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A study on the improvement of gastrointestinal function and quality of life in patients with lung cancer after chemotherapy by combining traditional Chinese medicine acupoint moxibustion and psychological nursing

Студија о побољшању гасне троинтестиналне функције и квалитета живота код пацијената са карциномом плућа након хемотерапије комбинацијом акутне моксibusције традиционалне кинеске медицине и психолошке неге

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SUMMARY

Introduction /Objective To investigate the effects of combined Chinese medicine acupoint moxibustion and psychological nursing on the gastrointestinal function and quality of life of patients with lung cancer undergoing chemotherapy.

Methods A total of 120 lung cancer patients were randomly divided into two groups. The control group received conventional care, while the observation group was administered combined traditional Chinese medicine acupoint moxibustion and emotional nursing. The observation indicators included serum acetylcholinesterase (AChE) activity, plasma inhibin B, gastrin, motilin, dopamine, 5-hydroxytryptamine levels, incidence and duration of nausea/vomiting, Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS) scores, and World Health Organization Quality of Life-BREF (WHOQOL-BREF) scores.

Results Before intervention, no significant differences were observed between groups ($p > 0.05$). Post-intervention, the observation group showed significantly higher AChE activity (7.64 ± 1.17 U/mL vs. 6.96 ± 1.11 U/mL, $p < 0.001$) and inhibin B levels (193.52 ± 15.72 pg/mL vs. 166.77 ± 20.36 pg/mL, $p < 0.001$), lower gastrin (146.70 ± 13.02 ng/L vs. 157.35 ± 14.40 ng/L, $p < 0.001$) and motilin levels (151.55 ± 9.99 pmol/L vs. 158.22 ± 8.37 pmol/L, $p < 0.001$), reduced incidence (2.83 ± 0.64 times/day vs. 3.12 ± 0.67 times/day, $p < 0.001$) and duration (1.7 ± 0.50 d vs. 2.97 ± 0.64 d, $p < 0.001$) of nausea/vomiting, lower SAS (40.55 ± 2.79 vs. 47.06 ± 4.12 , $p < 0.001$) and SDS (39.82 ± 2.81 vs. 47.25 ± 4.50 , $p < 0.001$) scores, and higher quality-of-life total scores (309.44 ± 9.11 vs. 294.56 ± 8.45 , $p < 0.001$) than the control group.

Conclusion The combined use of Chinese medicine acupoint moxibustion and traditional Chinese medicine emotional care for patients with lung cancer undergoing chemotherapy has significant effects, which can significantly improve their gastrointestinal function and effectively improve their anxiety and depression symptoms, and improve their quality of life.

Keywords: lung cancer; traditional Chinese medicine acupoint moxibustion; emotional care; gastrointestinal function; quality of life

САЖЕТАК

Увод /Циљ Истражити ефект комбиноване кинеске медицинске мохибустије тачака и психолошког неговања на гастроинтестиналну функцију и квалитет живота пацијената са плућним карциномом који су подвргнути хемотерапији.

Методе Укупно 120 пацијената са плућним карциномом били су насумично подељени у две групе. Контролна група је примила конвенционалну негу, док је опазива група примила комбиновано традиционално кинеско лечење мохибустијом тачака и емоцијску негу. Опазиви индикатори укључивали су активност серумског ацетилхолинестеразе (АЦхЕ), разине инхибина Б, гастрина, мотилина, допамина, 5-хидрокситриптамина, учесталост и трајање мучнине/вражђа, резултате самодиагностиковања анксиозности (САС) и депресије (СДС), као и резултате квалитета живота.

Резултати Пре интервенције нису биле забележене значајне разлике између група ($p > 0.05$). После интервенције, опазива група показала је значајно већу активност АЦхЕ (7.64 ± 1.17 U/mL усп. 6.96 ± 1.11 U/mL, $p < 0.001$) и разине инхибина Б (193.52 ± 15.72 pg/mL усп. 166.77 ± 20.36 pg/mL, $p < 0.001$), нижи ниво гастрина (146.70 ± 13.02 ng/L усп. 157.35 ± 14.40 ng/L, $p < 0.001$) и мотилина (151.55 ± 9.99 pmol/L усп. 158.22 ± 8.37 pmol/L, $p < 0.001$), смањену учесталост (2.83 ± 0.64 пута/дан усп. 3.12 ± 0.67 пута/дан, $p < 0.001$) и трајање (1.7 ± 0.50 d усп. 2.97 ± 0.64 d, $p < 0.001$) мучнине, ниже резултате САС (40.55 ± 2.79 усп. 47.06 ± 4.12 , $p < 0.001$) и СДС (39.82 ± 2.81 усп. 47.25 ± 4.50 , $p < 0.001$), као и више укупних резултата квалитета живота (309.44 ± 9.11 усп. 294.56 ± 8.45 , $p < 0.001$) у односу на контролну групу.

