

COMPARISON OF CLINICAL FEATURES AND VIDEOURODYNAMIC PARAMETERS BETWEEN DETRUSOR UNDERACTIVITY AND BLADDER OUTLET OBSTRUCTION IN WOMEN

Hypothesis / aims of study

In women with voiding dysfunction (VD), the causes to affect bladder emptying can be related to either detrusor underactivity (DU) and/or bladder outlet obstruction (BOO). The voiding and storage symptoms can coexist in women with VD, making the diagnosis challenging. The clinical features of DU may show significant overlap with BOO. Videourodynamic studies provide pressure-flow relation with simultaneous fluoroscopic imaging of the bladder outlet during voiding phase can obtain an appropriate diagnosis, especially to differentiate between DU and BOO. The aim of this study was to compare the clinical features and videourodynamic parameters between DU and BOO women.

Study design, materials and methods

We retrospectively reviewed our videourodynamic database of consecutive women with lower urinary tract dysfunction who visited the urogynecologic clinics for treatment between August 2011 to October 2015. In 183 patients, urodynamic diagnosis with DU and BOO were selected for analysis. BOO was defined using simultaneous fluoroscopic imaging of the bladder outlet during voiding (videourodynamics) as radiographic evidence of obstruction between the bladder neck and distal urethra in the presence of a sustained detrusor contraction, without the application of strict pressure-flow criteria[1]. DU is defined by the International Continence Society (ICS) as "a contraction of reduced strength and/or duration, resulting in prolonged bladder emptying and/or failure to achieve complete bladder emptying within a normal time span"[2]. Actually, this definition may be hampered by the subjective interpretation. Moreover, there is lack of a strict accepted diagnostic criteria now. In our practice, if patients did not have DO and the voiding Pdet was less than 20 cmH₂O and they needed to void by abdominal straining or were unable to void, then DU was diagnosed. Patients without full urodynamic or clinical data were excluded.

Continuous variables were represented as mean \pm standard deviation (SD) or median (interquartile range, IQR, Q1-Q3) and categorical data were presented by number (n) and percentage (%). Statistical comparisons between the groups were tested using chi-square test or Mann-Whitney U test. A P value of less than 0.05 was considered statistically significant.

Results

A total of 91 women including 41 DU and 50 BOO patients who met the inclusion criteria were recruited for analysis. The patients with BOO were younger than those with DU (46.9 vs 55.5 years, P=0.001). Storage symptoms were the most prevalent symptoms in each group (68.3% vs 58%, DU vs BOO). There were no significant differences on the prevalence of storage symptoms, voiding symptoms and combination of both storage and voiding symptoms between between DU and BOO. Table 2 showed the comparison of urodynamic parameters in DU and BOO patients. PdetQmax and bladder contractility index (BCI) were the most distinguishable urodynamic parameters to differentiate between DU and BOO. An overlap of pressure-flow parameters between DU and BOO groups was presented with scatter plots in Fig. 2.

Interpretation of results

The lower urinary tract symptoms are similar in DU and BOO groups. Videourodynamic studies providing pressure-flow relation with simultaneous imaging of the bladder outlet can differentiate DU and BOO appropriately.

Concluding message

Videourodynamic study provides the most comprehensive investigation of voiding dysfunction in women.

Table 1 Comparison of clinical parameters between women with detrusor underactivity (DU) and with bladder outlet obstruction (BOO)

	DU (n=41)	BOO (n=50)	P value
Age (yr)	55.5 \pm 11.1	46.9 \pm 12.7	0.001
Storage symptoms (n%)	29 (70.7%)	31 (62%)	0.382
Voiding symptoms (n%)	28 (68.3%)	29 (58%)	0.313
Storage and voiding symptoms (n%)	19 (46.3%)	20 (40%)	0.543
Diabetes mellitus (n%)	9 (22%)	5 (10%)	0.116
Hysterectomy (n%)	10 (24.4%)	8 (16%)	0.317
Anti-incontinence surgery (n%)	11 (26.8%)	6 (12%)	0.071

