Predicting Bladder Outlet Obstruction in Men with Persistent Overactive Bladder Symptoms after Medical Treatment for Lower Urinary Tract Symptoms

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Aims: To analyze the underlying lower urinary tract dysfunctions by video-urodynamic studies in men who have persistent overactive bladder (OAB) symptoms after initial drug therapy for lower urinary tract symptoms (LUTS).

Methods: The medical records of 614 men ≥40 years of age with LUTS and an IPSS of ≥8 were retrospectively analyzed. Patients had persistent OAB symptoms after medical treatment for at least 6 months. A video-urodynamic study was done to investigate the underlying bladder or bladder outlet dysfunction. Predictors of bladder outlet obstruction (BOO) by baseline urine flow metrics and prostate parameters were investigated.

Fig. 1. The video-urodynamic diagnosis of lower urinary tract dysfunction in men with overactive bladder symptoms after medical treatment for LUTS or BPH.
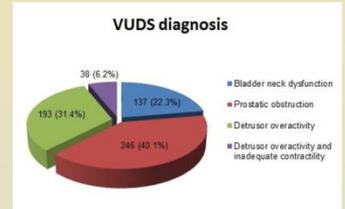
Results: The analysis included 614 men. The final video-urodynamic study revealed BND in 137 (22.3%), BPO in 246 (40.1%), DO in 193 (31.4%), and DHIC in 38 (6.2%) patients (Fig. 1). Nearly two-thirds (62.4%) of the men had BOO on video-urodynamic studies.

Table 1 presents the patients' age, IPSS, prostatic measures, and urodynamic parameters. Patients with DHIC were significantly older than were those with BND, BPO, and DO. LUTS symptom scores including IPSS-total, IPSS-subscore, and V/S ratio showed no significant differences between the groups. Patients with BPO had significantly larger TPV and TZI than those in the other groups. Urodynamic studies showed patients with BPO had the highest Pdet, followed by those with BND, DO, and DHIC. Qmax was significantly greater in patients with DO and did not differ significantly among patients with BND, BPO, and DHIC. PVR was significantly smaller in DO group compared with that in BND and BPO groups and was larger in the patients with DHIC. BOOI was the greatest in the BPO group, and BND ranked second and was the lowest in the DO and DHIC groups.

When we used TPV as the predictor for the differential diagnosis of lower urinary tract dysfunction in the study patients, 221 (78.6%) patients with TPV ≥ 40 mL had BOO including 43 (15.3%) with BND and 178 (63.3%) with BPO. Another 162 (48.8%) patients with TPV <40 mL had BOO including 94 (28.3%) with BND and 68 (20.5%) with BPO. When we used Qmax as the predictor, 301 (67.6%) patients with a Qmax <12 mL/s had BOO including 105 (23.6%) with BND and 196 (44.0%) with BPO (**Table 2**). If we combined TPV ≥40 mL and Qmax <12 mL/s as predictors, BOO was found in 176 (81.8%) patients including 34 (15.8%) with BND and 142 (66%) with BPO. In 102 patients with TPV <40 mL and Qmax ≥12 mL/s 64 (62.7%) had DO (**Table 3**).

Table 1. Variables among men with lower urinary tract dysfunction with storage symptoms after medical treatment for LUTS or BPH

