ORIGINAL RESEARCH ARTICLE

Effects of Chinese herbal treatment and biofeedback electrical stimulation on pelvic floor muscle strength and quality of life in patients with postpartum stress urinary incontinence

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Abstract

This was an original article, and mainly evaluated the impacts of Buzhong Yiqi decoction and biofeedback electrical stimulation on pelvic floor muscle strength and the quality of life in patients with postpartum stress urinary incontinence (PSUI). PSUI patients (total = 256) were randomly selected into a control group and study group. The control group adopted pelvic floor muscle rehabilitation training only while the study group added Buzhong Yiqi decoction and biofeedback electrical stimulation. The degree of urinary incontinence, pelvic floor muscle strength, pelvic floor muscle tension, urodynamics, therapeutic effectiveness, quality of life along with incidence of adverse reactions in the two 2 groups were compared. The results showed that after therapy, in contrast to the control group, the study group presented improved degree of urinary incontinence, higher muscle strength of class I along with class II muscle fibers, better pelvic floor muscle tension, better urodynamics indicators, better treatment efficiency, and higher quality of life. We concluded that Buzhong Yiqi decoction combined with biofeedback electrical stimulation can improve urinary incontinence, promote the pelvic floor muscle strength along with promote the quality of life in PSUI patients. *(Afr J Reprod Health 2024; 28 [11]: 196-204).*

Keywords: Postpartum stress urinary incontinence, Buzhong Yiqi decoction, Biofeedback electrical stimulation, Pelvic floor muscle strength

Résumé

Il s'agissait d'un article original évaluant principalement les impacts de la décoction de Buzhong Yiqi et de la stimulation électrique par biofeedback sur la force musculaire du plancher pelvien et la qualité de vie des patientes souffrant d'incontinence urinaire d'effort post-partum (PSUI). Les patients PSUI (total = 256) ont été sélectionnés au hasard dans un groupe témoin et un groupe d'étude. Le groupe témoin a adopté uniquement un entraînement de rééducation des muscles du plancher pelvien tandis que le groupe d'étude a ajouté la décoction de Buzhong Yiqi et la stimulation électrique par biofeedback. Le degré d'incontinence urinaire, la force musculaire du plancher pelvien, la tension musculaire du plancher pelvien, l'urodynamique, l'efficacité thérapeutique, la qualité de vie ainsi que l'incidence des effets indésirables dans les deux groupes ont été comparés. Les résultats ont montré qu'après le traitement, contrairement au groupe témoin, le groupe d'étude présentait un degré amélioré d'incontinence urinaire, une force musculaire plus élevée de classe I ainsi que des fibres musculaires de classe II, une meilleure tension musculaire du plancher pelvien, de meilleurs indicateurs urodynamiques, une meilleure efficacité du traitement. et une meilleure qualité de vie. Nous avons conclu que la décoction de Buzhong Yiqi combinée à une stimulation électrique par biofeedback peut améliorer l'incontinence urinaire, favoriser la force musculaire du plancher pelvien et favoriser la qualité de vie des patients PSUI.
. *(Afr J Reprod Health 2024; 28 [11]:196-204).*

Mots-clés: Incontinence urinaire d'effort post-partum, décoction de Buzhong Yiqi, stimulation électrique par biofeedback, force musculaire du plancher pelvien

Introduction

Postpartum stress urinary incontinence (PSUI) belongs to one of the symptoms of postpartum pelvic floor dysfunction in women[1]. It refers to the symptoms of involuntary urine leakage after delivery, when abdominal pressure increases (such as with cough and laughter) due to weak pelvic floor support tissue, which greatly influences mothers' quality of life along with daily activities, and leads to a certain degree of psychological disorders[2]. Currently, pelvic floor muscle (PFM) rehabilitation training is identified as a common method for treating PSUI, which can raise PFM strength through

autonomous contraction of PFMs, thereby promoting urine control ability[3]. However, the PFM training implemented alone has insufficient efficacy in some patients, and it is necessary to combine with other therapies[4].