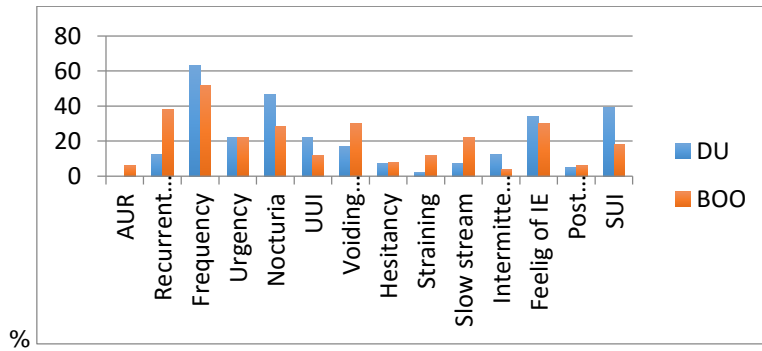


Fig. 1. Bar graph showing prevalence of lower urinary tract symptoms of DU and BOO groups. AUR= acute urinary retention; UTI=urinary tract infection; UUI= urgency urinary incontinence; IE=incomplete emptying; SUI=stress urinary incontinence; DU=detrusor underactivity; BOO=bladder outlet obstruction.

Table 2. Comparison of urodynamic parameters in DU and BOO patients

	DU (n=41)	BOO (n=50)	P value
First sensation (ml)	122.0 (75.0-148.0)	119.0 (76.8-163.0)	0.811
Maximum cystometric capacity (ml)	299.0 (230.5-358.0)	273.5 (207.8-339.8)	0.453
Poor compliance (n%)	6 (14.6%)	15 (30.0%)	0.083
PdetQmax (cmH ₂ O)	15.0 (10.5-18.0)	33.0 (20.0-41.3)	<0.001
Qmax (ml/sec)	14.0 (11.0-17.5)	16.0 (12.8-21.3)	0.032
Qave (ml/sec)	5.0 (3.0-7.0)	6.0 (4.0-9.0)	0.015
BCI	84.0 (65.0-102.5)	113.0 (96.8-137.5)	<0.001
Time to Qmax (sec)	13.6 (8.2-40.2)	17.2 (9.9-32.1)	0.411
Flow time (sec)	45.2 (25.2-70.4)	39.6 (24.2-53.7)	0.416
Voided volume (ml)	227 (168-332.5)	284.5 (160.0-410.5)	0.116
Postvoid residual (ml)	144 (10.0-200.0)	88 (0-150.0)	0.006

Poor compliance: <40 ml/cmH₂O; BCI= bladder contractility index (PdetQmax+5Qmax).

Nonparametric analysis: Mann-Whitney U test

Compliance: chi-square test

Data are presented with median (interquartile range, IQR, Q1-Q3) or n (%)

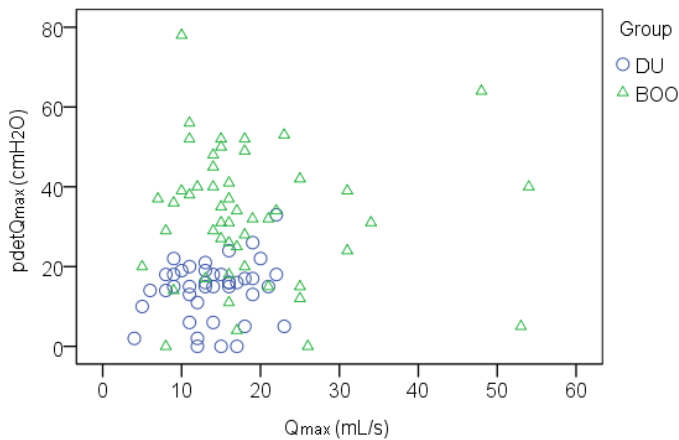


Fig.2. Scatter plots reveal relationships between PdetQmax and Qmax in DU and BOO groups. PdetQmax= detrusor pressure at Qmax; Qmax=maximum urine flow rate; DU=detrusor underactivity; BOO=bladder outlet obstruction.

References

1. Nitti VW, Tu LM, Gitlin J. Diagnosing bladder outlet obstruction in women. J Urol. 1999;161:1535-1540.
2. Abrams P, Cardozo L, Fall M, et al. The standardisation of terminology of lower urinary tract function: report from the Standardisation Sub-committee of the International Continence Society. NeuroUrol Urodyn 2002;21:167-78.

Disclosures

Funding: NONE. **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** IRB of Chang Gung Memorial Hospital **Helsinki:** Yes **Informed Consent:** No