

Traditional and complementary medicine practices in postoperative analgesia

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ABSTRACT

Pharmacological methods are fast-acting, easily applicable and accessible methods with scientifically proven efficacy and standardized protocols. For this reason, it is the most preferred treatment method in the treatment of pain caused by various reasons. However, uncontrolled use of analgesics can sometimes cause more harm than benefit. Sometimes, the use of pharmacologic methods may be limited due to the patient's comorbidities and physiologic limitations, and may not provide the intended level of pain management. Due to the cost, it brings a serious burden to both the individual and the national economy. An individual approach should be the basis of pain management and it would be appropriate to consider the use of traditional and complementary treatment (T&CM) methods in the search for different methods.

Keywords: Postoperative pain, complementary therapies, traditional therapies, analgesia

INTRODUCTION

The World Health Organization defines traditional and complementary therapies (T&CM) as a set of knowledge, skills and practices based on theories, beliefs and experience specific to different cultures, which can be explained or not, used in the prevention of diseases, maintenance of health and well-being, and treatment of diseases.¹ These practices can be used in addition to modern medical practices or as an alternative treatment in cases where they are risky due to the patient's clinical condition.

The training and application area of T&CM practices, which have become widespread in our country as well as all over the world, was regulated by the regulation issued by the Ministry of Health in 2014. In the Official Gazette No. 9158, 15 methods and practices (acupuncture, apitherapy, phytotherapy, hypnosis, leech application, homeopathy, chiropractic, cupping, larva application, mesotherapy, prolotherapy, osteopathy, ozone application, reflexology and music) were accepted as traditional and complementary medicine practices.²

T&CM applications can be applied for different medical indications such as depression, anxiety, menstrual irregularities, diabetes mellitus, hypertension, injury, infection, respiratory problems.^{3,4} Anesthesiologists use different T&CM methods for preoperative anxiolysis, perioperative sedation, postoperative

recovery, analgesia and anti-emesis in the perioperative process.⁵⁻⁷ These methods can be used alone or in combination with modern medical applications depending on the patient's condition. In postoperative analgesia, multimodal analgesia protocols are used to provide effective analgesia and to reduce the side effects of medications. With the addition of T&CM applications to medical treatment protocols, it is expected that possible drug interactions and complications will be further reduced.⁸⁻¹⁰ In this review, T&CM methods that can be used in postoperative analgesia are presented in the light of current literature.

ACUPUNCTURE

Acupuncture is a treatment method that has been practiced for thousands of years. According to the teaching of acupuncture, life energy (QI) flows through 12 main and 8 secondary meridians in the human body. It is accepted that pathology develops when there is any blockage in this energy flow, and health is maintained by reorganizing the energy flow by stimulating the acupuncture points on these meridians.¹¹ The mechanism of action of acupuncture has not been clearly demonstrated. However, in studies in which the effects of stimulation of these points were examined with functional

MRI imaging methods, an increase in activity in brain sections associated with the described effects was found.^{12,13} Specific proresolution mediators (SPMs) such as resolvins, protectins, maresins and lipoxins are lipid molecules produced during the resolution phase of inflammation. Animal experiments suggest that these mediators inhibit inflammatory pain, postoperative pain, neuropathic pain and cancer pain through immune, glial and neuronal modulations. Ear acupuncture has been shown to increase the level of resolvin in guinea pigs and it has been reported that acupuncture may be a guide in explaining the mechanism of analgesia.¹⁴⁻¹⁶

Acupuncture can be used for acute and chronic pain. It is also an effective treatment for postoperative analgesia.¹⁷ Total knee replacement (TKP) is associated with severe postoperative pain. A meta-analysis of twenty RCTs involving 1295 participants investigating the use of acupuncture using transcutaneous electrical acupoint stimulation (TEAS) for analgesia after TKP was performed.¹⁸ TEAS was found to improve several outcomes compared to control groups. Significant reductions in pain were found in the TEAS group at 6 hours, 12 hours, 2, 3, 4, 7 and 14 days postoperatively. In addition, postoperative range of motion (ROM) improved significantly in patients who underwent TEAS. Patients who underwent TEAS experienced fewer analgesic-related side effects and exhibited lower levels of IL-6 and CRP. As a result of the meta-analysis, it was concluded that TEAS application is effective in postoperative analgesia, contributes to functional recovery and is associated with fewer side effects associated with analgesics in patients undergoing TKA.¹⁸

An analysis of 7 studies involving 891 patients on the use of acupuncture after knee replacement showed that acupuncture is an effective analgesic method. In this meta-analysis, Xuehai (SP10), Liangqiu (ST34), Dubi (ST35), Neixiyan (EX-LE4), Yanglingquan (GB34), and Zusanli (ST36) were the most commonly used acupuncture points for analgesia in knee replacement.¹⁹ A large-scale meta-analysis of 41 studies involving 3003 patients in TKP surgery, including the use of different acupuncture methods such as ear, body and transcutaneous electrical stimulation, showed that acupuncture was the most effective method to be used in addition to multimodal analgesia.²⁰

