

## THE EFFECT OF COMORBIDITY ON AUTONOMIC FUNCTION DURING HYDRODISTENSION IN IC/BPS PATIENTS UNDER LARYNGEAL MASK GENERAL ANESTHESIA

### Hypothesis / aims of study

Recent studies showed that there was an increase in sympathetic nerve fibres expression where activity in the urinary bladder of patients with IC/BPS. During cystoscopic hydrodistension, autonomic dysfunction had been reported in glomerulations but not non-glomerulations in IC/BPS patients. However, IC/BPS is often associated with other painful conditions such as IBS and fibromyalgia, which seems to be indicative of a common systemic etiology and also support for an involvement of the sympathetic nervous system. So the aim of our study was to investigate if there was any difference in autonomic response during hydrodistension between pure IC/BPS patients without comorbidity and those with comorbidities.

### Study design, materials and methods

A total of 58 consecutive IC/BPS patients undergoing bladder hydrodistension were enrolled. The diagnosis was made on the consensus of IC/PBS proposed by the AUA in 2012. All patients were diagnosed on the basis of chronic (> 6 weeks) pelvic pain, pressure, or discomfort perceived to be related to the urinary bladder accompanied by at least one other urinary symptom, such as frequency, persist urge, or nocturia, in the absence of infection or other identifiable causes. All patients completed measures of demographic data and questionnaire comprising symptom duration, visual analog scale (VAS) pain score, VAS urgent score, ISCI, ICPI, PUF, voiding diary and sexual pain before cystoscopic hydrodistension. All patients received general anesthesia via laryngeal mask. Detailed procedure is shown on study flow chart below (see fig. 1). Cystoscopic hydrodistension was performed according to International Society for the Study of BPS recommendations. Two successive sessions of hydrodistension were performed and full-filled for 2 and 5 minutes, respectively. Systolic and diastolic blood pressure, heart rate, respiratory rate and minimal alveolar concentration (MAC), as representative of alveolar volatile concentration, were collected at 10 scheduled times. 2 and 5 minutes anesthetic maximal capacities and grade of granulations were recorded. Patients were classified into 2 groups, including pure IC/BPS (group1) and those with comorbidities (group 2). The observer and the surgeon were both blind to patient's comorbidity history. Data were analyzed with independent t-test.

### Results

This study comprised 48 females and 10 males. 16 patients have comorbidities. Between the 2 groups, there were no significant differences in demographics, symptom duration, symptom score, voiding diary, sexual pain, grade of glomerulations, anesthetic maximal bladder capacity, volume change between 2 successive anesthetic maximal bladder capacity, respiratory rate or MAC. In patients with comorbidities, compared systolic blood pressure at the ends of 2 successive hydro-distensions (A2 and B2) to that at the beginning of first hydro-distension (A1), average $\pm$ SD increased by 47.7 $\pm$ 12.9 and 58.6 $\pm$ 18.5 mm Hg, respectively. Relating to diastolic blood pressure, average $\pm$ SD increased by 39.0 $\pm$ 11.0 and 43.0 $\pm$ 10.7 mm Hg. As to heart rate, average $\pm$ SD increased by 14.5 $\pm$ 11.7 and 19.1 $\pm$ 12.6 beats per minute. All hemodynamic changes, except heart rate increased at 1<sup>st</sup> full-filling, were statistically significant ( $p < 0.05$ ) (see table.1 and 2).

### Interpretation of results

Comorbidities of IC/BPS, such as irritable bowel syndrome and fibromyalgia, are associated with autonomic dysfunction as IC/BPS. From our analysis, hemodynamic variables, including blood pressure and heart rate, in IC/BPS patients with comorbidities manifested significant higher than pure IC/BPS patients under similar MAC, except heart rate increased at 1<sup>st</sup> full filling stage. However, demographics, symptom duration, symptom severity, endoscopic grading of glomerulations and anesthetic maximal capacity, all show no significant differences between the 2 groups. Although the significant sympathetic response between the 2 groups is not clear, it may imply the possibility of additive autonomic effect from comorbidities.

### Concluding message

IC/BPS patients with comorbidities demonstrate more exaggerated hemodynamic changes than pure IC/BPS patients. Close monitor and foresee the autonomic change are needed in safe management of anesthesia in this patient group.

### Disclosures

**Funding:** No **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Ethics Committee of Feng Yuan Hospital **Helsinki:** Yes **Informed Consent:** No

