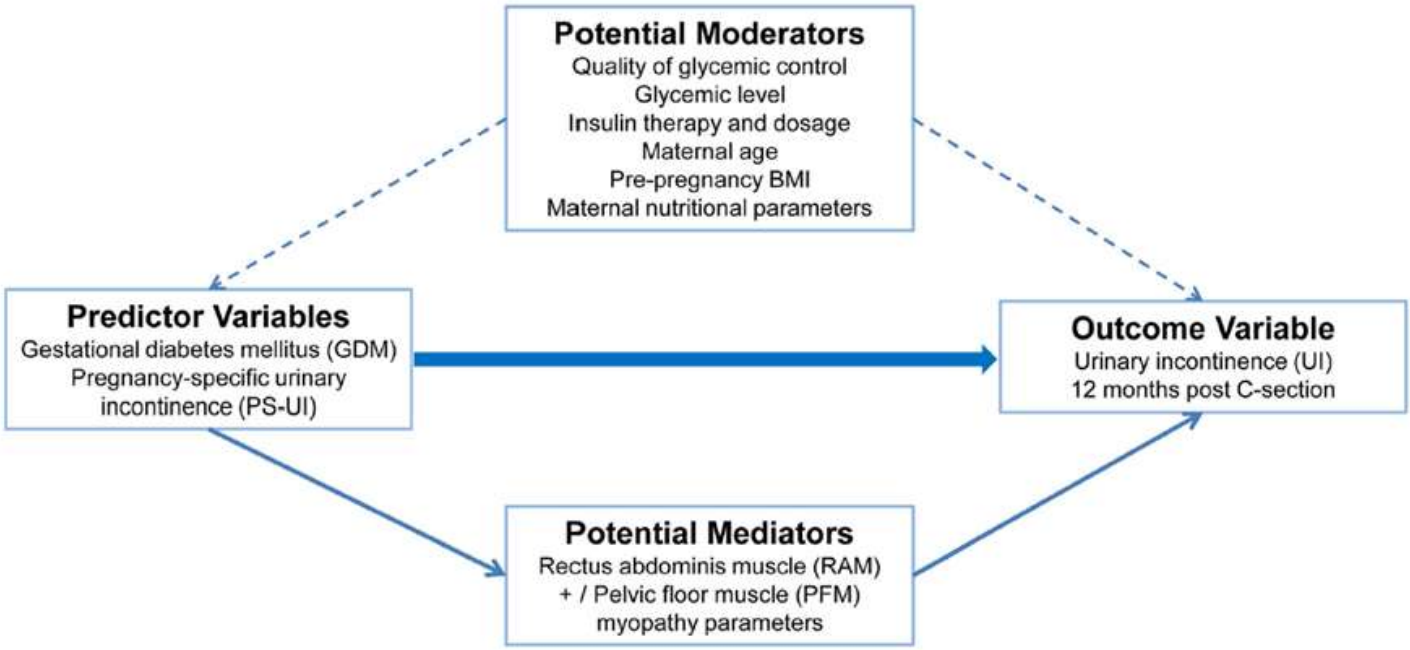

Figura 2 – Variáveis Preditoras, Moderadoras, Mediadoras e de Desfecho (3)

O DMG está associado a repercussões maternas, fetais, neonatais e perinatais negativas com maior frequência, quando comparado à gestação normoglicêmica (7,8).

Sua incidência está em torno de 18% e é a complicação médica de maior ocorrência na gestação (8,9). A cada ano no Brasil, estima-se que 400 mil gestantes necessitarão de cuidados especiais devido o desenvolvimento de qualquer tipo de hiperglicemia gestacional (8). Dessa forma, os cuidados obstétricos devem ser realizados por uma equipe multiprofissional que auxiliem no controle glicêmico, no manejo de comorbidades ou até mesmo no tratamento de lesões em órgãos-alvo desta doença. Essa rigorosa e necessária assistência é justificada pelo fato de que mulheres com DMG possuem risco aumentado de desfechos adversos durante a gravidez (malformações fetais, macrossomia e polidrâmnio) e no parto; chance elevada de desenvolvimento de DMG em gestações subsequentes ou de DM2 e doença cardiovascular ao longo da vida (3,8). Além disso, as repercussões do DMG na prole destas mães incluem risco para obesidade, DM2, dislipidemia, morbidade neurológica e psíquica a curto e longo prazo (3,8).

O DMG mostrou-se ainda estar relacionado à deterioração da função muscular fisiológica (9–11), o que denota a existência de conexão entre o metabolismo e a função mecânica dos músculos (7,9,11). A literatura evidencia que o DMG danifica o músculo esquelético causando atrofia pelo efeito direto dos níveis glicêmicos elevados (12). A atrofia muscular, definida como diminuição na massa muscular, tem efeito negativo sobre a qualidade de vida global e ocorre quando a taxa de degradação é maior do que a taxa de síntese (12–14).

Resultados do CIDPN confirmaram prevalência aumentada da DMAP nas gestantes com DMG (15,16) e dois anos após a cesárea, definindo clara associação entre DMG e DMAP (2,17,18). Na mesma linha, a pesquisa translacional, usando modelos de hiperglicemia leve (induzida ao nascimento) e severa (induzida na prenhez) em ratas *Wistar*, evidenciou interação entre hiperglicemia e alterações

morfológicas e estruturais da musculatura estriada periuretral e reto abdominal (19–22).

Os estudos com modelo animal reforçam o achado clínico de alterações musculares, demonstrando que ratas prenhes com diabete moderado (glicemia entre 120 e 300 mg/dL) apresentam alterações similares ao diabete grave (21) na Matriz Extracelular e no músculo estriado uretral, como: atrofia, adelgaçamento, aumento de colágeno na área de músculo estriado, aumento de vasos, acúmulo de mitocôndrias, além de gotas de lipídios e grânulos de glicogênio presentes em grande quantidade, colocalização das fibras rápidas e lentas, diminuição de fibras rápidas e a presença de fibrose/deposição de fibras de colágeno, associados com atrofia muscular (6,20).

A remodelação uretral do tecido conjuntivo com perfil de glicosaminoglicanos e organização de fibrilas de colágeno constituíram a primeira linha de evidência entre hiperglicemia e lesão do sistema fibromuscular uretral, possivelmente, relacionada à DMAP em gestantes com hiperglicemia (19–22). Isto trouxe reflexões sobre potenciais implicações clínicas e respectivas estratégias terapêuticas na atenção à saúde dessas mulheres. Estes resultados clínicos e experimentais demonstraram intrínseca relação do binômio DMG e miopatia diabética, especificamente dos MRA.

O abdômen é o compartimento que se estende da caixa torácica à pelve e fornece proteção para os órgãos e estruturas do sistema digestivo, reprodutor e urinário. Além da estrutura óssea é composto pelos músculos transverso do abdome, oblíquo interno e oblíquo externo lateralmente e anteriormente pelo MRA. A ação coordenada destes músculos controla e modula a pressão intra-abdominal (23,24) e desempenha papel importante no controle de postura, estabilidade pélvica, respondem rapidamente as demandas respiratórias, aumento da pressão intra-abdominal e participam da manutenção da continência urinária (25–28).

Por estar envolvido nos mecanismos de continência urinária o MRA tem sido investigado por vários grupos de pesquisa focados na compreensão da relação entre os MAP e os músculos abdominais. Estas pesquisas evidenciaram que a co-contração dos MAP e os músculos abdominais ocorre tanto durante a contração voluntária dos MAP como durante demandas abdominais (24,27,29–34).

