

The Changes of Urodynamic Parameters and Storage Function in Women with IC/BPS after Long-term Follow-up

Yuh-Chen Kuo*¹, Hsiu-Jen Huang², Hann-Chorng Kuo²

¹Department of Urology, Taipei City Hospital, Taipei, Taiwan

²Department of Urology, Buddhist Tzu Chi General Hospital and Tzu Chi University, Hualien, Taiwan

Aims of Study

- Interstitial cystitis/bladder pain syndrome (IC/BPS) is a debilitating chronic disease requiring long-term repeated treatment.
- Although our previous study has demonstrated the value of urodynamic study (UDS) on IC/BPS [1], the role of UDS on IC/BPS remained controversial and little was known about the long-term changes of UDS findings in IC/BPS patients.
- We investigated the changes of UDS parameters in a cohort of IC/BPS women underwent long-term treatment and follow-up in a tertiary medical center.
- The clinical factors that might affect the changes of UDS parameters were also evaluated.

Materials and Methods

- IC/BPS women who have been followed up for two years or more and had at least two records of UDS with an interval of one year or more were enrolled.
- UDS was performed at baseline and in case the treatment outcome was not satisfied or other pathologies were suspected.
- The changes of UDS parameters including first sensation of filling (FSF), first desire to void (FD), strong desire to void (SD), maximum flow rate (Qmax), detrusor pressure at Qmax (Pdet), voided volume (Vol), postvoid residual volume (PVR), cystometry bladder capacity (CBC) and compliance were analyzed between baseline and the latest UDS and were compared between patient groups stratified with different age (<55 vs. ≥55), CBC (<250 vs. ≥250 ml), PVR (<100 vs. ≥100 ml), result of potassium sensitivity test (PST) (negative vs. positive), IC phenotype (ulcer vs. non-ulcer), cystoscopic maximal bladder capacity (MBC) (<600 vs. ≥600 ml) and degree of glomerulations (≤1 vs. =2 vs. >2).

Results

- A total of 212 female IC/BPS patients (mean age, 60.8±13.3; range 24~95) were included in this study.
- The mean duration of history of IC/BPS was 16.2±10.4 (2-61) years.
- The mean interval between the baseline and the latest UDS was 6.4±4.7 (1~20) years.
- After long-term follow-up, most of the UDS parameters did not change except the mean FSF, FD and PVR increased significantly (Table 1).

Table 1. Change of UDS parameters from baseline to the latest visit in 212 IC/BPS women.

UDS Parameters	Baseline	Follow-up	P-value
FSF	117±50.6	133±61.8	0.001*
FD	184±67.6	206±84.8	0.001*
SD	230±82.0	239±100	0.256
Pdet	20.0±13.6	23.4±37.7	0.206
Qmax	12.7±5.71	12.1±6.27	0.199
Vol	250±114	243±129	0.444
PVR	33.8±65.1	58.7±91.1	0.001*
CBC	284±125	302±131	0.100
Compliance	65.5±66.8	68.1±67.1	0.661

*p < 0.05 when compared between baseline and follow-up.

FSF: first sensation of bladder filling; FD: first desire to void; SD: strong desire to void; Pdet: detrusor pressure at Qmax; Qmax: maximum flow rate; Vol: voided volume; PVR: postvoid residual volume; CBC: cystometry bladder capacity.

- Patients with a baseline CBC<250 ml had significantly larger increases in volumes at FD, SD, Vol and CBC than those with a CBC≥250 ml (Table 2).
- Subjects with a baseline PVR ≥100 ml had significantly increased Qmax and Vol, and decreased PVR while subjects with a baseline PVR<100 ml had significantly decreased Qmax and Vol, and increased PVR (Table 3).
- Those with a baseline positive PST had a significantly smaller increase in FSF and FD (Table 4).
- Women with ulcer type IC/BPS had a significantly larger increase in PVR.

References:

- Kuo YC, Kuo HC. Videourodynamic characteristics of interstitial cystitis/bladder pain syndrome-The role of bladder outlet dysfunction in the pathophysiology. *Neurourol Urodyn*. 2018 Aug;37(6):1971-1977.

Disclosures Statement: None

Table 2. Comparison of change of UDS parameters from baseline to the latest visit between IC/BPS women with different CBC.

