

SIGNIFICANCE OF PREMICTURITION DETRUSOR PRESSURE IN PATIENTS WITH BLADDER OUTLET OBSTRUCTION

Hypothesis / aims of study

To examine the clinical significance of pre-micturition detrusor pressure (PMDP) in patients with bladder outlet obstruction (BOO), particularly in comparison with bladder compliance (BC).

Study design, materials and methods

A retrospective cohort study in a single center. Among consecutive male patients who visited our clinic with lower urinary tract symptoms (LUTS) suggestive of BOO and underwent urodynamic studies (UDS), a total of 104 cases aged 49 and 89 (mean age 68.5 ± 8.6) were enrolled in this study excluding those with neurological disorders or disorders that possibly cause them, and without phasic detrusor contractions accompanied with synergic relaxation of the urethral sphincter in UDS. PMDP and other urodynamic parameters were evaluated by filling cystometry and pressure flow study, and BC was calculated from reflex volume and PMDP. The bladder wall-thickness was assessed by transabdominal ultrasonography, and a presence of present and/or past hydronephrosis histories was investigated by imaging and/or chart recordings.

Results

The mean PMDP value was 11.6 ± 9.9 cmH₂O ranged 1 to 50 cmH₂O. It was significantly associated with UDS parameters indicating a degree of BOO such as BOO index (BOOI) ($r=0.489$, $P<0.0001$)(Fig.1) and Schäfer nomogram obstruction grade ($r=0.506$, $P<0.0001$), as well as the bladder wall thickness ($r=0.522$, $P<0.0001$). PMDP values more than 15 cmH₂O were superior in positive predictive value (100%), but inferior in negative predictive value (39.7%) for a presence of BOO with the cutoff value of $BOOI>40$. In addition, PMDP was significantly higher in cases with histories of hydronephrosis (mean 28.6 ± 11.8 cmH₂O) than in cases without them (mean 8.9 ± 6.2 cmH₂O) ($P<0.0001$). On the other hand, BC was also associated with BOOI ($r=-0.313$, $P=0.0019$)(Fig.2) and Schäfer nomogram obstruction grade($r=-0.435$, $P<0.0001$), but did not show a significant correlation with the bladder wall thickness ($P=0.8724$), and the receiver operator characteristics analysis of PMDP and BC for predicting a presence of hydronephrosis histories demonstrated the area under the curve of 0.937 (95%CI:0.878-0.996) and 0.171 (95%CI:5.483E-02-0.288), respectively (Fig.3).

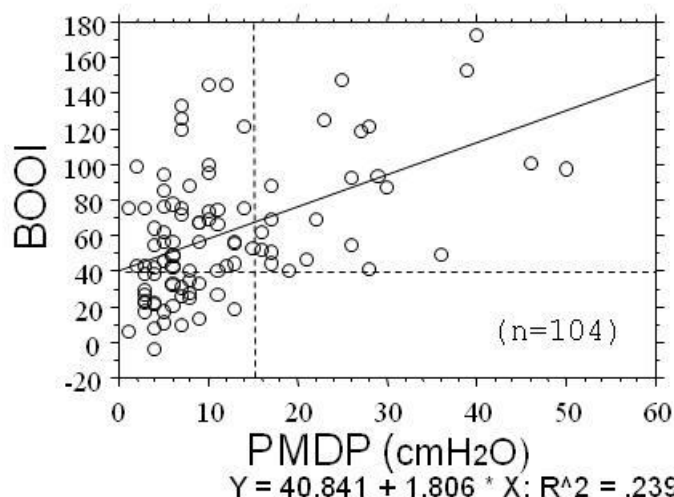


Fig. 1 Linear regression analysis of bladder outlet obstruction index (BOOI) and pre-micturition detrusor pressure (PMDP) ($P<0.0001$; $r=0.489$). Dotted lines are on 15 cmH₂O in PMDP and on 40 in BOOI.

