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Complementary and Alternative Medicine Treatment for Urinary Incontinence

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Abstract

Complementary and alternative medicine has been widely used for various diseases and gained acceptance throughout the industrialized world. Basically, complementary and alternative medicine is grouped into five domains: biologically based therapies, mind-body interventions, manipulative and body-based approaches, energy therapies and whole medical systems. Each domain covers a number of therapies. In this chapter, we present the evidence about effectiveness of each complementary and alternative medicine therapy as well as the possible mechanism on the treatment of urinary incontinence. Besides reviewing existed evidence, our research and clinical experience are also presented.

Keywords: urinary incontinence, complementary and alternative medicine, acupuncture

1. Introduction

Urinary incontinence (UI) is common in adult population. It is estimated that about half of women suffer from UI [1]. In men, UI mainly occurs secondary to prostatectomy. The reported prevalence of UI following radical prostatectomy is as high as 50% [2]. In general, UI is classified into stress urinary incontinence (SUI), urgency urinary incontinence (UUI), mixed urinary incontinence (MUI) and overflow urinary incontinence (OUI). Although a number of treatments are available for different types of UI, some patients still cannot get benefit from these therapeutic measures. Furthermore, adverse events related to the treatment bother both patients and their doctors. For these reasons, plenty of patients resort to complementary and alternative medicine (CAM) therapies. In this chapter, we present the evidence for the efficacy of CAM on different types of UI.

CAM refers to a series of medical and health care practices and products that are not considered to be part of conventional medicine [3]. The National Center for Complementary and Alternative Medicine at the National Institutes of Health (NIH) has grouped CAM into five domains: (1) biologically based therapies, such as dietary modifications and nutraceuticals; (2) mind-body interventions, such as biofeedback and yoga; (3) manipulative and body-based approaches, such as massage; (4) energy therapies, such as Qigong and Reiki; (5) whole medical systems, such as traditional Chinese medicine, acupuncture and naturopathy [4].

2. Biologically based therapies

2.1. Dietary modifications

It is reported that some food and beverages may aggravate UI. Of those, caffeinated beverages are considered to play an important role in inducing UI due to their diuretic effect. A prospective cohort study of more than 65,000 women found that excessive caffeine intake (≥ 450 mg/day) was associated with an increased incidence of UI [5]. A case-control study demonstrated that high caffeine intake (≥ 400 mg/day) might cause detrusor overactivity which is related to UUI based on urodynamic evaluation [6]. A recent cross-sectional study, US National Health and Nutrition Examination Survey, further revealed that moderate caffeine intake (≥ 204 mg/day) was associated with UI in female population [7]. Based on these findings, some studies were designed to identify the efficacy of caffeine reduction on improvement of UI symptoms. Tomlinson et al. found that UI patients could get significant benefit from a caffeine reduction education. In this study, 41 patients' daily caffeinated beverages consumption was reduced from 829 ± 385 to 489 ± 312 ml in 4 weeks. As a result, their daily urinary leakage and UI episode were decreased from 42.21 ± 77.34 to 24.09 ± 40.93 and from 2.60 ± 2.65 to 1.68 ± 1.52 , respectively [8]. By contrast, outcomes from a prospective randomized trial showed that reduced caffeine intake could only improve patients' symptoms of frequency and urgency significantly, but had no effect on reduction of urinary leakage [9]. A prospective cohort study further revealed that caffeine reduction could not decrease the risk of UI progression over 2 years [10].

Besides caffeinated beverages, carbonated drinks are considered as another daily consumption which may exacerbate the UI symptoms. In a prospective cohort study, the lower urinary tract symptoms (LUTS), diet and lifestyle from 7046 women were collected and analyzed. It confirmed that consumption of carbonated drinks was a significant risk factor for occurrence of SUI [11]. Another study found that only excessive consumption of carbonated beverages was associated with the increased risk of UI [12]. Additionally, Thomas and his colleague found that some other diets and beverages including spicy foods, citrus juices and tomato-based products could trigger UI [13]. On the contrary, outcomes from a large prospective cohort study demonstrated that citrus juice consumption decreased the risk of storage LUTS progression in men [14].

