The Effect of Auricular Plaster Therapy on Insomnia in Patients with Rheumatoid Arthritis

Liudan Lu, MD,¹ Jihong Liu, MD,² Shan Mo, MD,¹ and Haiyu Chen, MD¹

ABSTRACT

Objective: This research was conducted to observe the effects of auricular plaster therapy on insomnia in patients with rheumatoid arthritis (RA).

Materials and Methods: This study involved 76 patients with insomnia caused by RA, who were admitted to Foshan Chancheng Central Hospital—in Foshan, Guangdong, China—from August 2017 to August 2018. The patients were randomized, with 38 to the intervention group and another 38 to the control group. The intervention group was treated with auricular plaster therapy with beans, while the control group was treated with estazolam orally before going to bed. Curative effects were compared between the 2 groups. The Pittsburgh Sleep Quality Index scale (PSQI) and the Athens Insomnia Scale (AIS) were used to assess and evaluate the sleep quality of patients.

Result: Scores of the PSQI dimensions all fell in both groups after treatment. Scores for sleep quality, sleep latency, sleep efficiency, sleep disorder, and daytime dysfunction in the observation group were lower than those in the control group ($P < 0.05$). AIS scores in all dimensions decreased in both groups, and, after treatment, scores and total points of sleep latency, night-time revival, overall sleep quality, and the dimensionality of daytime body function in the intervention group were lower than those in the control group ($P < 0.05$).

Conclusions: Auricular plaster therapy has a marked effect on insomnia in patients with RA, and the therapy is easy and simple to apply.

Keywords: rheumatoid arthritis, insomnia, auricular plaster therapy

INTRODUCTION

RHEUMATOID ARTHRITIS (RA) is an autoimmune disease that is characterized by chronic and progressive polyarthritis and that can lead to great disability. The prevalence of RA in China is 0.34%, and the total number of people affected is about 6 million. As the disease progresses, RA can be accompanied by joint-movement disorder or even physical disability, which can lead to mental-health problems, such as anxiety, depression, and sleep disorders. RA can make patients unable to work; lower their quality of life (QoL); and impose huge economic burdens on the patients

themselves, their families, and society. In recent years, sleep disorders caused by RA have attracted increasing attention from scholars. Through clinical practice, it was found that auricular plaster therapy with beans had an obvious curative effect on insomnia in patients with RA.

MATERIALS AND METHODS

General Information

There were 76 cases in this study; all were patients with RA who had insomnia. They were admitted to Foshan

¹Department of Traditional Chinese Medicine, Foshan Chancheng Central Hospital, Foshan, Guangdong, China.

²Preventive Treatment Centre, Foshan Hospital of Traditional Chinese Medicine, Foshan, Guangdong, China.

Chancheng Central Hospital—in Foshan, Guangdong, China—from August 2017 to August 2018, and were randomly divided into an intervention group and a control group with 38 cases in each group. The 2 groups were analyzed statistically in terms of age, gender, Traditional Chinese Medicine (TCM) syndromes, and indicators that can affect sleep; there were no significant differences, between the groups, so they were comparable. This study was approved by the ethics committee of Foshan Chancheng Central Hospital. All patients were informed fully and signed informed consents before treatment.

Diagnostic Criteria

Western medicine diagnostic criteria. The diagnostic criteria for RA in Western Medicine (WM) were based on the diagnostic criteria for RA jointly revised by the American College of Rheumatology/European League Against Rheumatism in 2010.¹ The diagnosis of insomnia is based on the diagnostic criteria of the Chinese Classification Scheme and Diagnostic Criteria for Mental Diseases in 2001.² Sleep quality score was assessed by the Pittsburgh Sleep Quality Index (PSQI) for the following symptoms: difficulty in falling asleep; not attaining deep sleep; easy arousal; dreaminess; waking up early; difficulty in falling asleep after waking up; feeling unwell; being tired after waking up; or being sleepy during the day. Symptoms occur at least 3 times per week and last for more than 1 month. Mental activity becomes less efficient, or work and study are affected, and the symptoms cannot be part of any kind of physical disease or mental or neurologic disorder seen after examination of the patient's system and laboratory test values. A score above 7 on the PSQI is judged as insomnia.

