

#354 Videourodynamic Characteristics of Detrusor Underactivity in Women with Voiding Dysfunction

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Aims of study

Voiding dysfunction has gained interest due to its high prevalence in the elderly. This study characterized different bladder dysfunctions in women with voiding dysfunction by videourodynamic study (VUDS), focused on detrusor underactivity (DU).

Study design, materials and methods

A total of 1914 female patients with voiding dysfunction failed first line medical treatment were recruited. All patients underwent VUDS. Age, comorbidities and the urodynamic parameters including bladder sensation, compliance, maximum flow rate, voiding detrusor pressure, voided volume, post-void residual volume, cystometric bladder capacity, voiding efficiency and bladder contractility index were analysed. Linear regression was used to determine the association between bladder sensation and contractility.

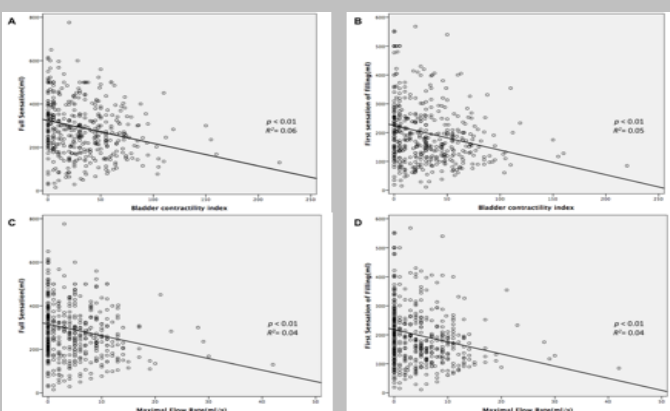
Results

The proportion of each group was shown in Table 1, while bladder outlet dysfunction compose the rest of 42.3%. The mean age in DU and DHIC patients was significantly older than in normal tracing and HSB groups ($p < 0.01$). There was a trend toward higher prevalence of diabetes mellitus and hypertension in the DU and DHIC group compared to the normal tracing group.

Linear regression analysis showed that bladder sensation (including FSF and FS) of the DU patients was negatively associated with bladder contractility (Figure A-D).

	Normal tracing	Bladder dysfunction, 1048 (54.7%)				P value
		DU	DHIC	HSB	DO	
Patient No.(%)	56(2.9%)	443(23.1%)	231(12.0%)	325(17%)	49(2.6%)	-
Age (years)	53.9±14.3	66.5±14.5	75.5±9.50	53.8±16.3	67.4±15.3	<0.01
DM	8(14.3%)	81(18.3%)	49(21.2%)	33(10.2%)	3(6.1%)	<0.01
Hypertension	6(10.7%)	80(18.1%)	49(21.2%)	36(11.1%)	4(8.2%)	0.001
CAD	2(3.6%)	21(4.7%)	10(4.3%)	8(2.5%)	1(2.0%)	0.51
COPD	0(0.0%)	6(1.4%)	2(0.9%)	1(0.3%)	0(0.0%)	0.47
CKD	2(3.6%)	11(2.5%)	6(2.6%)	4(1.2%)	0(0.0%)	0.48

Figure A-D. The negative association between bladder contractility and bladder sensation in women with detrusor underactivity. (A) Bladder contractility index (BCI) vs. full sensation (FS). (B) BCI vs. the first sensation of filling (FSF). (C) Maximum flow rate (Q_{max}) vs. FS. (D) Q_{max} vs. FSF.



When further stratified the patient in the DU group into very low detrusor pressure ($P_{det} < 5$) and low detrusor pressure ($P_{det} \geq 5$), and compared these two subgroups in terms of VUDS parameters, and co-morbidities, we found that bladder sensation were significantly higher in the very low detrusor pressure group, and the prevalence of DM was higher in the very low detrusor pressure group.

The bladder contractility index and voiding efficiency were significantly lowest in DU and DHIC groups and lower in HSB and DO groups than the normal tracing group.

Interpretation of results

In recent years, urotheliogenic aetiology emerges as an important factor for DU. In our study, patients in the DU group had increased threshold of FSF and FS, suggesting reduced bladder sensation may be specific to the aetiology of DU. Negative association between detrusor contractility and bladder sensation in the linear regression, and increased threshold of FSF, FS and bladder capacity in the very low detrusor pressure DU group further support this hypothesis. Although patients in the DHIC group also had insufficient detrusor contractility and even urinary retention, the sensation of bladder did not decrease; in contrast, the threshold of FSF and FS in the DHIC, HSB and DO group significantly decreased compared to the normal tracing group.

DU is a multi-factorial symptom complex. Other than the bladder itself, aging and comorbidities also attribute to this condition. In our study, the age in the DU group was significantly older than the normal and HSB group. In the later phase of diabetic bladder dysfunction decompensated bladder leads to DU. However, in our study, there was no difference in the prevalence of DM comparing the DU and normal tracing group, which may be explained by the high incidence of DM in Taiwan.

Finally, we believe that accurate diagnosis of voiding dysfunction through VUDS is very important. In this study, 48.7% were diagnosed as having BOO including bladder neck dysfunction, dysfunctional voiding, PRES and urethral stenosis. Without VUDS, it is not possible to identify the site of BOO. To summarize: DU patients were characterized of decreased bladder sensation, very low P_{det} , Q_{max} , VE and BCI on the urodynamic study. The bladder capacity is smaller than the normal tracing group, but larger than those in other voiding dysfunction groups.

Concluding message

The bladder conditions of women with voiding dysfunction included DU, DHIC, HSB and DO. Bladder contractility index and voiding efficiency were significantly lowest in DU and DHIC groups and lower in HSB and DO groups than normal tracing group. Reduced bladder sensation was noted in DU and negatively associated with detrusor contractility.