Whether fluid intake should be restricted in UI patients is another issue. Swithinbank et al. performed a randomized, prospective, crossover study to assess the effect of increasing and decreasing fluid intake on symptoms in women with UUI or SUI. They found that fluid intake restriction could decrease the episode of both UUI and SUI significantly [15]. Another study, however, showed that increased fluid intake was not related to episode of UI; even an increased urine volume was observed [8]. Hashim et al. further explored the relationship

between fluid intake restriction and LUTS in patients with overactive bladder (OAB). They found that a 25% reduction in fluid intake could relieve OAB symptoms, but not UI [16].

Despite inconsistent evidence, a dietary modification to decrease intake of fluid, caffeine and carbonated drinks is recommended for all UI patients [17]. On the other hand, an individualized strategy in dietary change should be taken into consideration for each patient. We advise patients to eliminate all the foods and beverages which may worsen UI from their diet for at least 1 week. Then the comestibles will be added one by one to identify the sensitive foods and beverages. After that, an individualized dietary modification strategy can be established and practiced. The reported foods and beverages with potential negative effect for UI patients are listed in **Table 1**.

Category	Specific items
Beverages	Coffee (caffeinated and decaffeinated) Tea (caffeinated) Carbonated beverages (cola, non-cola, diet, and caffeine-free) Alcoholic drinks (liquor, beer, wine and champagne)
Fruits and vegetables	Citrus juice Tomato and tomato products
Other foods	Spicy foods

Table 1. Foods and beverages affecting UI.

3. Mind-body interventions

3.1. Pelvic floor muscle training

Pelvic floor muscle training (PFMT) is a common regimen for patients with UI. On one hand, it can improve SUI by increasing pelvic floor muscle tone. On the other hand, contraction of pelvic floor muscle induced by PFMT inhibits detrusor overactivity, which can reduce the episode of UUI. In a randomized, controlled trial, 130 female patients with SUI or MUI were allocated into PFMT or control group. After 12 weeks treatment, the average leakage assessed by 1-h pad test dropped from 5.1 to 1.5 g significantly in PFMT group, whereas the counterpart increased from 4.6 to 5.1 g in control group. Additionally, pelvic floor muscle strength was increased markedly in PFMT group, while not in control group [18]. A systematic review published in Cochrane collaboration has further confirmed the efficacy of PFMT for SUI, UUI and MUI [19]. That review also revealed that the effect of PFMT on MUI is lower than the one on pure SUI. In terms of PFMT procedure, patients normally are asked to squeeze the muscles which they use to stop the urine flow. Once they can identify the right muscles, they need to hold the contraction for 5 s and then relax for 5 s. To obtain substantial benefit, PFMT program should comprise at least eight pelvic floor muscle contractions performed three times per day. With regard to the duration, PFMT is recommended to be performed for at least 8–12 weeks. Unfortunately, the majority of patients with UI fail to practice a long-term PFMT. In a follow-up study, Beyar and his colleague found that the rate of 5-year adherence to PFMT in women

with SUI was only 41.6% [20]. Another early study showed that only 28% of patients adhered to practice PFMT during the 15-year follow-up period [21].

3.2. Bladder training

Bladder training is a self-control technique suppressing urge to urinate, which can reduce the episode of UUI. The common technique of bladder training is timed voiding. To practice timed voiding, patients need to complete a 3-day bladder diary first. Based on the diary, the interval between two micturations is easy to determine. Then a voiding schedule can be drawn up by adding about 15 min to the voiding interval. Patients are asked to comply with the voiding schedule, no matter whether they actually feel the urge to void. Once patients are accustomed to the current schedule, the amount of time between micturations will be increased gradually, until they can last for 3 h without having to go to the bathroom. Traditionally, bladder training is used for treatment of UUI. Some studies found that bladder training was also effective for SUI and MUI. A systematic review has demonstrated the efficacy of bladder training on UUI, SUI and MUI [22]. A randomized controlled trial compared the effects of bladder training and PFMT on SUI in elderly women. The result showed that bladder training is less effective than PFMT in management of SUI [23]. It is noteworthy that bladder training needs to be performed at least 6 weeks in order to achieve a satisfactory benefit. In addition, patients may experience a significant discomfort during bladder training. To ensure patients can accept the therapy, they should be sufficiently educated prior to bladder training.