Durante a gestação o MRA se distende, para permitir o crescimento uterino, podendo chegar a aproximadamente 20 cm de alongamento em seu comprimento e os feixes inicialmente paralelos afastam-se progressivamente da linha Alba dando origem à diástase do músculo reto abdominal, considerado patológico quando o afastamento é superior a três centímetros (35) que pode alterar a capacidade de produzir o torque, interferindo dessa forma no vetor de força (36) e podendo repercutir negativamente no pós-parto (35). A diástase ocorrida na gestação pode permanecem no pós-parto imediato e ao longo da vida (36–43). A diástase acomete 66% das mulheres e é mais comum na região umbilical com incidência em 52% dos casos, a supraumbilical em 36% e a infraumbilical em 11% dos casos (36,40–43).

Os critérios para o diagnóstico de diástase em mulheres nulíparas consideram "normal" quando a largura é de menos de 1,5 cm no nível do apêndice xifoide, 2,2 a 3 cm acima do anel umbilical, e 0,6 a 2 cm abaixo do mesmo (36,40–43). Em estudos relacionados ao pós-parto, a diástase do MRA foi definida como a linha alba que tem largura maior do que dois dedos ou equivalente a 1,5 cm, quando medido com palpação (36,43,44). A integridade da estrutura dos músculos abdominais e do assoalho pélvico pode se alterar nas diferentes fases da vida da mulher, particularmente na gestação e parto, sendo que a gestação complicada pelo diabetes pode ter alterações ainda mais evidentes (18,45,46). A avaliação da integridade tem sido negligenciada e a consequência pode impactar desde a ocorrência de disfunções

pélvicas (47).

As estruturas do MRA podem ser avaliadas por diferentes recursos dos quais se destaca a Ultrassonografia (US) (48–52) como padrão ouro de exame anatômico. A US é claramente mais conveniente na prática clínica, de fácil acesso, e pode ser realizada com segurança durante a gestação. A técnica para adquirir as imagens por US pode ser rapidamente apreendida por pesquisadores clínicos (48–52). Ganho de ajuste das zonas focais para a área de interesse (profundidade de 2 a 5 cm) e ajustes no software para melhorar a qualidade das imagens deve ser realizado (53,54).

As imagens da US Bidimensional (2D) possibilitam verificar a morfometria do MRA em qualquer região de sua extensão e a distância (diástase) entre seus feixes musculares que é dada pela mensuração em três níveis, tomando-se como base a Linha Alba, 2,5 cm acima e abaixo do anel umbilical e na altura do anel umbilical (55). A US 2D tem sido usado para avaliar os MRA em mulheres e demonstra ser método acurado e preciso de avaliação da morfologia e diástase abdominal (55).

Com o conhecimento sobre as alterações nos MRA observados em estudos experimentais e ainda sobre as distenção e afastamento do mesmo durante a gestação, é fundamental a investigação com análises de sua anatomia, funcionalidade e diástase em gestantes com DMG, uma vez que não foram encontrados estudos sobre o respectivo tema neste grupo específico.

O presente estudo, com o recurso de avaliação por imagem de US 2D, justifica-se por ser inédito e como importante instrumento para colaborar na investigação da anatomia, funcionalidade e diástase, do MRA em gestantes com DMG e desta forma contribuir com a prática clínica obstétrica e fortalecer o conhecimento científico sobre os efeitos do binômio gestação/DMG sobre o organismo materno. A hipótese do presente estudo é de que haverá diferenças na anatomia, funcionalidade e diástase

do MRA avaliados pela US 2D, com resultado alterado no grupo com DMG quando comparado com o grupo controle não diabético gestacional (NDG).

Até o momento, nenhum estudo foi encontrado que demonstram proposta para avaliar o desempenho dos MRA com dinâmica das suas diferentes atividades. Nesse contexto, analisar o desempenho dos MRA com medidas ultrassonográficas confiáveis, objetivas, visíveis e em tempo real é método alternativo para orientar a prática clínica e científica na avaliação e nos cuidados preventivos e terapêuticos.

A presente Dissertação inédita integra e se propõe responder perguntas previstas nos objetivos do Projeto Temático Diamater. Tem aprovação do Comitê de Ética em Pesquisa (CEP) para seu desenvolvimento no projeto "mãe" CAAE: 82225617.0.0000.5411 (Anexo 2). Os objetivos a saber, são: 1) Avaliar pela ultrassonografia bidimensional a anatomia e funcionalidade do músculo reto abdominal de gestantes com DMG e comparar com gestantes não diabéticas**;** 2) Avaliar pela ultrassonografia bidimensional diástase do músculo reto abdominal de gestantes com DMG e comparar com gestantes não diabéticas.

Os resultados desta Dissertação estão apresentados no respectivo artigo:

1 - Rectus abdominis muscle biometry in pregnant women with Gestational Diabetes Mellitus: a cross-sectional study using ultrasonography assessment at rest and during functional maneuvers

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Seção 3

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Title Page

Rectus abdominis muscle biometry in pregnant women with Gestational Diabetes Mellitus: a cross-sectional study using ultrasonography assessment at rest and during functional maneuvers

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Abstract

Objective: To analyze the effects of gestational diabetes mellitus (GDM) on the biometry of rectus abdominis muscles (RAM) in pregnant women assessed by ultrasonography at rest and during functional maneuvers.

Design: A cross-sectional study.

Setting: Perinatal Diabetes Research Center of Botucatu Medical School.

Participants: We recruited GDM and non-GDM women to participate in the study from 24 to 30 weeks of gestation.

Main Outcome Measures: Rectus abdominis muscle thickness measured at rest, RAM contraction, pelvic floor muscle (PFM) contraction, and co-contraction of RAM and PFM.

Results: We included 195 participants in the study. Of these, 154 were non-GDM and 41 were GDM. Regarding clinical, obstetrical, and anthropometrical aspects, the groups showed similarities. The thickness of the RAM at rest in the GDM group was significantly thinner than the non-GDM group ($p = .115$), and had a weaker and worst endurance performer ($p = .016$) than the PFM.

Conclusions: The higher RAM thickness at rest and in isolated voluntary contraction was more significant in the non-GDM group when compared to the GDM group.

Introduction

Gestational diabetes mellitus (GDM) is associated with functional, metabolic, and structural changes induced by the hyperglycemic status in the musculoskeletal system.[1,2] The interaction between pregnancy status and GDM impacts on early and long-term maternal health.[3]

The abdomen has essential muscles for daily actions. The transversus abdominis muscles are the deepest topographically among the trunk muscles, followed by the internal oblique and external oblique muscles. The rectus abdominis muscle (RAM) is located superficially in the anterior region of the abdomen. The activation of these muscles, associated with the passive and neural component, control and modulate intra-abdominal pressure.[4,5] Moreover, the RAM is related to posture control, pelvic stability, neuromuscular responses, and participation in maintaining urinary continence.[6,7]

Urogynecology has investigated the RAM because abdominal muscles are involved in the complex system maintaining urinary continence. Research indicates that co-contraction of the pelvic floor muscles (PFM) and abdominal muscles occur during voluntary contraction of the PFM and abdominal demands.[8-11]

A morphological injury on RAM during the gestational period is related to GDM.[12,13] Translational studies showed detrimental impacts, either long-term mild or short-term severe hyperglycemia on urethral pregnant rats' muscle as atrophy, thinning, disorganization, rupture of muscle fibers, and loss of specific fiber types from normal anatomical locations, denoting a connection between glycemic levels and PFM structure. [12,13]

Ultrasonography (US) is a non-invasive accurate method for assessing the RAM.[14] Furthermore, the RAM US has good interobserver and interdisciplinary

reliability, and the technique permits the functional assessment.[15]

We did not find studies investigating the RAM biometry and functionality during the GDM-pregnancy span. Therefore, our study aimed to analyze the effects of GDM on the US biometry and the function of rectus abdominis muscles in pregnant women. We hypothesized that the RAM is impaired by GDM, even during the gestational span. Thus, we expect to recognize changes in the biometry and functionality during pregnancy to propose further preventive measures for the abdominal muscles and pelvic floor status. Consequently, reducing the occurrence of urinary incontinence.