<Figure 1> Flow chart

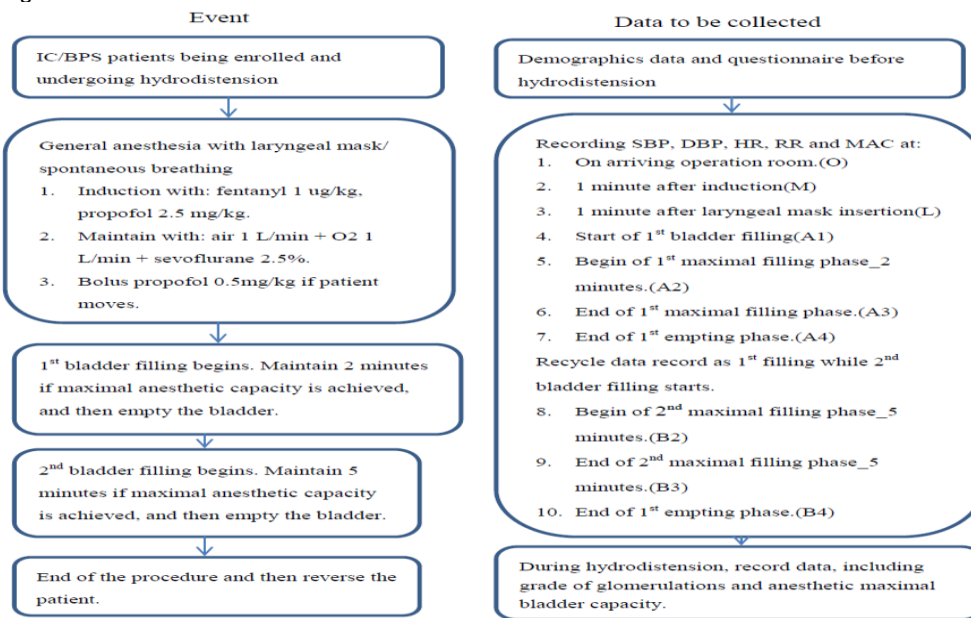


Fig 1. Study flow chart

<Table 1> Demographics, clinical variables and hydrodistension parameters in pure IC and IC with comorbidities

**Table 1.** Demographics, clinical variables and hydrodistension parameters in pure IC/BPS patients (group 1) vs IC/BPS patients with comorbidities (group 2)

		Group 1	Group 2	P
Number	(N)	42	16	
Age		45.8±13.1	46.9±10.7	0.80
Sex	Male	8 (19.0%)	2 (12.5%)	0.53
	Female	34 (81.0%)	14 (87.5%)	
Education	High school	21 (50.0%)	9 (56.2%)	0.57
	University	16 (38.0%)	7 (43.7%)	
	Graduate	5 (12.0%)	0 (0%)	
Marriage	Yes	30 (71.4%)	12 (75.0%)	0.64
	No	12 (28.6%)	4 (25.0%)	
Symptom duration		6.8±6.6	9.2±12.2	0.43
Symptom score	VAS Pain score	6.4±2.2	6.0±2.1	0.69
	VAS Urgent score	6.9±2.2	5.7±1.8	0.32
	ICSI	14.2±3.2	14.5±3.3	0.84
	ICPI	12.2±2.8	12.8±2.6	0.64
	PUF	20.0±7.0	20.3±6.4	0.92
Voiding diary	Daytime frequency	14.4±4.5	12.6±3.4	0.26
	Daytime voiding volume	108.4±45.8	119.8±46.6	0.49
	Nighttime Frequency	2.5±1.7	2.3±1.5	0.71
	Nighttime voiding volume	127.4±71.8	138.8±43.1	0.63
Sexual Pain	Yes	28 (66.7%)	11 (68.7%)	0.66
	No	14 (33.3%)	5 (31.3%)	
Glomerulations	Grade 1	6 (14.3%)	2 (12.5%)	0.90
	Grade 2	6 (14.3%)	2 (12.5%)	
	Grade 3	5 (11.9%)	4 (25.0%)	
	Grade 4	25 (59.5%)	8 (50.0%)	
Anesthetic maximal bladder capacity_2'		736.5±205.9	678.8±166.6	0.45
Anesthetic maximal bladder capacity_5'		822.0±222.3	740.0±172.9	0.26
Δ Difference between 2 hydrodistensions		85.5±39.6	61.1±25.2	0.09

<Table 2> Autonomic parameters in pure IC and IC with comorbidities

**Table 2.** Autonomic parameters, respiratory rate and minimal alveolar concentration in pure IC/BPS patients (group 1) vs IC/BPS patients with comorbidities (group 2)

		Group 1	Group 2	P
Number	(N)	42	16	
Systolic blood pressure (SBP)	ΔSBP_A2 to A1	29.5±23.1	47.7±12.9	0.01
	ΔSBP_B2 to A1	35.6±25.1	58.6±18.5	<0.01
Diastolic blood pressure (DBP)	ΔDBP_A2 to A1	21.1±20.3	39.0±11.0	<0.01
	ΔDBP_B2 to A1	28.5±16.4	43.0±10.7	<0.01
Heart Rate (HR)	ΔHR_A2 to A1	10.1±9.9	14.5±11.7	0.22
	ΔHR_B2 to A1	10.7±10.5	19.1±12.6	0.04
Respiratory Rate (RR)	ΔRR_A2 to A1	4.5±5.1	6.2±8.4	0.45
	ΔRR_B2 to A1	8.0±6.3	11.1±6.3	0.75
Minimal alveolar concentration (MAC)	ΔMAC_A2 to A1	0.05±0.09	0.03±0.08	0.65
	ΔMAC_B2 to A1	0.13±0.10	0.11±0.11	0.74