

Progress in the Treatment of Depression Combined with Insomnia with Different Amounts of Acupuncture Stimulation

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Abstract

Depression and insomnia are common categories of physical and mental medicine, which are causative of each other and often occur as co-morbidities, causing a huge health and economic burden. Acupuncture treatment in insomnia co-morbidity mild-moderate depression shows better clinical efficacy, with multi-target, multi-pathway, multi-dimensional and other characteristics. However, the clinical efficacy and effect mechanism of acupuncture parameters have not been clearly determined, therefore, this paper systematically describes the possible mechanism of different acupuncture stimulation volume, including manipulation of the needle, electroacupuncture waveform, electroacupuncture frequency, acupuncture site, and other variables, and proposes that future research should focus on exploring the effect mechanism of different acupuncture stimulation volume in the treatment of the disease, with a view to providing theoretical basis and research ideas for the treatment of insomnia depression co-morbidities by acupuncture.

Keywords: depression, insomnia, electroacupuncture, electroacupuncture frequency, electroacupuncture waveforms

1. Introduction

Depression is a mental illness with persistent low mood as the main clinical manifestation due to environmental, psychological and physiological factors, and may be accompanied by somatization symptoms such as sleep disturbance, fatigue, loss of appetite and pain. Even if insomnia patients have good sleep environment and sleep conditions, they still report dissatisfaction with sleep duration or sleep quality, which is often characterized by long sleep latency, difficulty in maintaining sleep, early awakening, or accompanied by daytime dysfunction, moodiness, or irritability. The two share aetiology and pathological mechanisms[1], in the disease in the development of often co-morbid and mutual influence, mutual promotion[2]. Depression is often associated with or residual sleep disorders[3], and insomnia is twice as common as normal sleep in people with insomnia[4], and is an independent predictor and risk factor for depression and suicide risk[5]. Insomnia and depression can occur as co-morbidities and are also seen in peri-menopausal women, cancer, Parkinson's and many other disease processes. Studies have shown that about 70% of depressed patients have co-morbid insomnia, and more than 2/3 of insomniacs suffer from depression, more in women than in men, with a poorer prognosis and a higher risk of suicide, posing a serious threat to global public health health[6][7].

Currently, antidepressants or sedative-hypnotic drugs are mostly used in the treatment of co-morbidities, but the long-term use of drugs brings about sleep fragmentation, gastrointestinal discomfort and other adverse effects, drug dependence and drug withdrawal and other related problems are open to question, while cognitive-behavioral therapy, acupuncture, electrical, magnetic, optical stimulation, psychotherapy and other physiotherapy modalities have become a hotspot of research due to the lack of obvious toxic side effects. Acupuncture has shown unique advantages in the treatment of co-morbidities with long-term effects[8][9], probably through the modulation of the HPA axis, anti-inflammatory, brain-gut axis, modulation of synaptic plasticity and brain reward mechanisms[10]. However, the diversity of acupuncture points, needle selection or electroacupuncture frequency, waveform and other parameters make many scholars and other scholars have many problems in the treatment of disease, this study is based on the search of the full text database of Chinese journals (CNKI), Wipro Chinese Science and Technology Journal Database (VIP), Wanfang Academic Journals Full-text Database (Wanfang), China Biomedical Literature Database (SinoMed), PubMed, Euromedicine, and other databases.), PubMed, and EMBase

databases from 2000 to 2024 on acupuncture treatment of insomnia and depression co-morbidities in clinical and animal experimental studies and combed, aiming to provide a reference for the clinical diagnosis and treatment program and the selection of electroacupuncture parameters.