Methods

Study design

We developed a cross-sectional study performed at the Perinatal Diabetes Research Center (PDRC), São Paulo State University (UNESP), Botucatu Medical School, Brazil, by the Diamater Study Group. We collected data in an individual patient evaluation between March/2018 to July/2021. The Institutional Review Board (CAAE 40418215.8.0000.5411) approved the study. All participants provided written informed consent before data collection.

Participants

The inclusion criteria were pregnant women from 24-30 weeks of gestation, 18-40 years of age, at the first or the second pregnancy (whether a previous elective C-section in previous birth). In addition, we excluded the participants who had connective tissue disease, neurological disorders, severe clinical obstetrics and gynecologic disorders, preterm birth, vaginal birth, stillbirth, and previous or postpartum diabetes mellitus (DM).

After the recruitment, the participants were universally screened for GDM according to the current ADA criteria[16], were then allocated to the GDM-group when the OGTT-75g was positive. Those who screened negatively were allocated to the non-GDM group.

Data collection

We collected the following demographic information: maternal age in years, ethnicity (Caucasian or non-Caucasian), educational degree, smoking or not during pregnancy, physical activity or not during pregnancy (at least 150 minutes per week), the body weight in Kg, the pre-pregnancy and the gestational body mass index (BMI) at 24-30 weeks of gestation. In addition, clinical data about glycemic control in mg/dL were obtained from the medical records to assure that all participants recruited were previously not-GDM and not *overt*-DM.

RAM thickness collection For the biometrical and functional evaluations of the RAM using 2D-US, all the participants were instructed to remain supine with the lower limbs extended.[17] The exams were performed by the same examinator, SKN (one of the paper authors), who previously instructed and ensured that the participants performed the functional maneuvers correctly. In addition, the lead author attended and analyzed all examinations.

We determine the lower right portion of the RAM in the transverse direction to perform the exam.[18] We used a linear 8-12 MHz transducer, positioned transversely 2 centimeters above and to the right of the upper edge of the pubic symphysis. The anatomical variable of the RAM considered was the transverse thickness of the right

RAM acquired at rest (**fig 1a**). The right RAM's anteroposterior and transverse thickness for functional maneuvers analysis were considered:

I) With the sustained contraction of the PFM (**fig 1b**)

II) With the sustained contraction of the RAM with a 30-degree trunk elevation (**fig 1c**)

III) With the sustained co-contraction of the PFM associated with a 30-degree trunk elevation with contraction of the RAM (**fig 1d**). The US images were recorded at rest and during functional maneuvers.

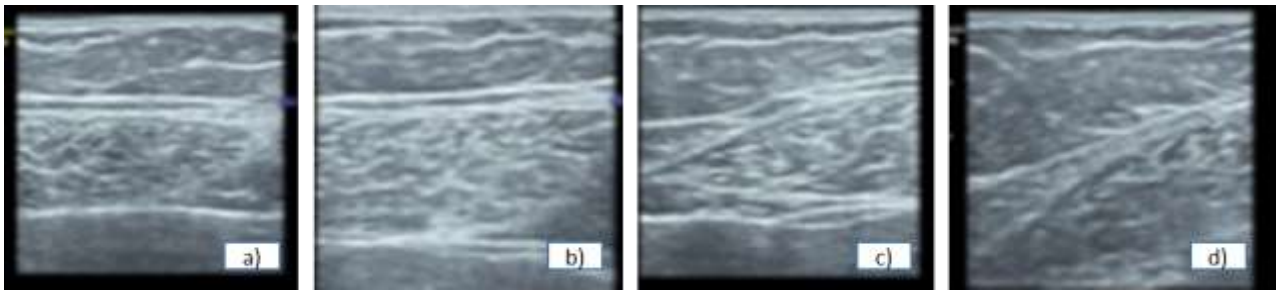

Fig 1 – Transverse visualization of RAM during rest (a), RAM contraction (b), pelvic floor muscle (PFM) contraction (c) and during co-contraction of RAM and PFM (d).

All images acquired were coded by number, keeping the participants' identification anonymous and guaranteeing subsequent blind evaluation. In addition, all images were stored for further offline analysis using specific software provided by the ultrasound device manufacturer.

Outcome measures

The raw value of thickness in each task measured in centimeters. Afterward, the index considering the rest state was calculated for each task (T) separately (RAM, PFM contraction, and co-contraction, using abdominal and PFM integrated) by subtracting the thickness from the thickness at rest (R) (Index= T–R). The smaller the value

obtained for contraction, the lower the capacity to contract RAM during the task in relation to rest.

The technique of PFM contraction was explained by this verbal prompt: “Please squeeze your pelvic muscle, as though you were trying to hold in gas and as hard as you can, maintaining it as long as possible".[19] A PFM contraction was considered correct when the examiner observed the best cranial shift of the levator ani muscle (LAM) and when felt inward pressure or upward traction on the finger inserted in the vagina.[20] This step was conducted as a way of learning the correct contraction and thus avoiding bias in the assessment of the RAM by 2D-US during co-contraction.

Sample Calculation

Considering the prevalence of muscle dysfunction in people with diabetes is 25%, we used 95% reliability and 80% statistical power, generating a minimum sample size of 40 in the group of GDM-pregnant women and 40 non-GDM.[21]

Statistical methods

We used the software IBM SPSS Statistics for Windows, version 20.0 (IBM Corp., Armonk, N.Y., USA) for statistical analysis. Categorical variables were expressed as numbers and percentages, and mean and standard deviation for continuous variables. The Chi-square test or Fisher's exact test was applied to compare the nominal data between groups. Comparisons between groups were performed by independent-T test. Differences were considered statistically significant at $p < .05$.

Results

A total of 293 participants met the inclusion criteria and completed all stages of the

research. Ninety-eight participants were excluded from the final analysis: 57 due to missing data and 41 due to technical fail during US analysis. Finally, 195 participants were successfully evaluated, 154 non-GDM and 41 were GDM (**fig 2**).