Закључак Комбинована употреба кинеске медицине акупонт мохибустион и традиционалне кинеске медицине емоционално брига за пацијенте са плућним раком који се подвргавају хемотерапији има значајне ефекте, који могу значајно побољшати њихов гастроинтестинални функцион и ефикасно побољшати њихове симптоме анксиозности и депресије, као и побољшати квалитет живота.

Кључне речи: рак дроба; акупунктурна моксотерапија традиционалне кинеске медицине; емоционална пажња; функција гастроинтестиналног тракта; квалитет живота

INTRODUCTION

Lung cancer is the leading malignant tumor, significantly affecting the physical and mental health of patients [1]. Non-small cell lung cancer is the most common type of lung cancer [1]. Currently, treatment strategies include surgical resection, chemotherapy, targeted therapy, and radiotherapy [2]. Chemotherapy is a common treatment option for lung cancer patients, but chemotherapeutic agents often exhibit cytotoxic effects, leading to adverse reactions. Gastrointestinal side effects, primarily nausea and vomiting, are the most common during chemotherapy. Studies have shown that the overall incidence of gastrointestinal symptoms in patients reaches 97.9%, with the most severe and intolerable being gastrointestinal reactions. During the chemotherapy period for lung cancer patients, nausea is the most common symptom (incidence rate of 89.2%), followed by constipation (68.3%) and vomiting (53.3%) [3]. Decreased appetite is one of the most severe symptoms in the diagnosis and treatment of the disease. Patients often refuse chemotherapy due to severe gastrointestinal reactions, delaying treatment and impacting their quality of life [4]. The underlying mechanism is that most chemotherapeutic agents do not specifically kill tumor cells but merely inhibit cell proliferation, which, while blocking tumor cells, also causes toxic damage to the epithelial cells of the gastrointestinal mucosa, leading to gastrointestinal symptoms.

Research on the quality of life of cancer patients is receiving increasing attention. It can assess the impact of the disease and treatment on patients from a professional perspective, thereby guiding the selection of treatment plans and predicting patient survival, enhancing biomedical understanding [5]. Therefore, to ensure the effectiveness of chemotherapy in lung cancer patients, it is essential to actively prevent and manage gastrointestinal adverse reactions during chemotherapy.

Currently, commonly used Western medicines include 5-HT₃ receptor antagonists, NK-1 receptor antagonists, hormones, dopamine antagonists, sedatives, and acid-suppressing gastrointestinal protectants. For chemotherapy-related constipation, the main approaches used domestically involve oral prokinetic agents, laxatives, and enemas, such as the use of glycerin suppositories, lactulose, and magnesium oxide [6]. Although these medications are effective for preventing nausea and vomiting, they can cause adverse reactions such as headaches, dry mouth, rashes, and constipation. They are also expensive and do not provide significant relief for other gastrointestinal symptoms such as decreased appetite and constipation, presenting numerous drawbacks.

Traditional Chinese medicine emphasizes an ‘holistic perspective and syndrome differentiation treatment’ in addressing gastrointestinal symptoms related to spleen and stomach deficiency in lung cancer chemotherapy. Currently, the main approaches include traditional Chinese nursing techniques and herbal decoctions. Among the treatment methods for gastrointestinal reactions after chemotherapy, acupoint moxibustion has gained attention due to its cost-effectiveness, simplicity, ease of operation, and minimal side effects.