3.3. Biofeedback

Biofeedback, as a technique enhancing the effect of PFMT, typically uses a device to record the biological signals when patients contract their pelvic floor muscle voluntarily and present the information to patients, which can help patients to perform the right PFMT. A systematic review showed that biofeedback could provide benefit in addition to PFMT for women with SUI, UUI and MUI [24]. However, a later randomized, controlled study revealed that biofeedback had no add-on effect in women with SUI compared to PFMT alone [25]. A study showed that 55% of patients with UUI achieved an improvement of more than 50%. That study also found that patients with severe detrusor overactivity had poor response to biofeedback [26]. According to our experience, biofeedback is more effective for women with pure SUI than counterparts with UUI or MUI. Besides SUI, UUI and MUI, we also find that biofeedback may be helpful for patients with OUI, although they normally need catheterization or other invasive treatment. The possible reason might result from the urethral muscle relaxation induced by biofeedback.

3.4. Yoga

Yoga, a series of exercises originated in ancient India, can regulate the physical and mental function spontaneously. It is reported that yoga can modulate pelvic floor muscle tone, which contributes to LUTS relief [27]. A study showed that yoga could improve the symptoms of UUI and enhance the quality of life [28]. In a randomized, controlled trial, 19 women with SUI, UUI or MUI were allocated to yoga therapy or control group. After 6-week therapy, women in yoga therapy group presented a more significant decrease in daily episode of UI than counterparts in control group (1.8 vs. 0.3) [29]. In terms of specific yoga postures, frog pose, fish pose, locust pose, plank pose, sitting forward bend and seated twist may be beneficial for UI [27].

4. Manipulative and body-based approaches

4.1. Massage

Massage refers to a series of actions on the body with appropriate pressure to make muscle relaxed. Kassolik et al. tried to treat a 50-year-old woman with SUI using massage. Following 4 weeks treatment, the patient reported a 100% improvement on her SUI [30]. Although only limited evidence is available, we find that massage is effective for SUI, UUI and MUI. Based on our clinical experience, the majority of patients can get benefits from six to eight sessions of massage focusing on the pelvic floor muscles. The possible mechanism includes the relaxation of pelvic floor muscle induced by massage and regulation effect of massage on central nervous system [31].

5. Energy therapies

It has been widely accepted that energy therapies are helpful for people to maintain their health. A retrospective study reviewed the effect of extracorporeal magnetic energy stimulation on symptoms in women with SUI and OAB. In that study, 72 patients completed a 9-week therapy of magnetic energy stimulation. After treatment, the majority of patients achieved a significant improvement in their symptoms [32]. Qigong, as an important component of energy therapies, has been used to treat many chronic diseases. However, there have not been substantial evidence for its effectiveness on UI. Despite the lack of evidence, we find that Qigong can improve the symptoms in some patients with SUI, UUI or MUI according to our clinical experience. However, the efficacy of Qigong usually varies and depends on an individual's confidence for this energy therapy.

6. Whole medical systems

6.1. Acupuncture

Acupuncture, as an effective therapy, has gained acceptance in urologists over the past decades [33]. A number of studies have shown its efficacy on different types of UI. In order to present the evidence in a clear way, we discuss the effect of acupuncture on SUI, UUI, MUI and OUI, respectively.