2. Different Electroacupuncture Waveforms: Low-Frequency Continuous and Sparse Waveforms

2.1 Low-Frequency Continuous Waves

The heart is the master of the five organs and six bowels. Sleep and emotions are dominated by the heart, the same belongs to the category of physical and mental medical diseases, related to the heart and brain, electroacupuncture treatment of insomnia research focuses on low-frequency continuous wave and sparse-dense wave[11], low-frequency induced sleep brain waves appear, shorten the sleep latency period, and may be associated with the brain's synchrotron resonance. The study randomly assigned 270 patients with depression and insomnia to the blank group, electroacupuncture group and pseudo-electroacupuncture group, and chose Baihui, Shenting, Yintang, Anmian, Neiguan, Shenmen, and Sanyinjiao to carry out a total of 24 treatments for 8 weeks and six-month observational follow-up, and recorded the sleep parameters in the activity recorder, the PSQI, and the 17-item Hamilton Depression Scale. The results showed that the electroacupuncture group using 30 HZ, continuous waves to the extent tolerated by the patient had a 4.2% higher sleep efficiency than the sham acupuncture group at week 8, with a significant reduction in depression scale scores and the efficacy lasting for half a year, which also confirms that acupuncture treatment is not a placebo effect and has a sustained effect[12], however, no increase in sleep efficiency was found in the electroacupuncture group at week 4. Low-frequency square wave (asymmetric bidirectional wave) CMNS6-1 Wuxi Jiajian Medical Devices Co. Chuang[13] 150 patients with major depression combined with insomnia were divided into acupuncture group, micro-acupuncture and placebo group, and the acupuncture group chose the ear shenmen, the four shencongs, the Baihui, the Yintang, the shenmen, the three yinjiao, the Neiguan, and the anmian, and a constant-current square wave of 4HZ with 0.4ms was used for 3 times/week. The micro-acupuncture group was treated with superficial needling at non-acupuncture points in the corresponding areas, and the placebo group was treated with placebo needling 1 inch open next to the selected points in the acupuncture group for a total of 5 weeks of treatment. The results showed that the improvement in sleep latency was significantly higher in the acupuncture group than in the micro-acupuncture group after 1 week of treatment, but there were no significant differences in other parameters of the sleep diary, activity recorder parameters, or depressive symptoms. Acupuncture as alternative medicine may improve symptoms and depression-related residual insomnia symptoms in insomniac-depressed patients and is not a placebo effect, but a high level of evidence has not been established[14]. In both studies, the model "CMNS6-1 PLUS" was used. Although the researchers used different models of electro-acupuncture devices, the output was mostly asymmetric bi-directional waves, and low-frequency electro-acupuncture was more often used.

2.1 Sparse and Dense Waves

Sparse and dense waves are not easy to make the body adaptive, and are better than continuous waves in analgesia, anti-fatigue and other effects[15], while different frequencies of electroacupuncture will cause the release of different neurotransmitters from the center, the frequency of 2HZ can make the body endorphins and enkephalins elevated, while 100HZ is more likely to make prednisolone elevated, and 2/100HZ can make all three elevated[15]. Ping Liu[16] Insomnia modeling was performed using progressive restraint braking to study spontaneous activity, circadian activity level, behavioral tests and neurotransmitter tests such as central and peripheral blood NE and DA in insomniac mice. The frequency of 4/60 HZ, current 1 mA, and sparse-dense wave were used to continuously needling Shenmen and Sanyinjiao for 4 days, and the results showed that the electroacupuncture group could significantly reduce the content of NE, DA, and EPI in the peripheral blood of insomnia-modeling rats, and improve the amount of abnormal circadian activity, insomnia, and depression and anxiety, probably by inhibiting the activity of sympathetic-adrenomedullary system. However, some studies have also confirmed that low-frequency sparse waves can adjust sleep continuity, increase the delta2 power spectrum of NREM 3, and improve insomnia and depression symptoms[17]. Animal experiments confirmed that different waveforms (sparse, dense and dense waves) treated chlorophenylalanine-modeled insomniac rats. Electroacupuncture of Shenmen-Sanyinjiao in rats found that 5-HT content in the hypothalamus of the rats was increased and NE and DA content was decreased in the hypothalamus of rats compared with that of the model group, but hormonal changes in the sparse waveforms were significantly stronger than that in the dense and dense waveforms[18]. High-frequency electroacupuncture may treat insomnia by antagonizing sympathetic electroacupuncture excitation and reducing the synthesis and release of norepinephrine[19], but there are few existing studies on high-frequency electroacupuncture treatment of insomnia and depressive disorders.

