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CORRELATION BETWEEN THE EXTENT OF HUNNER LESIONS AND CLINICAL SYMPTOMS IN PATIENTS WITH HUNNER TYPE INTERSTITIAL CYSTITIS

Hypothesis / aims of study
It has been demonstrated that Hunner type interstitial cystitis (HIC) is an inflammatory disorder characterized by pancystitis; inflamed not only in Hunner lesions but in a non-lesion area, and the degree of inflammation did not correlate with symptom severity (1). It is well-known facts that fulguration only for Hunner lesions ameliorates the painful symptoms, or intravesical therapies to complement the defective urothelium are effective for HIC patients. In this study, we evaluated the correlation between the extent of Hunner lesions and clinical parameters to examine whether Hunner lesions could be attributable to symptom severity in HIC patients.

Study design, materials and methods
A retrospective evaluation of a prospective, single center, clinical database of IC/HSB (Hypersensitive bladder) seen at our institution between 2009 and 2016 was carried out. Diagnosis of IC/HSB was made based on the clinical guidelines for IC/HSB (2) This database comprised patients' demographics including sex, age, duration of illness, symptom scores of O'Leary-Sant Symptom and Problem Indexes (OSSI and OSPI), visual analogue scale (VAS) for pain, Overactive Bladder Symptom Scores (OABSS), International Prostate Symptom Scores (IPSS), quality of life (QOL) index, and voiding symptoms including daytime frequency, nocturia, average and maximum voided volume (AVV and MVV) obtained by the frequency volume chart (FVC), and operative demographics at hydrodistension including maximum bladder capacity at a pressure of 80 cm H2O, the number, location, and occupation rate of Hunner lesions in the bladder. From the database, we selected patients with HIC who underwent their initial hydrodistension at our institution with all procedures performed by a single surgeon. Comparison of clinical parameters between patients with extensive Hunner lesions (defined as more than the median occupation rate) and those with focal Hunner lesions (less than the median occupation rate), and correlation between the extent of Hunner lesions and clinical parameters were explored.

Results
A total of 21 males (22%) and 73 females (78%) met the criteria and were analysed. The demographics and characteristics of the study cohort are shown in Table 1 and Table 2. Patients had mean 2.6 Hunner lesions occupying 25.6% of the bladder wall. Patients with extensive Hunner lesions (defined as more than 25% occupation) had significantly higher OSSI and OSPI scores (p<0.01, respectively), VAS for pain scores (p = 0.01), IPSS scores (p<0.01), worse QOL index (p = 0.02), greater daytime urinary frequency (p = 0.04), more nocturia (p = 0.04), AVV and MVV (p=0.02, respectively), and maximum bladder capacity at hydrodistension (p<0.01) compared to those with focal Hunner lesions (less than 25% occupation) (Table 3). The extent of Hunner lesions was significantly correlated with symptom severity: positively with OSSI/OSPI, VAS, OABSS, IPSS, daytime urinary frequency and nocturia, and inversely with AVV, MVV, and maximum bladder capacity at hydrodistension (Table 4).

Table 1. *Demographics of patients with HIC*

No. (male / female)	94 (21 / 73)
Mean age at the time of biopsy (years)	66.7 ± 11.2 [25 – 88]¶
Years from symptom onset to biopsy (years)	4.4 ± 4.3 [0 - 30]
OSSI	13.8 ± 4.3 [4 - 20]
OSPI	11.5 ± 4.3 [1 - 16]
VAS	6.7 ± 2.7 [0 - 10]
OABSS	7.9 ± 2.8 [2 - 15]
IPSS	
total	22.4 ± 8.7 [2 - 35]
storage symptoms (Q2, 4, 7)	11.7 ± 3.5 [2 - 15]
voiding symptoms (Q1, 3, 5, 6)	10.6 ± 6.2 [0 - 20]
QOL index	22.4 ± 8.7 [2 - 35]
Daytime frequency (/daytime)	14.6 ± 6.6 [5 – 34]
Nocturia	4.4 ± 2.6 [0 - 15]
Average voided volume (mL)	114.0 ± 57.9 [22 - 300]
Maximum voided volume (mL)	183.1 ± 86.5 [50 - 450]

¶mean ± SD [range]