The technique of biofeedback electrical stimulation is to put electrodes in the vagina and give current stimulation to promote the passive contraction and relaxation of patients, with the purpose to restore muscle strength[5]. Previous reports have pointed out that biofeedback electrical stimulation can effectively relieve the condition of stress urinary incontinence[6].

Traditional Chinese Medicine points out that PSUI belong to the category of "enuresis", and the pathogenesis is qi deficiency[7]. Buzhong Yiqi decoction is mainly made up of astragalus, codonopsis, atractylodes, etc., which have the impact of strengthening metabolism and physiological functions, and is widely applied in the treatment of various diseases caused by qi deficiency[8].

In this study, we intended to explore the impacts of Buzhong Yiqi decoction plus biofeedback electrical stimulation on PFM strength along with quality of life in PSUI patients.

Methods

Materials

Two hundred and fifty six (256) patients with patients who received treatment in Changzhou Hospital of Traditional Chinese Medicine from July 2020 to July 2023 were chosen for the study. The inclusion criteria were: (1) women who met the diagnostic criteria of stress incontinence; (2) single pregnancy; (3) complete clinical data; (4) patients with clean lochia after 42 days postpartum. The exclusion criteria were: (1) patients with other postpartum complications; and those with (2) chronic cough, pelvic surgery, etc.; (3) urinary system infection; and (4) history of urinary incontinence prior to pregnancy. Patients were separated into control group (CG) and study group (SG) following the random number table method, and each group had 128 cases. No difference wa seen in general information between 2 groups (P>0.05, Table 1).

Methods

The CG adopted PFM rehabilitation training. On the 42nd day after delivery, a nurse assisted the patient to keep sitting, lying, standing, and other positions, while breathing deeply and slowly. During the inhalation, the patient was instructed to tighten the urethra and anus. The buttocks and thighs did not need to contract, while the PFMs raised were felt. The optimal time was maintained at 5-8 s. Nurses encouraged the patient to relax while exhaling, 2 ~ 3 times a day, more than 10 minutes/time, and continuous training for 8 weeks.

The SG adopted Buzhong Yiqi decoction plus biofeedback electrical stimulation. For biofeedback electrical stimulation, MyoTrac series of biofeedback pelvic floor electrical stimulation therapy instrument was used for intervention, and appropriate electrical stimulation intensity, frequency, pulse width along with other parameters were chosen based on patient tolerance, 30 min per time, 3 times per week, and continuous training for 8 weeks.

The ingredients of Buzhong Yiqi decoction contained astragalus, angelica and leonurus 18 g each, codonopsis 16 g, radix dipsaci 15 g, atractylodes, cimicifugae foetidae, radix bupleuri, tangerine peel and ligustici 12 g each, bitter cardamon, fructus chebulae and cornus officinalis 10 g each, prepared liquorice root 8 g. The drugs were decocted in water for 2 h, and 200 mL of juice was taken, 1 dose a day, twice in the morning and evening, and continuous treatment for 8 weeks.

Observed outcomes

(1) Utilizing International Consultation Incontinence Questionnaire Short-Form (ICIQ-SF)[9], the degree of urinary incontinence was assessed, containing the impact of urinary leakage, urinary leakage volume, and urinary leakage frequency.

The score ranged 0-21 points, with higher score representing more severe urinary incontinence.

Table 1: General data of patients in 2 groups

Groups	Cases	Average age (years)	Maternal type		Urinary incontinence degree		Methods of delivery	
			Primipara	Multipara	Mild	Moderate	Natural delivery	Cesarean section
Control group	128	27.81±5.46	70	58	72	56	82	46
Study group	128	27.83±5.52	71	57	71	57	80	48
t/χ^2		0.03	0.02		0.02		0.07	
P		0.10	0.90		0.89		0.80	

