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Efficacy of Electro acupuncture for Intestinal Paralysis after Laparoscopic Cholecystectomy: A Case Report and Literature Review

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Abstract

Background: Postoperative Intestinal Palsy (POI) is a common complication after surgery and is a major cause of high morbidity, prolonged hospital stay, increased resource utilization, and high economic burden.

Case presentation: We report a case of a 60-year-old male patient with a 10-year history of gallbladder stones who underwent laparoscopic cholecystectomy and presented with postoperative incisional pain, abdominal distention, and failure to defecate. We used Electro Acupuncture (EA) for treatment, and the patient began to exhaust flatus after 20 h, began to defecate 67.5 h postoperatively, and was discharged on the 4th day.

Conclusions: EA reduced the duration of POI and reduced the length of hospital stay. As an effective intervention for POI, most of the current studies are believed to be associated with the anti-inflammatory effect, but the clinical mechanism deserves further exploration.

Keywords: Surgical procedure; Cholecystolithiasis; Intestinal paralysis; Electroacupuncture; Anti-inflammatory.

Abbreviations: POI: Postoperative Intestinal Palsy; EA: Electro Acupuncture; ERAS: Enhanced Recovery After Surgery; VAS: Visual Analogue Scale.

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Introduction

POI is a post-surgical complication mediated by stress and systemic inflammation, often causing temporary impairment of gastrointestinal dynamics and prolonging recovery time, mainly manifested by abdominal pain, bloating, nausea and vomiting, no exhaust and defecation, and diminished bowel sounds, which were the main causes of high morbidity, prolonged hospital stay, and high utilization of medical resources [1,2]. Data provided by a healthcare provider indicate that hospitalization costs for patients who develop POI after colectomy are twice as high as those who do not develop intestinal paralysis, that more than half of patients with intestinal paralysis develop at least one adverse outcome, and that additional complications that occur lead to increased mortality [3]. Current mechanistic studies on POI have focused on the complex interactions related to neurogenic, inflammatory, humoral, electrolyte, and pharmacological components [2]. The first phase is neurally mediated and involves intraoperative and postoperative activation of adrenergic neurons by incisional trauma, which activates pro-adrenocorticotropic releasing factors and causes acute intestinal paralysis. The second phase, starting 3-4 h postoperatively, is mediated by inflammation, where various types of inflammatory factors activate macrophages in the intestine, triggering the migration of leukocytes to the outer muscular layer, and macrophages inhibit smooth muscle contraction by releasing nitric oxide and prostaglandins. Electrolyte disturbance is one of the risk factors for POI. Low potassium decreases smooth muscle excitability and diastolic function and reduces gastrointestinal motility; Fluid overload also prolongs postoperative recovery of gastrointestinal function. In addition, the use of opioid analgesics decreases gastrointestinal nerve activity and delays transit function [4].

In terms of treatment, we generally use anti-infection, rehydration, analgesia, enteral nutrition, and other nursing treatment plans for POI. With the emergence of the Enhanced Recovery After Surgery (ERAS) concept, accelerating postoperative gastrointestinal recovery has become a topic of research for many scholars, aiming to shorten hospital stays, improve patients' quality of life, and reduce postoperative complications and readmission rates, for which many studies have proposed innovative therapies. Watanabe, J and Eamudomkarn, N et al. suggested [5,6] that postoperative coffee consumption shortens the time to first defecation and accelerates gastrointestinal recovery without side effects. Its effects are mediated through caffeine and chlorogenic acid, with caffeine dilating blood vessels to promote gastrointestinal recovery and chlorogenic acid acting as an anti-inflammatory, edema-inhibiting agent and improving pain. However, coffee consumption raises blood pressure and heart rate, which has limitations for patients with hypertension. Short, V et al [7] conducted a meta-analysis of chewing gum to promote postoperative bowel obstruction suggesting that chewing gum shortens the time to first defecation and bowel movement after surgery but has a large effect on colorectal surgery and a small effect on cesarean section. However, one perioperative care guideline [8] for colorectal surgery does not recommend oral coffee drinking or gum chewing for postoperative patients, both of which reduce the duration of postoperative intestinal paralysis but lack large, high-quality confirmatory studies, and the exact mechanisms need to be further elucidated. Therefore, there is an urgent need for a safer and more effective treatment method.

