

MICTURITIONAL URETHRAL PRESSURE PROFILOMETRY REVISITED IN THE DIAGNOSIS, QUANTIFICATION AND LOCALIZATION OF BLADDER OUTLET OBSTRUCTION IN ADULT MEN AND WOMEN.

Hypothesis / aims of study

In patients presenting with voiding type lower urinary tract symptoms (LUTS), it is important to diagnose the presence of bladder outlet obstruction (BOO), and if present, to know the level of obstruction. Currently, videourodynamic study (VUDS) with pressure flow analysis is utilized for this purpose. It may be difficult to diagnose BOO in presence of detrusor underactivity. Various urodynamic parameters have been devised for diagnosis and quantification of BOO, i.e. Abrams-Griffiths number (AG) and detrusor adjusted mean passive urethral resistance relation factor (DAMPF) in men. The situation is less clear in women. Moreover, significant cost and radiation is incurred by adding fluoroscopic surveillance. We examined the role of dynamic multichannel resting and Micturitional urethral pressure profilometry (UPP) in establishing diagnosis and level of BOO.

Study design, materials and methods

The study was approved by departmental ethical committee and written informed consent was obtained from all participants. Fifteen consecutive patients with predominantly voiding type bothersome LUTS were enrolled in the study. After standard initial evaluation, urodynamic study was undertaken. It comprised of multichannel pressure flow study, and resting and micturitional urethral pressure profilometry using 9Fr triple lumen UPP catheter and 5Fr single lumen ballooned rectal catheter (Solar silver®, Medical Measurement Systems, Enchede, the Netherlands). Since C-arm fluoroscopy was not available in our UDS suite, a dynamic cystogram (filling and voiding) was performed separately in radiology suite for location of BOO and was considered the standard for diagnosis of BOO. AG no. was defined as $[P_{det}Q_{max} - (2XQ_{max})]$. DAMPF was computed by computer software of Solar Silver® on Schaefer pressure-flow plot. The computer generated number was cross examined using manual calculations as suggested by Schaefer [1]. For women, Blaivas' criteria for BOO were utilized and for numerical comparison, AG and DAMPF were also computed. BOO was further quantified by Area under curve Pdet in voiding phase [2]. In MUPP BOO was defined as pressure difference of $>5\text{cmH}_2\text{O}$ between Pves and Pura during voiding and proximal location of the obstruction was taken as a point at which the pressure difference occurs [3]. BOO was quantified as urethral closure pressure ($P_{clos} = P_{ves} - P_{ura}$) and area under curve Pclos in MUPP (fig 1).

Results

Of the 15 enrolled patients 9 were males and 6 females (mean age 45.5 ± 15.2 years). All urodynamic parameters were comparable between the two sexes ($p > 0.05$) except resting profile length which was significantly higher in men ($p = 0.0001$). A highly significant correlation of AUC-Pclos was observed with AG ($r = 0.77$, $p = 0.001$), DAMPF ($r = 0.70$, $p = 0.006$), Pmuo (0.69 , $p = 0.007$) and AUC-Pdet ($r = 0.72$, $p = 0.002$) and maximum Pclos ($r = 0.85$, $p = 0.0001$). A total of 12 participants were found to have evidence of BOO on cystogram level of which corroborated with findings of MUPP. Three participants were deemed unobstructed on cystogram corroborated with findings of MUPP ($P_{clos} < 5\text{cmH}_2\text{O}$), despite AG no., DAMPF and Blaivas criteria (for women) being in obstructed range.

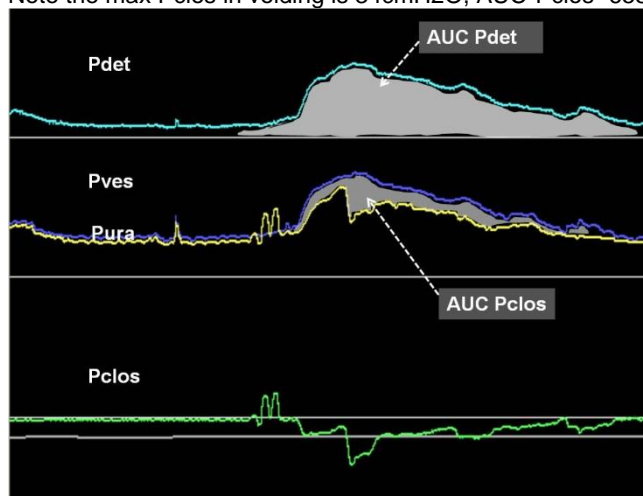
Interpretation of results

MUPP fares favourably in the diagnosis and quantification of bladder outlet obstruction with already established urodynamic measures of BOO. It fares favourably in localization of bladder outlet obstruction with cystogram.

Concluding message

Micturitional urethral pressure profilometry accurately diagnoses and if present, localizes the bladder outlet obstruction in men and women with voiding LUTS. It may be used for a complete diagnosis of LUT function in this situation in lieu of videourodynamic study where resources are limited.

Fig 1: Micturitional urethral pressure profile of a 45 year old man with bladder neck obstruction along with detrusor underactivity. Note the max Pclos in voiding is $34\text{cmH}_2\text{O}$, AUC-Pclos $-655\text{cmH}_2\text{O.s}$ and AUC-Pdet $1136\text{cmH}_2\text{O.s}$



References

1. Schaefer W. Analysis of bladder-outlet function with the linearized passive urethral resistance relation, linPURR, and a disease-specific approach for grading obstruction: from complex to simple. World J Urol 1995; 13: 47-58.

2. Blaivas JG, Groutz A. Bladder Outlet Obstruction Nomogram for Women With Lower Urinary Tract Symptomatology. *Neurourol Urodynam* 2000; 19: 553-564.
3. Dubeau CE, Sullivan MP, Cravalho E, Resnick NM, Yalla SV. Correlation between micturitional urethral pressure profile and pressure-flow criteria in bladder outlet obstruction. *J Urol* 1995; 154: 498-503.

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<i>What were the subjects in the study?</i>	HUMAN
<i>Was this study approved by an ethics committee?</i>	Yes
<i>Specify Name of Ethics Committee</i>	institute ethics committee, postgraduate institute of medical education and research
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	Yes