Parameters		CBC<250 (N=84)	CBC≥250 (N=128)	P-value
FSF	Baseline	92.5±39.0	133±51.1	0.072
	Follow-up	120±67.3*	142±56.6	
FD	Baseline	140±50.2	212±62.3	0.018*
	Follow-up	182±87.8*	222±79.2	
SD	Baseline	171±62.0	270±69.1	0.001*
	Follow-up	210±102*	258±94.0	
Pdet	Baseline	21.0±16.1	19.3±11.6	---
	Follow-up	22.0±31.0	24.4±41.5	
Qmax	Baseline	10.5±4.58	14.2±5.33	---
	Follow-up	10.7±6.26	13.0±6.13*	
Vol	Baseline	159±55.2	311±101	---
	Follow-up	197±109*	273±132*	
PVR	Baseline	21.2±36.2	42.1±77.6	0.161
	Follow-up	58.7±93.0*	58.7±90.1	
CBC	Baseline	180±50.5	353±111	0.000*
	Follow-up	256±121*	332±129	
Compliance	Baseline	50.8±53.0	75.1±73.2	0.278
	Follow-up	61.6±75.8	72.4±60.6	

*p < 0.05 when compared with baseline.

#p < 0.05 when compared between groups.

FSF: first sensation of bladder filling; FD: first desire to void; SD: strong desire to void; Pdet: detrusor pressure at Qmax; Qmax: maximum flow rate; Vol: voided volume; PVR: postvoid residual volume; CBC: cystometry bladder capacity.

Table 3. Comparison of change of UDS parameters from baseline to the latest visit between IC/BPS women with different PVR.

Parameters		PVR<100 (N=183)	PVR≥100 (N=29)	P-value
FSF	Baseline	114±50.7	132±47.8	0.504
	Follow-up	132±61.4*	140±65.5	
FD	Baseline	180±65.5	206±77.3	0.838
	Follow-up	203±85.9*	225±76.2	
SD	Baseline	227±79.6	253±94.4	0.692
	Follow-up	234±101	269±90.2	
Pdet	Baseline	19.8±13.1	21.1±16.2	0.089
	Follow-up	19.3±20.0	49.6±85.3	
Qmax	Baseline	13.3±5.52	8.90±5.47	0.000*
	Follow-up	12.0±6.19*	13.1±6.81*	
Vol	Baseline	259±106	194±145	0.015*
	Follow-up	239±127*	265±136*	
PVR	Baseline	12.6±18.5	168±91.0	0.000*
	Follow-up	56.6±90.1*	71.8±97.7*	
CBC	Baseline	272±104	362±199	0.317
	Follow-up	296±129*	337±143	
Compliance	Baseline	64.6±61.6	71.3±94.5	0.900
	Follow-up	67.5±67.0	72.1±68.5	

*p < 0.05 when compared with baseline.

#p < 0.05 when compared between groups.

Table 4. Comparison of change of UDS parameters from baseline to the latest visit between IC/BPS women with different result of PST.

Parameters		PST(-) (N=17)	PST(+) (N=187)	P-value
FSF	Baseline	124±57.4	116±50.2	0.005*
	Follow-up	189±72.8*	128±59.3*	
FD	Baseline	214±59.8	181±66.5	0.053
	Follow-up	279±95.8*	200±82.3*	
SD	Baseline	274±66.3	226±79.5	0.140
	Follow-up	319±118	232±96.3	
Pdet	Baseline	21.8±13.8	19.9±13.7	0.512
	Follow-up	19.2±9.29	24.0±40.0	
Qmax	Baseline	15.3±6.08	12.6±5.66	0.580
	Follow-up	13.7±8.48	12.0±6.08	
Vol	Baseline	297±152	244±102	0.385
	Follow-up	321±172	238±123	
PVR	Baseline	28.0±51.2	81.5±56.8	0.239
	Follow-up	81.4±108	55.6±89.6*	
CBC	Baseline	325±161	276±101	0.096
	Follow-up	402±144	294±129	
Compliance	Baseline	76.8±91.7	59.8±52.6	0.297
	Follow-up	63.6±43.1	68.2±69.9	

*p < 0.05 when compared with baseline.

#p < 0.05 when compared between groups.

- There was no significant difference in changes of all the UDS parameters between patients stratified with different age, cystoscopic MBC and degree of glomerulations.

Interpretation

- Our results demonstrated FSF and FD but not Vol or CBC increased significantly, indicating there was a little improvement in urothelial function yet the overall storage function didn't alter after long-term TX and follow-up.
- However, the storage function in patients with a baseline CBC<250 ml did improve.
- For women with a baseline PVR ≥100 ml, there is low risk of receiving long-term treatment (having significantly increased Qmax and Vol, and decreased PVR).
- Patients with a positive PST may have more severe urothelial dysfunction which responded poorer to TX and thus had a significantly smaller increase in FSF and FD.
- A larger increase of PVR in ulcer type IC/BPS may be attributed to augmentation enterocystoplasty performed in more than half of the patients (12/21).

Conclusions

- After long-term follow-up, the overall storage function did not change in women with IC/BPS.
- However, the storage UDS parameters could be affected by clinical factors such as patients with a baseline CBC<250 ml and with a positive PST.
- Even in subjects with a large baseline PVR (≥100 ml), there was low risk of receiving long-term treatment.