In a meta-analysis examining the efficacy of acupuncture for postoperative analgesia in lumbar disc herniation surgery (LDH), 10 clinical trials involving a total of 838 patients were analyzed. Postoperative VAS scores were lower in the acupuncture groups, and the incidence of side effects was lower than with medication. Acupuncture has been reported to be a safe and effective method of analgesia after LDH operations.²¹

A meta-analysis of 17 studies investigating the use of transcutaneous acupoint electrical stimulation for postoperative analgesia was performed. As a result of this meta-analysis, it was shown that the use of TEAS was effective in the treatment of pain, decreased the frequency of drug-induced dizziness, nausea and vomiting, and its use was recommended as part of multimodal analgesia.²²

In cases where drug use is risky, such as pregnancy and breastfeeding period, the use of acupuncture provides effective analgesia in the mother and protects the mother and baby from drug-related side effects.²³ In a study, the effectiveness of acupuncture use in patients undergoing cesarean section under spinal anesthesia was investigated. It was found that

acupuncture provided effective analgesia compared to standard care, mothers were mobilized early, urinary catheter was removed early, and less nausea and vomiting were observed.²⁴

Acupuncture can be used safely in children as well as adults. In a study investigating the effectiveness of acupuncture after adenotonsillectomy in pediatric patients, LI 4, LI 10, LI 14, LI 20, DU 20, CV 23, Yin Tang points were used. As a result of the study, acupuncture was recommended as an effective, easy to apply and cost-effective treatment method in pediatric patients.²⁵

In a meta-analysis of clinical studies investigating the effect of acupuncture in postoperative analgesia, a significant decrease in postoperative VAS values was observed with acupuncture applications. However, side effects such as nausea, vomiting, dizziness, pruritus and urinary retention due to opioid use have been found to be less common.²⁶ Acupuncture has been recommended to be considered in treatment protocols for postoperative pain management.

PHYTOTHERAPY

Phytotherapy is the systemic or local use of plants in various pharmaceutical forms to protect and treat health. The use of essential oils of plants is called aromatherapy. It can be used in the treatment of preoperative anxiety, postoperative pain, nausea and vomiting in the perioperative process. Echinacea, ephedra, garlic, ginkgo, ginseng, kava, St. John's wort, lavender, St. John's wort, lavender and valerian are commonly used, and lavender essential oil is particularly preferred for analgesia.²⁷

Lavender is a plant with sedative and analgesic activity. In one study, the efficacy of lavender essential oil in analgesia after inguinal hernia operation was investigated. Immediately after surgery, patients inhaled lavender aromatic oil for 20 minutes with mask oxygen. In the pain controls performed in the first 24 hours, VAS values were statistically significantly lower in the aromatherapy group compared to the control group.²⁸ In a randomized, controlled study investigating the efficacy of lavender essential oil in the treatment of pain after gynecological surgery, the control group received only routine analgesic treatment, the placebo group received hand massage with ultrasound gel in addition to routine treatment, and the study group received massage with lavender oil and the pain levels of the patients were followed up afterwards. The pain levels of the patients in the group massaged with lavender oil were found to be statistically significantly lower. As a result of the study, it was stated that massage with lavender essential oil is an effective complementary medicine practice that can be easily applied by nurses in the treatment of postoperative acute pain.²⁹

Lower extremity orthopedic operations are operations in which severe postoperative pain is expected. A randomized, controlled study was conducted to investigate the effectiveness of aromatherapy in the treatment of pain after such operations. In this study, sweet almond oil was used in the control group and citrus oil (*Citrus aurantium*) in the research group. The pain levels of the patients were questioned at 4, 8 and 12 hours after surgery and aromatherapy was applied to patients with a VAS value greater than 3. Pain levels were re-evaluated after aromatherapy. In the study group in which citrus essential oil was used after aromatherapy, there was a statistically significant decrease in pain levels at 4 and 12 hours.³⁰ It has been reported

that aromatherapy with essential oils may be helpful in the treatment of pain after orthopedic surgery.