TCM diagnostic criteria. According to the 2007 *Internal Medicine of Traditional Chinese Medicine, 2nd edition*,³ diagnostic criteria of insomnia are: difficulty in falling asleep or easy arousal; being unable to fall asleep after waking up or even sleepless at night; headache, dizziness, palpitations, and forgetfulness; fatigue and feeling upset; and exclusion of other organic lesions via systematic and laboratory examinations. The symptoms last for more than 1 month. There are 5 types, including: (1) internal disturbance of Phlegm–Heat; (2) depression of the Liver generating pathogenic Fire; (3) Heart–Spleen Deficiency; (4) Fire Excess from Yin Deficiency; and (5) Deficiency of vital energy in the Heart and Gall Bladder.

Inclusion Criteria

Inclusion criteria for this study were:

- (1) The patient's symptoms fitted the abovementioned diagnostic criteria and the Chinese medicine diagnostic criteria of any type.
- (2) The patient had no infection or fever in the past 1 week, and no drugs affecting sleep were used.

- (3) External interference and other factors caused by transient insomnia were excluded.
- (4) The patient was informed and consented to treatment.

Exclusion Criteria

Patients were excluded if they:

- (1) had consciousness disorders or mental illness
- (2) had sleep apnea syndrome
- (3) had other serious diseases of the viscera (Heart, Liver, Kidney, etc.)
- (4) had skin inflammations, breakage, eczema, and ulcers that would be affected by the treatment
- (5) had allergic constitutions
- (6) were pregnant or lactating women
- (7) had severe mental or cognitive impairments
- (8) used other anti-insomnia drugs or were receiving sedation treatment

Interventions

Patients in both groups were treated with routine treatments for RA. Both groups were analyzed in terms of efficacy after the treatment for 1 month.

Intervention group. These patients received auricular plaster therapy with beans. Main points were *Shen Men*, Heart, Sympathetic, and Subcortex. Matching acupoints were depression of the Liver generating pathogenic Fire: Liver and ear tip; Phlegm–Heat internal disturbance: Spleen and Endocrine; Fire Excess from Yin Deficiency: Kidney and Bladder; Heart–Spleen Deficiency: Spleen and Small Intestine; Deficiency of vital energy in Heart and Gall Bladder: Gall Bladder and pulvinar.

Acupoints were detected with a meridian analyzer, looking for the most sensitive spots, pressing them for a while, and using indentations as marks when pressing the beans. The auricle of each patient was disinfected routinely, then a bean comprised of a seed of *Codonopsis* spp. was adhered to the middle point of a 0.5 cm × 0.5 cm square of medical zinc-oxide adhesive cloth and the cloth was cut to expose the bean. The cloth was pressed against the auricle, so the bean was aligned to the chosen indentation, and pressed with appropriate finger pressure on each hole for about 1–2 minutes. This made the bean produce acid and anesthetic bilge that induced a painful heat feeling in the patient. The patient was instructed to perform 4–5 of these compressions daily, and the intensity of stimulation was determined by the patient's sensation of acid distension, numbness, burning, and tolerance. In addition the patient was told to press the beans once 30 minutes before going to bed. The patient was instructed to apply this pressure to one side of the auricular point each time, and to press alternately on both ears, once every 3–5 days.

Control group. Patients in the control groups were given 1 mg of estazolam orally before going to bed every night.

TABLE 1. COMPARISON OF PSQI SCORES BETWEEN THE 2 GROUPS AFTER TREATMENT

Group		Number of cases	Sleep quality	Sleep latency	Sleep time	Sleep efficiency	Sleep disorders	Daytime dysfunction
Intervention	Before treatment	38	2.31±0.76	2.27±0.76	2.34±0.57	2.43±0.61	2.38±0.58	2.38±0.62
	After treatment	38	1.45±0.82*	1.48±0.86*	1.26±0.86*	1.53±0.82*	1.77±0.81*	1.65±0.71*
Control	Before treatment	38	2.28±0.62	2.47±0.58	2.49±0.60	2.33±0.57	2.32±0.66	2.39±0.54
	After treatment	38	0.97±0.65*#	1.00±0.62*#	1.25±0.73*#	0.93±0.64*#	0.89±0.65*#	0.96±0.68*#

Compared with before treatment in the same group * $P < 0.05$.