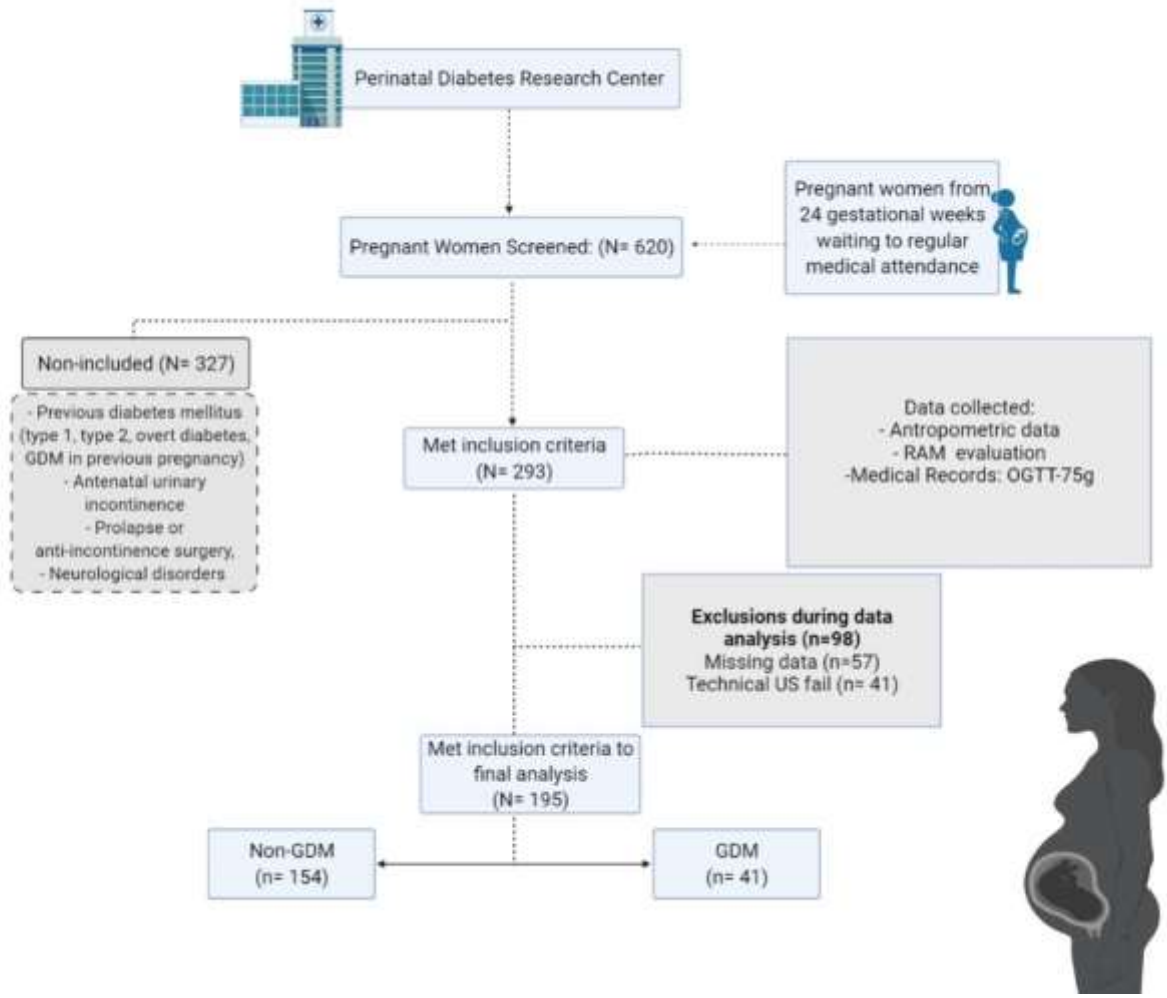

Fig 2 - Flowchart for cohort derivation showing the number of participants and the reasons for loss to follow-up.

The baseline characteristics of 195 participants are summarized on **table 1**. The OGTT (fasting; 1 hour and 2 hours) differed between the Non-GDM and GDM groups ($p < .001$), as expected. In addition, we matched the groups for age, pre-gestational BMI, gestational BMI, gestational age, maternal weight gain, ethnicity, previous C-section, physical activity, and smoking status. All variables were similar in comparison

between groups, and the differences were not significant.

Table 1 - Baseline characteristics of study participants according to glycaemic status.

Variables	***Non-GDM (n=154)***	***GDM (n=41)***	***p-value***
Age (years)	26.1±5.8	27.7±5.0	.177
Gestational age (weeks)	26.8±3.3	26.8±3.3	.213
Pre-pregnancy BMI	26.2±6.5	27.9±5.1	.626
BMI at 24-30 weeks	28.8±5.6	30.2±4.5	.263
Weight gain (kg)	6.8±6.0	6.0±4.9	.876
OGTT-75g fasting (mg/dL)	70.5±7.6	89.0±11.9	.000
OGTT-75g 1 hour (mg/dL)	103.2±24.2	160.7±49.5	.000
OGTT-75g 2 hours (mg/dL)	95.4±21.2	148.6±49.3	.000
Caucasian	125 (81%)	25 (72.4%)	.309
Previous C-section	35 (22.9%)	15 (37.9%)	.151
Physical activity	15 (10.5%)	4 (10.3%)	.562
Smoking	4 (2.9%)	0 (0.0%)	.509

n: sample; BMI: body mass index; kg: kilograms; OGTT-75g: 75 grams oral glucose tolerance test; independent T-test and chi-square test. Non-GDM: non-Gestational diabetes mellitus group; GDM: Gestational diabetes mellitus; $p < .05$ significant difference between groups.

Outcomes: all measures at rest and after the functional maneuvers are summarized in **table 2**. The comparisons between groups showed that considering whether or not resting state, GDM and non-GDM groups had significant differences. The higher RAM thickness at rest and in isolated voluntary contraction was more significant in the non-GDM group when compared to the GDM group. The mean of the RAM thickness at rest was 0.7 (+/-0.1) cm in the non-GDM group and 0.6 (+/- 0.1) cm in the GDM-group ($p = .045$); at RAM contraction, 0.8 (+/-0.2) in the non-GDM and 0.7 (+/-0.2) in the GDM group ($p = .041$). In addition, the study showed that the non-GDM group presented greater power and longer duration of contraction maintenance (endurance) of the PFM when compared to the GDM group.

Table 2 - Comparison of the rectus abdominis muscle (RAM) thickness on rest, RAM contraction, pelvic floor muscles (PFM) contraction and co-contraction (RAM and PFM), considering raw data, index and percentage due to the rest state, according to the gestational diabetes mellitus (GDM) and non-GDM (non-GDM) groups.

	Non-GDM (154)	***GDM (41)***	****p-value***
Raw thickness due to maneuvers			
Rest (cm)	0.7±0.1	0.6±0.1	.045
RAM contraction (cm)	0.8±0.2	0.7±0.2	.041
PFM contraction (cm)	0.6±0.1	0.6±0.2	.115
Co-contraction (RAM+PFM) (cm)	0.8±0.2	0.7±0.2	.101
Index-considering the rest state			
RAM contraction (cm)	0.2±0.2	0.2±0.2	.098
PFM contraction (cm)	0.0±0.1	0.0±0.1	.666
Co-contraction (RAM+PFM) (cm)	0.2±0.2	0.2±0.1	.363
Percentage-considering the rest state			
RAM contraction (%)	32.04±27.23	31.18±46.96	.145
PFM contraction (%)	3.12±10.43	7.08±24.97	.650
Co-contraction (RAM+PFM) (%)	32.98±30.04	35.37±43.05	.595
PFM function			
PFM Power	2.49±1.61	1.66±1.35	.004
PFM Endurance	3.67±2.95	2.37±2.41	.016

RAM: rectus abdominis muscle, PFM: pelvic floor muscles; cm: centimeter; %: percentage. Non-GDM: non-Gestational diabetes mellitus group; GDM: Gestational diabetes mellitus. Index-considering the rest state was calculated by (the task – Rest); Percentage-considering the rest state was calculated by ((the task – rest)/ rest*100). Data are presented in mean ± standard deviation. *Based on independent T-test. *P-value = < .05*.

