

MORPHOLOGICAL ANALYSIS OF THE RECTUS ABDOMINIS MUSCLE IN PREGNANT WOMEN WITH HYPERGLYCEMIA AND URINARY INCONTINENCE

Marilza Vieira Cunha Rudge¹, Giovana Vesentini¹, Fernanda Piculo^{1,3}, Beatriz Souza Harada², Ana Paula Silveira Leite⁴, Carina Guidi Pinto⁴, Débora Cristina Damasceno¹, Selma Maria Michelin Matheus⁴, Sarah Maria Barneze Costa¹, Angélica Mércia Pascon Barbosa^{1,5}, Gabriela Marini^{1,2*}

São Paulo State University (Unesp), Medical School, Botucatu, Brazil
 São Paulo State University (Unesp), School of Philosophy and Sciences, Marília Brazil

HYPOTHESIS / AIMS OF STUDY

The American Diabetes Society estimates that 1 in 5 pregnant women (18%) are at risk of having gestational diabetes mellitus [1] and the prevalence of urinary incontinence (UI) during pregnancy may reach 75%.

Skeletal striated muscle is the main organ of glucose metabolism, so it is of great importance to study the muscular changes due to gestational hyperglycemia. The aim of this study was to analyze the morphology of fiber types and extracellular matrix in the rectus abdominis muscle of pregnant women with hyperglycemia and urinary incontinence

METHODS

Were included pregnant women who underwent prenatal care and underwent cesarean delivery in the aforementioned Department, without previous diagnosis of diabetes and hyperglycemia, without previous UI, with current gestational UI and agreed to sign the informed consent form. The incontinent women were divided into two groups: hyperglycemic pregnant women and normoglycemic pregnant women. During the surgical procedure of the cesarean section, a sample of the rectus abdominis muscle was removed with 1cm in diameter and the tissues were intended histological analysis with hematoxylin-eosin and picrossíruis red and immunohistochemistry for fast and slow fibers

RESULTS

Of the 324 women who accepted to participate in the study, 250 evolved to normal deliveries or out-of-service deliveries, 74 biopsies were performed but after 37 losses in the processing of the material, the final analysis of the rectus abdominis muscle was performed in 21 women in the hyperglycemic group and 16 in the normoglycemic group.

The groups were homogeneous in all sociodemographic and clinical variables, except for the glycemic average and values of the oral glucose tolerance test.

In the morphometric variables, the hyperglycemic group had a smaller area and diameter of the slow fibers when compared to the normoglycemic group ($p = 0.0241$ and $p = 0.0019$ respectively), besides the loss of predominance of fast fibers.

There was no difference in relation to the area, diameter and number of fast fibers, number of slow fibers and amount of collagen. (Table 1)

Table 1. Morphometric analysis intra and intergroups of the rectus abdominis muscle of normoglycemic and hyperglycemic pregnant women

	Normoglycemic Group (n=21)	Hyperglycemic Group (n=16)	P-value (intergroups)
Fast fiber area (μm^2)	31114.05 ± 21036.40	29862.77 ± 18231.04	0.0834
Slow fiber area (μm^2)	38871.87 ± 19370.55	37135.35 ± 21250.15	0.0241*
P-value (intragroup)	0.0001#	0.0001#	
Fast fiber diameter (μm)	152.18 ± 60.98	148.86 ± 57.29	0.1271
Slow fiber diameter (μm)	181.27 ± 49.28	175.04 ± 55.57	0.0019*
P-value (intragroup)	0.0001#	0.0001#	
Fast fiber number	112.19 ± 50.82	107.67 ± 40.46	0.7748
Slow fiber number	78.63 ± 35.25	86.33 ± 36.25	0.5352
P-value (intragroup)	0.0093#	0.0519	
Number of fast fibers/slow fibers Ratio	1.56 ± 0.65	1.37 ± 0.59	0.3812
Collagen area (μm^2)	84392.86 ± 49576.21	80609.95 ± 40771.18	0.5955

Data presented as mean \pm standard deviation

* intergroup difference

intragroup difference

INTERPRETATION OF RESULTS

It is known that diabetes induces functional, metabolic and structural changes in skeletal muscle and the morphological changes found in this work are in agreement with the results found in animal models in the urethral and rectus abdominis muscle of diabetic pregnant rats, which demonstrate the loss of predominantly fast fiber [2,3]

CONCLUDING MESSAGE

Hyperglycemia leads to changes in the fibers of the rectus abdominis muscle in pregnant women with urinary incontinence. This study is the beginning of a line research that confirms in humans the same alterations found in animal models and requires future investigations.

REFERENCES

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