3. Manipulation of Needles

Acupuncture treatment in the qi sense based on the application of complementary and diarrhea techniques, the "Ling Shu - official needle" chapter in the detailed discussion of the "five thorns," "nine thorns," "twelve thorns," and other assassination method, other classic medical books Other classic medical books on the fourteen-character acupuncture techniques, single-type techniques, double-type techniques or penetrating needle method, such as acupuncture tonicity and diarrhea, depth, etc. were discussed in detail. In clinical practice, acupuncture operation is often combined with the anatomical location of acupuncture points and the needs of the disease, forming a penetrating acupuncture point, local multi-needle acupuncture method and different positions of the depth of the acupuncture method to improve clinical efficacy. The repetitiveness of manual needle operation is not high, and it is difficult to quantitatively assess the amount of stimulation, and it is difficult to control the consistency of variables in the research design, but it is widely used in acupuncture clinics because of its effectiveness. The "Pulse skill repertoire identification" said "Ren and Duda two veins, for the program of yin and yang of the human body." Yin and yang imbalance, all kinds of diseases, adjust the yin and yang, Ren and the Governor with the adjustment of the day essence of the night, all night, qi and blood and smooth[20]. Yu Lei[21] According to the deficiency and reality dialectic of "deficiency is complementary, solid is diarrhea", the sparing and balancing acupuncture method of Shen Ting penetrating Hundred Clubs and Qi Hai penetrating Guan Yuan was used to treat 83 cases of insomnia and depression, and at the same time, the traditional acupuncture group and oral eszopiclone group were set up, and the results showed that all the three groups could improve the efficiency of sleep and reduce the PSQI scores, and the acupuncture group could improve the depression and anxiety before and after the treatment. Depression and anxiety before and after the treatment, but the liver-sparing and spirit-regulating acupuncture method showed a better post-acupuncture effect. Hongfang Tian[22] Strong and weak stimulation were used to treat sleep and depression and anxiety in patients with insomnia of the liver-depression and fire type. Shenmen, Sanyinjiao, Shenwei, Zhaohai, Xingma, and Manxi were used in both groups to detoxify the liver, reduce depression and fire, and calm and tranquilize the mind to help sleep. In the strong stimulation group, Sanyinjiao was stabbed 1.2 inches, and the remaining points were stabbed 0.5 inches, and the twisting diarrhea method was applied, with an interval of 10 min, and each point was needled for 10 s. In the weak stimulation group, the depth of the needles was 0.2 inches, and no manipulation was applied. The emotional symptoms of both groups improved after treatment, but the strong stimulation group showed better efficacy than the weak stimulation group in improving emotional and somatization symptoms. Cheng Wei-Ping[23] Applying strengthened Yang-pricked Baihui acupoints to treat depression and insomnia, strengthened Yang-pricked Baihui was able to significantly reduce patients' PSQI and HAMD scores compared with conventional acupuncture.

The amount of acupuncture stimulation in addition to the acupuncture technique should also include the time of needle retention and treatment cycle, now the clinical use of needle retention 30min, every other day, three times a week treatment frequency. The length of needle time has not attracted much attention, and clinically it is found that appropriate prolongation of needle time can help to improve some of the persistent insomnia[24]. The treatment cycle of the disease is mostly 5-6 consecutive times per week or three times per week for 4 weeks, and few studies have focused on the correlation between the treatment cycle and the disease, which may be related to the cumulative effect of acupuncture or the theory of meridian fatigue[25].

3. Snapping Needle Embedding

3.1 Heart and Liver Literal Acupuncture Combined with Intradermal Needling

Bibliometric studies have found that insomnia is a class 1 indication in the disease spectrum of intradermal acupuncture[26]. The advantage of intradermal acupuncture lies in the long-lasting stimulation of acupoints, which achieves the effect of adjusting meridian qi, regulating yang and yin. According to modern medicine, intradermal acupuncture mainly stimulates the dermis, exerts neurohumoral and immunological regulation through the gut-brain-cortex axis, releases substances such as 5-HT and bradykinin, and thus improves brain functional connectivity[27]. Wang Sampanze et al. [28] treated patients with insomnia and depression co-morbidities with the treatment method of liver-sparing and spirit-regulating, the control group selected Baihui, Yintang, Hegu, and Taichong, and the optimized acupuncture group added Zhaohai and Liejiao under the guidance of the theory of the eight meridians and the eight channels of the odd meridians and applied intradermal needling alternately on the heart, gallbladder, or kidney, and anamnesis points 2 times/week for six consecutive weeks. By means of mediation effect analysis and subgroup analysis, it was confirmed that acupuncture combined with intradermal needling was able to improve insomnia symptoms and thus depression in patients with mild symptoms.

