

Research progress on the analgesic effect of acupuncture on laparoscopic patients

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Abstract: Laparoscopic surgery is an effective means to treat abdominal diseases, but it can also lead to postoperative pain symptoms, so relieve postoperative pain plays a vital role in patients. Acupuncture is an ancient Chinese medical method, which is considered to be one of the most effective postoperative analgesia methods. Acupuncture can not only relieve pain, but also reduce postoperative body reactions, such as postoperative inflammatory reaction and gastrointestinal reaction, enhance human immunity, enable patients to have a good convalescence experience, and reduce the occurrence of postoperative pain, which has a very important value. This paper will introduce in detail the analgesic mechanism of acupuncture on postoperative pain in laparoscopic patients. To discuss the clinical progress of acupuncture in the treatment of postoperative pain in laparoscopic patients.

Keywords: acupuncture; laparoscopic surgery; ease pain

1. Introduction

With the rapid increase of surgical operations worldwide, postoperative pain is a problem that surgeons often face and need to deal with. Laparoscopic technique is an important means to reduce surgical incision marks, reduce postoperative pain, promote postoperative rehabilitation, and improve patients' quality of life. It has the advantages of less trauma, fewer complications, and faster postoperative recovery, but minimally invasive does not mean painless, and there will still be a certain degree of pain after the operation, and it varies from person to person. If it is ignored or handled improperly or not in time, it can lead to restlessness during recovery, and even cause a variety of complications, which seriously affect the postoperative recovery and prognosis of patients^[1]. Effective analgesic treatment after surgery is beneficial to reduce the stress response of the body, reduce the complications of postoperative patients, and realize the smooth recovery after surgery. Surgical clinic requires correct evaluation of postoperative pain and appropriate analgesia and sedation. The concept modern pain management is "on time" rather than "on demand", and the threshold of pain tolerance varies greatly among different patients. Therefore, we should pay attention to the different degree of postoperative pain response of each patient and make effective intervention. In recent years, with the further understanding of pain mechanism and the deepening of pharmacology, molecular biology and bioengineering medicine research, a variety of new analgesic measures and methods continue to appear. At present, the commonly used postoperative analgesia methods mainly include: steroid and non-steroidal anti-inflammatory drugs; Opioids; Non-opioid drugs such as gabapentin, aspartic acid receptor antagonists, tramadol are commonly used; Local anesthetic; Epidural anesthesia; Multimodal analgesia. Drug analgesia, narcotic analgesia or multimodal analgesia are inseparable from drug application, but it is difficult to avoid various risks including side effects brought by drugs^[2,3]. Acupuncture was first tried and successfully used for surgical pain relief in the late 1950s, a success that greatly stimulated renewed interest in this ancient method of pain relief. Over the past several decades, acupuncture analgesia has been proved to be a physiologic adjustment process through multi-level (from the cellular level to the molecular and genetic level) and multi-angle (nerve, body meridian) exploration by multidisciplinary experts. This paper discusses the application of acupuncture in laparoscopic patients after operation^[4].

2. Modern medical treatment

There are three components of pain after laparoscopic surgery: a. pneumoperitoneum: gas

to peritoneum and organs. Residual gas after laparoscopic pneumoperitoneum is the basis of postoperative pain, which is mainly related to the following aspects^[5]: phrenic nerve apraxia caused by abdominal pressure after pneumoperitoneum; Causing peritoneal pulling; The volume of residual gas in the abdominal cavity; Type and temperature of gas; Acidic intraperitoneal environment during CO₂ pneumoperitoneum; The use of drainage tube, etc. b. Traumatic pain caused by tissue injury at the incision site and injury at the surgical operation area, which may lead to sustained chronic neuropathic pain after surgery if nerve injury^[6]. Ischemia and gangrene caused by suturing can also cause pain. c. Inflammatory pain: The tissue and nerve damage caused by surgery, the injury site secretes a variety of inflammatory factors, mediates the immune response of congenital immune response and non-specific immune response, and produces a variety of cytokines and chemokines, forming inflammatory pain. At present, the analgesia methods in Western medicine are mainly divided into four categories, namely, intravenous controlled analgesia, epidural controlled analgesia, surgical site infiltration anesthesia, and multi-mode analgesia. Controlled intravenous analgesia is an analgesic device that gives various types of analgesic drugs intravenously. The device can make the drug concentration in the body quickly reach the target concentration, has the advantages of quick effect, wide range of action, and patients self-regulate the drug concentration according to the degree of pain, in line with the principle of on-demand and individualized drug delivery. Controlled intravenous analgesia belongs to systemic drug use. Although the analgesic effect is clear, it is prone to excessive sedation, respiratory inhibition, nausea and vomiting and other adverse reactions^[7]. Self-controlled epidural analgesic drugs are injected into the epidural space, and opioids are combined with local anesthetics to act on the opioid receptors and nerve roots in the posterior horn of the spinal cord respectively, thus exerting the role of postoperative analgesia and sedation^[8]. Invasive anesthesia at the surgical site is the injection of local anesthesia drugs into the surgical area at the end of the operation, which can reduce the demand for opioids and reduce the adverse reactions caused by them^[9]. Multi-mode analgesia is the combination of multiple analgesic drugs and methods to achieve the most effective analgesic effect, aiming to reduce the adverse reactions caused by a single drug or method^[10].

