

FEMALE BLADDER NECK DYSFUNCTION -- A VIDEOURODYNAMIC DIFFERENTIAL DIAGNOSIS AMONG WOMEN WITH VOIDING DYSFUNCTION

Hypothesis / aims of study

Voiding dysfunction in women is not uncommon, however diagnosis of bladder neck dysfunction (BND) is especially challenging. This study analyzed women with voiding dysfunction by videourodynamic study (VUDS), in particular, examined the role of bladder neck and the effectiveness of treatment.

Study design, materials and methods

We retrospectively reviewed consecutive women aged ≥ 18 years, who had undergone a video urodynamic study at our institution for investigation of lower urinary tract symptoms from August 1996 to Jan 2014. All patients had at least one voiding symptom (ie. difficult urination, hesitancy, intermittency, slow stream, straining and urinary retention) with or without storage or post-micturition symptoms. Individuals with proven urinary tract infection, frank neurogenic voiding dysfunction, interstitial cystitis/ bladder pain syndrome, stress urinary incontinence, previous genitourinary surgery or malignancy were precluded at enrollment. The age distribution, presence of detrusor overactivity and treatment modalities in patients diagnosed with BND were analyzed.

Results

Based on VUDS findings, female voiding dysfunction included bladder dysfunction (n=1048, 55%), bladder outlet dysfunction (n=810, 42%) and normal VUDS tracing (n=56, 3%). The VUDS findings of bladder outlet dysfunction included BND (n=100, 12.3%), poor pelvic floor relaxation (n=336, 41.5%), dysfunctional voiding (DV, n=325, 40.1%), cystocele (n=19, 2%) and urethral stricture (n=30, 4%). Compared with normal tracing group, BND patients had significantly lower first sensation of filling, full sensation and voided volume, maximum flow rate (Q_{max}); but higher post-void residual volume, voiding detrusor pressure, and bladder outlet obstruction index (all p < 0.05). (Table 1) Detrusor overactivity was noted in 46 (46%) BND patients. These urodynamic parameters, however, were not significantly different from patients with DV. High pressure BND had a greater bladder outlet obstruction degree but low pressure BND had a lower voiding efficiency. (Table 2) Alpha-blocker therapy and transurethral incision of the bladder neck (TUI-BN) were effective in patients who failed medical treatment.

Interpretation of results

This study revealed that BND is not uncommon in women with voiding dysfunction, however, the diagnosis should be made under video urodynamic study. BND in women could be high pressure and low pressure, resulting in incomplete voiding, large PVR and urodynamic DO. Treatment with alpha-blocker usually is effective in relieving symptoms, but TUI-BN might be necessary in patients who failed initial medical treatment.

Concluding message

The causes of female voiding dysfunction are heterogeneous. BND comprises 12.3% of women with bladder outlet dysfunction. BND could be high pressure or low pressure in nature. The high pressure BND can cause anatomical BOO, whereas low pressure BND is likely to affect the micturition through inhibitory effect of sympathetic hyperactivity on detrusor contractility. Video urodynamic study is the mainstay diagnostic tool to diagnose BND in women. Alpha-blockers and TUI-BN are effective in improving Q_{max} in BND patients.

Table 1. The videourodynamic parameters among female patients with normal tracing, bladder neck dysfunction, dysfunctional voiding and other bladder outlet obstruction

	Normal (n= 56)	BND (n=100)	DV (n=325)	BOO (n=49)	P value
Age	54.0 ± 14.3	63.9 ± 17.1	61.1 ± 16.5	57.8±16.7	0.0001
FSF (ml)	167 ± 71.6	137 ± 76.9	130 ± 69.0	141±57	0.0001
FS (m)	290 ± 103	208 ± 101	197 ± 95.0	214±80	0.0001
CBC (ml)	508 ± 120	358 ± 176	300 ± 145	297±109	0.0001
Pdet.Qmax(cmH2O)	17.3 ± 8.23	39.3 ± 24.0	46 ± 18	49±29	0.0001
Qmax (ml/s)	24.1 ± 7.82	6.06 ± 5.64	9.4 ± 6.1	7.0±4.6	0.0001
Vol (ml)	489 ± 114	144 ± 143	179 ± 125	166±120	0.0001
PVR (ml)	19.5 ± 28.8	213 ± 186	121 ± 123	131±109	0.0001
BOOI	-31.0 ± 17.5	27.2 ± 26.3	27 ± 23	35±30	0.0001
VE	0.96±0.05	0.41±0.37	0.62±0.31	0.54±0.30	0.0001
Compliance	84.8 ± 72.1	60.8 ± 70.0	63 ± 77	59±46	0.0001
DO (%)	0	46 (46.5%)	195 (60%)	22 (45)	0.0001

Data were expressed as mean ± standard deviation or number (percentage).

BND: bladder neck dysfunction; DV: dysfunctional voiding; BOO: bladder outlet obstruction, including cystocele (n=19) and urethral stricture (n=30); BOOI: bladder outlet obstruction index = Pdet.Qmax-2 x Qmax; CBC: cystometric bladder capacity; DO: detrusor overactivity; FS: full sensation; FSF: first sensation of filling; Pdet.Qmax: detrusor pressure at Qmax; PVR: post-void residual; Qmax: maximum flow rate; Vol: voided volume; VE: voiding efficiency.

Table 2. The comparison of videourodynamic parameters between patients with normal tracing and bladder neck dysfunction of different voiding pressure

	Normal (N=56)	LPBND (N=45)	HPBND (N=55)	P-value
Age	53.98±14.32	63.52±17.68	64.24±16.83	0.839
FSF (ml)	166.82±71.60	135.18±61.10	138.11±88.00	0.852
FS (m)	290.30±103.05	214.36±88.79	202.20±110.95	0.556
CBC (ml)	167.68±39.57	127.66±63.62	109.93±52.93	0.133
Pdet.Qmax(cmH2O)	17.32±8.23	19.00±10.93	55.55±18.65	0.000
Qmax (ml/s)	24.14±7.82	5.48±6.31	6.53±5.04	0.362
Vol (ml)	488.64±114.29	118.09±127.49	165.07±152.52	0.105
PVR (ml)	19.48±28.76	268.75±208.76	168.05±153.47	0.007
BOOI	-30.97±17.52	8.04±15.09	42.49±23.12	0.000
VE	0.96±0.05	0.32±0.32	0.50±0.33	0.010
Compliance	84.80±72.06	68.60±62.86	54.53±75.19	0.323
DO (%)	0	12 (27.3%)	34 (61.8%)	0.001

Data were expressed as mean ± standard deviation or number (percentage).

LPBND: low pressure bladder neck dysfunction; HPBND: high pressure bladder neck dysfunction; BOOI: bladder outlet obstruction index = Pdet.Qmax-2 x Qmax; CBC: cystometric bladder capacity; DO: detrusor overactivity; FS: full sensation; FSF: first sensation of filling; Pdet.Qmax: detrusor pressure at Qmax; PVR: post-void residual; Qmax: maximum flow rate; Vol: voided volume; VE: voiding efficiency.

Disclosures

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