

NEW OBSERVATIONS ON THE PERSISTENT DETRUSOR OVERACTIVITY AFTER DEOBSTRUCTION IN RATS WITH INFRAVESICAL OUTFLOW OBSTRUCTION

Hypothesis / aims of study

Detrusor overactivity (DO) persists after prostatectomy in 25% of patients treated for benign disease. Determination of the pathophysiological basis of this DO has been hampered by the lack of a reproducible animal model. The main disadvantage of conventional partial bladder outlet obstruction (BOO) in animal models is the need to repeatedly open the abdomen to study this type of DO. Therefore, we have modified this technique by placing the knot of the obstruction into the vaginal lumen not to incise the abdomen for deobstruction.

The aim of this study was to observe the functional and morphological changes that accompany persistent DO after deobstruction of the bladders of rats with a partial BOO of this modified technique.

Study design, materials and methods

Thirty-three conscious female Sprague Dawley rats underwent obstruction (n = 6; two weeks), obstruction (two weeks)/deobstruction (one week) (n = 17), or a sham operation (n = 10; two weeks). Two weeks after obstruction, deobstruction surgery was performed. Intraabdominal and intravesical pressures were measured simultaneously under standardized conditions.

Results

The weights of obstructed (P < 0.01) and deobstructed rat bladders (P < 0.01) increased relative to those of sham-operated bladders. DO was observed in five of six obstructed rats (83%) and in six of 17 deobstructed rats (35%). The total volume measured (TVM) increased in the obstructed (P < 0.01) and deobstructed bladders (P < 0.01) relative to that of the sham-operated bladders. However, the relative voided volume (VV) increased only in deobstructed bladders (P < 0.01), and the relative residual urine increased only in obstructed bladders (P < 0.01) (Fig. 1A). Bladders with persistent DO after deobstruction tended to have higher micturition pressures (P > 0.05) and decreased TVM, VV and micturition intervals (MI) (P > 0.05), but increased bladder weights (P < 0.05), relative to those of bladders without DO after deobstruction (Fig. 2B). Bladders with persistent DO after deobstruction showed higher frequencies (per minute) of characteristic spontaneous activity (P < 0.01) compared with those of obstructed bladders with DO.