Table 2. *Cystoscopic findings at hydrodistension*

No. Hunner lesions	2.6 ± 1.6 [1 - 7]¶
Occupation rate of Hunner lesions to the bladder wall (%)	25.6 ± 18.0 [5 – 80]
Location of Hunner lesions in the bladder wall (No. patients) (%)†	
neck	2 (2)
Trigone	1 (1)
Dome	27 (29)
Lateral (right/left)	46 (49)/45(48)
Anterior	27 (29)
Posterior	57 (61)
Mucosal bleeding after distension (No. patients) (%)	
none	10 (11)
glomerulations	4 (4)
Rainy bleeding	30 (32)
Waterfall bleeding	50 (53)
Maximum bladder capacity at hydrodistension (mL)	443.5 ± 166.7 [80 – 800]

†Counted redundantly

Table 3. *Comparison between patients with extensive Hunner lesions and those with focal Hunner lesions*

	Hunner lesions		
	Extensive	Focal	P value
No. (male / female)	38 (9 / 29)	56 (12 / 44)	0.80
Mean age at the time of biopsy (years)	68.6 ± 8.3 [41 – 81]¶	65.4 ± 12.7 [25 – 88]	0.21
Years from symptom onset to biopsy (years)	4.3 ± 5.1 [0 – 30]	4.5 ± 3.7 [0 – 17]	0.44
OSSI	15.4 ± 3.2 [8 – 20]	12.7 ± 4.6 [4 – 20]	<0.01*
OSPI	13.7 ± 2.3 [8 – 16]	10.0 ± 4.7 [8 – 16]	<0.001*
VAS	7.5 ± 2.3 [2 – 10]	6.1 ± 2.8 [0 – 10]	0.01*
OABSS	8.7 ± 2.8 [4 – 15]	7.4 ± 2.9 [2 – 15]	0.10
IPSS			
total	25.6 ± 6.8 [11 – 35]	20.1 ± 9.0 [2 – 35]	0.01*
storage symptoms (Q2, 4, 7)	12.6 ± 2.6 [7 – 15]	11.1 ± 3.8 [2 – 15]	0.11
voiding symptoms (Q1, 3, 5, 6)	13.0 ± 5.5 [3 – 20]	9.0 ± 5.9 [0 – 20]	<0.01*
QOL index	5.9 ± 0.4 [4 – 6]	5.5 ± 0.8 [2 – 6]	0.02*
Daytime urinary frequency (/day)	16.2 ± 6.8 [5 – 33]	13.5 ± 6.3 [5 – 34]	0.04*
Nocturia	5.3 ± 3.2 [0 – 15]	3.9 ± 2.0 [1 – 12]	0.04*
Average voided volume (mL)	96.7 ± 48.4 [22 – 225]	126.6 ± 61.3 [30 – 300]	0.02*

¶mean ± SD [range] *Significant difference by Wilcoxon rank-sum test

Table 4. *Correlation between the extent of Hunner lesions and clinical parameters*

	Correlation with the extent of Hunner lesions				
	Spearman's ρ	P value		Spearman's ρ	P value
OSSI	0.30	<0.01*	QOL index	0.18	0.09
OSPI	0.39	<0.001*	Daytime urinary frequency (/day)	0.27	0.01*
VAS	0.22	0.03*	Nocturia	0.23	0.03*
OABSS	0.24	0.04*	Average voided volume (mL)	−0.30	0.01*
IPSS total	0.36	<0.01*	Maximum voided volume (mL)	−0.30	0.01*
storage (Q2, 4, 7)	0.24	0.04*	Maximum bladder capacity	−0.34	<0.001*
voiding (Q1, 3, 5, 6)	0.35	<0.01*	at hydrodistension (mL)		

*Significant difference by Spearman rank correlation coefficient test

Interpretation of results
The results indicate that symptom severity was correlated with the extent of Hunner lesions, suggesting the impact of Hunner lesions on the clinical manifestations in patients with HIC.

Concluding message
Hunner lesions, but not subepithelial inflammation, may be a gateway to the symptom trigger in the HIC bladder.

References
1. Maeda D, Akiyama Y, Morikawa T et al. Hunner type (classic) interstitial cystitis: a distinct inflammatory disorder characterized by pancystitis, with frequent expansion of clonal B-cells and epithelial denudation. PLoS One. 2015; 10: e0143316.
2. Homma Y, Ueda T, Tomoe H, et al. Clinical guidelines for interstitial cystitis and hypersensive bladder updated in 2015. Int J Urol. 2016; 23: 542-9.

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