Compared with control group after the treatment # $P < 0.05$.

PSQI, Pittsburgh Sleep Quality Index.

Curative Effect Evaluation

The patients' responses on answer sheets and questionnaires were evaluated according to the PSQI. Treatment efficacy was evaluated according to the Athens Insomnia Scale (AIS).

Statistical Method

The SPSS 13.0 (Chicago, IL) statistical software package was used for analysis. Measurement data were described by $\bar{x} \pm s$, and differences were compared through t -tests. Count data were described by rate, proportion, and ratio, and differences were compared through a rank-sum test.

RESULTS

Scores of the PSQI dimensions all fell for the patients of both groups after treatment (Table 1). The scores for sleep quality, sleep latency, sleep efficiency, sleep disorder, and daytime dysfunction in the experimental group were lower than those in the control group ($P < 0.05$). AIS scores in all dimensions decreased in both groups (Table 2), and, after treatment, the scores and total points for sleep latency, night-time arousal, overall sleep quality, and dimensionality

of daytime body function in the experimental group were lower than those in the control group ($P < 0.05$).

DISCUSSION

RA is a chronic and disabling autoimmune disease that relapses easily. Foreign reports show that 54%–70% of patients with RA suffer from sleep disorders, including difficulty in falling asleep, early awakening, and increased daytime sleep.⁴ Good sleep is important for the body's regulation and repair, while sleep disorders can worsen illness, activity, pain, morning stiffness, fatigue, or mood disorders. Insomnia is one of the most common sleep disorders. If insomnia symptoms are not alleviated effectively, efficacy and prognosis of primary disease are also affected.

Common treatments for insomnia include medication, psychotherapy, and complementary and alternative medicine approaches.⁵ Drug therapy mainly includes benzodiazepines, nonbenzodiazepines, melatonin supplements, and antidepressants.⁶ At present, drug treatment is the mainstay for treating chronic insomnia in China. Cognitive-behavioral therapy (CBT) for insomnia includes sleep-related cognitive therapy, behavioral interventions (such as sleep restrictions and stimulus controls), and education (such as sleep hygiene), which have been recognized being effective.⁷

TABLE 2. COMPARISON OF AIS SCORES BEFORE AND AFTER TREATMENT BETWEEN THE 2 GROUPS

Group		Number of cases	Sleep latency	Waking up at night	Waking up earlier than expected	Total sleep quality	Daytime physical function	Excessive daytime sleepiness	Total score
Intervention	Before treatment	38	2.33±0.74	2.29±0.76	2.35±0.59	2.46±0.60	2.36±0.54	2.24±0.63	14.15±1.34
	After treatment	38	1.42±0.86*	1.47±0.89*	1.26±0.89*	1.53±0.85*	1.73±0.80*	1.29±0.56*	8.21±1.67*
Control	Before treatment	38	2.29±0.61	2.42±0.59	2.48±0.60	2.33±0.58	2.39±0.67	2.33±0.71	14.13±1.50
	After treatment	38	0.93±0.68*#	1.00±0.63*#	1.25±0.78*#	0.92±0.67*#	0.88±0.65*#	1.05±0.64*#	6.18±1.48*#

Compared with before treatment in the same groups * $P < 0.05$.

Compared with control group after the treatment # $P < 0.05$.

AIS, Athens Insomnia Scale.

Per the guidelines for the managing adult chronic insomnia, published by the American College of Physicians in 2016,⁷ all adults with chronic insomnia should first receive drug treatment. Yet, each treatment has limitations. Drug treatment has the advantage of quick onset and a definite curative effect. However, long-term medication will lead to drug dependence, which affects patients' QoL seriously. Thus, nondrug therapies for reducing cognitive impairment in insomnia are gaining traction as first-line treatments, and they are often used before—or in conjunction with—medications.

Due to the relative lack of medical resources to engage in professional CBT in China and psychologic resistance to the concept of mental illness, CBT alone might also lead to compliance problems. Therefore, alternative therapy has become the nondrug treatment of choice for patients with insomnia. Auricular point sticking is one of the therapies.

