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Urinary ATP may be a biomarker of interstitial cystitis/ bladder pain syndrome and its severity

Abstract:

Urinary tract cells exhibit a response to bladder distension by releasing adenosine triphosphate (ATP). Interstitial cystitis/bladder pain syndrome (IC/BPS) patients demonstrate elevated levels of urinary ATP in comparison to asymptomatic controls. The objective of this study was to investigate the potential of urinary ATP as a non-invasive biomarker for IC/BPS and its symptom severity.

This study involved 56 patients diagnosed with IC/BPS, and 50 asymptomatic individuals as controls. Urine were collected from both groups. The level of urinary ATP was measured using a lucigenin-luciferase bioluminescence method. The severity of IC/BPS symptoms was assessed using the visual analogue score (VAS), interstitial cystitis symptom index (ICSI), and interstitial cystitis problem index (ICPI) from the O'Leary-Sant score. The study examined the correlations between symptom scores and urinary ATP levels specifically in patients with IC/BPS.

Urinary ATP were found to be significantly elevated in IC/BPS patients compared to the control group ($p < 0.0001$). Among IC/BPS patients, there was a notable positive association observed between the concentration of urinary ATP and VAS, ICPI, and ICSI ($p < 0.0001$). The threshold value for ATP concentration was determined to be 56.6 nM, with an area under the receiver operating characteristic (ROC) curve of 0.811 (95% CI: 0.730-0.892).

Individuals diagnosed with IC/BPS have been found to excrete higher amounts of ATP in urine. This observation suggests that urinary ATP could potentially be utilized as a non-invasive biomarker for IC/BPS. Furthermore, the levels of ATP in the urine may also possess predictive value in terms of symptom severity.

Keywords: Lower urinary tract symptoms, lower abdominal pain, interstitial cystitis/ bladder pain syndrome (IC/BPS), adenosine triphosphate

Biography: YanyuanWu graduated from Shanghai Jiaotong University School of Medicine. She was jointly supervised by Professor Jun Qi (a Clinical Urologist), Professor Weifang Rong (a basic scientist with a research interest in bladder physiology and dysfunction) and Professor Weihong Tan (a academician in the field of analytical chemistry). Her current research focuses on ion channels and receptors in hypersensitive bladder.