Acupoint moxibustion has shown good effects on gastrointestinal adverse reactions during chemotherapy in patients with malignant tumors. By allowing the absorption of medication through acupoints [7-8], it helps to alleviate nausea and regulate the stomach, as well as to soothe the liver and promote the flow of Qi. This approach aids in the regular peristalsis of the gastrointestinal tract, enhances digestion and absorption, and can also reduce gastrointestinal symptoms by stimulating vagus nerve activity and promoting the secretion of gastrointestinal neuropeptides [9, 10]. The biological connection between meridians/acupoints and internal organs has been increasingly recognized, and gastrointestinal diseases can trigger specific

characterization phenomena on the body surface, providing a scientific basis for acupoint-based therapies [11].

Patients with tumors often experience a range of negative emotions, such as irritability, anger, pessimism, and disappointment, after undergoing chemotherapy and radiotherapy. These emotions can negatively impact their quality of life and exacerbate their condition [12]. Anxiety and depression are classified as emotional disorders in Traditional Chinese Medicine (TCM). Emotional care in TCM is implemented based on syndrome differentiation. For example, for patients with sadness (grief injuring the lung), nurses use the “joy overcomes grief” principle by providing cheerful media and encouraging pleasant activities. For those with fear (fear injuring the kidney), reassurance about medical measures and relaxation techniques like foot bathing are employed. For anxious patients (thought injuring the spleen), distraction through hobbies and entertainment is encouraged. For those prone to anger (anger injuring the liver), breathing exercises and muscle relaxation are taught to soothe liver qi stagnation. Additionally, five-element music therapy is utilized based on the correspondence between the five notes (Jue, Zhi, Gong, Shang, Yu) and the five internal organs to regulate emotional imbalances [13, 14]. Research shows that TCM emotional care can alleviate patients’ negative psychological states, enabling them to face their illness and treatment positively, thereby improving their quality of life [15, 16].

Currently, there have been studies exploring the effects of acupoint moxibustion and TCM emotional care on gastrointestinal function and quality of life, but research on their application in lung cancer patients is limited. Therefore, this study aims to investigate the effects of acupoint moxibustion combined with emotional care on the adverse gastrointestinal reactions and quality of life in lung cancer patients after chemotherapy, providing new methods for improving gastrointestinal function and quality of life in these patients.

METHODS

General information

A total of 120 lung cancer patients undergoing chemotherapy at Hebei University of Chinese Medicine from September 2020 to July 2024 were selected. They were randomly divided into a control group and a study group, with 60 cases in each group, using a random number table method. This study was approved by the medical ethics committee of our institution (Approval No: YXLL202307001). The acetylcholinesterase (AChE) assay kit was purchased from Suzhou Geruis Biotechnology Co., Ltd.; the human inhibin B (INHB) enzyme-linked immunosorbent assay (ELISA) kit, human gastrin (GT) ELISA kit, human motilin (MTL) ELISA kit, and dopamine (DA) ELISA kit were all purchased from Wuhan Erylate Biotechnology Co., Ltd.

Inclusion and exclusion criteria

Inclusion Criteria: ① Patients who meet the diagnostic criteria for lung cancer according to the Chinese Society of Clinical Oncology (CSCO) Guidelines for Diagnosis and Treatment of Primary Lung Cancer 2024 [17] and have developed gastrointestinal dysfunction after chemotherapy. ② Patients who meet the diagnostic criteria for gastrointestinal dysfunction defined as nausea, vomiting, constipation, or diarrhea $\geq$ Grade 1 according to the Common Terminology Criteria for Adverse Events (CTCAE) Version 5.0 [18]. ③ Age > 18 years, regardless of gender. ④ Patients who provide informed consent. ⑤ Patients with Self-Rating Anxiety Scale (SAS) score > 50 and/or Self-Rating Depression Scale (SDS) score > 53 , but excluding those with severe mental disorders (defined as SAS ≥ 70 or SDS ≥ 73 or pre-existing diagnosis of major depressive disorder or generalized anxiety disorder prior to cancer diagnosis).

Exclusion criteria: ① History of allergy to related treatment drugs; ② Skin inflammation at the application site that prevents treatment; ③ Severe upper gastrointestinal bleeding; ④ Mechanical complete intestinal obstruction; ⑤ History of mental illness, intellectual disability, and poor compliance.