Interpretation of results

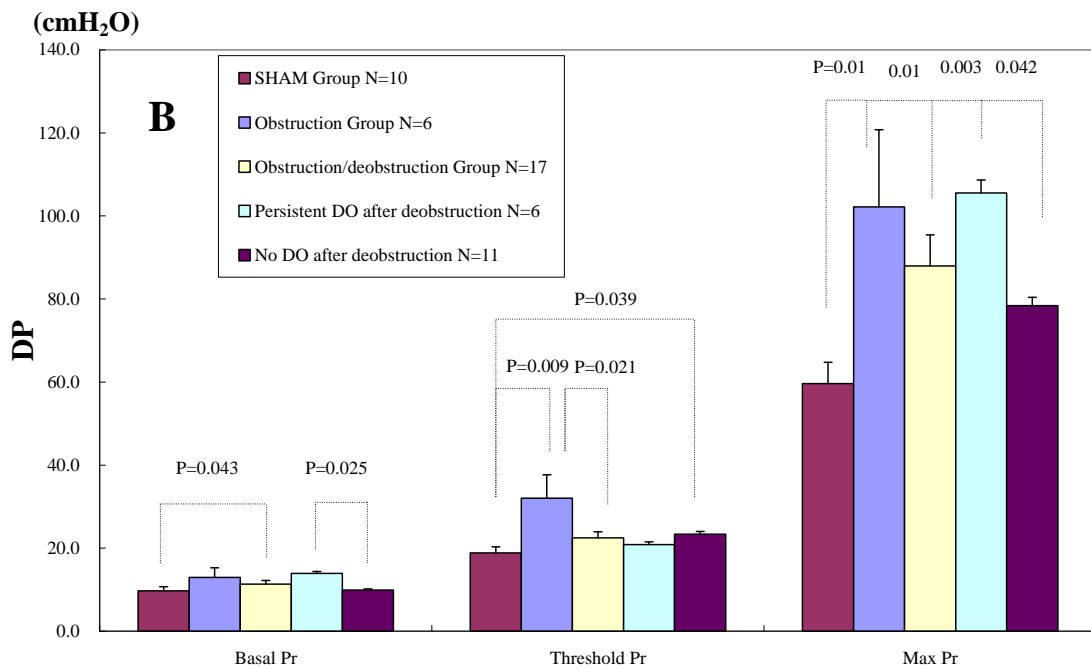
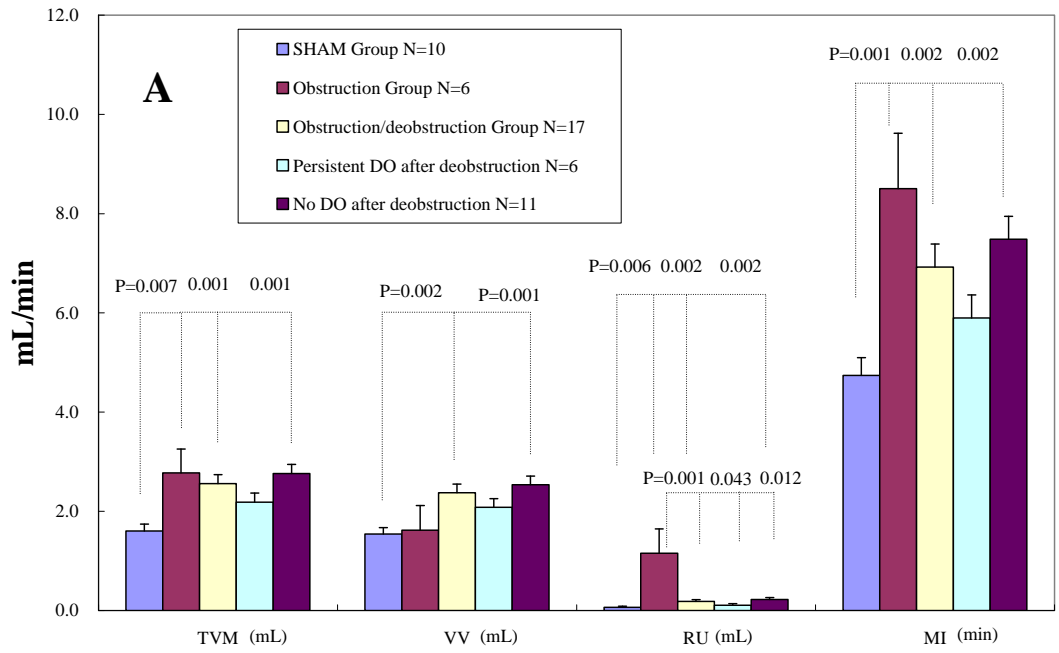
DO after deobstruction appears to be related to the presence of bladder hypertrophy, which is seen in patients with persistent DO after transurethral resection of the prostate. Some characteristics of DO in deobstructed bladders differ from those of DO in bladders with obstruction.

Concluding message

The present results suggest that this modified model is adequate for studying persistent DO after deobstruction. Further experiments with this model should be conducted to better understand the pathophysiology of DO.

References

Fig. 1. (A) Comparison of volume parameters (mL) and micturition intervals (min) in obstructed, deobstructed, and sham-operated rats. (B) Comparisons of detrusor pressure (DP) with simultaneous basal pressure (BP), threshold pressure (FP), and micturition pressure (MP) in obstructed, deobstructed, and sham-operated rats.



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ANIMAL SUBJECTS: This study followed the guidelines for care and use of laboratory animals and was approved by the Animal Ethics Committee of the Inha University, Korea