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CAN VOIDED PERCENTAGE (WITH UROFLOWMETRY PARAMETERS) DISCRIMINATE DETRUSOR UNDERACTIVITY (DU) FROM BLADDER OUTLET OBSTRUCTION (BOO) IN MALE LUTS ?

Hypothesis / aims of study

Low flow rate is the common feature for both patients with DU and BOO. Pressure-flow study, an invasive method, should be used for differentiation of cases that are in doubt from results of uroflowmetry. There may be a correlation between DU and BOO and voided percentage (Void%) (numerical description of the voiding efficacy or efficiency which is the proportion of bladder content emptied)(1). This ratio, also known as bladder voiding efficiency (BVE), was addressed in the articles on pressure-flow studies and DU in the literature, but it's insufficiently studied topic. Our aim was to distinguish detrusor underactivity (DU) and bladder outlet obstruction (BOO) by using voided percentage (Void%) and other uroflowmetry parameters.

Study design, materials and methods

Between January 2007-January 2015, uroflowmetry (including post-void residual volume (PVR)) parameters and subsequent pressure flow study (PFS) data were retrospectively examined for male patients. Primarily, male patients with minimum two uroflowmetry studies with voided volumes ≥ 150 ml and mean maximum flow (Qmax) over 10 ml/second were included to the study. Patients with malignancies that may affect lower urinary tract (LUT) (bladder, prostate cancer, etc.) , neurogenic LUT dysfunction, bladder and ureteral stones, urinary tract infection, prior foley or clean intermittent catheterization and transurethral interventions were excluded from the study, Bladder outlet obstruction index (BOOI) and bladder contractility index (BCI) (ICS nomogram) were calculated according to the patients' PFS values. Patients with PFS values of BCI < 100, BOOI < 40 were grouped as DU group and BCI > 100 and BOI > 40 were grouped as BOO group (2).

Voided percentage (Void%) values were calculated as (volume voided/volume voided + PVR) × 100) for both BOO and DU groups. Among the uroflowmetry parameters, total voiding time, time to reach the maximum urinary flow rate and voided volume were also measured.

Results

93 patients were evaluated . 44 in DU and 49 in BOO groups. Age in DU group was older than one in BOO group.

Among the uroflowmetry parameters, total voiding time, time to reach the maximum urinary flow rate and voided volume showed statistically significant difference between the two groups ($p < 0.001$). Average voided percentage (Void%) was 63.6(±2.43)% and 46.2(±2.63)% for DU and BOO groups respectively and the difference was statisticaly significant ($p < 0.001$). (Table 1)

Interpretation of results

Patients in the DU group voided more volumes in longer time period and more efficiently than BOO group. A statistically significant difference was detected between the two groups for average voided percentage (Void%)

Concluding message

Average voided percentage (Void%) with other significant uroflow parameters may be an important non-invasive tool for discrimination between DU and BOO in future. Long term prospective studies with larger populations are obviously needed in for cut off value for that discrimination .

PARAMETERS	**DU Group**	**BOO Group**	***P* value**
Number of patients	44	49	
Mean age (Year)	78.54(±11.6)	64.18(±11.1)	<0.001
Uroflowmeter parameters			
Maximum urinary flow (ml/s)	11.36(±0.70)	10.46(±0.59)	0.387
Mean urinary flow (ml/s)	7.59(±0.43)	6.53(±0.40)	0.061
Total voiding time (s)	89.68(±3.75)	39.06(±2.73)	<0.001
Voided volume (ml)	666.9(±38.84)	213.46(±13.67)	<0.001
Postvoid residual urine volume (ml)	381.4(±45.53)	296.93(±25.57)	0.208
Voided percentage (Void%)	66.02(±2.43) %	45.53(±2.63) %	<0.001

Table 1 Results of the study

References
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