

## SACRAL ACUPUNCTURE NORMALIZED BLADDER SENSORY DYSFUNCTION OF C-FIBER IN PATIENTS WITH OVERACTIVE BLADDER AND PAINFUL BLADDER SYNDROME

### Hypothesis / aims of study

Acupuncture is one of the standardized neuromodulatory therapies available. We have reported that acupuncture had impact on increasing the maximum cystometric bladder capacity as well as suppressing the bladder contraction in patients with detrusor overactivity and on relieving the chronic pelvic pain (1, 2). Neuromodulation by acupuncture is also believed to impact on inhibit transmission of pain as well as to normalize sensory processing within the peripheral and/or central nervous systems. Recently we reported that, using Neurometer (Neuroton, Baltimore, MD), quantitative neuroselective measurement of the current perception threshold (CPT) values (i.e. vesical sensory threshold) values of the A-delta and C fibers in the human bladder mucosa, allowing the detection of hyper-esthetic (abnormally low) or hypo-esthetic (abnormally high) vesical sensory threshold (3). We investigated whether sacral acupuncture had clinical impact on urinary sensory dysfunction in patients with overactive bladder (OAB) or painful bladder syndrome (PBS), in special reference to the monitored CPT values of c-fiber in the human bladder mucosa.

### Study design, materials and methods

Thirty six patients (6 male, 30 females) suffering from OAB (n=25, age ranged from 43 to 80) and PBS (n=11, age ranged from 29 to 78) were treated by acupuncture. Acupuncture was performed using disposable stainless steel needles (0.3 mm in diameter, 60 mm in length, SEIRIN Kasei, Shimizu, Japan) with the patient in the prone position. Acupuncture needles were inserted into the bilateral BL-33 (Zhongliao) points as standardized by the World Health Organization, on the skin of the third posterior sacral foramina. A needle was inserted into each side of the foramina sufficiently deeply for its tip to be placed close to the sacral periosteum, and then the bilateral needles were picking up and down reciprocally with manual for 10 min. The treatment was repeated once a week for 4 weeks for the initial treatment (1st to 4th acupuncture). In all patients bladder diary was recorded, and in patient with PBS, visual analogue scale (VAS) for the bladder pain was monitored. Neuroselective bladder mucosal sensory function was evaluated before the treatment, using Neurometer to measure the CPT (1=0.001mA) of c-fiber in the bladder mucosa. In 19 patients (12 with OAB, 7 with IC) the possible changes of CPT values after the 4th treatment were monitored. With the data set of mean and standard deviation (S.D.) values of CPT which were obtained from healthy volunteers, the normal range of the CPT in the bladder mucosa were defined as the range from mean - 1S.D. to mean + 1S.D. of the CPT in the health volunteers (3).

### Results

24-hour frequency significantly ( $p < 0.001$ ) decreased from 15.0 to 9.8 times a day. Maximum voided volume significantly ( $p < 0.05$ ) increased from 170ml to 230ml. Post-treatment VAS for bladder pain (48mm) was significantly improved from baseline (79mm) ( $p < 0.01$ ). No adverse effects were recognized throughout the treatment period. The mean CPT value for c-fiber of patients with OAB (n=25) was 31.9, while the mean CPT value for c-fiber of patients with PBS (n=11) was 53.6. In 18 patients with abnormal pre-treatment CPT value, post-treatment CPT values in 8 of the 18 (44.4%) patients changed to normal range (mean  $\pm$  1S.D.), accompanied with significant improvement of the symptoms (**Figure1**).

### Interpretation of results

Sacral acupuncture was found to be a safe promising therapeutic alternative for the difficult-to-treat patients with OAB and/or suspicious PBS, improving the clinical symptoms of urinary frequency, urgency, and bladder pain, accompanied with increase of bladder capacity. Our findings suggested sacral acupuncture to BL-33 likely inhibits the C-fiber hypersensitivity which could be involved in the pathogenesis in OAB and PBS/IC. A prospective controlled trial with sham of acupuncture in comparison to our current protocol of sacral acupuncture treatment for OAB or PBS is warranted.

### Concluding message

Sacral acupuncture to BL-33 point has significant impact on inhibit transmission of pain or urinary urgency, with the possible mechanism to modulate abnormality of sensory afferent nerve systems in patients with OAB and PBS.

### References

1. Urol Int 65: 190-195, 2000.
2. Int J Urol 11: 607-612, 2004.
3. Eur Urol 45:70-76, 2004.

