

IMPACT OF GESTATIONAL DIABETES MELLITUS ON RECRUITMENT OF PELVIC FLOOR MUSCLES DURING HOLD CONTRACTION: COHORT STUDY

Hypothesis / aims of study

PFM function depends on the integrity and synergy of neuromuscular and metabolic system, connective structures altered by gestational diabetes mellitus (DMG). This is the first study to investigate disturbs in neuromuscular behaviour of PFM muscle and DMG. Therefore the aim of this study was to investigate and compare EMG activity in hold contraction of PFM in GDM women at 24–30 to 36–40 weeks of gestation.

Study design, materials and methods

Prospective cohort study conducted between 2015 and 2016 was approved by the Research Ethics Committee of the Institution (Protocol Number 972.104). After the knowledge of all procedures a written informed consent was obtained from all subjects. Helsinki Declaration on human experimentation guidelines was respected.

Inclusion Criteria: nulliparous or primiparous women who had undergone 1 previous elective Cesarean delivery between 24-30 weeks of gestation, singleton pregnancy and 18–40 years of age divided in two groups: GDM and normoglycemic according to ADA 2015. The exclusion criteria were clinical diabetes (type I or II or overt diabetes in previous pregnancy), urinary incontinence, >2 pregnancies, previous urinary incontinence, previous prolapse or incontinence surgery, no understanding of the command to contract PFM, neurological diseases, diagnosis of genital prolapse, cervical isthmus incompetence, smoking, dropouts, preterm birth and abortion.

Sample size was obtained by a pilot study. Determining a sample effect of 0.846, two-sided α of 0.05, and a power of 80%, 23 pregnant women in each group to detect differences were required.

Personal, clinical, Obstetric and anthropometric data was collected. After, Vaginal palpation was performed by encouraging the women to perform a maximal voluntary contraction and hold it for 10 seconds, simulating the steps of the EMG test performed later. If the examiner felt an inward pressure and/or upward traction in palpation the electromyography protocol was performed.

For the EMG recordings, part of Glazer protocol was used to verify muscle activity during hold contractions. The sequence consisted of 60 second preliminary followed by five repetitions of 10 second contractions, each contraction preceded by a 10 second rest period, were defined as hold contraction.(1)

The raw signal was processed by using MiotecSuite software by an examiner blinded to the women's clinical data. The electrical data of the recruitment root mean square (RMS) from the period of five hold contractions were performed by using Hanning window processing, after calculation of each RMS arithmetic mean was performed to determine a mean single value for each contraction type. To normalize the EMG recruitment signal, we used the maximal voluntary contraction at 24–30 weeks of gestation because that was considered to be base data for analysis of changes in PFM activity. (2)

Results

Maternal age, gestational ages at two points, BMI, cesarean delivery were pared between groups. Concerning the glucose tolerance test as expected the values were different between groups.

Table 1. Analysis Intragroup of Normalized Root Mean Square (RMS) Values From Electromyography Activity of Pelvic Floor Muscles in Hold Contraction of the Normoglycemic (NG) and Gestational Diabetes Mellitus (GDM) at 24–30 and 36–40 weeks of gestation.

		24-30 Weeks of Gestation Median (Min,Max)	36-40 Weeks of Gestation Median (Min,Max)	P*
Hold Contraction	GDM (26)	0.57 (0.14,5.85)	0.41 (0.12,5.42)	.049
	Control (26)	0.70 (0.07,2.16)	0.70 (0.1,3.10)	.571

Data are the median (minimum, maximum) range.

* Analyses intragroup from 24-30 to 36-40 weeks of gestation based on Wilcoxon Test;

Interpretation of results

The normalized RMS values of PFM activity shown in Table 1 demonstrated the influence of GDM on pelvic floor activity. Intragroup differences are present only in GDM group. GDM group decreases hold contraction between two points. The results showed that GDM decreases PFM activity at hold contraction instead NG group maintain the PFM activity. These findings and the homogeneity of our data may suggest that GDM were responsible for changes on PFM activity detected by EMG

Concluding message

. Knowledge of the neuromotor behavior of PFM is of paramount importance for the training and reorganization of motor planning in pregnancy.(3) This investigation contributes to the understanding of EMG activity in GDM women at two time points of gestation.

References

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Disclosures

Funding: CAPES (Coordination for the Improvement of Higher Level -or Education- Personnel) **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Comitê de Ética em Pesquisa da Faculdade de Medicina de Botucatu **Helsinki:** Yes **Informed Consent:** Yes