In obese patients, opioids should be used with caution due to the risk of obesity-related respiratory complications, and multimodal analgesia should be preferred.⁶ In a study, it was found that aromatherapy with lavender essential oil for analgesia in PACU after laparoscopic bariatric surgery significantly reduced opioid use in these patients. As a result of the study, it was stated that aromatherapy may be preferred as a part of multimodal analgesia in the treatment of pain after bariatric surgery.³¹

MUSIC THERAPY

Music therapy is a specialty that uses music and musical activities to meet the physical, psychological, social and mental needs of individuals. It can be used in the treatment of postoperative pain in the perioperative period.³²

The effectiveness of music therapy in the treatment of pain after cesarean section under general anesthesia was investigated. The study group was allowed to listen to music in the style that the patients liked, while the control group received standard treatment. Postoperative PCA was started in both groups and tramadol consumption was compared. It was observed that tramadol consumption was significantly lower in the music therapy group.³³

In an interesting study, music therapy was applied in patients under general anesthesia in laparoscopic gynecological surgeries. Following induction of general anesthesia, the patients were played music with headphones. Routine anesthesia care was applied to the control group. In the postoperative period, VAS values were lower and quality of recovery score (QoR-40) was higher in the group that received music therapy.³⁴

Patients who underwent heart valve replacement were compared with patients who were listened to music for 15 minutes 3 times a day in the postoperative period and patients who received routine standard care. It was determined that the pain and anxiety levels of the patients in the music therapy group were lower. While there was no difference between the diastolic blood pressures of the patients, systolic blood pressure and respiratory rate were found to be lower in the music therapy group. Music therapy seems to have a positive effect on the hemodynamic parameters of patients with anxiolytic and analgesic effects.³⁵

A meta-analysis of 92 clinical studies involving 7385 patients showed that music therapy reduced anxiety and pain sensation in the perioperative period. In the meta-analysis, which emphasized the possibility of bias in the studies, it was reported that age, gender, selected music and anesthesia type had an effect on the result.³²

REFLEXOLOGY

Reflexology is defined as a treatment practice that is applied with special techniques to special reflex points on the hands, feet and ears that are connected to the organs and helps regulate body functions. Each organ in the body represents a specific point on the hands, feet and ears. Since the points on the feet where the organs are reflected are in a larger area, these points are more prominent than the points on the hands and

ears. In reflexology, if pressure is applied to the relevant point, the peripheral nervous system is stimulated. With this stimulus transmitted to the central nervous system, the functioning of the relevant body part is regulated. In addition, a serious anxiolysis is provided in the person with the massage applied to the foot (Figure).³⁶



Figure. Foot reflexology chart

In a randomized controlled study, Öztürk et al.³⁷ investigated the effect of foot reflexology on anxiety and pain after abdominal hysterectomy. Postoperative anxiety level was evaluated by STAI score and pain level by VAS scoring. STAI and VAS scores were lower in the reflexology group compared to the control group in which routine standard postoperative care was provided.

In a study examining the anxiolytic and analgesic effect of ear acupuncture and foot reflexology after cesarean section, it was found that reflexology had anxiolytic and analgesic effect compared to the control group, but acupuncture was much more effective. It has been emphasized that both methods are noninvasive, effective complementary medicine methods that can be used in the treatment of postoperative pain after cesarean section.³⁸

Elmowafy et al.³⁹ compared the group that received standard postoperative care after abdominal surgery with the group that received reflexology in addition to this care in their study on 200 patients. Pain scores were lower and comfort scores were higher in the reflexology group.

OZONE THERAPY

Ozone is a gas consisting of 3 oxygen atoms. Its use in the medical field has been increasing rapidly since World War I.⁴⁰ Its use in ischemia reperfusion injury, cancer, osteoarthritis and sepsis is becoming widespread.

In lumbar disc herniation, it has been reported that ozone treatment alone provides improvement and analgesia equivalent to ozone treatment with betamethasone.⁴⁰

Uslu et al.⁴¹ investigated the use of ozone in gingivectomy and gingivoplasty. The quality of life of the control group, photobiomodulation therapy (PBM) group and ozone therapy group were evaluated with the Oral Health Impact Profile (OHIP-14) questionnaire and pain levels were evaluated with VAS. As a result, the VAS values of the PBM group and the ozone therapy group were found to be lower and it was stated

that these treatments positively affected the quality of life of the patients. A meta-analysis of clinical studies on the application of ozone therapy after impacted mandibular third-molar surgery was performed. As a result of the meta-analysis, it was found that facial swelling and trismus did not decrease in patients treated with ozone therapy, but postoperative pain and analgesic need were less and quality of life was higher. Studies investigating the effectiveness of ozone therapy in reducing postoperative complications were recommended.⁴²

Teixeira et al.⁴³ formed 3 groups for the treatment of pain after ovariectomy in animal experiment. One group received 0.2 mg/kg im meloxicam, one group received rectal ozone and one group received ozone via insulin injector at the acupuncture points LI 4, LIV 3, ST 36, GB 34, SP 6. As a result, both ozone groups achieved analgesia equivalent to the use of nonsteroidal anti-inflammatory drugs. As a result of the study, in which there were no complications related to ozone therapy, it was suggested that ozone therapy may be an alternative analgesic treatment.⁴³

CUPPING THERAPY

Cupping therapy is one of the most commonly used T&CM methods. It is frequently used especially for muscular pain. In the postoperative period, it regulates blood circulation, resolves muscle spasm, reduces inflammation and pain and accelerates the healing process.

