Videourodynamic Findings of Interstitial Cystitis and the Association with Clinical Characteristics

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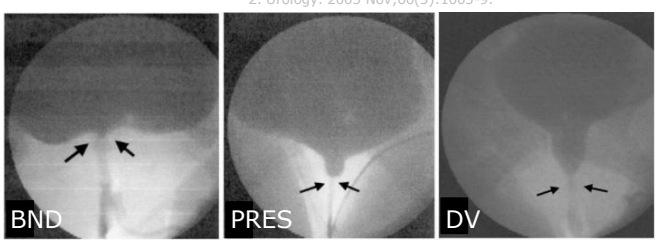
Aims of study

- Urodynamic study (UDS) has been controversial with regard to its value in interstitial cystitis/bladder pain syndrome (IC/BPS).
- There is a paucity of current literature evaluating the role of UDS in IC/BPS.
- Videourodynamic study (VUDS) possesses the ability to assess function and morphology of the lower urinary tract by measuring various aspects of urine storage and evacuation.
- We reported the VUDS findings in IC/BPS patients and the association with clinical characteristics.

Materials and Methods

- IC/BPS patients with complete data of a symptom assessment, VUDS, potassium sensitivity test (PST) and cystoscopic hydrodistention were reviewed retrospectively.
- The VUDS was set up in accordance with the recommendations of the International Continence Society using C-arm fluoroscopy during the filling and voiding phases.
- Diagnoses of bladder dysfunction and bladder outlet dysfunction (BOD) including dysfunctional voiding (DV), poor relaxation of external urethral sphincter (PRES) and bladder neck dysfunction (BND) were made according to the criteria suggested in our previous publications [1,2].

1. Urology. 2007 Aug;70(2):272-6.
2. Urology. 2005 Nov;66(5):1005-9.



- The distribution of the different VUDS diagnoses in IC/BPS patients were determined.
- The clinical and UDS parameters between normal and abnormal VUDS diagnoses were analyzed.

Results

- A total of 414 IC/BPS patients (66 men and 348 women; mean age, 48.8±13.5) were enrolled in this study.
- Among them, 26 had ulcer type IC/BPS and 381 had non-ulcer type I/BPS.
- Bladder dysfunction (hypersensitive bladder, HSB) were found in 364 (87.9%) patients and BOD in 244 (58.9%).
- The causes of BOD included DV in 42 (10.1%), PRES in 193 (46.5%), BND in 9 (2.1%).
- HSB was more prevalent in IC/BPS patients with a positive PST, with smaller volume of cystoscopic maximal bladder capacity (MBC), and with higher grade of glomerulations (Table 1).
- IC/BPS patients with DV had smaller volumes at first sensation of filling, first desire to void (FD), strong desire to void, cystometric bladder capacity, voided volume, lower maximum flow rate (Qmax), higher detrusor pressure at Qmax (Pdet) and larger volume at postvoid residual (PVR) than those with normal tracing (Table 2).
- Patients with PRES also had lower volumes at SD and voided volume, higher Pdet, lower Qmax, larger PVR than those with normal tracing.
- BND was more prevalent in male than in female patients. Detrusor overactivity (DO) was more prevalent in patients with DV or BND than those with normal tracing (Table 2).

Disclosures Statement: None

Table 1. Comparison of clinical and urodynamic parameters between normal and hypersensitive bladder (HSB) in IC/BPS patients.

Parameters	Normal (n=50)	HSB (n=364)	P value
Age (years)	48.5±13.1	48.9±13.6	0.845
Gender (M)	9 (18.0%)	57 (15.7%)	0.672
(F)	41 (82.0%)	307 (84.3%)	
Duration (years)	3.3±2.8	4.7±5.1	0.055
ICSI	12.6±4.4	12.1±3.9	0.478
ICPI	11.3±3.6	11.3±3.6	0.998
Pain VAS	5.2±2.3	4.7±2.7	0.330
FSF (mL)	167.4±62.5	115.1±50.3	0.000*
FD (mL)	262.8±74.2	179.1±67.0	0.000*
SD (mL)	325.7±79.5	219.3±77.5	0.000*
CBC (mL)	330.8±83.4	217.8±80.6	0.000*
Pdet (cmH2O)	19.5±8.7	22.8±14.4	0.125
Qmax (mL/s)	18.5±7.4	12.0±5.8	0.000*
Volume (mL)	436.5±113.7	234.6±94.8	0.000*
PVR (mL)	30.4±73.8	31.0±67.8	0.951
Capacity (mL)	468.1±78.1	266.3±95.6	0.000*
DO (+)	2 (4.0%)	38 (10.4%)	0.148
PST (+)	35 (70.0%)	312 (85.7%)	0.002#
MBC (ml)	801.0±157.6	619.7±188.7	0.000*
Glomerulation	1.2±0.6	1.8±0.9	0.000*
Ulcer (+)	0 (0%)	26 (7.1%)	0.054

*p<0.05 when compared between groups.

Table 2. Comparison of clinical and urodynamic parameters between normal tracing and different causes of bladder outlet dysfunction in IC/BPS patients.