Intervention methods

Control group

At the beginning of chemotherapy, conventional treatment and nursing intervention were adopted. Patients were given symptomatic treatment, orally Ondansetron tablets (Qilu Pharmaceutical Co., Ltd., National Drug Approval Number H10970062, specification: 8 mg/tablet), 8 mg each time, twice a day. At the same time, routine chemotherapy nursing intervention was carried out. ① All patients were warmly welcomed upon admission. In order to reduce the patients' unfamiliarity with the hospital and help them better adapt to the hospital, the nurses introduced the patients to their attending doctors and the basic environment of the hospital. Basic nursing care for respiratory medicine was provided to better cooperate with hospital's treatment. ② Health education: After admission, nurses should fully inform patients about the knowledge of the disease, including the relevant pathogenesis of lung cancer clinical manifestations, and treatment methods for lung cancer, as well as precautions for lung cancer chemotherapy. This increases the patient's understanding of their own disease and enhances their compliance with treatment. ③ Psychological care: Communicate more with patients, promptly understand the psychological problems they face, answer their doubts, enhance their confidence, and help them maintain a good attitude towards treatment. ④ Infection prevention: Appropriate preventive measures can prevent the further aggravation of cancer, prevent patients from getting infections and avoid worsening of their condition, which could affect their recovery. ⑤ Dietary guidance: Appropriate dietary care should be provided to patients,

guiding them to eat reasonably and balance their nutrition. They should avoid smoking, alcohol, and spicy foods, and instead eat light, small, and frequent meals, and drink plenty of water.

Observation group

On the basis of the control group, traditional Chinese medicine acupoint moxibustion was added and combined with traditional Chinese medicine care. (1) Acupoint moxibustion: The operation procedure of acupoint moxibustion is based on the Manual of Traditional Chinese Techniques for Nurses issued by the National Administration of Traditional Chinese Medicine: Give patients Wu Zhu Yu plaster, mix cloves, processed pinellia, and Evodia fruit in equal proportions, grind them into powder, mix them with vinegar to form a paste, wrap them in gauze to make a ball, and apply them on both sides of Zusanli (ST36) and Neiguan (PC6) with adhesive tape. Apply before bedtime and remove the next morning. 10 days is a course of treatment. (2) Traditional Chinese medicine emotional care measures refer to relevant literature and are formulated in combination with our own practice: Communicate and interact with patients in detail, patiently explain the impact of the seven emotions “joy, anger, sorrow, thought, sadness, fear, and fright” on physical health and provide targeted care for different emotional states of patients based on individualized principles. ① For those who are sad: Provide patients with cheerful and pleasant video materials in a comfortable environment, and cultivate an optimistic attitude and a happy mood through the method of overcoming emotions. ② For those who are fearful: Fully introduce the medical and emergency measures of the hospital to the patients and their families, eliminate the patients’ doubts and worries, and guide them to soak their feet and massage their foot acupoints before bedtime to promote sleep. ③ For those who are anxious: Encourage patients to engage in activities they are interested in, and divert their attention from the disease by watching comedies and other entertainment

programs. ④ For those who are easily angry: Guide patients to relieve emotions and pressure by relaxing all muscles and breathing, patiently explain the impact of anger on the condition, and keep a peaceful mind. In addition, use the five-sound therapy, assist patients to choose comfortable music according to their emotional performance and music preference, relax their mood, twice a day (e.g., 10:00 am and 3:00 pm), 30 minutes each time. Both groups received continuous intervention for 3 months.

Observation indicators and statistical methods

Observation Indicators

① Compare the changes in serum acetylcholinesterase (AChE) activity, plasma inhibin B, gastrin, motilin, dopamine, and 5-hydroxytryptamine before and after the intervention between the two groups. Venous blood (6 mL) was collected in the morning after an overnight fast on the day before the study and on the day after the study. The blood was centrifuged at 2000 r/min for 10 min (centrifuge radius of 15 cm) 2 h later. The upper serum and lower plasma were taken by laboratory personnel for separate detection. ② Nausea and vomiting episodes and duration: Professional medical staff observed and recorded in detail the episodes and duration of nausea and vomiting in the two groups during the study period. The frequency of nausea and vomiting in this study was expressed in “times/day”, calculated as the total number of nausea and vomiting episodes in all patients divided by the total number of intervention days; the duration was the time it took for the nausea and vomiting to subside, defined as no vomiting and no use of rescue drugs, and a Multinational Association of Supportive Care in Cancer (MASCC) Antiemesis Tool (MAT) nausea severity score < 2 for both, indicating relief of nausea and vomiting. ③ Compare the changes in Self-Rating Anxiety Scale (SAS) [19] and Self-Rating Depression Scale (SDS) [20] scores before and after the intervention between the two groups. The Chinese versions of SAS and SDS have been validated with Cronbach’s α

