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Original Article

Effects of auricular point sticking and progressive muscle relaxation in elderly patients with insomnia of heart-spleen deficiency type

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Abstract: Objective: This study was to explore the effects of auricular point sticking (APS) combined with progressive muscle relaxation (PMR) in elderly patients with insomnia of heart-spleen deficiency type. Method: 100 elderly patients with insomnia of heart-spleen deficiency type in our hospital from November 2017 to March 2020 were retrospectively analyzed and divided into the Group A (GA, n=48, conventional nursing) and the Group B (GB, n=52, conventional nursing + PMR+ APS). Scores of TCM syndromes, Pittsburgh Sleep Quality Index (PSQI), Hamilton Anxiety Rating Scale (HAMA) and quality of life (QOL) were compared between the two groups. Results: After intervention, the scores of pulse manifestation, tongue manifestation, anorexia, fatigue and weakness, lusterless facial complexion, dizziness and blurred vision, amnesia, palpitation, dreaminess, restless sleep, daytime dysfunction, use of hypnotic drugs, sleep disorders, sleep efficiency, length of sleep, sleep latency and subjective sleep quality as well as the total scores were lower in GB ($P<0.05$); compared to GA, GB had lower HAMA score ($P<0.05$) and higher scores of mental health (MH), emotional role (RE), social function (SF), general health (GH), vitality (VT), physical role (RP), bodily pain (BP) and physical functioning (PF) ($P<0.05$). Conclusion: In elderly patients with insomnia of heart-spleen deficiency type, APS combined with PMR have demonstrated ideal efficacy, including improving sleep quality, mental state and QOL.

Keywords: Elderly, insomnia of heart-spleen deficiency type, auricular point sticking (APS), progressive muscle relaxation (PMR), effects

Introduction

Presently, urbanization is accelerating in China and more people stay up late with short length of sleep. As a result, dyssomnia becomes general. Its incidence and severity vary depending on social status and age [1, 2]. Studies have revealed that in people above 65, the incidence of dyssomnia ranges between 35% and 50%, and it is called senile dyssomnia [3].

Dyssomnia is often complicated with many mental disorders. According to studies, over 40% of the dyssomnia patients have mental disorders such as generalized anxiety and severe depression, etc. [4, 5]. Dyssomnia is also closely associated with a variety of diseases, with more than 95% of the patients with mental disorders suffering from varying degrees of insomnia [6]. Elderly patients admitted to the Department of Cardiology need to bear both physical pain and heavy psychological burden, so they face the risk of insomnia 2 to 3 times higher than normal people. In addition, recurrent insomnia is one of the risk factors for Alzheimer's disease [7, 8]. At present, high attention has been paid to the close correlation between insomnia and senile diseases at home and abroad [9]. Clinical western medicine advocates the use of drug in the treatment of senile insomnia, which although has achieved some efficacy, long-term medication is associated with various adverse reactions such as withdrawal, addiction and tolerance [10, 11]. Therefore, a scientific and effective non-drug therapy is urgently needed in the clinic.

PMR is a common relaxation therapy introduced from foreign countries. It leverages the reciprocal inhibition between anxiety and mus-

cle relaxation [12, 13]. At the present stage, this therapy has been extensively applied in fields such as medical science and psychology to effectively control anxiety [14]. In traditional Chinese medicine, insomnia falls into the scope of "agrypnia", "incapability of supination" and "wakefulness", and heart is where the disease lies. Many therapies have been developed accordingly, including APS which is effective, simple and non-invasive [15, 16]. Therefore, to ensure the high sleep quality of elderly patients with insomnia of heart-spleen deficiency type, this study combined PMR with APS.

Materials and methods

Patient samples

100 elderly patients with insomnia of heart-spleen deficiency type in our hospital from November 2017 to March 2020 were retrospectively analyzed and divided into two groups: the Group A (GA, n=48, conventional nursing) and the Group B (GB, n=52, conventional nursing + PMR+ APS). The selection criteria are set as the following: (1) Inclusion criteria: informed consent from patients; compliance with the diagnosis criteria of insomnia of heart-spleen deficiency type in *Internal Medicine of Traditional Chinese Medicine*, a textbook according to the "12th Five-year Plan" [17]; normal cognitive ability; clear consciousness; approval from the Ethics Committee of Ganzhou People's Hospital. (2) Exclusion criteria: mental diseases; consciousness disorder; severe cardiovascular and cerebrovascular diseases; paralysis; disability; withdrawal before completion.