3.2 Heart and Gallbladder Lipstick Acupuncture Combined with Snap Needles

Depression and insomnia in ancient Chinese medicine, although there is no specific name of the disease, but is categorized as depression, lily disease and not sleep, do not sleep, not sleep and other categories. The Golden Chamber of the Essentials": lily disease, a hundred veins of one , want to eat again can not eat, often silent, want to lie down can not lie down. Nestle's source of disease": upset not sleep, the heart is hot, but not sleep in vain, the gallbladder is cold. Many ancient books have recorded that insomnia is often co-morbid with depression and anxiety and other psychiatric diseases, and there are heart and gallbladder related. Yan Luda[29] et al. based on "the heart masters the spirit, the gallbladder masters the decision" the concept of the heart and gallbladder unified in the spirit of the treatment of mild to moderate depression and insomnia patients, the observation group to take the Baihui, Yintang, Neiguan, Yanglingquan, and the introduction of qi return to the source of the group of acupoints (the middle epigastric region, the lower wrist, the sea of qi, Guan Yuan) and supplemented with the heart Yu, gallbladder Yu snap needle buried acupuncture, for 3 times/week, and 1 Hz, 80% of the low-frequency rTMS for 5 consecutive weekly sessions of magnetic stimulation for 1 month of treatment and follow-up. The control group was treated with comfort needling and rTMS of the same intensity, which showed depression in both groups, but at the end of treatment and during follow-up, the total PSQI score and scores of sleep efficiency and daytime functioning in the needling group were significantly improved compared with those in the control group, and needling may improve insomnia and depressive symptoms by modulating neurotrophic factor (BDNF) and gamma-aminobutyric acid (GABA). The researchers also conducted a 2-month acupuncture combined with heart, liver, and kidney auricular snap-needle burying on the basis of oral sertraline hydrochloride tablets for patients with insomnia and depression caused by the new crown isolation experience, and the results showed that both groups could reduce the SDS and SAS scores and increase the concentration of 5-HT, and the acupuncture group was better, which confirms that acupuncture lowers the resting motor threshold, improves the amplitude of the motor evoked potentials, the cortical resting period, the concentration of serum 5-HT, regulates the balance of excitatory and inhibitory neuronal function, thereby improving mood and sleep quality[30].

4. Mechanisms of Effects Induced by Different Amounts of Acupuncture Stimulation

4.1 Head and Body

Electroacupuncture treatment of insomnia and depression co-morbidities in the selection of acupoints has not yet been a significant difference, mostly to the ducal acupuncture points, head acupoints, Shenmen - Sanyinjiao, Hegu - Taichong pair of acupoints to regulate the spirit of the heart, soothing qi is the main[31]. The Dudu vein belongs to the kidney - through the heart - and brain, and is closely related to the heart, brain, liver, kidneys and other organs, acupuncture Dudu vein acupuncture points after polysomnography sleep monitoring index levels, blood levels of 5-HT, GABA, and depression and anxiety improved significantly better than the oral medication group[32]. However, there is no lack of animal experiments in the design of the program using only the body acupuncture group, electroacupuncture Shenmen-Sanyinjiao is more common, the sensation of the limbs in the trunk area by the spinal ganglion conduction to the contralateral spinal thalamus tract through the thalamocortical fasciculus upward to the central postcentral gyrus, and the head and face sensory pathway is the sensory branch of the brain nerves (trigeminal nerve, lingual-pharyngeal nerve, facial nerve, vagus nerve) to the cerebral bridge transmitted to the contralateral trigeminal The thalamus system passes through the thalamocortical tract up to the postcentral gyrus. However, the existing research and clinical diagnosis and treatment of disease mostly use body acupuncture and head acupuncture together, so whether the difference between the limbs and the head and face sensory conduction pathway will cause the difference in the brain effect mechanism of head acupuncture and body acupuncture is still to be investigated.

4.2 Electroacupuncture and Manipulation of Needles

Acupuncture has been used in the treatment of diseases for more than thousands of years, and technological development and standardization of clinical research have led to the transformation of acupuncture from traditional manipulation to electroacupuncture stimulation. Functional magnetic resonance studies have found that different acupuncture maneuvers cause excitability changes in different brain regions and specific brain network connections, resulting in different acupuncture effects[33]. The afferent fibers of sensory nerves excited by electroacupuncture and manual acupuncture are different due to different stimulation intensities. Electroacupuncture mainly excites class II nerve fibers, and manual acupuncture mainly excites class III fine nerve fibers, while electroacupuncture is better than manual acupuncture in analgesia and adjusting the content of acetylcholine and norepinephrine in the central nerves[15]. Some studies have also claimed that the therapeutic effect produced by manual acupuncture is better than that of electroacupuncture stimulation alone, but the amount

of stimulation of manual acupuncture is more difficult to control due to the operator's needling technique, tonicity and diarrhea, etc. Therefore, electroacupuncture has been widely used in acupuncture research[34].