coefficients of 0.849 and 0.79, respectively, indicating good reliability and validity for Chinese populations [20, 21]. A SAS score > 50 was considered anxiety; an SDS score > 53 was considered depression, with higher scores indicating severe anxiety and depression. ④ Quality of life scoring. The World Health Organization Quality of Life-BREF (WHOQOL-BREF) developed by the WHO was chosen [22]. The Chinese version of WHOQOL-BREF has demonstrated good reliability and validity, with Cronbach's α coefficient ranging from 0.763 to 0.91 across different studies in Chinese populations [23, 24]. The scale includes physical, psychological, environmental, and social relationships. Each item is scored from 0 to 100, with higher scores being better.

The survey was conducted on-site, where investigators distributed the questionnaires and organized the subjects to fill them out. During the filling process, each subject was required to complete it alone, and discussion among subjects was prohibited. After the completion, all questionnaires were collected, and a dedicated person managed them to ensure validity of the questionnaires. While filling out the questionnaire, the investigators followed the entire process, identified problems encountered by the subjects or unclear parts, and provided on-site answers to ensure quality.

Statistical methods

All data were statistically analyzed using SPSS 22.0 statistical software, with the results of normal measurement data expressed as ($\bar{x} \pm s$). Intergroup differences were compared using t-tests, and sample rates were compared using χ^2 tests. A *P* value of less than 0.05 was considered significant.

Intervention outcomes

General information comparison

Table 1 presents the detailed baseline characteristics of the two groups. In the control group, there were 35 males and 25 females; the age range was 40 to 83 years (62.2 ± 8.19 years). In the observation group, there were 38 males and 22 females; the age range was 40 to 76 years (61.7 ± 9.20 years). No significant differences were found between the two groups regarding gender, age, pathological type, tumor location, tumor staging, chemotherapy regimen, number of chemotherapy sessions, or baseline laboratory indices including serum total protein, serum albumin, hemoglobin, lymphocyte count, white blood cell count, and platelet count (all $P > 0.05$), indicating comparability of the two groups at baseline. (The specific data are shown in Table 1)

Comparison of laboratory-related indicators

The results showed that there were no significant differences in AChE, plasma inhibin B, gastrin, motilin, dopamine, and 5-hydroxytryptamine between the two groups before intervention ($P > 0.05$). Compared with before intervention, the levels of AChE, plasma inhibin B, and 5-hydroxytryptamine increased in both groups, while the levels of gastrin, motilin, and dopamine decreased ($P < 0.05$). After intervention, the levels of AChE, plasma inhibin B, and 5-hydroxytryptamine in the observation group were higher than those in the control group, while the levels of gastrin, motilin, and dopamine were lower ($P < 0.05$), as shown in Table 2.

Comparison of nausea and vomiting episodes and duration

Both groups showed improvement in the number of nausea and vomiting episodes and duration compared to before intervention ($P < 0.05$); The number of nausea and vomiting episodes and duration in the observation group were lower than those in the control group after the intervention, with statistically significant differences ($P < 0.05$), as shown in Table 3.

Comparison of SAS and SDS scores

Before the intervention, there were no significant differences in SAS and SDS scores between the two groups ($P>0.05$). After the intervention, the SAS and SDS scores of both groups were lower than those before the intervention ($P<0.05$); the SAS and SDS scores of the observation group after the intervention were lower than those of the control group after the intervention, and the differences were statistically significant ($P<0.05$), as shown in Table 4.

Comparison of quality-of-life scores

The quality-of-life scores of the two groups were significantly higher after the intervention than before the intervention ($P<0.05$). After the intervention, the total score, physical function, psychological, environmental, and social relationship scores of the observation group were higher than those of the control group, and the differences were statistically significant ($p < 0.05$). See Table 5.