(2) The muscle strength of class I along with class II muscle fibers was detected by PFM strength analyzer[10]. (3) PFM tension: The patient's vaginal systolic pressure (VSP), vaginal resting pressure (VRP) and the duration of vaginal contraction were measured with the French PHENIX PFM rehabilitation instrument[11].Urodynamics: maximum urine flow rate (Qmax) and bladder carcinogen (BC), maximum urethral closure pressure (MUCP) as well as abdominal leakage point pressure (ALPP) was examined by urine flow dynamics analyzer[12].
(4) The therapeutic effectiveness of PSUI was assessed and categorized as follows: Obvious effect: the symptoms disappeared and the PFM strength returned to normal; effective: symptoms and PFM strength were significantly improved; ineffective: no improvement in PFM function. Total effective rate = (number of effective cases + number of effective cases)/total number of cases ×100%. (5) Utilizing Incontinence Quality of Life (I-QOL)[13], patients' quality of life was assessed, which contained 22 questions, including self-disturbance and social behavior disorder. 5-level scoring method was employed for each question (1-5 points), with higher representing better quality of life. (6) The total incidence of adverse reactions during treatment was recorded, including vaginal pain, bleeding, nausea and vomiting, headache, palpitations, dry mouth and fatigue.

Statistical analysis

Utilizing SPSS 24.0 statistical software, data analysis was implemented. Measurement data were exhibited as (x±s), followed by comparison using t-test. Count data were exhibited as (n, %), followed by comparison using χ^2 test. $P<0.05$ meant statistical significance.

Ethical considerations

Our study was approved by the Medical Ethics Committee of Changzhou Hospital of Traditional Chinese Medicine, and complied with the guidelines of the Declaration of Helsinki.

Results

Degree of urinary incontinence in 2 groups

No difference was exhibited in ICIQ-SF score between 2 groups prior to therapy ($P>0.05$).
After therapy, the ICIQ-SF score declined in the two groups.
Relative to the CG, the SG presented lower ICIQ-SF score ($P<0.05$, Figure 1).

PFM strength in 2 groups

Prior to therapy, no significant difference was observed in PFM strength between the two groups ($P>0.05$). Following therapy, the muscle strength of class I and the class II muscle fibers were elevated in 2 groups, and relative to the CG, the SG presented higher muscle strength of class I along with class II muscle fibers ($P<0.05$, Figure 2).

PFM tension in the two groups

Prior to therapy, no significant difference was exhibited in VSP, VRP and the duration of vaginal contraction between 2 groups ($P>0.05$).

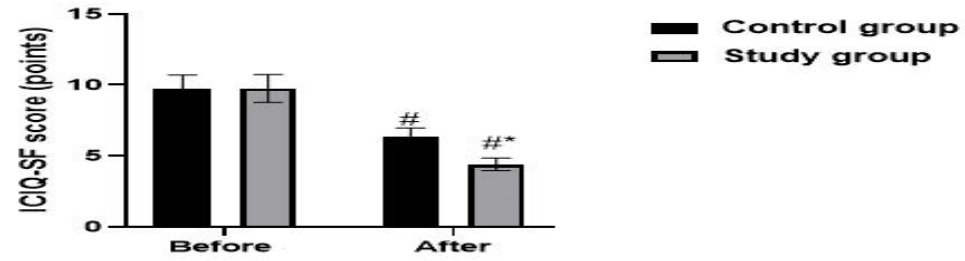

Figure 1: Degree of urinary incontinence in 2 groups. #P<0.05, in contrast to before therapy, *P<0.05, in contrast to control group