Acupuncture and moxibustion have been experienced in China for thousands of years, sprung from the Neolithic era, have a complete academic theoretical system, and have become one of the major medical resources in China and some other Asian countries. Acupuncture has also been increasingly accepted by practitioners and patients around the world, bringing more benefits to patients with various functional gastrointestinal disorders because of its ease of use, low cost, significant efficacy, and few complications [9]. In a randomized controlled trial of 129 patients with primary colorectal cancer [10], electroacupuncture at Zusanli (ST 36) shortened the time to first defecation after surgery and was more tolerant of a liquid diet than the control group. A meta-analysis evaluating the efficacy of EA for post-abdominal surgery intestinal paralysis [11] showed that EA is a safe and effective therapeutic method, in which Zusanli (ST36), Shangjuxu (ST37), and Xiajuxu (ST39) are the preferred acupoints for the treatment of POI, but its efficacy in terms of postoperative analgesia is poor. Research on the analgesic aspects of acupuncture is somewhat controversial, and further clinical studies are needed to add to the evidence for evidence-based medicine.

Case presentation

The patient was a 60-year-old man with a history of cholecystolithiasis for 10 years. He came to our hospital with right upper abdominal pain for 6 days. Physical examination showed a normal abdominal profile, soft abdominal muscles, and right upper abdominal pressure pain without rebound pain. Murphy's sign was positive. The clinic examination of blood routine suggests a high inflammatory index, abdominal CT suggests: gallbladder stones, and possible cholecystitis. He was given oral moxifloxacin and dexamethasone tablets, and his symptoms were relieved, but he still had paroxysmal abdominal pain. Subsequently, abdominal ultrasound showed thickening of the gallbladder wall and gallbladder-filled gallbladder stones (Figure 1).

The patient's condition was considered stable and the operative treatment was decided after communicating with his family. Therefore, laparoscopic cholecystectomy was performed on

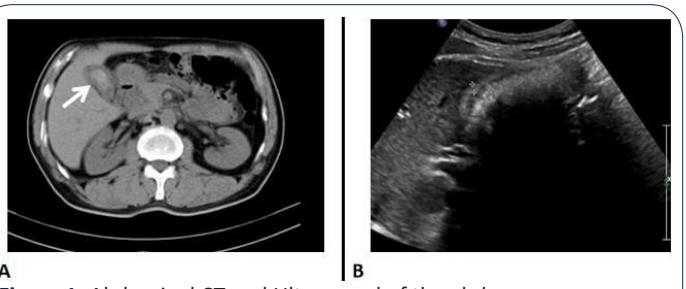
January 31, 2023. After successful anesthesia, the patients were taken supine position and made 1, 1, 0.5 and 0.5 cm incisions at the lower edge of the umbilicus, the middle xiphoid process of the upper abdomen, the middle line of the right clavicle, the right costal margin and the front line of the right armpit respectively. A pneumoperitoneum needle was inserted through the incision at the lower edge of the umbilicus. The size of the gallbladder was about 8 x 6 x 3 cm, the serosa of the gallbladder was hyperemia and edema, and the common bile duct was not dilated. The triangle of the gallbladder was dissected, the cystic duct was dissociated, clipped, and clipped, the cystic artery was dissociated and clipped, the gallbladder was completely separated from the gallbladder bed by electric hook, and the gallbladder was removed from the body through the incision under the xiphoid process. The operation went well, with good intraoperative anesthesia, and the patient returned to the ward safely after the operation (Figure 2).

After the operation, the drainage tube was put in for the treatment of anti-infection, fluid replacement, and nutritional support. On the second postoperative day, the patient complained of incisional pain but tolerable, abdominal distension, and the anus

was deflated but not defecated. The patient was treated with EA, the pain of the incision was relieved after the treatment and the patient defecated on the 2nd day.

Treatment: Tianshu (ST25), Zhigou (TE6), Zusanli (ST36), Yanglingquan (LR3), taichong straight acupuncture; ST25, ST36, LR3 plus electroacupuncture for 30 minutes (Figure 3).

