

DECREASE NUMBER OF SUBUROTHELIAL MYOFIBROBLASTS IN THE RAT BLADDER DUE TO BLADDER OUTLET OBSTRUCTION

Hypothesis / aims of study

Recently, some reports have suggested that suburothelial myofibroblasts play a key role in the afferent nerve system of urinary sensation (1, 2). FRY et al. suggested that suburothelial myofibroblasts express muscarinic and vanilloid receptors and connect with the afferent nerve system via gap junctions (3). Our group demonstrated that an inflammatory state in the rat bladder induced by chemical stimulation, which presented like overactive bladder, resulted in an increased number of suburothelial myofibroblasts.

However, whether mechanical stress induced bladder outlet obstruction on the rat bladder wall alter the number of suburothelial myofibroblasts has not been previously reported. In this time, we studied changes in the number of suburothelial myofibroblasts using a rat partial bladder outlet obstructive (P-BOO) animal model.

Study design, materials and methods

Bladder specimens were obtained from 12-week-old Wistar female rats that were divided into two groups; a partial bladder outlet obstruction (P-BOO) group and a sham-operated group. Each group was investigated 2 and 4 weeks after P-BOO and sham operation, the alteration of the suburothelial myofibroblasts was analyzed by using the cystometric findings and immunohistochemical staining. At the same time, bladder functions were investigated with urodynamic study. The association between the suburothelial myofibroblasts and the bladder function under the P-BOO was investigated.

Results

The voiding pattern of the sham rats was normal. The voiding frequency at two weeks of the P-BOO rats was significantly less than that of the sham rats. In addition, the voiding frequency of the P-BOO rats at four weeks was significantly less than that of the P-BOO rats at two weeks. Likewise, intravesical pressure was decreased with time course.

The immunohistochemical staining demonstrated that the expression of suburothelial myofibroblasts was decreased in the P-BOO rats compared with the sham rats. In the P-BOO rats, the number of suburothelial myofibroblasts at four weeks was significantly decreased compared with that at two weeks.

Interpretation of results

Our data suggested that alternation of the number of suburothelial myofibroblasts is related to bladder hypersensitivity. Therefore, the reduced expression of suburothelial myofibroblasts may be related to prolongation of the micturition interval by P-BOO.

Concluding message

Suburothelial myofibroblasts might play an important role in the bladder dysfunction with bladder outlet obstruction.

Figure 1. The alterations of bladder function with P-BOO

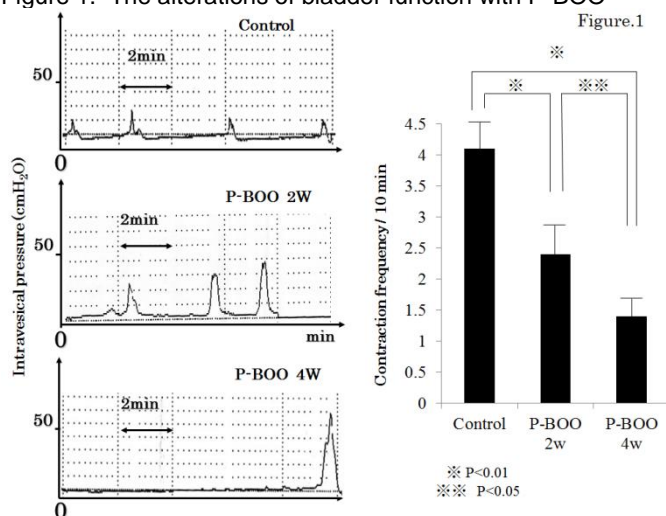
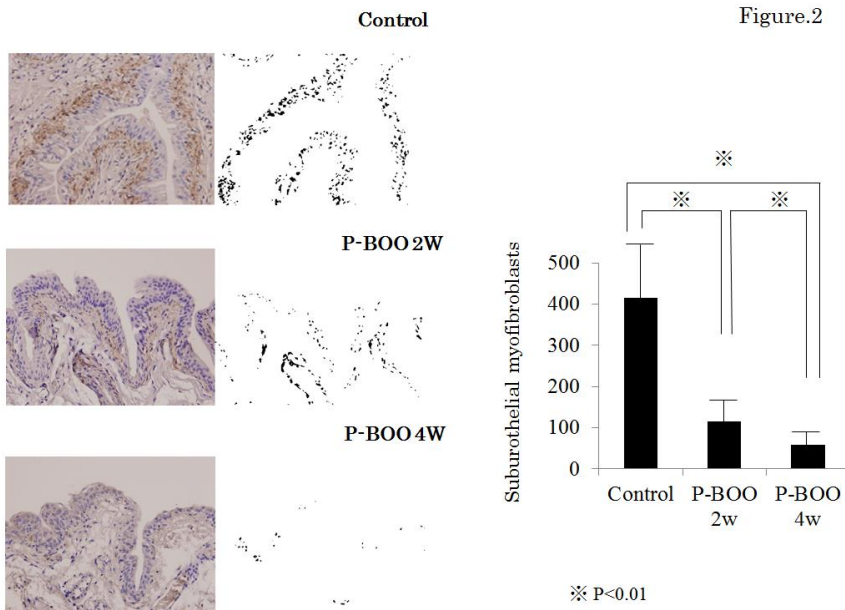


Figure 2. The alterations of suburothelial myofibroblasts



References

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3. FRY, Christopher H., et al. Control of bladder function by peripheral nerves: avenues for novel drug targets. *Urology*, 2004, 63.3 Suppl 1: 24.

Disclosures

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