Parameters	Normal(n=170)	DV (n=42)	PRES(n=193)	BND(n=9)	P Value#
Age (years)	48.6±13.7	49.0±13.1	49.3±13.5	42.7±14.2	0.547
Gender (M)	31 (18.2%)	2 (4.8%)	25 (13.0%)	8 (87.5%)*	0.000#
(F)	139 (81.8%)	40 (95.2%)	168 (87.0%)	1 (12.5%)*	
Duration (years)	3.8±3.9	3.8±4.1	5.4±5.8*	2.1±1.2	0.005#
ICSI	11.9±4.0	11.8±4.3	12.4±3.8	12.3±5.1	0.700
ICPI	11.3±3.6	10.6±4.3	11.3±3.5	12.0±3.4	0.780
VAS	4.6±2.5	4.9±±3.4	4.8±2.6	5.8±3.9	0.681
FSF (mL)	126.8±59.6	103.6±50.9*	121.0±50.5	111.9±46.5	0.098
FD (mL)	200.3±79.2	165.8±76.5*	184.6±65.4*	190.1±66.5	0.030#
SD (mL)	245.2±90.6	197.7±77.5*	230.9±80.7	215.0±84.7	0.029#
CBC (mL)	244.9±93.9	188.6±83.2*	230.2±82.6	206.6±88.4	0.002#
Pdet (cmH_2O)	20.5±8.9	45.6±16.9*	17.7±9.7*	43.3±22.3*	0.000#
Qmax (mL/s)	16.0±5.7	9.4±5.9*	10.8±5.9*	9.8±3.9*	0.000#
Volume (mL)	300.8±115.5	201.4±102.8*	235.3±112.1*	240.8±100.1	0.000#
PVR (mL)	15.1±32.5	44.2±66.1*	42.1±88.5*	33.3±48.5	0.001#
Capacity (mL)	316.8±116.4	256.9±100.4*	276.0±112.8*	274.1±93.5	0.001#
DO (+)	15 (8.8%)	14 (33.3%)*	8 (4.1%)	3 (33.3%)*	0.000#
PST (+)	142 (86.6%)	36 (87.8%)	166 (88.8%)	3 (42.9%)*	0.006#
MBC (mL)	660.9±213.3	642.4±200.9	624.1±171.8	633.3±230.5	0.281
Glomerulation	1.7±0.8	1.6±1.0	1.8±0.9	1.4±0.9	0.365
Ulcer (+)	12 (7.2%)	4 (9.8%)	10 (5.3%)	0 (0.0%)	0.578

*p < 0.05 when compared with normal group. # p < 0.05 when compared between groups.

- Pooling all the patients with BOD together, univariate logistic regression analysis revealed a significant positive correlation of disease duration and negative correlations of urodynamic volume parameters with BOD presented in IC/BPS patients (Table 3).
- Multivariate logistic regression analysis found a cut-off value of Qmax≦11 ml/s predicts BOD in IC/BPS patients with an area under ROC curve of 0.78 (sensitivity = 79.4%, specificity = 65.8%) (Figure 1).

Table 3. Univariate and multivariate logistic regression analyses of parameters significantly associated with bladder outlet dysfunction (BOD) in IC/BPS patients.

Parameters	Normal (n=170)	BOD (n=244)	Uinvariate OR (95% CI)	p	Multivariate OR (95% CI)	p
Duration (years)	3.8±3.9	5.0±5.5	1.057 (1.011-1.105)	0.015	1.048 (0.993-1.106)	0.086
FD (mL)	200.3±79.2	181.6±±67.6	0.996 (0.994-0.999)	0.011	0.998 (0.990-1.005)	0.559
SD (mL)	245.2±90.6	224.7±80.9	0.997 (0.995-1.000)	0.029	1.002 (0.992-1.011)	0.719
CBC (mL)	244.9±93.9	222.1±84.1	0.997 (0.995-0.999)	0.011	1.002 (0.994-1.010)	0.645
Pdet (cmH_2O)	20.5±8.9	23.7±16.5	1.018 (1.002-1.034)	0.025	1.004 (0.984-1.024)	0.681
Qmax (mL/s)	16.0±5.7	10.5±5.8	0.840 (0.804-0.878)	0.000	0.864 (0.818-0.912)	0.000
Volume (mL)	300.8±115.5	229.6±110.5	0.994 (0.992-0.996)	0.000	0.995 (0.978-1.012)	0.549
PVR (mL)	15.1±32.5	42.2±83.6	1.011 (1.005-1.016)	0.000	1.001 (0.983-1.019)	0.929
Capacity (mL)	316.8±116.4	272.6±110.0	0.997 (0.995-0.998)	0.000	1.002 (0.985-1.020)	0.818
MBC ≦600 mL	72 (43.4%)	125 (52.7%)				0.731
601-800 mL	56 (33.7%)	81 (34.2%)	0.833 (0.533-1.303)	0.424	1.252 (0.709-2.214)	0.439
≧801 mL	38 (22.9%)	31 (13.1%)	0.470 (0.269-0.819)	0.008	1.196 (0.542-2.640)	0.657

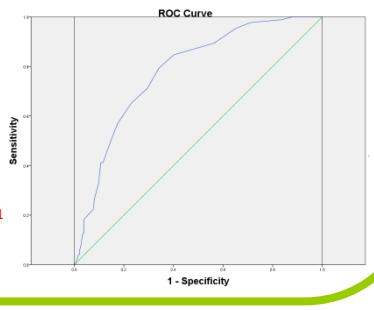


Figure 1. The area under the ROC curve for Qmax ≦11 as a predictive factor for bladder outlet dysfunction in patients with IC/BPS.

Area under ROC curve = 0.781
Sensitivity = 79.4%
Specificity = 65.8%)

Conclusions

- Hypersensitive bladder and bladder outlet dysfunction are common findings of VUDS performed in IC/BPS patients.
- BOD is associated with duration and hypersensitive bladder.
- A Qmax ≦11 ml/s predicts BOD in IC/BPS.