Method

GA: patients in GA were guided to develop good sleep habits, including no strenuous exercise before sleep and control over the time of watching TV and using cell phone; they were observed for sleep habits, posture and length as well as intake of stimulating beverage in daily life, such as cola, coffee and strong tea; they were advised to keep a light diet and stay away from greasy or sweet fine food or food with a strong or spicy taste; food intake was strictly controlled at supper in case of fed-upness and no eating is allowed before sleep; patients were informed of the impact of negative emotions on sleep quality and enjoined to maintain a steady and pleasant state of mind with proper control of happiness and anger; every day, proper exercise was taken to invigorate health effectively.

GB: PMR: patients were guided to relax muscles according to the Jacobson PMR when they lied or sat down at a comfortable place. Respiration was regulated for mental relaxation. The training was a cycle of concentration, muscle tensioning, maintaining tension, relieving tension and relaxing muscles. It was performed once before the afternoon nap and sleep in the night. 10 mins guidance was provided until patients mastered the correct training method and then they completed the whole training independently.

APS: points including Heart, Spleen, Shenmen, Liver, Subcortex, Autonomic Nerve and Ermigen were selected. The auricula was disinfected with 75% alcohol and an adhesive plaster (0.5 cm*0.5 cm) with the seed of cowherb was affixed to the selected points. The operator pressed the auricula back and front with the forefinger and the thumb and increased the force slowly until patients felt pain, distension, limpness and numbness or the desired sensation was brought about after radiation and conduction along the main and collateral channels. Each point was pressed by 3 to 4 times a day, 20 s each time. The plaster was replaced every 7 d and alternatively used in the two ears. The total times of sticking were 4 and the course of treatment lasted 4 weeks.

Observation indicators

Score of TCM syndrome: according to the *guiding principles of clinical research on New Traditional Chinese Medicines* [18], pulse manifestation, tongue manifestation, anorexia, fatigue and weakness, lusterless facial complexion, dizziness and blurred vision, amnesia, palpitation, dreaminess and restless sleep were scored based on the severity, 0 for nil, 2 for mild, 4 for moderate and 6 for severe.

PSQI score: before and after intervention, PSQI was used to evaluate the sleep quality of both groups. It consisted of 18 items in 7 dimensions, i.e., daytime dysfunction, use of hypnotic drugs, sleep disorders, sleep efficiency, length of sleep, sleep latency and subjective sleep quality. The score to each dimension ranged between 0 and 3, 0 for no difficulty and 3 for

Table 1. Intergroup Comparison of General Materials [n (%)]/($\bar{x}$ ±s)

Materials		GA (n=48)	GB (n=52)	t/X^2	*P*
Gender (n)	Male	33 (68.75)	36 (69.23)	0.003	0.959
	Female	15 (31.25)	16 (30.77)		
Age (y)		71.25±3.28	71.22±3.25	0.046	0.963
Educational background (n)					
Elementary school and below		15 (31.25)	13 (25.00)	0.125	0.963
Junior secondary school		12 (25.00)	15 (16.30)		
Polytechnic school/senior high school		13 (27.08)	14 (26.92)		
College and university		8 (16.67)	10 (19.23)		

extremely difficult. By summing up these scores, the total PSQI score was obtained in a range of 0 and 21. A higher total score indicates worse sleep quality [19].

HAMA score: before and after intervention, the HAMA was used to evaluate the negative emotions of both groups. It consisted of 14 items related to mental anxiety and somatic anxiety. Each item was scored on a scale of 0 to 4, where ≥29 indicates severe anxiety, ≥21 definitely obvious anxiety, ≥14 definite anxiety, ≥7 possible anxiety and <7 no anxiety [20].

QOL score: before and after intervention, the SF-36 was used to evaluate the QOL of both groups. The scale covered MH, RE, SF, GH, VT, RP, BP and PF. Each item was scored on a scale of 0 to 100. Between the QOL and the score was a positive correlation [21].

Statistical analysis

Statistical analysis was performed with SPSS 22.0. In case of numerical data expressed as Mean ± Standard Deviation, comparison studies were carried out through *t* test for data which were normally distributed, and Mann-Whitney U test for data which were not normally distributed; in case of nominal data expressed as [n (%)], comparison studies were carried out through X^2 test for intergroup comparison. For all statistical comparisons, significance was defined as P<0.05.

