238

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URINARY ATP IS THE PREDICTIVE MARKER FOR THE EFFECT OF HYDRODISTENSION IN THE INTERSTITIAL CYSTITIS PATIENT

Abstract Text:

Hypothesis / aims of study

Interstitial cystitis (IC) is a syndrome presented with the symptoms of urinary frequency, urgency and pelvic pain. The diagnosis is usually reached on the combination of a patient's history and cystoscopic evaluation. The severity of IC was evaluated by using the questionnaire, including the symptoms index and the problem index[1)]. However, the cause of this syndrome has not been elucidated. Moreover, there were no specific urinary markers for detecting and evaluating the disease severity. Hydrodistension is one of the major diagnostic and therapeutic tools for IC. However, the efficacy rate of hydrodistension and the duration of the effect are not integrated. There are no urinary markers which predict the effect of hydrodistension.

Recently the urothelium is one of the interesting research targets for the bladder function, because the urothelium expresses many important factors including adenosine tri-phosphate (ATP), Nitric Oxide (NO) and prostaglandin E2 (PGE2). Especially previous reports showed that ATP release was more prominent in IC patients than in control patients (2, 3).

In this study, to examine the relationships between urinary markers and efficacy of hydrodistension, we measured urinary NO, PGE2, and ATP from the urine collected from the IC patients before and after hydrodistension.

Study design, materials and methods

Twenty-five patients (3 male and 22 female; 57.5+/-12.1 years-old (average +/- SD)) were newly diagnosed of IC in our institute from March 2005 to December 2005. The average symptom and problem index is 14.7 +/- 4.3 and 11.8 +/- 3.6. Each study patients underwent hydrodistension under spinal anesthesia with sorbitol irrigating solution until bladder capacity reached 600 ml or the bladder pressure reached 80 cmH_2O. We measured urinary creatinine, NO_2^-, NO_3^-, PGE2 and ATP before and one week after the hydrodistension treatment. Data of NO_2^-, NO_3^-, PGE2 and ATP were adjusted with urinary creatinine. To identify the efficacy of hydrodistension, symptom index and problem index were obtained one month after the treatment. A case was considered as effective when more than 25% decrease of total score (symptom index plus problem index) was found. Otherwise (increased score, no change, less than 25% decrease), the case was considered as ineffective. Then we compared the urine markers described above with these two groups. The results were presented as means +/- SE. Unpaired t-test was used to compare the means between effective and ineffective cases. Paired t-test was used to compare the means between before and after the hydrodistension. $P<0.05$ was considered as statistically significant

Results

Twelve patients among 25 patients were effective for the treatment of hydrodistension (total score: before 25.6 +/- 1.4, after 13.6 +/- 1.7). Other 13 patients were ineffective (total score: before 27.5 +/- 2.6, after 27.5 +/- 2.4). Between two groups, there are no significant difference in urine NO_2^-, NO_3^- and PGE2 concentration before the hydrodistension (Table). However, urine ATP level in effective cases (31.47 +/- 4.06 pmol /mg Cr) is significantly lower than that of ineffective group (73.95 +/- 13.9 pmol /mg Cr) ($p=0.0094$). In effective group, only urine ATP level (42.55+/- 4.86) significantly increased one week after the hydrodistension ($p=0.022$), but NO and PGE2 level did not increased significantly. In ineffective group, there was no significant difference in ATP, NO and PGE2 between before and after the hydrodistension.

Interpretation of results

The urothelium can release ATP in response to mechanical stretch, and the ATP release was reported prominent in IC patients than control patients. In our study, urinary ATP level in IC patients is higher than our control study (Data not shown). Among IC patients which ATP level is high, higher ATP level patients are likely to be resistant to the hydrodistension treatment in this study. Interestingly, ATP level in the effective group increased significantly higher than pre-treatment status. This indicated that the ability to response to the stretch-activated ATP release mechanism remains the good response of hydrodistension.

Concluding message

Urinary ATP could be the useful prediction marker to evaluate the effect of hydrodistension treatment.

References

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Table Urinary markers before and after the hydrodistension in IC patients

	Effective	Ineffective	p-value
NO2- (umol/mg Cr)	<1	<1	NA
NO3- (umol/mg Cr)	2.09 +/- 0.64	1.99 +/- 0.29	0.8916
PGE2 (pg/mg Cr)	279.3 +/- 98.3	194.1+/- 44.8	0.4261
ATP (pmol/mg Cr)	31.47+/- 4.06	73.95 +/- 13.9	0.0094**

Data was presented as mean +/- SE.. ** statistically significant

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