DISCUSSION

This study demonstrates that combined TCM acupoint moxibustion and emotional nursing significantly ameliorate chemotherapy-induced gastrointestinal adverse reactions and improve psychological status and overall quality of life in lung cancer patients. Specifically, the intervention group exhibited enhanced serum AChE activity and 5-HT levels, reduced motilin and gastrin levels, lower frequency and duration of nausea and vomiting, decreased anxiety and depression scores, and higher WHOQOL-BREF scores compared to the control group. Acupoint moxibustion mainly employs the theory of traditional Chinese medicine meridians. The heat generated by the application of drugs on acupoints can stimulate blood circulation under the acupoints, relieve meridian stasis, and unblock meridians[25]. It can also absorb the body's biological energy to produce a resonance effect, causing vasodilation and improving

microcirculation [26]. Chemotherapy-induced adverse reactions in the digestive system are mainly related to gastric disharmony and upward qi inversion[27]. Based on this pathogenesis, acupoints related to gastric qi and blood, such as Neiguan (PC6), Tiantu (CV22), Yongquan (KI1), Zhongwan (CV12), and Zusanli (ST36), can be selected. By applying patches on these acupoints, the gastric qi and blood can be effectively improved. Among them, Zusanli (ST36) is the lower confluent point of the Foot-Yangming Stomach Meridian, and its role in regulating gastrointestinal function has been confirmed in animal experiments and clinical practice [28]. *Evodia rutaecarpa* tastes bitter and is warm in nature, belonging to the liver, stomach, and kidney meridians. It has the effect of dispelling cold and relieving pain, descending Qi to stop vomiting, and regulating the liver and descending Qi; its main components are alkaloids, which have a bidirectional regulatory effect on the gastrointestinal tract [29].

The results of this study show that after the intervention, the activity of AChE and inhibin B in the observation group were higher than those in the control group, while gastrin and motilin were lower than those in the control group. After the intervention, the serum dopamine level in the observation group was lower than that in the control group, and the serum 5-hydroxytryptamine level was higher than that in the control group. This is mainly because acupoint moxibustion can stimulate blood vessels to absorb drugs, stimulate nerve endings, and regulate the secretion of dopamine and 5-hydroxytryptamine in the patient's body. Motilin (MTL) and gastrin (GAS) are gastrointestinal excitatory hormones, MTL is an orexigenic peptide produced by gastrointestinal endocrine cells, which regulates food intake, gastrointestinal motility, digestion and absorption, proliferation and differentiation of adipocytes and lipid storage. The interdigestive phase (i.e., the fasting phase) hormone control-mediated phase III migrating motor complex (MMC) is mainly accomplished by MTL, which can cause strong gastric contractions and obvious segmentation movements in the small intestine. GAS is a peptide hormone secreted by human G cells, which can promote gastric

emptying by increasing gastric contractions and accelerating intestinal peristalsis. The mechanism of chemotherapy-induced gastrointestinal reactions is mainly due to the fact that chemotherapeutic drugs kill tumor cells while also destroying normal human cells to some extent, most commonly cells in the blood and lymphatic tissues, inhibiting the proliferation of gastrointestinal mucosal epithelial cells, leading to gastric mucosal damage, reduced intestinal cell division, and thus causing reactions such as nausea, vomiting, loss of appetite, constipation, and diarrhea [30].

Among them, modern medicine proposes that chemotherapy-induced vomiting is achieved through peripheral and central mechanisms. The peripheral mechanism refers to the damage of chemotherapeutic drugs to the gastrointestinal mucosa, which stimulates chromaffin cells to release large amounts of neurotransmitters 5-HT, substance P, and binds to 5-HT₃ receptors, causing nerve impulses to be transmitted to the vomiting center, leading to vomiting [31]; The central mechanism refers to the stimulation of the chemoreceptor trigger zone (CTZ) located in the medulla oblongata by chemotherapeutic drugs, which sends impulses to the vomiting center, causing vomiting. Nausea, vomiting, and other gastrointestinal reactions after chemotherapy have a significant impact on patients. Escalante et al. [32] noted that while the histological damage in the gut may subside within days after chemotherapy treatment, long-term gastrointestinal dysfunction can persist for up to 10 years after chemotherapy. Gastrointestinal symptoms are a lifelong issue for patients as a side effect of chemotherapy, so gastrointestinal reactions must be better managed.