Results

Intergroup comparison of general materials

The proportions of male and female patients, the average age, the proportions of patients with education in elementary school and below, junior secondary school, polytechnic school/senior high school, college and university were 68.75%, 31.25%, (71.25±3.28), 31.25%, 25.00%, 27.08% and 16.67% in GA, 69.23%, 30.77%, (71.22±3.25), 25.00%, 16.30%, 26.92% and 19.23% in GB (P>0.05) (**Table 1**).

Intergroup comparison of TCM syndrome score before intervention

Before intervention, the two groups were not statistically different in the scores of pulse manifestation, tongue manifestation, anorexia, fatigue and weakness, lusterless facial complexion, dizziness and blurred vision, amnesia, palpitation, dreaminess and restless sleep (P>0.05) (**Figure 1**).

Intergroup comparison of TCM syndrome score after intervention

After intervention, the scores of pulse manifestation, tongue manifestation, anorexia, fatigue and weakness, lusterless facial complexion, dizziness and blurred vision, amnesia, palpitation, dreaminess and restless sleep were lower in GB (P<0.05) (**Figure 2**).

Intergroup comparison of PSOI before and after intervention

Before intervention, the two groups were not statistically different in the scores of daytime dysfunction, use of hypnotic drugs, sleep disorders, sleep efficiency, length of sleep, sleep latency, subjective sleep quality as well as the total score (P>0.05).

After intervention, the scores of daytime dysfunction, use of hypnotic drugs, sleep disorders, sleep efficiency, length of sleep, sleep latency, subjective sleep quality as well as the total score were lower in GB (P<0.05) (**Figure 3**).

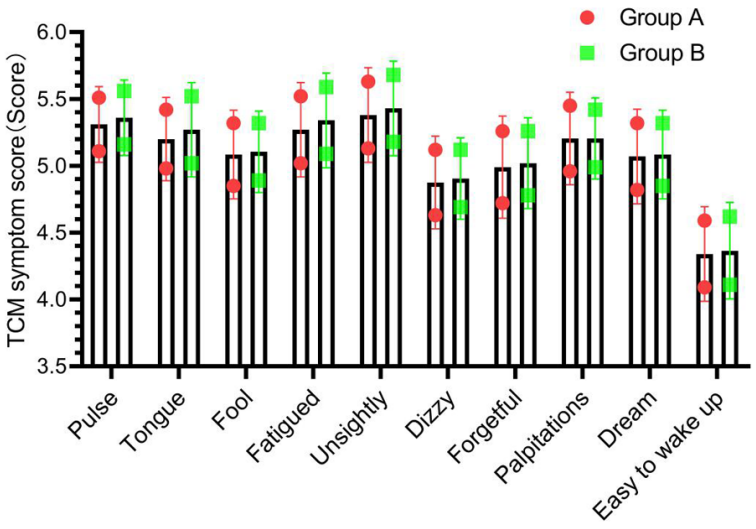

Figure 1. Intergroup Comparison of TCM Syndrome Score before Intervention. Before intervention, the two groups were not significantly different in the scores of pulse manifestation, tongue manifestation, anorexia, fatigue and weakness, lusterless facial complexion, dizziness and blurred vision, amnesia, palpitation, dreaminess and restless sleep (P>0.05).