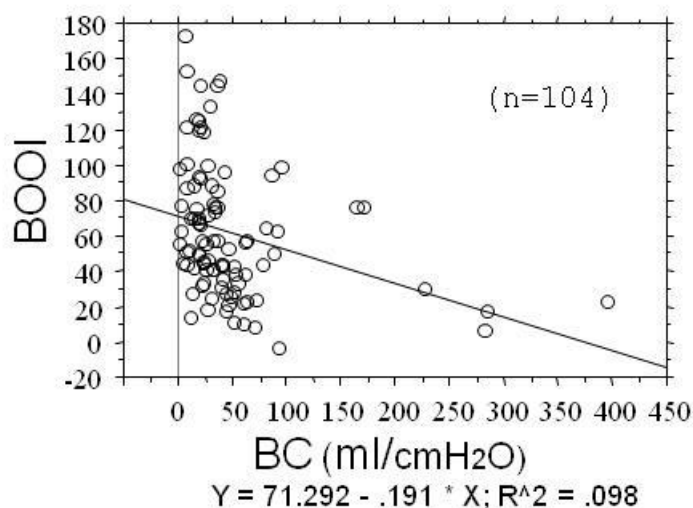


Fig. 2 Linear regression analysis of bladder outlet obstruction index (BOOI) and bladder compliance (BC) (P=0.0019; r=-0.313).

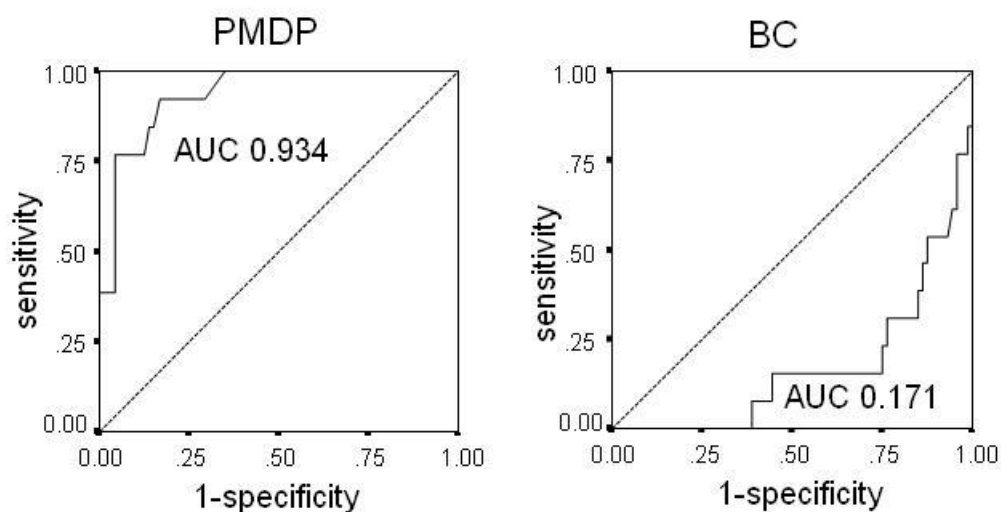


Fig. 3 The receiver operator characteristics analysis of the relationship between premicturition detrusor pressure (PMDP) (Left), bladder compliance (BC)(Right) and a presence of hydronephrosis history. The area under curve (AUC) is 0.937 and 0.171, respectively.

Interpretation of results

From these results, it was thought that PMDP could reflect not a severity of BOO directly but secondary obstructive changes of the bladder wall and an incidence of hydronephrosis due to BOO. On the other hand, BC was inferior to PMDP in predicting the bladder wall thickness and hydronephrosis, so that the value might change easily due to the bladder capacity.

Concluding message

It was suggested that an elevation of PMDP in cases with BOO could reflect an obstructive change of the bladder and a risk of upper urinary tract deterioration due to BOO, and in this respect PMDP was more useful parameter than BC.

Disclosures

Funding: None. **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** The Ethics Committee of Hyogo Rehabilitation Center Hospital **Helsinki:** Yes **Informed Consent:** Yes