In holographic theory, a diagram of an inverted fetus shows each part of the auricle corresponding to the internal organs of the body. In WM terms, the peripheral nerves of the ear are abundant, and stimulation of auricular acupoints is a good way to excite the vagus nerve. Sympathetic excitation is inhibited to regulate the sympathetic and parasympathetic nerves and produce a curative effect. Studies have confirmed that using auricular acupoints increases cardiac parasympathetic activity and decreases sympathetic activity, thereby reducing insomnia.⁸

In addition, melatonin is a neuroendocrine hormone that can regulate the sleep–wake mechanism through specific receptor mediation to play sedative and inducing roles in sleep. Studies have found that auricular therapy can be used to treat insomnia by regulating the body's natural secretion of melatonin at night.⁹ Stimulation of the first part of the ear can also change the body's levels of 5-hydroxytryptamine and dopamine in the body, thus improving sleep.¹⁰

The seed of *Codonopsis* spp. activates Blood, removing Blood Stasis and activating the relevant meridians. Auricular acupoint pressing with seeds produces slow and continuous benign stimulation that can dredge the channels and collaterals, regulate *Zang-Fu* functions, and make the body achieve Yin and Yang in relative equilibrium to improve sleep.

In this present study, no side-effects were found during the treatment. Auricular point therapy had an obvious curative effect in patients with RA who had insomnia. The treatment was easy to perform and was acceptable. Thus, there was better compliance among these patients, and this therapy is worth promoting in clinical practice.

CONCLUSIONS

Auricular plaster therapy has a marked effect on insomnia in patients with RA, and is easy and simple to apply.

AUTHOR DISCLOSURE STATEMENT

No financial conflicts exist.

REFERENCES

1. Expert Consensus Panel on Definition, Diagnosis and Drug Therapy for Insomnia. Expert consensus (draft) on definition, diagnosis and drug therapy for insomnia. *Chin J Neurol*. 2006; 39(2):141–143.
2. Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer J. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research [J]. *Psychiatry Res*. 1989; 28(2):193–213.
3. Zhou Z-Y. *Internal Medicine of Traditional Chinese Medicine*, 2nd ed. Beijing: China Press of TCM; 2007.
4. Martínez-Cengotitabengoa M, Carrascón L, O'Brien J, et al. Peripheral inflammatory parameters in late-life depression: A systematic review. *Int J Mol Sci*. 2016;17(12):E2022.
5. National Institutes of Health. National Institutes of Health State of the Science Conference statement on Manifestations and Management of Chronic Insomnia in Adults, June 13–15, 2005. *Sleep*. 2005;28(9):1049–1057.
6. McCurry SM, Pike KC, Vitiello MV, Logsdon RG, Larson EB, Teri L. Increasing walking and bright light exposure to improve sleep in community-dwelling persons with Alzheimer's disease: Results of a randomized, controlled trial. *J Am Geriatr Soc*. 2011;59(8):1393–1402.
7. Qaseem A, Kansagara D, Forcica MA, Cooke M, Denberg TD; Clinical Guidelines Committee of the American College of Physicians. Management of chronic insomnia disorder in adults: A clinical practice guideline from the American College of Physicians [J]. *Ann Internal Med*. 2016;165(2):125–133.
8. Kung YY, Yang CC, Chiu JH, Kuo TB. The relationship of subjective sleep quality and cardiac autonomic nervous system in postmenopausal women with insomnia under auricular acupressure. *Menopause*. 2011;18(6):638–645.
9. Nordio M, Romanelli F. Efficacy of wrists [sic] overnight compression (HT 7 point) on insomniacs: Possible role of melatonin. *Minerva Med*. 2008;99(6):539–547.
10. Fallgatter AJ, Neuhauser B, Herrmann MJ, et al. Far field potentials from the brain stem after transcutaneous vagus nerve stimulation. *J Neural Transm (Vienna)*. 2003;110(12): 1437–1443.

Address correspondence to:

Shan Mo, MD

Department of Traditional Chinese Medicine

No. 3 South Sanyou Road

Foshan Chancheng Central Hospital

Foshan, Guangdong 528000

China

E-mail: 1549505114@qq.com