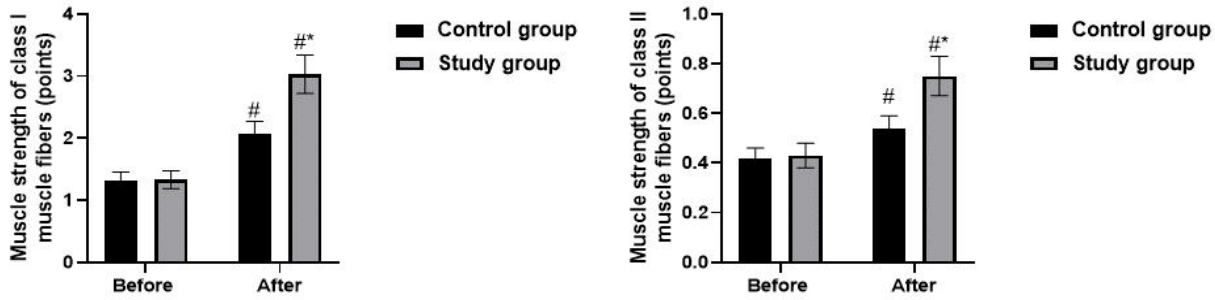

Figure 2: PFM strength in two groups. #P<0.05, in contrast to before therapy, *P<0.05, in contrast to control group

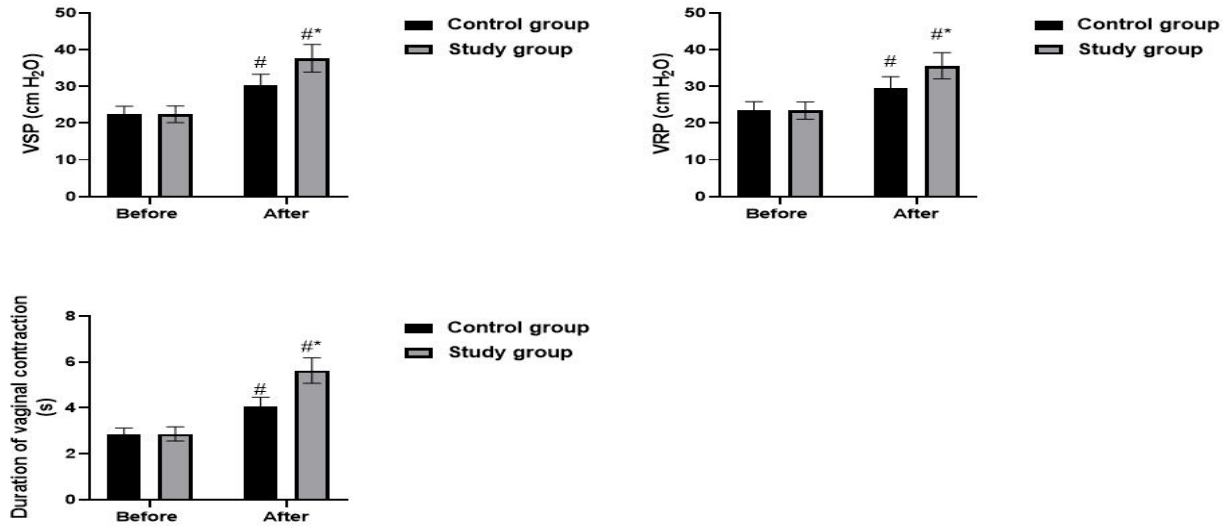

Figure 3: PFM tension in 2 groups. #P<0.05, in contrast to before therapy, *P<0.05, in contrast to control group.

