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DOES BLADDER NECK ELEVATION REPRESENT BLADDER OUTLET OBSTRUCTION IN PATIENTS WITH BENIGN PROSTATIC HYPERPLASIA?

Hypothesis / aims of study

It is known that patients with lower urinary tract symptoms (LUTS) and/or benign prostatic hyperplasia (BPH) are heterogeneous in terms of urodynamic findings. Bladder outlet obstruction (BOO) may be influenced by several factors. Urethroscopic observation of enlargement of lateral lobes in the patients with BPH is known as the 'kissing sign' and has been regarded to be for a cause of anatomical obstruction. However, there has been little information on the significance of median lobe enlargement in patients with BPH. Therefore, we evaluated the association of bladder neck elevation (BNE) with BOO index in men with LUTS suggestive of BPH (LUTS/BPH).

Study design, materials and methods

A prospective analysis was performed in 182 men older than 50 with LUTS/BPH. Patients who had prostatic cancer, previous prostatic surgery or neurogenic bladder were excluded from the study. BNE was evaluated during cystourethroscopic examination. The degree of BNE was evaluated in two different methods while the patient was placed in the standard lithotomy position: 1) initial subjective determination of the grade of BNE (no, mild, moderate, and severe) and 2) subsequent measurement of the angle using a half circle bevel protractor when the examiner introduced the tip of cystoscope in the bladder neck. Patients were also evaluated by the International Prostatic Symptom Score (IPSS), serum prostatic-specific antigen (PSA) levels, prostate volume measured by transrectal ultrasonography, uroflowmetry with post-void residual and urodynamic study with a pressure-flow study (PFS).

Results

The median patients age was 68 years old (50 - 91, range), PSA was 1.6 ng/mL (0.1 - 11.2), and prostate volume was 40.2 mL (21.0 - 155.0). The number of patients representing each voiding pattern determined by PFS was unobstructed in 42 (23.1%), equivocal in 75 (41.2%) and obstructed in 61 (33.5%). The proportion of BNE degree appeared in no BNE as 21 (11.5%), mild 37 (20.3%), moderate 40 (22.0%) and severe 79 (43.4%) respectively. In the linear regression analysis, as BNE angle increased, BOO index showed increment (r = 0.287, p = 0.013). The patients were divided into two subgroups objectively (angle $\geq 35^{\circ}$ / angle $< 35^{\circ}$) and subjectively (minimal degree of BNE / severe BNE) and were compared. The patients with higher BNE (angle $\geq 35^{\circ}$) had higher BOO index (p = 0.018) than those with lower BNE (angle $< 35^{\circ}$) and had more obstructed patterns in the ICS nomogram. However, there were no differences in age, PSA level, prostate volume, symptom scores and uroflow parameters (Table). Subgroups were comprised of the minimal group (subjectively no or mild or moderate, n = 120) and the severe group (n = 62). There were no significant differences in age, prostate volume, PSA and symptom score. However, in urodynamic studies maximum urethral closing pressure (MUCP) (p = 0.010), detrusor pressure at maximum flow rate (PdetQmax) (p = 0.017) and BOO index (p = 0.023) were significantly different in the two groups.

Table. Clinical parameters according to cysourethroscopic the bladder neck elevation angle

	BNE < 35°	BNE ≥35°	Р	Correlation Coefficients*	P*
	N= 122	N= 60			
Age (year)	67.0±6.9	66.8±8.1	0.908	-0.069	0.358
Prostate-specific antigen (ng/mL)	2.43±2.4	2.75±2.4	0.471	0.026	0.760
Transrectal ultrasonography					
Total prostate volume (mL)	45.4±23.4	51.9±30.5	0.209	0.085	0.359
Transitional zone volume (mL)	22.9±18.6	26.8±23.3	0.340	0.060	0.521
IPSS					
Voiding symptoms	10.2±5.7	10.5±6.6	0.843	-0.034	0.767
Storage symptoms	6.9±3.7	7.1±3.8	0.794	-0.073	0.522
Total score	17.1±8.3	17.6±9.4	0.802	-0.055	0.629
Quality of life index	4.1±1.2	3.9±1.3	0.612	-0.125	0.273
Uroflowmetry					
Qmax (mL/s)	8.8±4.4	9.2±4.4	0.596	-0.042	0.591
Postvoid residual (mL)	50.0±55.1	67.7±93.7	0.114	0.075	0.314
Urodynamic study					
Maximum urethral closure	72 6+26 5	82 6+27 8	0 020	0 203	0.006
pressure (cmH2O)	12.0120.0	02.0127.0	0.020	0.200	0.000
Maximum cystometric capacity	382+121	358+123	0 226	-0 154	0.043
(mL)	5021121	550±125	0.220	-0.13-	0.045
Compliance	50.3±24.1	44.4±29.4	0.162	-0.117	0.120
Detrusor pressure at Qmax	51.2±17.6	62.4±30.2	0.010	0.208	0.005
BOO index	33.5±20.2	45.0±33.0	0.018	0.186	0.013

*: Pearson correlation analysis of continuous variables, IPSS: international prostate symptom score, Qmax: maximum flow rate, BOO index: bladder outlet obstruction index

Interpretation of results

Prostatic urethral anatomy associated with bladder neck is considered as an important factor in BOO. [1] Previous studies suggest that the prostate urethral angle, median lobe hypertrophy, intravesical prostate protrusion can affect the BOO. [2] In this study some urodynamic parameters such as, BOO index, PdetQmax were significantly correlated with BNE angle, which suggest an obstructive voiding pattern. However, this study did not elucidate the correlation with symptom and uroflow parameters.

Concluding message

This study suggests that BNE contributes to BOO in men with LUTS/BPH, as the degree of BNE was correlated with BOO index. According to this study, BNE could be an important factor in the evaluation of the patients with LUTS/BPH.

References

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Disclosures

Funding: None **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** IRB of Seoul National University Hospital **Helsinki:** Yes **Informed Consent:** Yes