

FIBER MUSCLE PROFILE IN URETHRAL STRIATED MUSCLE OF DIABETIC PREGNANT RATS

Hypothesis / aims of study :

The aim of this study was to evaluate the fiber muscle profile in urethral striated muscle of diabetic pregnant rats that underwent cesarean section.

Study design, materials and methods

Twenty female Wistar rats (six-week-old, weighing approximately 180g) were distributed in four experimental groups (n=5/group): virgin (control), pregnant (control), diabetic virgin (control), and diabetic pregnant. Diabetes was induced by streptozotocin administration (blood glucose levels greater than 300 mg/dL). The rats were lethally anesthetized and the urethra and vagina were extracted as a unit. Cryostat sections of 6- μ m thickness were cut and immunohistochemical procedures to visualize fast and slow myosin heavy chain were performed and subjected to morphological and semi-quantitative analysis.

Results

In comparison with muscle from the three control groups, urethral striated muscle from diabetic pregnant rats presents co-localization of fast and slow fibers and a steady decrease in the proportion of fast to slow fibers (Table 1)(Figure 1).

Table 1. Semi-quantitative analysis of slow and fast fibers according the presence of each type of fiber throughout circumference of the layer; thickness of the muscle fiber layer; the degree to which the layers maintained a normal anatomic localization; fast index; slow index; and fast:slow index in each group.

| Groups | Virgin | Pregnant | Diabetic Virgin | Diabetic pregnant |
|--|----------------|--------------|-----------------|-------------------|
| Fast Throughout circumference/thickness/ normal anatomic localization | ++++/++++/++++ | ++++/++++/++ | +++/++++/+ | +++/+++/+ |
| Slow Throughout circumference/thickness/ normal anatomic localization | ++++/+/++++ | ++++/+/++ | +++/+++/+ | +++/+++/+ |
| Fast index | 64 | 32 | 12 | 9 |
| Slow index | 16 | 8 | 9 | 6 |
| Fast: Slow index | 4:1 | 4:1 | 1.5:1 | 1.5:1 |

Interpretation of results

Skeletal muscle can adapt to functional and metabolic demands by remodeling with fiber-type switches to maintain a normal energy balance and utilization of nutrients [1,2].

Concluding message

Our results indicate that diabetes and pregnancy impair the urethral striated muscle and alter the distribution of its fiber types.

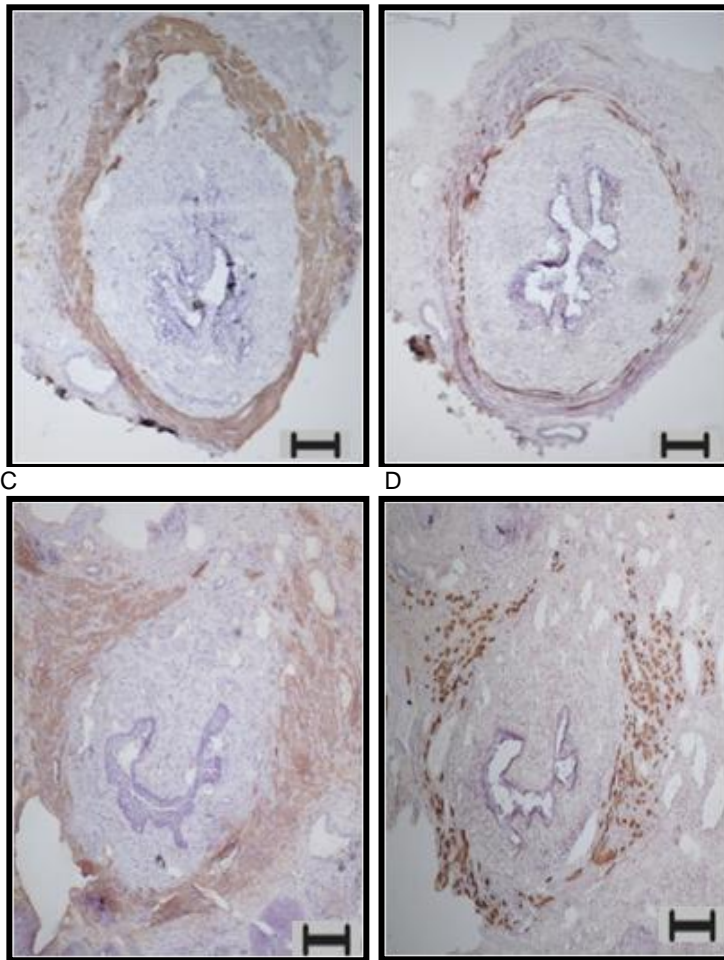


Figure 1. Microphotographs of transverse section of rat urethra. Immunohistochemical reaction for fast (A) and slow (B) myosin heavy chain in virgin group and fast (C) and slow (D) myosin heavy chain in diabetic pregnant group.

References

1. 1. Oberbach A, Bossenz Y, Lehmann S, Niebauer J, Adams V, Paschke R, et al (2006) Altered fiber distribution and fiber-specific glycolytic and oxidative enzyme activity in skeletal muscle of patients with type 2 diabetes. *Diabetes Care* 29(4):895-900
2. 2. Chen M, Feng HZ, Gupta D, Kelleher J, Dickerson KE, Wang J, et al (2009) G(s)alpha deficiency in skeletal muscle leads to reduced muscle mass, fiber-type switching, and glucose intolerance without insulin resistance or deficiency. *Am J Physiol Cell Physiol* 296(4):C930-40

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| Is this a clinical trial? | No |
| What were the subjects in the study? | ANIMAL |
| Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained? | Yes |
| Name of ethics committee | Institutional Animal Care and Use Committee on Animal Experimentation of Botucatu Medical School-UNESP Process number 668 |