Studies have shown that it provides general well-being and improves sleep quality in chronic fatigue syndrome.⁴⁴ It is thought that cupping therapy can be used as a support for this purpose in the postoperative period. In cupping therapy, as in acupuncture and reflexology, it is recommended to apply to certain points according to the indication. However, in a study by Silva et al.⁴⁵ L1-L5 bilateral dry cupping application was compared with sham application in nonspecific chronic low back pain. The results of the study showed that cupping was not superior to sham application. This may be due to the mechanism of action of cupping mainly by regulating local blood circulation. Therefore, local stimulation occurs in both applications.⁴⁵

PROLOTHERAPY

Prolotherapy is a treatment method that stimulates inflammation and regeneration by injecting 5% dextrose into tendons and ligaments. Joint stabilization and analgesia are aimed by strengthening the periarticular ligaments.

In osteoarthritis, prolotherapy is recommended primarily in the preoperative period and in early stage arthrosis. However, prolotherapy has also been shown to be effective in persistent pain that does not go away in the postoperative period.⁴⁶

In an article, the results of prolotherapy applications to 79 patients who complained of long-term pain in the postoperative period due to failed back surgery syndrome (FBSS) are presented. Patients' pain levels were assessed by VAS score, disability status by Oswestry disability index (ODI) and patient satisfaction by 5-point Likert scale. VAS scores and ODI indices of patients were found to decrease significantly after treatment.⁴⁷

MESOTHERAPY AND NEURAL THERAPY

These methods provide analgesia with the use of very low doses of local anesthetics. Injections are made into the surgical area, the surrounding area and the areas corresponding to the relevant dermatome.

In a case report in the literature, a 54-year-old woman presented with a complaint of persistent pain in the incision line after previous surgery. Despite the use of meloxicam, paracetamol and pregabalin, analgesia was not achieved.⁴⁸

Egli et al.⁴⁹ In one of their articles, they shared the results of their neural therapy applications to 280 patients with resistant chronic pain. In 60 patients, it was reported that the pain level did not change, 52 patients developed mild, 126 patients developed significant improvement, while 41 patients were completely pain-free. It was emphasized that patients should be given the chance of neural therapy instead of long-term, long-acting and costly treatments.⁴⁹

Randomized, controlled studies on the use of mesotherapy and neural therapy in the postoperative period are needed.

HIRUDOTHERAPY

The leeches used in medical treatments in our country are *H. verbana* and *H. Sulukii* species. Leeches provide analgesic and anti-inflammatory effects by secreting substances such as antistasin, hirustasin, ghilantens, leech-derived tryptase inhibitor, complement C1 inhibitor.

In a study examining the use of hirudotherapy in various chronic pain conditions including osteoarthritis, an analgesic effect lasting up to 12 months after hirudotherapy was reported.⁵⁰

A meta-analysis analyzed 15 clinical trials. As a result of the meta-analysis, it was reported that leech therapy may provide analgesic effect in different patients. It is recommended to use the appropriate leech species and the correct treatment protocol.⁵¹

In addition to providing analgesia in the postoperative period, leeches can also be used due to their edema reducing and blood circulation regulating effects.⁵²

MUSIC THERAPY

A study was conducted to examine the effect of music on the recovery process after knee replacement surgery. There was no statistically significant difference in anxiety scores between the two groups. However, the pain score at the 60th postoperative minute in the music therapy group was significantly lower than in the control group.⁵³ Akelma et al.⁵⁴ investigated the effects of preoperative music therapy on anxiety and recovery in 255 patients scheduled for inguinal hernia surgery under general anesthesia. In this study, patients were divided into 3 groups. One group was the control group and standard anesthesia management was performed. In the second group, patients listened to classical music, while in the third group, patients listened to the music they wanted. As a result of the study, it was observed that the anxiety scores of the patients in the third group decreased significantly. However, there was no statistically significant difference between the pain scores.⁵⁴

Music is a safe and cost-effective intervention, but more clinical studies are needed to investigate its effectiveness in postoperative pain.

CONCLUSION

This review demonstrates the applicability of different traditional and complementary medicine practices in postoperative analgesia. When the literature is reviewed, it is seen that acupuncture, music therapy and phytotherapy are used relatively more commonly. Although these methods can be used alone, it is stated in the articles that they are preferred as part of multimodal analgesia. Protecting patients from possible side effects, providing effective analgesia and increasing patient satisfaction are essential in health care.

However, more randomized controlled studies are needed to investigate the effectiveness of these treatment methods in different types of surgeries and different patient groups.

ETHICAL DECLARATIONS

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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