	BND (n= 137)	BPO (n=246)	DO (n=193)	DHIC (n=38)	ANOVA
Age	71.6 ± 10.6	74.3 ± 8.55	73.3 ± 9.70	79.0 ± 7.91	0.0001
IPSS total	12.4 ± 7.69	13.7 ± 8.23	15.1 ± 9.27	18.0 ± 6.40	0.213
IPSS voiding	6.42 ± 5.85	6.94 ± 5.75	7.63 ± 6.56	10.7 ± 4.39	0.306
IPSS storage	6.27 ± 3.57	6.61 ± 3.83	7.84 ± 3.98	7.29 ± 2.50	0.131
IPSS-V/S	1.22 ± 1.42	1.29 ± 1.27	1.16 ± 1.49	1.49 ± 0.53	0.898
TPV (mL)	36.6 ± 16.5	62.8 ± 35.7	34.4 ± 17.2	36.0 ± 18.1	0.0001
TZI (%)	35.8 ± 11.2	48.1 ± 12.4	34.5 ± 17.2	36.0 ± 18.1	0.0001
FSF (mL)	112 ± 54.3	106 ± 54.6	110 ± 56.9	124 ± 65.0	0.282
FS (mL)	166 ± 78.8	152 ± 78.6	160 ± 81.7	186 ± 88.4	0.054
Compliance	50.5 ± 54.6	46.6 ± 52.8	54.0 ± 62.3	53.5 ± 55.9	0.571
Pdet(cmH$_2$O)	48.2 ± 24.8	71.3 ± 25.5	31.8 ± 12.8	20.3 ± 11.3	0.0001
Qmax (mL/s)	8.59 ± 4.40	7.55 ± 4.39	11.9 ± 5.31	5.95 ± 3.70	0.0001
Volume (mL)	201 ± 110	169 ± 97.9	222 ± 107	117 ± 77.6	0.0001
PVR (mL)	55.9 ± 82.3	63.5 ± 85.5	19.4 ± 41.9	161 ± 106	0.0001
BOOI	31.0 ± 27.6	56.2 ± 27.4	7.98 ± 16.4	8.40 ± 12.8	0.0001
VE (%)	79.2 ± 28.9	75.4 ± 27.0	92.9 ± 14.0	45.6 ± 24.1	0.0001
BCI	91.1 ± 20.4	109 ± 32.8	91.2 ± 29.9	50.0 ± 22.6	0.0001

Table 2. Relationship of video-urodynamic diagnosis based on total prostatic volume and maximum flow rate

	Total no.	BND (n=137) No. (%)	BPO (n=246) No. (%)	DO (n=193) No. (%)	DHIC (n= No. (%)
TPV< 40 mL	332	94 (28.3) (68.6)	68 (20.5) (27.6)	145 (43.7) (75.1)	25 (7.5) (65.8)
TPV ≥ 40 mL	281	43 (15.3) (31.4)	178 (63.3) (63.4)	48 (17.1) (24.9)	13 (4.6) (34.2)
Qmax <12 mL/s	445	105 (23.6) (76.6)	196 (44.0) (79.7)	108 (24.3) (56.0)	36 (8.1) (94.7)
Qmax ≥12 mL/s	169	32 (18.9) (23.4)	50 (29.6) (20.3)	85 (50.3) (44.0)	2 (1.2) (5.3)

Table 3. Relationship of video-urodynamic diagnosis and combination of total prostatic volume and maximum flow rate

	Total no.	BND (n=137) No. (%)	BPO (n=246) No. (%)	DO (n=193) No. (%)	DHIC (n= No. (%)
TPV <40 mL & Qmax <12 mL/s	230	71 (30.9) (51.8)	54 (23.5) (22.0)	81 (35.2) (42.0)	24 (10.4 (63.2)
TPV <40 mL & Qmax ≥12 mL/s	102	23 (22.5) (16.8)	14 (13.7) (5.7)	64 (62.7) (33.2)	1 (1) (2.6)
TPV ≥40 mL & Qmax <12 mL/s	215	34 (15.8) (24.8)	142 (66) (57.7)	27 (12.6) (14.0)	12 (5.6) (31.6)
TPV≥ 40 mL & Qmax ≥12 mL/s	67	9 (13.4) (6.6)	36 (53.7) (14.6)	21 (31.3) (10.9)	1 (1.5) (2.6)

Conclusion: BOO, including BND and BPO, comprise 62.4% (383/614) of men with residual OAB symptoms after initial medical treatment for LUTS. A combination of TPV≥40 ml with Qmax<12 ml/s strongly predicts BOO while a combination of TPV<40 ml and Qmax≥12 ml/s suggests a high possibility of DO.