The number of episodes and duration of nausea and vomiting in the observation group were lower than those in the control group after intervention, and the difference was statistically significant. This indicates that acupoint moxibustion combined with emotional care can improve these indicators in lung cancer patients undergoing chemotherapy. Evodia fruit has

the effects of dispelling cold and relieving pain, and using Evodia fruit patches for acupoint moxibustion can achieve the function of dredging meridians and regulating the qi and blood of internal organs. Applying on Neiguan (PC6) acupoint can harmonize the stomach and reduce nausea, soothe the liver and regulate qi, and achieve an excellent antiemetic effect; Applying on Zusanli (ST36) acupoint can regulate the spleen and stomach, promote digestion and absorption, improve immune function, and alleviate various gastrointestinal discomforts caused by chemotherapy. Furthermore, the improvement in quality-of-life scores observed in the observation group is not solely due to emotional changes. By significantly reducing gastrointestinal symptoms such as nausea, vomiting, and dyspepsia, acupoint moxibustion directly alleviates physical discomfort, thereby enhancing physical function and social engagement. Improved nutritional status resulting from reduced vomiting also contributes to better physical health, which is reflected in the higher physiology and environment domain scores of WHOQOL-BREF.

Another result of this study shows that the SAS and SDS scores of the observation group after intervention were lower than those of the control group and the quality of life scores of the observation group were higher than those of the control group after intervention, with statistically significant differences. Traditional Chinese medicine believes that “thought hurts the spleen, worry hurts the lungs, and fear hurts the kidneys”. Chemotherapy patients, due to their concerns about their condition and lack of understanding of treatment methods, are prone to anxiety, depression, and fear, which affects the treatment effect. In the process of TCM emotional care, attention is paid to the relationship between the development of the patient’s condition and psychological activities, and individualized emotional care is provided through detailed communication and interaction with the patient. Additionally, the liver facilitates excretion and regulates the flow of qi, disliking depression and preferring smoothness, which is closely related to the patient’s mental state. The five musical notes (Jue, Zhi, Gong, Shang,

Yu) correspond to the five elements (wood, fire, earth, metal, water) and the five internal organs (liver, heart, spleen, lung, kidney) of the body. According to TCM theory, listening to specific types of music can regulate the corresponding organs, treat diseases, and relieve liver qi stagnation, thereby alleviating negative emotions such as anxiety and depression [14].

Of course, this study also has certain limitations. The patients included were all from a single hospital, with limitations in terms of region and personnel. There are issues such as small sample size, short study duration, and limited personnel, which need to be addressed by increasing the number and scope of samples and extending the study duration for deeper observation. Due to restrictions on funding and time, animal experiments related to the research were not conducted. Therefore, studies on the mechanism of action could not be carried out, and further exploration is needed.

CONCLUSION

In conclusion, the combination of acupoint moxibustion and emotional care for lung cancer patients undergoing chemotherapy has significantly improved gastrointestinal function, significantly alleviated anxiety and depression, reduced gastrointestinal reactions, and improved quality of life.

Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki and approved by the ethics committee of Hebei University of Chinese Medicine (Approval No: YXLL202307001). Written informed consent was obtained from all participants.

Availability of data and materials

All data generated or analysed during this study are included in this article. Further enquiries can be directed to the corresponding author.

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Authors' contributions

Wang Y and Wang SY conceived of the study, and Liu L, Wang CJ and Wang ZY participated in its design and data analysis and statistics and Liu H and Liu W helped to draft the manuscript. All authors read and approved the final manuscript.

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Table 1. Comparison of general information

Project	Observation group (n = 60)	Control group (n = 60)	p
Gender (male/female)	38/22	35/25	0.575
Age (years)	61.7 ± 9.20	62.2 ± 8.19	0.730
Pathological type			0.522
Squamous cell carcinoma	16	13	
Adenocarcinoma	44	47	
Tumor location (left/right)	23/37	31/29	0.142
Tumor staging			0.653
I stage	4	7	
II stage	10	13	
III stage	31	27	
IV stage	15	13	
Chemotherapy regimen			0.859
Gemcitabine and platinum based	5	6	
Etoposide and platinum based	19	16	
Pemetrexed and platinum-based	26	25	
Paclitaxel platinum-based	10	13	
Number of chemotherapy sessions	3 (2, 6)	3 (2, 5)	0.849
Serum total protein (g/L)	67.1 (63.30, 70)	66.2 (62.30, 69)	0.502
Serum albumin (g/L)	41 (37.70, 44.55)	42 (38.90, 44.7)	0.145
Hemoglobin (g/L)	116.11 (106.6, 128)	115 (103.50, 125)	0.502
Lymphocyte count (10 ⁹ /L)	1.31 (0.85, 1.69)	1.29 (0.87, 1.68)	0.140
White blood cell count (10 ⁹ /L)	5.76 (4.38, 7.37)	5.97 (4.15, 7.89)	0.622
Platelet count (10 ⁹ /L)	233 (181.20, 315.50)	240 (185, 318.5)	0.972