3. The necessity of acupuncture

Among the more than 40 clinical indications of acupuncture and moxibustion given by WHO, pain is the disease that has been studied most deeply and widely. In the treatment of various pain indications, acupuncture therapy, as one of the commonly used treatment means, has the advantages of quick effect, no side effects and significant curative effect, and can effectively improve patients' living standards and quality^[11]. Acupuncture, as an effective means to treat pain, has gradually been recognized by the medical community in the United States and other western countries^[12]. Acupuncture therapy is suitable for a variety of different types of pain, whether acute or chronic pain, acupuncture can achieve good results. At the same time, acupuncture treatment of cancer pain, visceral pain, referred pain and other pain syndrome also has a relatively ideal effect. It has been found that acupuncture can relieve pain by raising pain threshold or pain tolerance threshold and relieve various adverse emotional reactions caused by pain. At present, the clinical treatment of pain in Western medicine is mainly based on non-steroidal anti-inflammatory drugs and opioid analgesics. Long-term use of such drugs will produce different degrees of toxic side effects and dependence. Acupuncture can not only relieve pain, but also has unique advantages in the treatment of withdrawal syndrome. Therefore, no matter for the pain itself, or adverse drug reactions, the use of acupuncture treatment has great necessity.

4. Mechanism of acupuncture analgesia

In the 1960s, acupuncture therapy has been widely used in a variety of small and medium-sized surgery postoperative analgesia. Studies have found that acupuncture analgesia is related to neurohumoral factors, and can achieve analgesic effect by promoting the release of endogenous opioid peptides, up-regulating local endorphins and peripheral opioid receptors in inflammatory response^[13], and inhibiting the production of endogenous pain-causing substances. Acupuncture analgesia is a comprehensive process involving multiple pathways and levels. Fang et al.^[14] found that the analgesic effect could be exerted by intervening in the intracellular signal transduction pathway of spinal dorsal horn neurons. Kanai et al.^[15] believed that electroacupuncture could interfere with early peripheral sensitization of neuropathic pain by down-regulating the phosphorylation level of vanillate receptor 1 and the skin expression level related to calcitonin gene in the transient receptor potential of the dorsal root ganglion. Other studies have confirmed that electricity can regulate vanillate receptor 1 and P2X₃ in small diameter neurons in the dorsal root ganglion^[16]. Acupuncture treatment can improve the

threshold of pain perception and tolerance, inhibit surface pain, reduce or even eliminate deep pain and referred pain, relieve acute pain and chronic pain, reduce emotional response to pain, and improve the quality of life of patients. Up to now, acupuncture analgesia has been derived from a variety of acupuncture methods, including: ① percutaneous acupoint electrical stimulation^[17], also known as needle-like percutaneous nerve electrical stimulation, is a combination of acupuncture points in Chinese medicine and the western countries, using low-frequency pulse current instead of invasive acupuncture for acute or chronic pain. (2) Needle acupuncture, with the length of the needle within 2 inches into the body surface acupoints, in order to achieve the purpose of harmonizing Yin and Yang, dredging meridians. ③ Electroacupuncture^[18]. Electroacupuncture is based on the effect of millineedle on acupoints, connecting the electric needle apparatus to output pulse current, combining the stimulation of millineedle with the physiological effect of electricity, so as to better exert the analgesic effect. The dermatology needle acupuncture is based on the meridians theory of the skin, holding a needle thin handle, with the tip of the needle in the positioning of the skin for buckle, in order to achieve the purpose of harmonizing the viscera. (5) Intradermal needle acupuncture, also known as "embedding needle", is used to Pierce the needle into the skin and leave it for a certain time after fixation, avoiding repeated stimulation and using its continuous stimulation effect to achieve the purpose of disease treatment.