Discussion

We demonstrated that pregnant women with GDM had a lower RAM thickness during rest than non-GDM pregnant women. Still, this difference did not remain during the functional isolated or synergic maneuvers that demands PFM and RAM. In addition, the GDM group showed lower PFM' power and endurance compared to non-GDM.

According to previous translational data obtained by our study group, PFM and RAM of pregnant diabetic rats exhibit atrophy, co-localization of fast and slow fibers, and an increased collagen type I/III ratio. Similar characteristics were observed on RAM during biopsy after C-section in GDM pregnant women.[12,13] Although the scarce data in the literature, there is a plausible biomechanical-based explanation to support

that the abdominal wall has a synergic involvement with PFM. Besides the importance of this synergism in the urinary continence.[9] This statement means that in lower demand maneuvers, deficient abdominal activity is expected compared to PFM activation because if RAM activates at higher levels than PFM, increasing intra-abdominal pressure that, added to the short PFM contraction, would increase the pelvic floor dysfunction (PFD).[9]

From our results, the information emerges that at rest, the transverse thickness of RAM in GDM is 0.1 cm smaller than in non-GDM. It is important to emphasize that the RAM exhibits early and significant muscle atrophy as described by previous studies applied on other population.[22] So, this difference should be evidence of myopathy. Still, we cannot ensure that difference should be of other factors such as biological characteristics or technical concerns during US exam acquisition or analysis.[22]

During isolated maneuvers of RAM, there were differences between groups, but when analysed by index or percentage of considering the rest status, this difference does not remain. So, the previous significance on raw data should be addressed by the differences between groups during rest. Additionally, no differences were found during isolated PFM contraction or when associate PFM and RAM contraction together.

The results from digital palpation showed that the GDM group has a lower capacity to generate PFM power and endurance when compared to non-GDM group. The PFM comprises a higher number of slow-twitch fibers compared to fast-twitch fibers.[23] The both fibers types are essential to functional maneuvers and even to rest state, specially the slow-twitch fibers in GDM. The proportion of fast and slow fibers are different, and then there is evidence of colocalization between the different fibers types.[24,25]

Study limitations

We must consider some limitations of this study. First, at 24-30 weeks of gestation, the first maternal evaluation was considered the baseline. Ideally, all pregnant women should have been assessed before pregnancy to ensure no previous GDM interference. Nevertheless, we emphasize the strengths of the first study to report an assessment that allowed the evaluation of the GDM diagnosis impact through the pregnancy span. Moreover, the data sets and images analysis were blinded, and a second investigator reviewed the results.

Although the results demonstrated significant differences in the RAM biometry between the GDM and non-GDM pregnant women groups, there is insufficient evidence to support the generalization of this study.

Conclusions

The higher RAM thickness at rest and in isolated voluntary contraction was more significant in the non-GDM group when compared to the GDM group. In addition, the study showed that the non-GDM group presented greater power and longer duration of contraction maintenance (endurance) of the PFM when compared to the GDM group.

Keywords

Gestational Diabetes Mellitus; Rectus Abdominis Muscle; Pregnancy; Ultrasonographic; Pelvic Floor Muscle

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***List of Abbreviations*:**
RAM rectus abdominis muscle
PFM pelvic floor muscles
GDM gestational diabetes mellitus
DM diabetes mellitus
2D-US bidimensional ultrasonography
PDCR perinatal diabetes research center
OGTT glucose tolerance test
BMI body mass index
PFD pelvic floor dysfunction

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Seção 4

Perspectivas Acadêmicas e Científicas

Elaborar as perspectivas nesta fase final do mestrado, me fez rever todo o processo vivido até aqui e me estimulou ainda mais a cumprir esta etapa que é tão tensa e que exige dedicação, às vezes, até além da nossa capacidade. A formação no mestrado, fortaleceu e ampliou a perspectiva da carreira docente e de pesquisador.

Para a continuidade da busca do conhecimento e na colaboração para melhorar a assistência a mulher, a proposta é continuar a formação no desenvolvimento do doutorado, que iniciará em março de 2022 no Programa de Pós-Graduação em Tocoginecologia e continuar como colaborador do *Diamater Study Group*.

Espero poder levar o conhecimento e principalmente beneficiar as mulheres, ao longo desta nova etapa da minha vida.

Seção 5

The Diamater Study Group

Abaixo segue nominalmente o grupo Diamater

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Seção 6

Anexos

Anexo 1 - Artigos publicados em periódicos

Research, Society and Development, v. 10, n. 5, e52710515370, 2021
(CC BY 4.0) | ISSN 2525-3409 | DOI: http://dx.doi.org/10.33448/rsd-v10i5.15370

Evaluation of the knowledge of university students in the health area about sexually transmitted infections: A cross-sectional study

Avaliação do conhecimento dos estudantes universitários da área de saúde sobre infecções sexualmente transmissíveis: Estudo transversal

Evaluación del conocimiento de los estudiantes de salud sobre las infecciones de transmisión sexual: Estudio transversal

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Moderate and severe symptoms of anxiety and depression are increased among female medical students during the COVID-19 pandemic

Sintomas moderados e severos de ansiedade e depressão estão aumentados entre estudantes de medicina do sexo feminino durante a pandemia pelo COVID-19

Los síntomas moderados y severos de ansiedad y depresión aumentan entre las estudiantes de medicina durante la pandemia por COVID-19

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Abstract

Background: Emotional disorders in medical students are expected and deserve more attention, especially during the COVID-19 Pandemic. *Objective*: Evaluate anxiety and depression disorders among medical students during the COVID-19 Pandemic. *Methods*: A cross-sectional study at a private medical college in Brazil, two months after stay-at-home order and postponed classes due to the COVID-19 Pandemic. A survey among medical students was conducted in May 2020, using questionnaires regarding social and demographic status, the GAD-7 for symptoms of anxiety, and the PHQ-9 for symptoms of depression. Results: A total of 340 of 347 (97.98%) medical students participated. The average GAD-7 score was 9.18 (±4.75), and the average PHQ-9 score was 12.72 (±6.62). The results indicate a significant positive relationship between GAD-7 and females (F=5.816 *P=.016*). Using a cut-off score of 10 for GAD-7, 157 (46.17%) students were identified with moderate or severe anxiety symptoms. For the PHQ-9 score, using a cut-off of 10 219 (64.41%), students were recognized with moderate or severe symptoms of depression; the results indicate a significant positive relationship between the PHQ-9 and females (F=5.640 *P=.018*). *Conclusion*: The analysis demonstrated a significantly higher prevalence of moderate and severe anxiety and depression symptoms among female medical students during the COVID-19 Pandemic.

Keywords: COVID-19; Mental Health; Student, Medical; Anxiety; Depression.

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International Diabetes Federation

Deleterious effects of gestational diabetes mellitus on the characteristics of the rectus abdominis muscle associated with pregnancy-specific urinary incontinence

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ABSTRACT

Aims: To evaluate the effects of gestational diabetes mellitus (GDM) on the structural characteristics of the rectus abdominis muscle (RAM) and its indirect effects on pregnancy-specific urinary incontinence (PSUI).