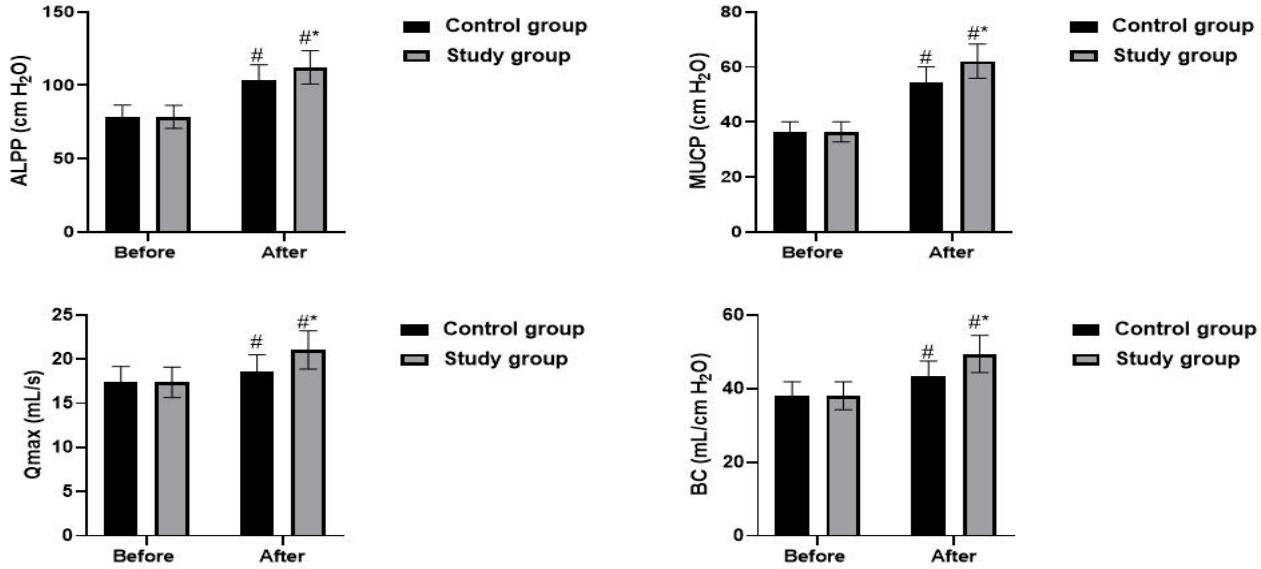

Figure 4: Urodynamics in 2 groups. #P<0.05, in contrast to before therapy, *P<0.05, in contrast to control group

Table 2: Therapeutic effectiveness in 2 groups

Groups	Cases	Obviously effective	Effective	Ineffective	Total effective rate
Control group	128	60 (46.87)	40 (31.25)	28 (21.88)	100 (78.12)
Study group	128	68 (53.13)	57 (44.53)	3 (2.34)	125 (97.66)
χ^2					22.94
P					<0.001

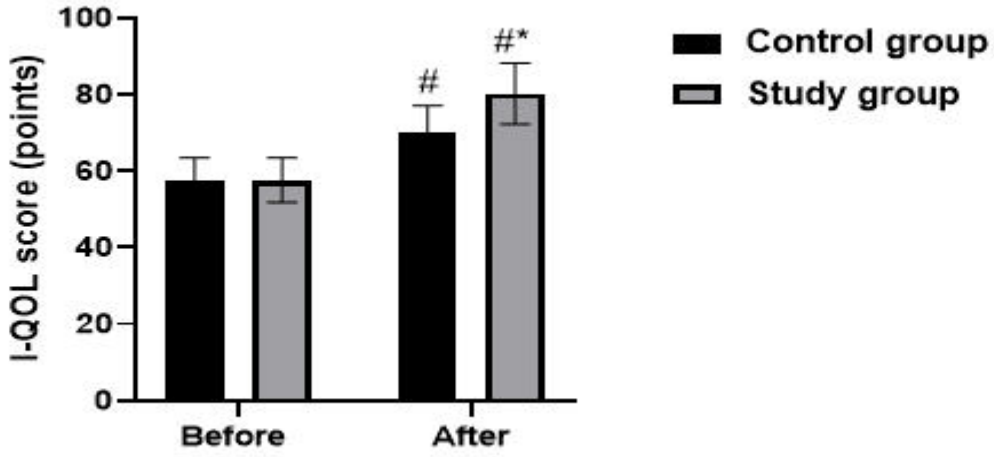

Figure 5: Quality of life in 2 groups. #P<0.05, in contrast to before therapy, *P<0.05, in contrast to control group.

After therapy, VSP, VRP and the duration of vaginal contraction were elevated in 2 groups, and relative to the CG, the SG exhibited higher VSP, VRP and the duration of vaginal contraction (P<0.05, Figure 3).

Urodynamics in 2 groups

Prior to therapy, no significant difference was exhibited in urodynamics between 2 groups (P>0.05). After therapy, the ALPP, MUCP, Qmax and BC were elevated in 2 groups, and relative to the CG, the SG presented higher ALPP, MUCP, Qmax and BC (P<0.05, Figure 4).

