

## COMBINATION THERAPY OF ELECTRO-ACUPUNCTURE AND TOLTERODINE FOR MIXED URINARY INCONTINENCE IN WOMEN

### Hypothesis / aims of study

To investigate the effect of combination therapy of electro-acupuncture and tolterodine in treating female patients with mixed urinary incontinence (MUI).

### Study design, materials and methods

63 women with MUI, diagnosed by history (> 1 year), symptoms, a 3-day micturition diary ( $\geq 1$  incontinence episode / 24 h) and 24-h pad testing (>4g / 24 h), were recruited to take electro-acupuncture therapy or the combination therapy of electro-acupuncture and tolterodine 2mg orally twice a day for 8 weeks. In electro-acupuncture therapy, the acupoints including BL23 (Shen Shu), BL32 (Ci Liao), BL35 (Hui Yang), SP6 (San Yin Jiao) and ST36 (Zu San Li) were selected with the stimulation of a low-frequency (20Hz) spaced-density wave. The International Consultation on Incontinence questionnaire (ICIQ) score<sup>1</sup>, the number of incontinence episodes and urine leakage were measured before and after the treatment. The cured cases were defined as those whose symptoms were eliminated or urine leakage per 24h was less than 4g. The improved ones were defined as those whose urine leakage per 24h reduced more than 50%. With a minimum of 30 patients per group, we had 85% power to detect a change in response rate (cured/improved) of 30% and cure rate of 25%.

### Results

The patients' demographic and baseline measurements are shown in *Table 1*. After 8 weeks the majority of patients showed positive response to the treatment in both groups. The response rates were 70% and 73% in electro-acupuncture therapy group and in combination therapy group respectively. There is no significant difference ( $p>0.05$ ), neither did the cure rates (16.7% vs. 21.2%). As shown in *Table 2*, ICIQ score, the number of incontinence episodes and urine leakage had a significant decrease ( $p<0.001$ ) after 8 weeks compared with the baseline in both groups. The patients in combination therapy group presented a higher response rate in reducing the number of incontinence episodes more than 50% (72% vs. 57%) and less urine leakage than those in electro-acupuncture therapy group ( $p<0.05$ ).

### Interpretation of results

Electro-acupuncture showed positive effect in treating MUI. The possible mechanisms are shown in *Figure 1*. On one hand, needling BL32, BL23 and SP6 can improve the stress component of MUI by down-regulating the c-Fos expression in brain, which is related to enhancing the abdominal leak point pressure<sup>2</sup>. On the other hand, needling BL32, BL35 and ST36 can improve the urgency component of MUI by down-regulating muscarine receptors binding capacities<sup>3</sup> and the VR1 expression in the sacral micturition centre. In addition, the low level of oestrogen associated with MUI can be improved in women by needling BL23, SP6 and ST36, which may benefit the MUI. The combination therapy showed better effect in comparison to electro-acupuncture therapy. The potential reason is the synergy between electro-acupuncture and tolterodine in blocking the combination of acetylcholine and muscarinic receptor, which reduces the abnormal bladder contractions significantly.

### Concluding message

In conclusion, it is suggested in the study that the electro-acupuncture has a positive effect on decreasing ICIQ score, the number of incontinence episodes and urine leakage in female patients with MUI; and the effect can be enhanced partly by tolterodine.

**Table 1. Patient characteristics**

Patient Characteristics	EA	CT
Number	30	33
Age (years)	58 ± 8	56 ± 9
Weight (kg)	58 ± 6	59 ± 7
Length of incontinence (years)	5.4 ± 2.4	5.1 ± 2.7
PVR (ml)	15 ± 14	14 ± 17
Maximal urine flow (ml/s)	19 ± 3	20 ± 4

Values are given as mean (s.d.). EA: electro-acupuncture; CT: combination therapy; PVR: post-void residual urine volume.

