# Correlation between Bladder Urothelial Thickness and Clinical Symptoms in Patients with Interstitial Cystitis / Bladder Pain Syndrome (IC/BPS)

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## Hypothesis / Aim of study :

Interstitial Cystitis / Bladder Pain Syndrome (IC/BPS) is a chronic bladder condition characterized by bladder pain, urinary urgency, urinary frequency, and nocturia. Recent studies showed that increased apoptosis and denudation/thinning of the bladder urothelium are common findings in IC/BPS patients. Thus, the aim of our study is to investigate the relationship between urothelial thickness and clinical symptoms of IC/BPS patients

## Study design, materials and methods :

The study group consisted of 30 patients with IC/BPS and the control group consisted of 12 volunteers without any IC/BPS symptoms. Bladder biopsies were taken from both groups. We determined the thickness of the bladder urothelium by immuno-histochemical staining for CK7 (cytokeratin 7; an epithelial marker). There are six clinical symptoms in consist of symptom questionnaire and potassium chloride sensitivity test (KCL test). The five symptom questionnaire including visual pain analogue scale (VAS-pain scale), visual urgency analogue scale (VAS-urgency scale), O'Leary-Sant Symptom Index (ICSI), O'Leary-Sant Problem Index (ICPI), and Pain and Urgency / Frequency symptom scale (PUF scale) were also recorded. The pain score of KCL Test was also performed. We analyzed the correlation between bladder urothelial thickness and clinical symptoms by using Spearman's rho.

## Results:

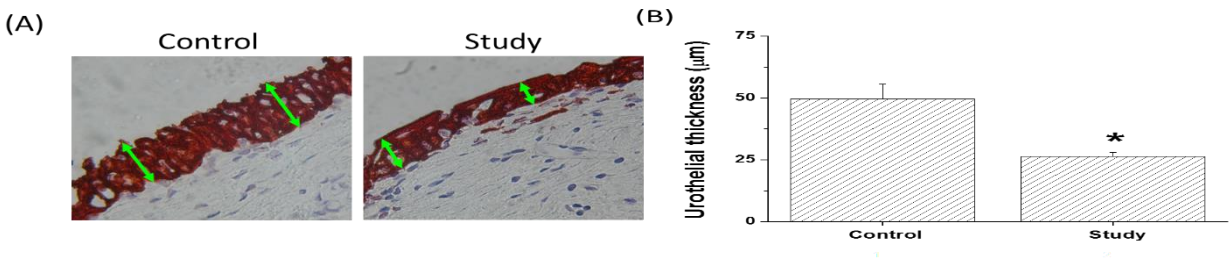
**<Table 1>** Demographics of IC/BPS patients

| Items (unit or range) | N | Value (mean ± standard error) |
|---|---|---|
| Age (years) | 30 | 40.5 ± 1.77 |
| No. 24-h frequency | 21 | 14.66 ± 2.24 |
| No. nocturnal frequency | 21 | 3.30 ± 0.99 |
| Visual pain analogue scale (0-10) | 25 | 4.52 ± 0.72 |
| Visual urgency analogue scale (0-10) | 25 | 6.16 ± 0.56 |
| O'Leary-Sant Symptom Index (0-20) | 20 | 12.25 ± 0.55 |
| O'Leary-Sant Problem Index (0-16) | 20 | 9.90 ± 0.77 |
| Pain and Urgency/Frequency symptom scale (0-35) | 20 | 18.25 ± 1.81 |
| Pain score of KCl test (0-5) | 25 | 2.92 ± 0.31 |

**<Table 2>** The correlation between urothelial thickness and symptoms in IC/BPS patients

| Group Thickness | Symptom | N | Spearman R | Spearman P |
|---|---|---|---|---|
| Thicker group (Thickness >26.42 μm) | | | | |
| | Visual pain analogue scale | 11 | -0.161 | 0.318 |
| | Visual urgency analogue scale | 11 | -0.546 | 0.041* |
| | O'Leary-Sant Symptom Index | 9 | 0.336 | 0.188 |
| | O'Leary-Sant Problem Index | 9 | 0.025 | 0.474 |
| | Pain and Urgency/Frequency symptom scale | 9 | -0.647 | 0.030* |
| | Pain score of KCl test | 11 | -0.422 | 0.098 |
| Thinner group (Thickness <26.42 μm) | | | | |
| | Visual pain analogue scale | 14 | -0.327 | 0.127 |
| | Visual urgency analogue scale | 14 | -0.029 | 0.461 |
| | O'Leary-Sant Symptom Index | 11 | -0.238 | 0.240 |
| | O'Leary-Sant Problem Index | 11 | -0.275 | 0.207 |
| | Pain and Urgency/Frequency symptom scale | 11 | -0.446 | 0.085 |
| | Pain score of KCl test | 14 | -0.683 | 0.004* |

**<Figure 1>** The bladder urothelium in IC/BPS and control group




## Conclusions :

The bladder urothelial thickness was significantly decreased (approximately 50% less) in the IC/BPS group compared with that in the control group. Additionally, the pain score of KCl test has significantly negative correlation with urothelial thinner group than in thicker group of IC/BPS patients.