6.1.1. SUI

Although many studies have reported the efficacy of acupuncture on SUI, most of them are retrospective and only with a small sample size, which causes the results controversial. Moreover, lack of appropriate control is a main issue in clinical trial of acupuncture. To overcome these limitation, we designed several single-blind, randomized, controlled trails. More importantly, we created a new pragmatic placebo needle, which has been confirmed to be able to achieve blindness for patients in clinical trials. In terms of the specific procedure, a small pad is adhered to patients' skin of each acupoint before performing acupuncture. A blunt needle is used to pierce the pad without penetrating the skin in control group, while

a normal needle penetrates the skin through the pad [34]. In phase I clinical trial, a total of 70 patients with SUI were allocated to receiving electro-acupuncture or placebo electro-acupuncture three times a week for 3 weeks. The selected acupoints included bilateral BL33 (Zhong Liao) located in the third sacral foramen and BL35 (Hui Yang) lateral to the tip of the coccyx. In acupuncture group, normal needles were inserted with a depth of 50 mm. After a De Qi sensation was obtained, paired electrodes of electro-acupuncture apparatus were attached transversely to bilateral BL33 and BL35, respectively, with a continuous wave (50 Hz) for 30 min, three times a week. By contrast, the placebo needles were used at same acupoints and the same parameters of electro-acupuncture device were used in control group. Based on the study design, each patient was asked to complete 1-h pad test, 3 days bladder diary and the International Consultation on Incontinence questionnaire short form (ICIQ-SF) at baseline and posttreatment to assess the effectiveness of acupuncture. After 6-week treatment, the urine leakage evaluated by 1-h pad test was reduced more significantly in electro-acupuncture group in comparison with counterparts in control group (2.3 g vs. 0.3 g), so did the episodes of SUI (2.0 vs. 0.7). Moreover, a significant decrease in ICIQ-SF score was found in electro-acupuncture group compared to control group after treatment, which means that patients in electro-acupuncture group gained a more improvement in SUI symptoms [35].

To further assess the long-term effect of acupuncture, a multicentered, randomized, controlled, phase II trial was designed. In this ongoing study, patients will be followed as long as 24 weeks after they receive 18 sessions of electro-acupuncture therapy [36]. In addition, another randomized, controlled trial is also ongoing, in which the effect of electro-acupuncture is compared with the PFMT [37]. We hope that the results of these clinical trials can bring us sufficient evidence for the effect of acupuncture on SUI.

6.1.2. UUI

Although anticholinergics have been considered as the first-line drug for OAB and UUI, as high as 30–50% of patients cannot get benefit from the pharmacological therapy [38]. A single-blind, randomized, controlled study investigated the effect of acupuncture on OAB refractory to anticholinergics. In it, 50 patients with OAB who had poor response to anticholinergics were given electro-acupuncture or sham electro-acupuncture randomly for 6 weeks. Based on the procedure, needles were inserted into bilateral BL32 (Ci Liao) located in the secondary foramen, BL33 and BL34 (Xia Liao) located in the fourth foramen at an angle of 60° horizontal and 30° sagittal with a depth of about 50 mm and each pair of needles were connected to electro-acupuncture device, with a disperse-dense (4/20 Hz) wave for 30 min, five sessions a week in electro-acupuncture group. By contrast, non-acupoints with superficial needles were used as control intervention. To assess the effect of acupuncture objectively, urodynamics were used to measure patients' bladder function at baseline and posttreatment. After 6-week treatment, a significant improvement in the first sensation of bladder filling, first urge to void and maximum cystometric capacity were observed in electro-acupuncture group, while no change in control group [39]. In another randomized, controlled trial, 199 patients with UUI were assigned into electro-acupuncture or pharmacological therapy group with a ratio of 2:1. For patients in electro-acupuncture group, two groups of acupoints were selected to perform acupuncture alternately. One included