Methods: A total of 92 pregnant women were divided into four groups, according to their clinical conditions: non-GDM continent, non-GDM associated PSUI, GDM continent and GDM associated PSUI. The muscle morphometry (histochemistry and immunohistochemistry) for the fiber types and collagen fiber distribution, the ultrastructural analysis (transmission electron microscopy), the protein expression of fiber types and calcium signaling (Western blotting), and the content of types I and III collagen fiber (ELISA) in RAM collected at delivery were assessed.

Results: The GDM groups presented a significantly increased number of slow fibers and slow-twitch oxidative fiber expression; decreased fiber area, number of fast fibers, and area of collagen; an increase in central nuclei; ultrastructural alterations with focal lesion areas such as myeloid structures, sarcomere disorganization, and mitochondrial alteration. The

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tions have been closely linked with the recruitment of the abdominal muscles [40,71–73].

There were some limitations to the present study. First, the size of the groups varied, given the difficulty in finding GDM women without PSUI. Second, the patients included in this study were not all primigravida, which may have influenced the results. Third, the RAM suffers from substantial strain (e.g., diastasis) during gestation. Diastasis recti abdominis is defined as a separation between the edges of the RAM at the linea alba [74] However, these limitations do not invalidate our results, as they also contribute to advancing knowledge in the field of urogynecology.

In conclusion, our results confirm that RAM is a plastic tissue that adapts its size and morphology in response to external and internal stimuli (here represented by GDM). GDM-related changes in muscular morphology may lead to the development of PSUI in pregnant women. Future studies are clearly needed to confirm RAM myopathy as a key factor of GDM-associated PSUI. In addition, this study may be a basis for the development of new therapies for pathologies with loss of muscle mass, diabetic myopathy, muscle atrophy, and consequently UI. Another relevant aspect of these findings is the identification of biomarkers that can be used as a diagnosis and prognosis allowing the implementation of early interventions and proper management of the patients, mitigating the deleterious impacts of GDM on the muscles.

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PLOS ONE

RESEARCH ARTICLE

Alterations in the structural characteristics of rectus abdominis muscles caused by diabetes and pregnancy: A comparative study of the rat model and women

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Abstract

Background and objective

In the present study, we compared the effect of diabetic pregnancy on the rectus abdominis muscle (RAM) in humans and rats. We hypothesized that our animal model could provide valuable information about alterations in the RAM of women with Gestational Diabetes (GDM).

Method

Newborns female rats (n = 10/group) were administered streptozotocin (100 mg/kg body weight) subcutaneously and were mated on reaching adulthood, to develop the mild hyperglycemic pregnant (MHP) rat model. At the end of pregnancy, the mothers were sacrificed, and the RAM tissue was collected. Pregnant women without GDM (non-GDM group; n = 10) and those diagnosed with GDM (GDM group; n = 8) and undergoing treatment were recruited, and RAM samples were obtained at C-section. The RAM architecture and the distribution of the fast and slow fibers and collagen were studied by immunohistochemistry.

Results

No statistically significant differences in the maternal and fetal characters were observed between the groups in both rats and women. However, significant changes in RAM

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BMC Pregnancy and Childbirth

STUDY PROTOCOL Open Access

Study protocol to investigate biomolecular muscle profile as predictors of long-term urinary incontinence in women with gestational diabetes mellitus

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Abstract

Background: Pelvic floor muscles (PFM) and rectus abdominis muscles (RAM) of pregnant diabetic rats exhibit atrophy, co-localization of fast and slow fibers and an increased collagen type I/III ratio. However, the role of similar PFM or RAM hyperglycemic-related myopathy in women with gestational diabetes mellitus (GDM) remains poorly investigated. This study aims to assess the frequency of pelvic floor muscle disorders and pregnancy-specific urinary incontinence (PS-UI) 12 months after the Cesarean (C) section in women with GDM. Specifically, differences in PFM/RAM hyperglycemic myopathy will be evaluated.

Methods: The Diamater is an ongoing cohort study of four groups of 59 pregnant women each from the Perinatal Diabetes Research Centre (PDRC), Botucatu Medical School (FMB)-UNESP (São Paulo State University), Brazil. Diagnosis of GDM and PS-UI will be made at 24–26 weeks, with a follow-up at 34–38 weeks of gestation. Inclusion in the study will occur at the time of C-section, and patients will be followed at 24–48 h, 6 weeks and 6 and 12 months postpartum. Study groups will be classified as (1) GDM plus PS-UI; (2) GDM without PS-UI; (3) Non-GDM plus PS-UI; and (4) Non-GDM without PS-UI. We will analyze relationships between GDM, PS-UI and hyperglycemic myopathy at 12 months after C-section. The mediator variables to be evaluated include digital palpation, vaginal squeeze pressure, 3D pelvic floor ultrasound, and 3D RAM ultrasound. RAM samples obtained during C-section will be analyzed for ex-vivo contractility, morphological, molecular and OMICS profiles to further characterize the hyperglycemic myopathy. Additional variables to be evaluated include maternal age, socioeconomic status, educational level, ethnicity, body mass index, weight gain during pregnancy, quality of glycemic control and insulin therapy.

Discussion: To our knowledge, this will be the first study to provide data on the prevalence of PS-UI and RAM and PFM physical and biomolecular muscle profiles after C-section in mothers with GDM. The longitudinal design allows for the assessment of cause-effect relationships between GDM, PS-UI, and PFMs and RAMs myopathy. The findings may reveal previously undetermined consequences of GDM.

Keywords: Gestational diabetes mellitus, Hyperglycemic myopathy, Pelvic floor muscles, Rectus abdominis muscles, Urinary incontinence, Proteomics, Collagen, Electromyography, Transmission electron microscopy

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risk of long-term UI in GDM mothers. An enhanced understanding of the impact of modifiable risk factors can lead to protocols to reduce the rates of UI and associated health care costs, improve the quality of life of affected women and contribute to the global eradication of UI after GDM exposure. It will also enable clinicians to deal more effectively with individual women after their pregnancy and facilitate the transition of the Brazilian Health System from a curative to a preventive strategy [65].

Conclusion

In conclusion, Diamater is an ongoing study recruiting GDM pregnant women at a prenatal care outpatient clinic to investigate the relationship between GDM plus PS-UI with the occurrence of symptomatic UI plus PFMD 1 year after C-section and assess whether this relation can be explained by hyperglycaemic myopathy. It offers the unique opportunity to establish well-powered biomarker research in a new triad composed of GDM + PS-UI+ hyperglycemic myopathy as a predictor of long-term UI and PFMD. This approach allows for future innovative treatment proposals.

Supplementary information

Supplementary information accompanies this paper at https://doi.org/10.1186/s12884-020-2749-x.

Additional file 1. Specific protocols for clinical assessment and laboratory analysis of PFM and RAM.