5. Example of therapeutic effect of acupuncture on postoperative pain in laparoscopic patients

5.1 Application of percutaneous acupoint electrical stimulation in postoperative pain of laparoscopic patients

Percutaneous acupoint electrical stimulation is a new type of non-invasive and safe acupuncture therapy. The combination of nerve electrical stimulation and acupuncture concept can release endogenous analgesic substances in the body through electrical stimulation of acupoints, which has advantages of convenient operation and exact effect. LC (Laparoscopic cholecystectomy) is one of the more mature minimally invasive operations in general surgery at present. It has the characteristics of fast healing and small trauma, and is accepted by physicians and patients, which is conducive to improving the quality of life of patients. However, due to the influence of anesthesia, surgical trauma and other factors in the perioperative period, the degree of postoperative pain of patients is severe, which affects the postoperative comfort of patients and reduces their satisfaction. In a clinical study on the application of percutaneous acupoint electrical stimulation to rapid recovery of LC, it was found that percutaneous acupoint electrical stimulation could reduce intraoperative anesthetic drug dosage, improve recovery speed, alleviate postoperative pain, and improve patients' satisfaction with anesthesia^[19]. Percutaneous acupoint electrical stimulation can not only reduce postoperative pain, but also reduce the incidence of postoperative agitation in patients undergoing laparoscopic surgery.

5.2 Application of electroacupuncture in postoperative pain of laparoscopic patients

Electroacupuncture, as a green and safe non-drug intervention means, regulates the homeostasis of the body by stimulating the meridians with micro-pulse current, and plays a positive role in assisting analgesia, improving gastrointestinal function and preventing postoperative nausea and vomiting^[20]. Gynecological laparoscopic surgery has the advantages of less trauma, fewer complications, quick recovery after surgery, but there are postoperative pain, nausea, vomiting and other problems. In a study on the influence of perioperative electroacupuncture stimulation on early postoperative recovery quality of gynecological laparoscopic surgery patients, it was found that perioperative treatment of electroacupuncture could reduce postoperative pain and improve the quality of early postoperative recovery of patients^[21]. Oxycodone, as a powerful dual opioid agonist, has a good effect on relieving perioperative pain. Through the combined treatment of oxycodone and electroacupuncture, it was found that the incidence of pain in the group of electroacupuncture combined with oxycodone self-controlled intravenous analgesia was significantly lower than that in the group of oxycodone self-controlled intravenous analgesia alone within 24 hours after surgery^[22]. Electroacupuncture has been widely used in postoperative pain of laparoscopic patients. Electroacupuncture can relieve pain after laparoscopic surgery, which is better than single drug treatment, and is safe and effective. Electroacupuncture can significantly reduce the incidence of pain, nausea and vomiting and promote recovery in laparoscopic patients with postoperative pain. It can improve muscle tone, improve postoperative pain, and can significantly reduce postoperative discomfort symptoms.

5.3 Application of cutaneous needle and intradermal needle acupuncture in postoperative pain of laparoscopic patients

In recent years, skin acupuncture as an effective method to relieve postoperative pain has been widely studied. Skin acupuncture is a minimally invasive technique in which needles are inserted into the skin for therapeutic and cosmetic purposes. It is thought to work by stimulating the release of endorphins, natural hormones that reduce the perception of pain. Postoperative pain application of intradermal needle mainly refers to the neck and shoulder pain symptoms especially effective. With the advent of intradermal needle technology, postoperative pain control in patients has improved significantly. After neck and shoulder trauma surgery, intradermal needle technology can effectively reduce postoperative pain and allow patients to return to normal activities more quickly. The intradermal needle also helps to reduce postoperative muscle tension, thus reducing postoperative pain and restoring its function more safely and efficiently. In addition, intradermal acupuncture can also promote postoperative wound healing, thus accelerating the recovery of patients' quality of life. At present, there are few reports on dermatology and intradermal needles after laparoscopic surgery, but based on previous relevant studies, dermatology and intradermal needles are worth looking forward to.

6. Summary

Laparoscopic technology is increasingly widely used in surgical treatment, the most common diseases include colon cancer, gallbladder stones, fluid accumulation in various areas of abdominal cavity, surgical injury and breast cancer. For these patients, postoperative analgesia is an important problem, if effectively controlled analgesia, can greatly reduce the postoperative convalescence adverse reactions, improve the quality of life of patients. Acupuncture, as a non-drug analgesic method, has good anti-pain and anti-inflammatory effects, and can effectively reduce postoperative hyperpain in laparoscopic patients. Therefore, after laparoscopic surgery, acupuncture should be used as far as possible in order to effectively reduce patients' pain perception and improve adverse reactions in the postoperative convalescence period. Especially at present, there are various acupuncture methods. Selecting appropriate acupuncture methods is also a promising treatment direction for postoperative analgesia with less effort and double results, and acupuncture combined with drugs is also a promising treatment direction in the future.

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