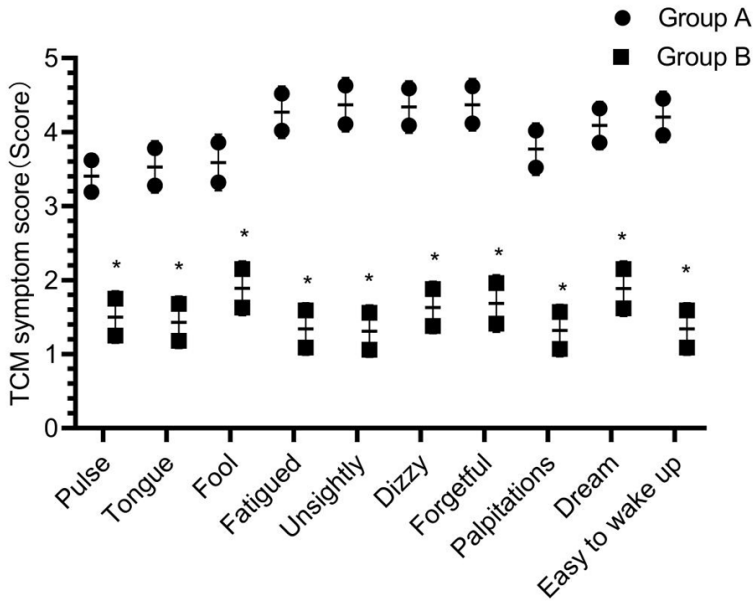

Figure 2. Intergroup Comparison of TCM Syndrome Score after Intervention. After intervention, the scores of pulse manifestation, tongue manifestation, anorexia, fatigue and weakness, lusterless facial complexion, dizziness and blurred vision, amnesia, palpitation, dreaminess and restless sleep were lower in GB than in GA (P<0.05). *P<0.05 vs GA.

Intergroup comparison of HAMA score before and after intervention

No significant difference was observed between the two groups in HAMA score before intervention (P>0.05); after intervention, the HAMA score reduced in both groups (P<0.05) and was lower in GB (P<0.05) (**Table 2**).

Intergroup comparison of QOL scores before and after intervention

Before intervention, the two groups were not significantly different in the scores of MH, RE, SF, GH, VT, RP, BP and PF (P>0.05).

After intervention, the scores of MH, RE, SF, GH, VT, RP, BP and PF were higher in GB (P<0.05) (**Table 3**).

Discussion

In 1985, the American Psychiatric Association defined insomnia as follows: patients complain difficulty in falling asleep or maintaining effective sleep for 4 nights at least each week and for more than 3 weeks; sleep latency exceeds 30 min or sleep efficiency is below 85% [22, 23]. In traditional Chinese medicine, insomnia is assigned to the category of "wakefulness". According to the *Classic on Medical Problems·46 Problems*, the major cause of the elderly staying awake in bed lies in "decline and blocked circulation of Qi and blood as well as unsmooth muscles" [24]. The main manifestations of wakefulness are light sleep and short length of sleep. In case of mild conditions, patients take a long period of time to fall asleep and can hardly go to sleep again if wake up; in case of severe conditions, they stay awake all the night. For patients with insomnia of heart-spleen deficiency type, palpitation, amnesia, dreaminess and restless sleep are the main symptoms while the secondary symptoms include pale white tongue with teeth marks, low appetite, lusterless facial complexion, gastrec-

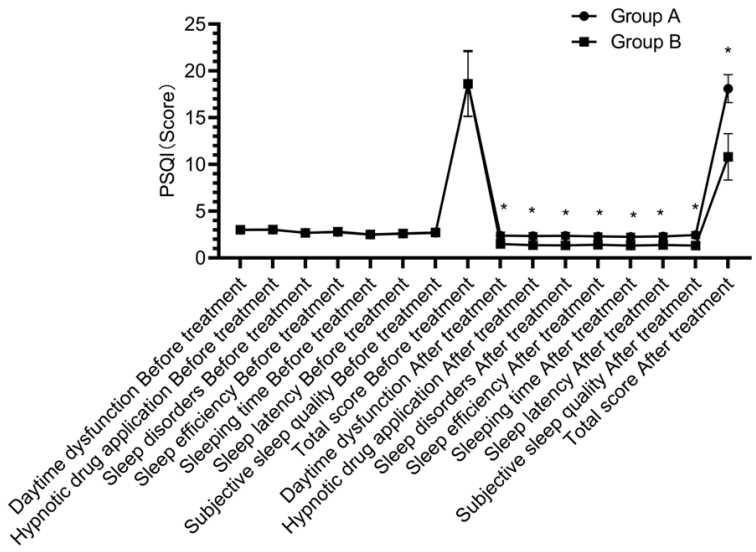

Figure 3. Intergroup Comparison of PSQI Score before and after Intervention. Before intervention, the two groups were not significantly different in the scores of daytime dysfunction, use of hypnotic drugs, sleep disorders, sleep efficiency, length of sleep, sleep latency and subjective sleep quality and the total score (P>0.05). After intervention, the scores of daytime dysfunction, use of hypnotic drugs, sleep disorders, sleep efficiency, length of sleep, sleep latency and subjective sleep quality and the total score were lower in GB than in GA (P<0.05). *P<0.05 vs GA.

