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DIFFERENTIAL EXPRESSIONS OF COLLAGEN TYPE I AND III IN THE PROXIMAL URETHRA OF DIABETIC RAT WITH AGING

Hypothesis / aims of study

It is well known that increased bladder outlet resistance is usually secondary to functional or anatomical obstruction. Previous study has demonstrated that increased urethral resistance was much more prominent in diabetic rats than controls, and that the increased resistance might be resulted from functional obstruction related to urethral nitric oxide synthase containing nerve fibers in part. (1)

To ascertain the role of anatomical obstruction other than functional obstruction in diabetes, we characterized the distribution and expression of collagen Type I and III in urethral tissues of diabetic rats comparing to those of controls and explored how they are altered with aging.

Study design, materials and methods

A total of 17 male Sprague-Dawley rats weighing 200 to 500 g. were divided into 2 groups, including 8 into the control and 9 in the experimental group. Diabetes was induced in the two day-old neonates by intraperitoneal administration of streptozotocin (100 mg/kg), which was the Non-insulin dependent diabetes mellitus model. Rats detected as high serum glucose level greater than 200 mg./dl. 12 weeks after injection were considered diabetic. The proximal urethra was obtained under anesthesia at 12, 24 and 36 weeks. Expression levels of collagen type I and III in distal part of proximal urethra were determined by **RT-PCR** and **Western blot** analyses, and their distribution was detected by **Masson's trichrome staining**.

Results

1. In Masson's trichrome staining, the distal part of proximal urethra in diabetic rats showed more fibrosis than that in control rats in all three periods. **2.** In **RT-PCR for mRNA**, expressions of collagen Type I mRNA in diabetic rats increased significantly than those in control rats at 12 and 24 week of age. However expressions of collagen Type III mRNA showed no difference between diabetic and control rats. Expressions of collagen Type I mRNA showed 2.5 times more than those of collagen Type III at all 12, 24 and 36 week of age **(Fig. 1). 3.** In **Western blot for collagen**, expressions of collagen Type I in diabetic rats showed significantly increased activities than those in control rats at only 12 week of age. Expressions of collagen Type III showed no significant difference between diabetic and control rats.

Interpretation of results

Collagen expression levels around the proximal urethra in diabetic rats increased more than those in control rats, especially in collagen type I.

Concluding message

Our findings suggest that these alterations of collagen expression levels in the proximal urethra may be partly responsible for the increased urethral resistance in diabetic rats.

References

(1) Urethral resistance and nitric oxide containing nerve in rats of NON-insulin dependent diabetes mellitus model. Neurourol Urodyn 19:412, 2000

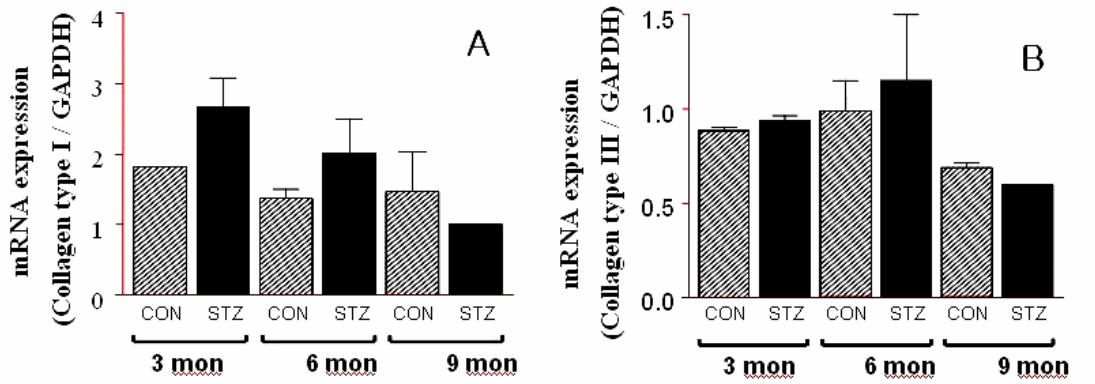

Fig. 1. Expression of collagen Type I (A) and III (B) mRNAs. Expression levels of collagen Type I in neonatal streptozotocin DM model were higher than those in controls, but not significant in those of collagen type III.