Abbreviations

ANOVA: One-way analysis of variance; CCL7: Chemokine C-C motif ligand 7; CRF: Case Report Forms; C-section: Cesarean section; DIAMATER: Diabetes and Maternity; ECM: Extracellular Matrix; EMG: Electromyography; EMGs: Surface electromyograms; GAGs: Glycosaminoglycans; GDM: Gestational Diabetes Mellitus; HPLC: High Performance Liquid Chromatography; ICIQ-SF: International Consultation on Incontinence Questionnaire-Urinary Incontinence-Short Form; IRB: The Institutional Review Board; ISI: Incontinence Severity Index; OGTT: Oral Glucose Tolerance Test; OPLS: Orthogonal partial least squares; PCR: Polymerase chain reaction; PDRC: The Perinatal Diabetes Research Centre; PFM: Pelvic Floor Muscles; PLS: Partial least squares; PS-UI: Pregnancy Specific Urinary Incontinence; PTH: Parathyroid Hormone; RAM: Rectus Abdominis Muscles; RNA: Ribonucleic acid; SENIAM: Surface Electromyography for the Non-Invasive Assessment of Muscles; T2DM: Type 2 Diabetes Mellitus; UI: Urinary Incontinence; UNESP: Universidade Estadual Paulista "Júlio de Mesquita Filho"

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Authors' contributions

MVCR and AMPB conceived the study concept, developed the funding proposal, applied for funding, and initiated the writing of the protocol paper. JFA and LT were responsible for the critical review of the final draft. SSW and RLSH were responsible for clarifying manuscript content and word usage for an English language audience. MVCR is the principal investigator (PI) and the grant holder of the CNPq -Brasil (PQ-1C); AMPB, IMPC and FPS are Co-PI of the Project, and IMPC is grant holder of CNPq-Brazil (PQ-1D). MVCR, AMPB, IMPC, and FPS initiated the study design. MVCR, AMPB, RLSH, and JP wrote the protocol for research ethics committee and conceptual model. AMPB, IMPC, JFA, RLSH, and JEC develop the statistical analysis plan and will contribute to the interpretation of data. MVRC, SFP, JFA, RLSH, JPM, HP, GM, GV, LT, IMPC, SSW, and AMPB drafted and revised the manuscript after feedback from all authors. All authors contributed to the refinement of the present manuscript and approved the final version of the manuscript.

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Availability of data and materials

This is an ongoing study, and data sharing does not apply to this article. No data were generated or analyzed during the current study. Protocol related information can be obtained from the corresponding author (Marilza V.C. Rudge) upon request.

Ethics approval and consent to participate

Institutional Research Bureau (IRB) of Botucatu Medical School-UNESP approved the study, on 2nd December 2017 (R17.036/NJ.60484.100.17). Written informed consent will be obtained from all subjects, and the procedures used in the study are in accordance with the guidelines of the Helsinki Declaration on human experimentation.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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ORIGINAL CLINICAL ARTICLE

WILEY

Impact of gestational diabetes on pelvic floor: A prospective cohort study with three-dimensional ultrasound during two-time points in pregnancy

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Abstract

Aim: To evaluate the pelvic floor (PF) biometry using three-dimensional ultrasound (US) at two-time points of gestational in pregnant women with gestational diabetes mellitus (GDM).

Methods: A prospective cohort study conducted at the Perinatal Diabetes Research Center including 44 pregnant women with GDM and 66 pregnant women without GDM at 24 to 28 weeks of gestation. Three-dimensional transperineal US was performed at 24 to 28 and 34 to 38 weeks of gestation in the lithotomy position at rest. The axial plane of the minimal Levator hiatal dimensions was used to determine Levator ani muscle and Hiatal area (HA) biometry at 24 to 28 and 34 to 38 weeks of gestation.

Results: Of the 110 pregnant women, 100 (90.9%) completed the follow-up at 34 to 38 weeks of gestation. The evaluation by US showed a negative biometric change between the two-time points, during pregnancy in women with GDM; in the HA (β coefficient: estimative of effect in biometric progression according to GDM diagnosis, using the non-GDM group as reference = −6.76; $P = .020$), anteroposterior diameter ($\beta = -5.07$; $P = .019$), and Levator ani thickness ($\beta = -12.34$; $P = .005$).

Conclusions: Pregnant women with GDM had a significantly lower than expected percentage of changes in biometry of Levator ani thickness and HA from 24 to 28 to 34 to 38 weeks of gestation when compared with the group of pregnant women without GDM. GDM alters the morphology of PF structures assessed by three-

Carlos I. Sartorão Filho, Fabiane A. Pinheiro, Caroline B. Prudencio, Sthefanie K. Nunes, Luiz Takano, Eusebio M.A. Enriquez, Maiara I. Orlandi, Baerbel Junginger, Marilza V. C. Rudge, and Angélica M.P. Barbosa contributed equally to this work.

Carlos I. Sartorão Filho and Fabiane A. Pinheiro are the first authors on this work.

Angélica M.P. Barbosa and Marilza V. C. Rudge are the last authors on this work.

PLOS ONE

REGISTERED REPORT PROTOCOL

Effectiveness of the pelvic floor muscle training on muscular dysfunction and pregnancy specific urinary incontinence in pregnant women with gestational diabetes mellitus: A systematic review protocol

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Abstract

Background

There is ample evidence that gestational diabetes mellitus has a direct influence on urinary incontinence and pelvic floor muscles. There are no standardized pelvic floor muscle exercise programs in the literature for the physiotherapy and differ in the type of exercise, intensity, type and duration of application, and the frequency and duration of treatment sessions. The aim of this systematic review will be to investigate that Pelvic Floor Muscle Training can prevent and/or decrease the pregnancy specific urinary incontinence in women with gestational diabetes mellitus or gestational hyperglycemia.

Methods

We will perform a systematic review according to the Cochrane methodology of Randomized Controlled Trials. An overall search strategy will be developed and adapted for Embase, MEDLINE, LILACS, and CENTRAL databases, with the date of consultation until

In this way we may obtain robust and conclusive evidence whether or not there is evidence to support clinical practice, in addition to promote high quality studies on the subject.

Supporting information

S1 File. PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: Recommended items to address in a systematic review protocol*.
(DOC)

S2 File. PROSPERO international prospective register of systematic reviews.
(PDF)

Acknowledgments

We thank the Diamater Study Group for making valuable comments.

The Diamater Study Group: Rudge MVC, Barbosa, AMP, Caldeiron IMP, Souza FP, Berghmans B, de Bie R, Thabane L, Junginger B, Graeff CFO, Magalhães CG, Costa RA, Lima SAM, Kron-Rodrigues MR, Felisbino S, Barbosa W, Campos FJ, Bossolan G, Corrente JE, Nunes HRC Abbade J, Rossignoli PS, Pedroni CR, Atallah AN, Di Bella ZIKJ, Uchoa SMM, Hungaro MA, Mareco EA, Sakalem ME, Martinho N, Hallur LSR, Reyes DRA, Alves FCB, Marcondes JPC, Prudencio CB, Pinheiro FA, Sartorão CI, Quiroz SBCV, Pascon T, Nunes SK, Catinelli BB, Reis FVDS, Oliveira RG, Barneze S, Enriquez EMA, Takano L, Carr AM, Magyori ABM, Iamundo LF, Carvalho CNF, Jacomin M, Avramidis RE, Silva AJB, Orlandi MIG, Dangiò TD, Bassin HCM, Melo JVF, Takemoto MLS, Menezes MD, Caldeirão TD, Santos NJ, Lourenço IO, Marostica de Sá J, Caruso IP, Rasmussen LT, Garcia GA, Nava GTA, Pascon C, Bussaneli DG, Nogueira VKC, Rudge CVC, Piculo F, Prata GM.

Author Contributions

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Data curation: Angélica Mércia Pascon Barbosa, Eusebio Mario Amador Enriquez, Meline Rossetto Kron Rodrigues, Silvana Andréa Molina Lima, Marilza Vieira Cunha Rudge.