Therapeutic effectiveness in 2 groups

In contrast to the CG, the SG presented better treatment efficiency (P<0.05, Table 2).

Quality of life in 2 groups

Prior to therapy, no significant difference was exhibited in I-QOL score between 2 groups (P>0.05). After therapy, the I-QOL score was elevated in 2 groups, and relative to the CG, the SG presented higher I-QOL score (P<0.05, Figure 5)

Discussion

PSUI is a manifestation of pelvic floor dysfunction, which is mainly induced by pregnancy along with childbirth[14]. In PSUI, the PFMs of patients are damaged or relaxed, and when the patient coughs, sneezes, or laughs, the abdominal pressure of the patient increases, leading to urinary incontinence[15]. PFM rehabilitation training belongs to a rehabilitation training method with the main purpose of intervening the function of PFM and promoting its functional recovery[16].

In the implementation of this exercise method, the main effect is to intervene in the recovery of PFM elasticity and strength, and to improve the tension of guiding muscle and muscle relaxation[17]. Some scholars say that 30% of pregnant women cannot identify PFMs, leading to limitations in the implementation of PFM rehabilitation training measures[18].

As a physiotherapy method, biofeedback electrical stimulation is considered as a new treatment technology based on bioelectric technology[19]. During the treatment of diseases, biofeedback electrotherapy functions through the release of bioelectricity to stimulate the human body, to guide muscle and nerve activity, leading to effective treatment of nervous system damage, muscle strength abnormalities caused by disease and muscle dysfunction[20]. The combination of PFM rehabilitation training and biofeedback electrical stimulation not only strengthens the function of PFM, but also helps to improve the state of PFM, perineum and perianal tissue of patients[21].

Chinese medicine believes that stress urinary incontinence results from spleen deficiency together with kidney qi deficiency, and the treatment principle is to tonify middle-Jiao and qi and tonifying kidney and warming Yang[22]. In this study, Buzhong Yiqi decoction was used to treat the disease, in which astragalus, cimicifugae foetidae and radix bupleuri have the effect of enhancing physiological functions[23-25], codonopsis, atractylodes and prepared liquorice root can strengthen metabolism[26-28], angelica and tangerine peel can boost immunity[29,30], and ligustici, leonurus, radix dipsaci, bitter cardamom, fructus chebulae, and cornus officinalis can promote the recovery of body[31-35]. The combination of all kinds of medicines can play the function of enhancing metabolism and physiological functions[36]. Studies have demonstrated that Buzhong Yiqi decoction can improve pelvic floor dysfunction and restore PFM status and strength[37].

In our study, the results suggested that relative to the CG, the SG presented lower ICIQ-SF score, higher muscle strength of class I along with class II muscle fibers, higher VSP, VRP and duration of vaginal contraction, higher ALPP, MUCP, Qmax and BC, better treatment efficiency, and higher QOL score, suggesting that Buzhong Yiqi decoction plus biofeedback electrical stimulation could gain good results, which was conducive to restoring PFM strength and muscle tension, decreasing the number of urine leakage, improving urodynamic parameters, along with promoting the quality of life of PSUI

patients. Similar to our findings, Zhou *et al*. have indicated that modified Buzhong Yiqi decoction can effectively treat stress urinary incontinence in women[38]. Besides, Zhu *et al*. have proposed that biofeedback electrical stimulation plus PFM rehabilitation training can promote PFM endurance, strength, along with coordination of PSUI patients[39].

Conclusion

Buzhong Yiqi decoction plus biofeedback electrical stimulation can improve urinary incontinence, elevate the PFM strength along with promote the quality of life in PSUI patients.

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Authors contribution

Chen L and Wang DJ: conceived and designed the study, as well as collected and analysed the data. Cai JL, Yin CY and Yan XJ: prepared the manuscript. All authors mentioned in the article approved the manuscript.

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