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INHIBITION OF SACRAL ACUPUNCTURE ON BLADDER IRRITATION INDUCED BY ACETIC ACID IN CONSCIOUS RATS

Hypothesis / aims of study
Sacral acupuncture was reported to inhibit urinary urgency and improve decreased bladder capacity in patients with overactive bladder and painful bladder syndrome (1, 2). However, the action mechanisms of acupuncture are not known well. In this study, we investigated the effects of sacral acupuncture on cystometrical evaluation of the bladder irritation induced by acetic acid in conscious rats.

Study design, materials and methods
Twelve female Sprangue-Dawley rats (230-280g) were divided control group (n=6) and acupuncture group (n=6). After anesthesia with pentobarbital (40 mg/kg, i.p.), a polyethylene catheter (PE-50) was implanted into the bladder. Four or five days after the implantation, cystometry was performed in restrained conscious rats by infused saline (37C) into the bladder at constant rate (2.4ml/hr) using infusion pump. The three constant micturition contractions before acetic acid administration were determined baseline (***before***). Acetic acid (0.3%) was instilled intravesically for 60 min. Following acetic acid instillation, saline was infused for 60 min. After the saline infusion acupuncture stimuli was applied to sacral region for one min in acupuncture group, while saline infusion without acupuncture stimulation was continued in control group. After acupuncture or control the cystometrical evaluation was again performed for 60 min (***after***). The investigated cystometric parameters were as follows: basal pressure (BP), threshold pressure (TP), micturition pressure (MP) and intercontraction interval (ICI). The Mann-Whitney test was used for statistical data analysis. For all statistical analysis, $p<0.05$ was considered to be statistically significant.

Results
Each parameter obtained before the infusion of acetic acid showed to difference between two groups. A statistically significant difference was observed in ICI after the infusion of acetic acid between control and acupuncture group (23.8 ± 9.5 vs. 41.5 ± 10.1 min, $p<0.05$, respectively). However, no significantly differences were found in BP after the infusion of acetic acid between the two groups (23.1 ± 9.6 vs. 15.2 ± 9.9 cmH_2O, respectively). The changes of BP and ICI after acetic acid instillations in control group were significant (7.0 ± 3.4 vs. 23.1 ± 9.9 cmH_2O, 46.6 ± 13.9 vs. 23.8 ± 9.5 min, $p<0.05$, respectively). In contrast, there were no significant differences in BP and ICI between before and after in acupuncture group. There was no statistical significantly difference in TP and MP between two groups.

Interpretation of results
In control group BP significantly increased and ICI significantly decreased between before and after, while in acupuncture group BP and ICI remained significantly unchanged. In addition, in acupuncture group ICI increased significantly compared with control group. Therefore, sacral region acupuncture was inhibited the bladder irritation induced by acetic acid. The bladder irritations have been suggested to be related with the activated afferents of C-fiber in the bladder. According to the results of this study, sacral region acupuncture seemed to improve bladder irritation through the inhibition of C-fiber activation. It is suspected that sacral acupuncture could be useful to improve symptoms of overactive bladder and painful bladder syndrome.

Concluding message
Sacral acupuncture seems to inhibit C-fiber activation induced by acetic acid on filling bladder in conscious rats.

References
1) Urol Int 65: 190-195, 2000.
2) ICS2005 Abstract No.541

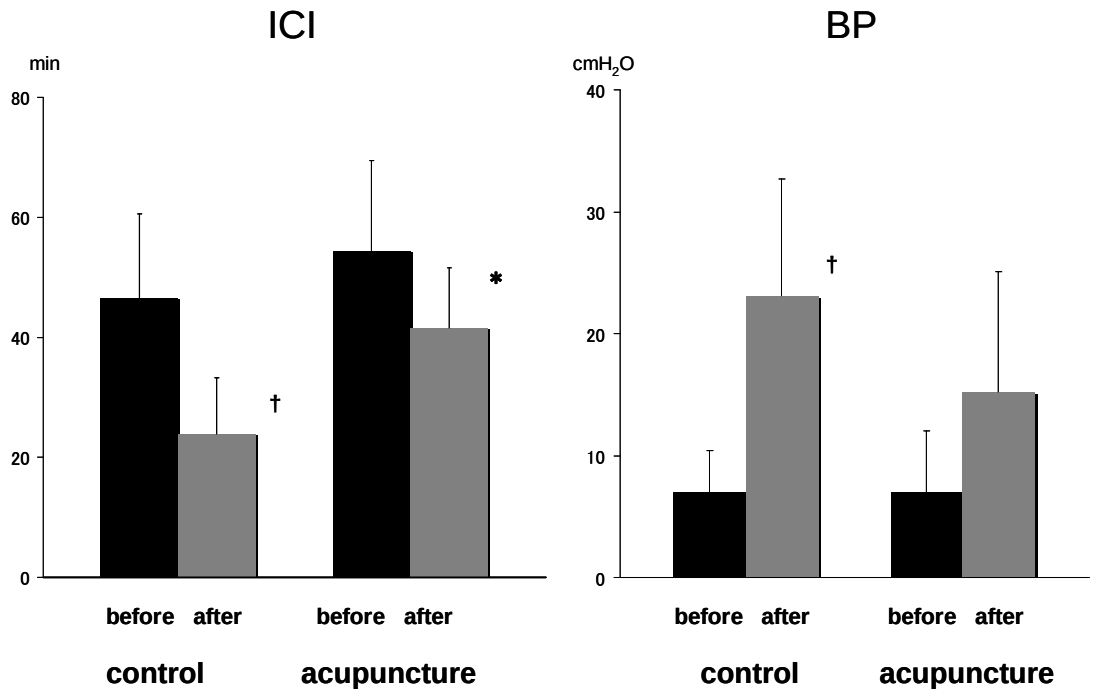

Figure 1.Changes of intercontraction interval (ICI) and basal pressure (BP) in control and acupuncture groups. All data are expressed as means ± SD. ＊P<0.05 control vs. acupuncture † P<0.05 before vs. after

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ANIMAL SUBJECTS: This study followed the guidelines for care and use of laboratory animals and was approved by Local Ethics Committee of Meiji University of Oriental Medicine