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Funding acquisition: Angélica Mércia Pascon Barbosa, Marilza Vieira Cunha Rudge.

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Methodology: Angélica Mércia Pascon Barbosa, Eusebio Mario Amador Enriquez, Meline Rossetto Kron Rodrigues, Silvana Andréa Molina Lima, Marilza Vieira Cunha Rudge.

Project administration: Angélica Mércia Pascon Barbosa, Meline Rossetto Kron Rodrigues, Silvana Andréa Molina Lima, Marilza Vieira Cunha Rudge.

Resources: Angélica Mércia Pascon Barbosa, Eusebio Mario Amador Enriquez, Marilza Vieira Cunha Rudge.

Anexo 2 - Aprovação Comitê de Ética em Pesquisa

UNESP -FACULDADE DE MEDICINA DE BOTUCATU

PARECER CONSUBSTANCIADO DO CEP

DADOS DA EMENDA

Título da Pesquisa: Projeto Mãe: Estudo de coorte prospectivo: nova tríade gestacional (hiperglicemia, incontinência urinária e perfil clínico, molecular e ômico da miopatia hiperglicêmica) na predição de incontinência. Pesquisa translacional com biodevice para regeneração muscular em ratas com diabetes

Subprojeto 1: Relação dos achados eletromiográficos dos músculos do assoalho pélvico com os níveis de relaxina ao longo da gestação e após o parto de mulheres com hiperglicemia gestacional e incontinência urinária específica da gestação (Orientador: Marilza Vieira Cunha Rudge/ Orientando: Caroline Baldini Prudencio/ Nível: Doutorado)

Subprojeto 2: Ultrassonografia Tridimensional do assoalho pélvico de mulheres com hiperglicemia gestacional 16-18 meses após a gestação (Orientador: Marilza Vieira Cunha Rudge/ Orientando: Carlos Izaias Sartorão Filho/ Nível: Doutorado);

Subprojeto 3: Coorte prospectiva da tríade hiperglicemia gestacional, incontinência urinária específica da gestação e disfunção muscular do assoalho pélvico, avaliada pela ultrassonografia funcional, como preditora da incontinência urinária e disfunção muscular 6-18 meses após o parto (Orientador: Marilza Vieira Cunha Rudge/ Orientando: Fabiane Affonso Pinheiro/ Nível: Doutorado)

Subprojeto 4: Níveis de micronutrientes e da expressão de seus receptores em mulheres com diabetes mellitus gestacional e incontinência urinária específica da gestação(Orientador: Marilza Vieira Cunha Rudge/ Orientando: Sarah Maria Barneze Costa/ Nível: Doutorado).

Pesquisador: Marilza Vieira Cunha Rudge
Área Temática:
Versão: 5
CAAE: 82225617.0.0000.5411
Instituição Proponente: Departamento de Ginecologia e Obstetrícia
Patrocinador Principal: FUNDACAO DE AMPARO A PESQUISA DO ESTADO DE SAO PAULO

DADOS DO PARECER

Número do Parecer: 3.747.338

Endereço: Chácara Butignolli , s/n
Bairro: Rubião Junior **CEP:** 18.618-970
UF: SP **Município:** BOTUCATU
Telefone: (14)3880-1609 **E-mail:** cep@fmb.unesp.br

Continuação do Parecer: 3.747.338

Apresentação do Projeto:

Trata a presente solicitação de emenda ao projeto em questão referente ao envio de amostras para análise em dois destinos diferentes,com a finalidade de aprendizado da técnica e maior sensibilidade/especificidade da técnica adotada.

Objetivo da Pesquisa:

Avaliar a solicitação de emenda ao presente projeto para envio de amostras a dois destinos diferentes.

Avaliação dos Riscos e Benefícios:

Já avaliados.

Comentários e Considerações sobre a Pesquisa:

A pesquisadora solicita a emenda ao presente projeto para envio de amostras para dois destinos diferentes:
1) para Londres - UK: com a finalidade de envio de amostras já coletadas para o mesmo fim aprovado anteriormente por este CEP, sendo exclusivamente para aprendizado da técnica pela aluna de doutorado (Dra Juliana) com o grupo em questão. Os pesquisadores informam que não haverá alteração no projeto anteriormente aprovado.
2) Para Lincoln / Neblaska - EUA: com a finalidade de envio de amostras já coletadas para o mesmo fim aprovado anteriormente por este CEP, sendo para substituição da técnica anteriormente descrita (espectoscopia por RMN) pela técnica de 2 espectômetro de massa, justificando maior especificidade e sensibilidade destas técnicas. Os pesquisadores informam que não haverá alteração no projeto anteriormente aprovado.
Os pesquisadores informam que o envio de amostras para o exterior, será feito por transportadora especializada], devendo seguir legislação vigente brasileira.

Considerações sobre os Termos de apresentação obrigatória:

Já avaliados.

Recomendações:

Não há.

Conclusões ou Pendências e Lista de Inadequações:

Após análise em REUNIÃO EXTRAORDINÁRIA, o Colegiado deliberou APROVADA A EMENDA apresentada.

Considerações Finais a critério do CEP:

Conforme deliberação do Colegiado, em REUNIÃO EXTRAORDINÁRIA do Comitê de Ética em

Continuação do Parecer: 3.747.338

Pesquisa FMB/UNESP, realizada em 19/11/2019, a EMENDA apresentada encontra-se APROVADA.

Atenciosamente,

Comitê de Ética em Pesquisa FMB/UNESP

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_1440649_E2.pdf	23/09/2019 15:11:41		Aceito
Outros	OficioLondres.doc	23/09/2019 15:10:28	Marilza Vieira Cunha Rudge	Aceito
Outros	OficioenvioEUA.doc	23/09/2019 15:09:10	Marilza Vieira Cunha Rudge	Aceito
Outros	Oficioexplicativo_envio.docx	23/09/2019 15:06:38	Marilza Vieira Cunha Rudge	Aceito
Outros	Carta_resposta_comite_c.pdf	11/04/2019 13:41:35	Marilza Vieira Cunha Rudge	Aceito
Folha de Rosto	FolhaDeRostoAssinada_Sub_Proje_4_Sarah.pdf	29/01/2019 11:51:24	Sarah Maria Barneze Costa	Aceito
Outros	TermoDeAnuenciaInstitucional_Sub_Proj_4_Sarah.pdf	29/01/2019 11:44:05	Sarah Maria Barneze Costa	Aceito
Projeto Detalhado / Brochura Investigador	Oficio_ao_comite_sub_proj_4_Sarah.pdf	29/01/2019 11:41:10	Sarah Maria Barneze Costa	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_tematico_com_subprojeto_4_de_Sarah_Barneze.pdf	29/01/2019 11:35:52	Sarah Maria Barneze Costa	Aceito
Projeto Detalhado / Brochura Investigador	Projeto_doutorado_Sarah_Barneze_sub_projeto_4.pdf	29/01/2019 11:32:45	Sarah Maria Barneze Costa	Aceito
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Outros	termodeautorizacao_HRA.pdf	26/11/2017 19:01:53	Marilza Vieira Cunha Rudge	Aceito

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TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE_tematico.docx	05/10/2017 22:48:47	Marilza Vieira Cunha Rudge	Aceito
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Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

BOTUCATU, 05 de Dezembro de 2019

Assinado por:
Trajano Sardenberg
(Coordenador(a))