Table 2. Comparison of laboratory parameters before and after intervention

Project	Time	Observation group (n = 60)	Control group (n = 60)	p
AChE (U/mL)	Before intervention	5.38 ± 1.39	5.33 ± 1.32	0.065
	After intervention	7.64 ± 1.17*	6.96 ± 1.11*	< 0.001
Plasma inhibitor (pg/ mL)	Before intervention	119.51 ± 15.98	120.17 ± 15.32	0.331
	After intervention	193.52 ± 15.72*	166.77 ± 20.36*	< 0.001
Gastrin (ng/L)	Before intervention	161.72 ± 13.07	162.47 ± 13.75	0.138
	After intervention	146.70 ± 13.02*	157.35 ± 14.40*	< 0.001
Gastromotin (pmol/L)	Before intervention	171.05 ± 12.00	170.83 ± 11.36	0.774
	After intervention	151.55 ± 9.99*	158.22 ± 8.37*	< 0.001
Dopamine(mmol/L)	Before intervention	519.92 ± 24.21	518.83 ± 24.78	0.139
	After intervention	437.93 ± 20.55*	450.83 ± 17.87*	< 0.001
5-hydroxytryptamine(mmol/L)	Before intervention	1508.50 ± 16.11	1507.33 ± 24.78	0.778
	After intervention	1531.73 ± 31.58*	1522.12 ± 26.59*	< 0.001

AChE – acetylcholinesterase;

*significant difference compared to before the intervention

Table 3. Comparison of nausea and vomiting episodes and duration

Project	Time	Observation group (n = 60)	Control group (n = 60)	p
Nausea and vomiting (times/day)	Before intervention	4.33 ± 0.73	4.32 ± 0.75	0.321
	After intervention	2.83 ± 0.64*	3.12 ± 0.67*	< 0.001
Duration(d)	Before intervention	3.88 ± 0.72	3.85 ± 0.73	0.159
	After intervention	1.7 ± 0.50*	2.97 ± 0.64*	< 0.001

*significant difference compared to before the intervention

Table 4. Comparison of SAS and SDS scores before and after intervention

Project	Time	Observation group (n = 60)	Control group (n = 60)	p
SAS	Before intervention	53.15 ± 4.96	53.25 ± 4.94	0.370
	After intervention	40.55 ± 2.79*	47.06 ± 4.12*	< 0.001
SDS	Before intervention	54.11 ± 5.47	54.25 ± 5.52	0.088
	After intervention	39.82 ± 2.81*	47.25 ± 4.50*	< 0.001

SAS – self-rating anxiety scale; SDS – self-rating depression scale;

*significant difference compared to before the intervention

Table 5. Comparison of quality-of-life scores

Project	Time	Observation group (n = 60)	Control group (n = 60)	p
Total score	Before intervention	284.22 ± 6.33	283.34 ± 4.56	0.065
	After intervention	309.44 ± 9.11*	294.56 ± 8.45*	< 0.001
Physiology	Before intervention	71.33 ± 1.73	71.20 ± 1.61	0.073
	After intervention	74.77 ± 1.91*	73.07 ± 2.22*	< 0.001
Psychology	Before intervention	69.23 ± 2.05	69.50 ± 1.72	0.103
	After intervention	73.27 ± 1.72*	72.05 ± 1.93*	< 0.001
Environment	Before intervention	72.95 ± 3.38	72.92 ± 3.40	0.159
	After intervention	76.05 ± 1.82*	75.2 ± 2.29*	< 0.001
Social relationships	Before intervention	70.58 ± 1.31	70.53 ± 1.38	0.182
	After intervention	74.75 ± 1.99*	73.02 ± 2.10*	< 0.001

*significant difference compared to before the intervention