Table 2. Intergroup Comparison of HAMA Score before and after Intervention ($\overline{x}$ ± s, score)

n	Before intervention	After intervention
GA (n=48)	37.15±0.28	30.12±0.15#
GB (n=52)	37.18±0.22	15.12±0.18#,*
t	0.598	450.661
P	0.551	0.000

Note: #P<0.05 vs before intervention; *P<0.05 vs GA.

tasia, fatigued limbs and spiritlessness, dizziness and blurred vision.

In this study, the scores of various TCM syndromes and HAMA were lower in GB than in GA, suggesting that APS combined with PMR improved the clinical symptoms and anxiety of elderly patients with insomnia of heart-spleen deficiency type. The reason lies in PMR, in which muscle relaxation and anxiety antagonize each other, namely, when one state shows up, the other is inhibited. Therefore, negative emotions such as depression and anxiety occur often when the muscles are tensioned. Tensioned muscles result in more severe depression and anxiety. When the muscles are relaxed, depression and anxiety abate [25]. Secondly, APS generates an optimal stimulation, which is conducted via nerves to inhibit the existing pathological impulse circulation and develop normal physiologic adjustment. As a result, lesions disappear or abate and clinical symptoms are eliminated [26].

Ears are closely correlated with main and collateral channels according to the *Internal Canon of Medicine* in TCM. Channel transmission in auricula have been reported [27]. Human body is an organized whole and ears are not isolated hearing organs but have obvious internal relevance with internal organs. The vital essence in kidneys, lungs, spleen, liver and heart can be transferred to the ears through main and collateral channels. Therefore, we hear sound and hearing disorder occurs to effectively reflect any lesion in internal organs. To improve the sleep quality of elderly patients with insomnia of heart-spleen deficiency type, APS was adopted in this study, and the results showed that all sleep quality scores and total scores in GB were higher than those in GA after intervention, fully supporting the effectiveness of PMR combined with APS. Feng [28] has also found that the sleep quality of patients with APS combined with PMR was significantly higher than that in the control group, which was highly consistent with the results of this study. To explore its mechanism of action, heart and spleen are where insomnia of heart-spleen deficiency type lies. PMR combined with APS, on the one hand, can nourish the heart and spleen, regulate Qi and blood by discriminated point selection, and on the other hand, relieve patients from anxiety to realize improvement in insomnia [29]. The combination of the two non-drug therapies lead to more ideal effects of improving insomnia. After intervention, the QOL scores in GB were higher than in GA (P<0.05), which further demonstrated the effectiveness of the combination in improving patients' QOL. The possible reason is that APS has the functions of nourishing heart and spleen and relaxing veins while PMR

Table 3. Intergroup Comparison of QOL Scores before Intervention ($\bar{x} \pm s$, score)

Time	n	MH	RE	SF	GH	VT	RP	BP	PF
Before intervention	GA (n=48)	62.15±0.25	63.18±0.88	64.18±0.69	58.85±1.28	58.59±1.05	60.13±0.23	60.58±0.26	60.19±0.18
	GB (n=52)	62.19±0.22	63.02±0.85	65.02±0.62	58.89±1.03	59.02±1.16	60.19±0.21	60.62±0.22	60.22±0.12
	t	0.851	0.925	1.221	0.173	1.938	1.364	0.833	0.988
	P	0.397	0.357	0.225	0.863	0.056	0.176	0.407	0.326
After intervention	GA (n=48)	78.96±1.05	72.15±3.12	73.07±2.18	75.26±3.17	74.18±1.36	75.63±2.17	73.25±1.18	74.09±1.06
	GB (n=52)	91.12±3.12*	90.98±2.22*	89.96±3.22*	91.28±3.09*	91.17±2.12*	92.25±1.17*	91.78±1.22*	92.63±1.08*
	t	25.684	34.979	30.459	25.582	47.259	48.175	77.083	86.529
	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note: *P<0.05 vs GA.

helps patients to relax completely and thus eliminate the negative impact of anxiety and enhance the overall QOL.

In conclusion, APR combined with PMR has achieved ideal effects in elderly patients with insomnia of heart-spleen deficiency type, including improved sleep quality, mental state and QOL.

Though some achievements have been made in this study, it is defective with limited samples. Future studies shall be based on a larger sample size, continue for a longer period of time and cover more aspects.

Disclosure of conflict of interest

None.

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