4.3 Mechanism of Effect of Different Electroacupuncture Parameters

Due to the diversity of electroacupuncture parameters makes the design of the research program complex and varied, its electroacupuncture R & D set the direction of the current varies (monophasic wave, biphasic wave / alternating current, direct current) and the morphology of the pulse wave (square, sharp, sinusoidal, etc.), the different combinations of pulse wave (sparse and dense, continuous, intermittent) and other parameters of the different combinations of the parameters may produce a different stimulus intensity and thus affect the acupuncture functioning. Mechanism of effect. The direction of the current of direct current remains unchanged, stimulating electrolysis, polarization and heating, easily polarizing the skin at the needle and causing burns, while the direction of the current of alternating current is constantly changing, and the waveform is presented as a biphasic or sinusoidal waveform, which only has the effect of heating. Modern clinical use of pulsed alternating current therapeutic instrument, that is, the voltage size or current direction of the sudden change. The current direction and pulse waveform of electroacupuncture therapeutic instrument are set when the instrument is shipped from the factory, and clinically there are only sparse and dense waves, continuous and intermittent waves and electroacupuncture frequency and stimulation intensity are adjustable, so the current research mainly focuses on the mechanism of the effect produced by different electroacupuncture frequency and waveform. Depression and insomnia co-morbidities in the literature found that electroacupuncture parameters are mostly set at low-frequency continuous wave or low-frequency sparse wave, and high-frequency electroacupuncture related research in insomnia and depression are less applied.

5. Conclusion

In the existing domestic and international literature on depression and insomnia co-morbidities, researchers have partially answered the choice of electroacupuncture parameters, but the choice of parameters in the severity of the disease and in different point selection schemes is yet to be investigated, and the influence on the efficacy of the treatment, and the mechanism of the resulting farcical effect is not clear. The present study combed the current research status and demonstrated that different amounts of acupuncture stimulation can improve brain functional connectivity or key nuclei in the brain to treat depression and insomnia co-morbidities by regulating the levels of hormones, inflammatory factors, and neurotrophic factors.

In the course of literature research, it was found that acupuncture treatment of depressive insomnia and insomnia with depressive state was common, and numerous studies have ill-defined depressive state and depression, or relied only on HAMD scale scores to screen subjects; therefore, the researchers should have the qualification of diagnosing psychiatric disorders, and clearly and accurately include the subjects. More scholars in China have chosen a comprehensive program of multiple sequential treatments in their research protocols, which will not be elaborated in detail in this study because of its many variables. Acupoint matching, the selection of special needle tools and different sequential programs, electroacupuncture parameters, etc. are important factors affecting the response to acupuncture and are key targets for precise treatment. The selection of acupoints sometimes varies greatly according to different dialectical methods, but with the development of standardized protocols and data mining technology, the main acupoints for disease selection are basically fixed. Sequential therapy is widely used in clinical practice, and when the efficacy of a single therapy is not ideal or the condition requires it, a variety of special therapies are often used to improve the efficacy and prolong the post-acupuncture effect, but the multivariate and multi-parameter results make it difficult to validate the scientific research. In-depth study of the electrophysiological changes produced by different parameters of electroacupuncture and the mechanism of neuroendocrine action, in order to accurately match the waveform, frequency and other parameters of electroacupuncture, is of great significance to improve the clinical efficacy and clinical transformation. Low-frequency electroacupuncture, sparse and continuous waveforms, and manipulative needle transport are beneficial in relieving depression and shortening the latency period for sleep, and are suitable for patients with insomnia co-morbidities in mild to moderate depression, with fewer studies on acupuncture treatment in major depression. Therefore, future research is based on electroacupuncture stimulation parameters, combined with electroencephalography, functional magnetic resonance, metabolomics and other technologies to further explore the multi-target, multi-dimensional effect mechanism of electroacupuncture treatment of disease, to better utilize the specificity advantage of acupuncture treatment of disease, and to improve clinical efficacy.

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