CV3 (Zhong Ji) located in the midline and above the pubic symphysis, bilateral KI12 (Da He) which is lateral to CV3, ST28 (Shui Dao) which is lateral to the midline and below the navel, and SP6 (San Yin Jiao) situated above the tip of the medial malleolus on the posterior border of the tibia. Of those, KI12 and ST28 were connected to the electrodes of electro-acupuncture equipment with a disperse-dense (4/20 Hz) wave for 30 min, three sessions a week. Another one includes bilateral BL32, BL35, BL29 (Zhong Lv Shu) located lateral to the midline and at the height of the third sacral foramen, and BL40 (Wei Zhong) situated in the midpoint of transverse crease of popliteal fossa. Of those, BL32 and BL35 were connected to a pair of wires of electro-acupuncture apparatus with the same parameters of electro-acupuncture device. As the control, patients in pharmacological group received oral tolterodine 2 mg, twice a day. After 3-week treatment, the ICIQ-SF score in electro-acupuncture group dropped from 4.06 ± 1.36 to 1.57 ± 1.14 ($P < 0.01$), while no significant difference was found in pharmacological therapy group [40].

6.1.3. MUI

MUI is a complicated disorder involving bladder and urethral function. Patients with MUI normally have poor response to both pharmacological and surgical treatment. To determine the effect of acupuncture on MUI, we designed a pilot study. In it, 42 women with MUI received acupuncture therapy for 8 weeks. The selected acupoints include bilateral BL32, BL35, SP6 and ST36 (Zu San Li) located below the lower border of the patella and lateral to the anterior border of the tibia. Of those, BL32 and BL35 were connected to the electrodes of electro-acupuncture equipment with a disperse-dense (4/20 Hz) wave for 30 min, three sessions a week. After 8-week treatment, the majority of patients presented a significant decrease in ICIQ-SF score and the episode of UI, so did the daily urine leakage [41].

We further designed a randomized, controlled trial to explore the synergy effect of acupuncture and anticholinergics. In this trial, 71 patients with MUI were allocated to combination therapy group or acupuncture group. Patients in each group received acupuncture therapy with same procedure in the pilot study and ones in combination therapy group received additional tolterodine 2 mg orally twice a day. After 8 weeks treatment, patients in combination therapy group presented a more significant reduction in daily urine leakage than the counterparts in control group, although no marked difference was found in cured and response rate between two groups [42].

6.1.4. OUI

Patients with OUI usually need to be treated with catheterization or invasive therapy. There have not been studies focusing on the effect of acupuncture in treating OUI so far. We designed a prospective, randomized, controlled trial to investigate the effect of acupuncture in preventing bladder over-distension, an important reason of OUI. In it, 61 patients underwent spinal anesthesia were allocated to receiving acupuncture or no intervention. Based on the procedure, acupuncture was performed when patients' sensory level regressed to T10 segment during anesthesia. The selected acupoints included CV3, CV4 (Guan Yuan) located below CV3 and bilateral ST29 (Gui Lai) situated below the navel and lateral to the midline. After the needles were inserted in these points with a depth of approximately 25 mm, the handles of needles were connected to electrodes of nerve stimulator with a low-frequency (2 Hz) con-

tinuous wave for 30 min. The incidence of bladder over-distention and urinary retention, the time to voluntary micturition after spinal anesthesia, urine volume and adverse events were collected and compared between two groups to evaluate the effect of acupuncture. During post-anesthesia follow-up, a significant lower incidence of bladder over-distention (16.1% vs. 53.3%, $P < 0.01$) and shorter time to voluntary micturition (228 ± 78 min vs. 313 ± 91 min, $P < 0.01$) were found in acupuncture group compared to control group. By contrast, no marked differences were detected in incidence of urinary retention, urinary volume and side effects between two groups [43]. Because the findings of this study suggest that acupuncture can decrease the incidence of bladder over-distention in patients undergoing spinal anesthesia, it might be reasonable to infer that acupuncture is effective for treatment of OUI. However, the exact effect of acupuncture on OUI needs to be confirmed by well-designed clinical trial.

7. Summary

There have been increasing evidence on effectiveness of CAM therapies for different types of UI. However, the majority of studies have non-blind design and small sample size, which limits the level of evidence. Despite these limitations, CAM therapies should be considered as the initial management for patient with UI since they are relatively noninvasive and can benefit a substantial group of UI patients.

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