**Table 2. ICIQ score, Number of incontinence episodes and urine leakage at baseline and post-treatment**

	Baseline		Post-treatment	
	EA	CT	EA	CT
ICIQ question1 <sup>a</sup>	4 (0)	4 (0)	2 (1) <sup>*</sup>	2 (1) <sup>*</sup>
ICIQ question2 <sup>a</sup>	4 (0)	4 (0)	2 (2) <sup>*</sup>	2 (0) <sup>*</sup>
ICIQ question3 <sup>a</sup>	8 (2)	8 (2)	5 (3.25) <sup>*</sup>	4 (3) <sup>*</sup>

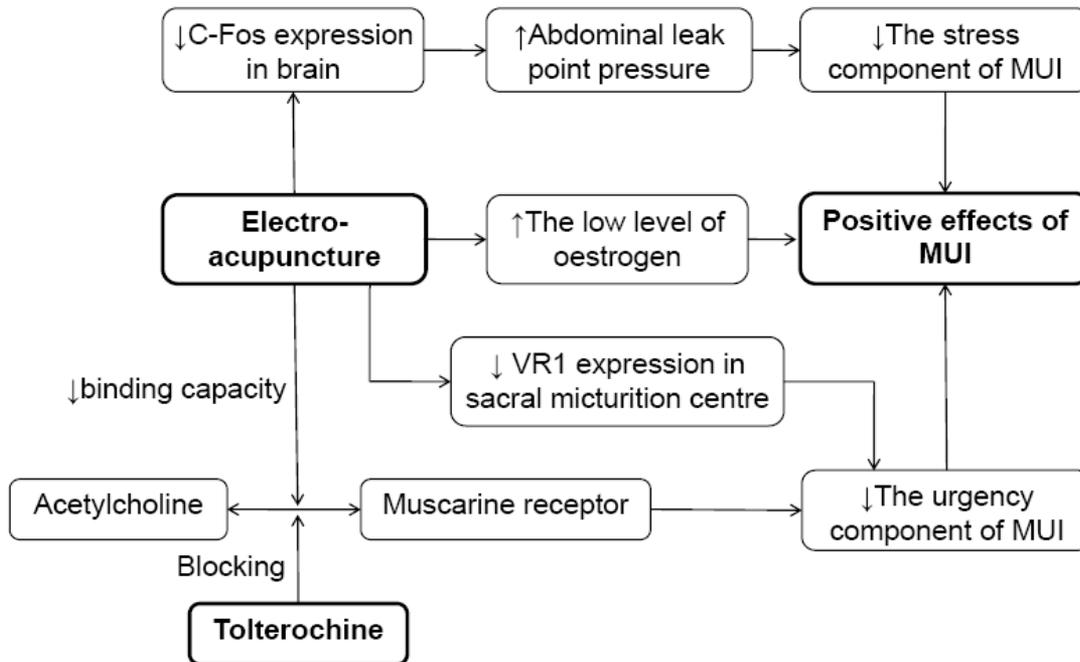
ICIQ total <sup>a</sup>	16 (3)	16 (3)	9 (5.5) <sup>*</sup>	7 (3.5) <sup>*</sup>
Number of incontinence episodes per 24h <sup>a</sup>	3.5 (3)	3 (3)	1.3 (1.3) <sup>*</sup>	1 (1.7) <sup>*</sup>
Urine leakage (g/24h) <sup>b</sup>	29.5 (14.4)	28.4 (13.3)	15.5 (9.1) <sup>*</sup>	11.2 (7.1) <sup>***</sup>

EA: electro-acupuncture; CT: combination therapy. \*  $P < 0.001$  vs. baseline; \*\*  $P < 0.05$  vs. EA at post-treatment.

<sup>a</sup> Values are given as median (interquartile range). Differences were analyzed by the Wilcoxon signed-rank test between baseline and post-treatment, by Mann-Whitney U test between two groups.

<sup>b</sup> Values are given as mean (s.d.). Difference was analyzed by paired t-test between baseline and post-treatment, by two sample t-test between two groups.

**Figure 1. Potential mechanisms of combination therapy in treating mixed urinary incontinence.**



MUI: mixed urinary incontinence.

#### References

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#### Disclosures

**Funding:** China Academy of Chinese Medical Science. **Clinical Trial:** Yes **Public Registry:** No **RCT:** No **Subjects:** HUMAN **Ethics Committee:** Acupuncture hospital ethics committee, China Academy of Chinese Medical Science **Helsinki:** Yes **Informed Consent:** Yes