After EA treatment, the patients defecated at 67.5 h after the operation, and the visual Analogue Scale (VAS) of pain was reduced, the time of tolerance to diet was shortened, and the I-FEED score was decreased (Table 1-2).



A B

Figure 1: Abdominal CT and Ultrasound of the abdomen.

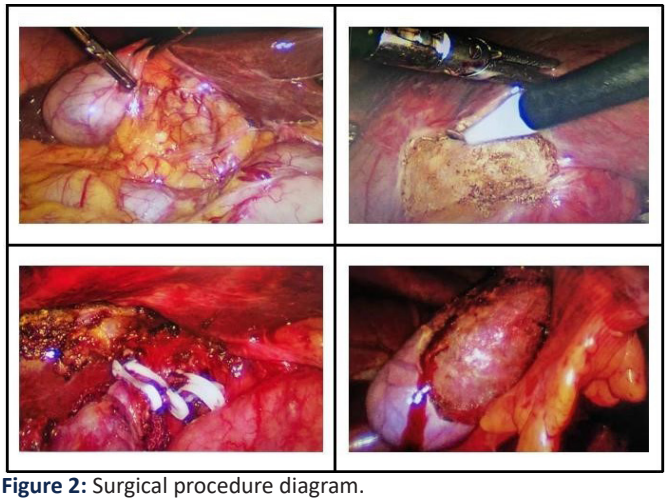


Figure 2: Surgical procedure diagram.

Figure 3: Electroacupuncture treatment.

Table 1: Recovery of gastrointestinal function.

Primary outcome	
(1) Time to first defecation(h)	67.5
Secondary outcome	
(1) Time tolerability of liquid food(h)	14
(2) Time tolerability of semiliquid food(h)	70
(3) Length of postoperative hospital stay(d)	4

Table 2: Severity of postoperative symptoms/assessment scale.

	Day 1	Day 2	Day 3	Day 4
VAS pain score	4	3	3	2
I-FEED score	4	4	3	2

Discussion

In this case, since electroacupuncture was intervened after the patient had already deflated, the primary observation was the time to first postoperative defecation (i.e., counting from the postoperative period), and the secondary observations were VAS score, time to tolerate diet (fluid or semifluid), I-FEED score, and length of hospital stay. We found that patients experienced a sensation of defecation immediately after the first treatment and that defecation started after the second treatment; Pain scores decreased after each treatment, but not significantly. POI is due to transient impairment of gastrointestinal function, while the I-FEED scale is a new index developed by expert consensus for assessing postoperative gastrointestinal recovery, measured by five main elements, namely intake, nausea, vomiting, physical examination, and duration; the higher the score, the longer the hospital stay [12]. The scores of I-FEED in this patient gradually decreased after treatment, suggesting the recovery of gastrointestinal function. In conclusion, EA treatment can promote the recovery of gastrointestinal function in patients with POI.

As described previously, POI is the result of neurological, inflammatory, and pharmacological interactions. Intraoperative anesthesia, stretching, and other manipulations can impair the integrity of the organism and cause postoperative gastrointestinal dysfunction. Although the potential mechanisms of electroacupuncture treatment have not yet been fully elucidated, there has been considerable research into the anti-inflammatory mechanisms of acupuncture. EA stimulation of the ST36 promotes contraction of the distal colon via the cholinergic pathway [13]; however, Fang, J F et al. suggested [14] that EA stimulation does shorten postoperative gastrointestinal transit time and promotes gastric emptying, but its mechanism of action is mediated mainly by stimulation of Nucleus Tractus Solitaries (NTS) neurons rather than by activation of the cholinergic anti-inflammatory pathway, and no reduction in inflammatory cell infiltration was observed in the experiment. Subsequently, Yang, N N et al [15] found that EA could attenuate peripheral inflammatory expression by suppressing the local immune response and correlated with acupoint selection and stimulation frequency. They also suggested [16] that EA stimulation of the ST36 could inhibit GABAA receptor expression in the Dorsal Nucleus of the Vagus nerve (DMV) and that the excited vagus nerve suppressed inflammatory responses triggered by intestinal manipulation and promoted gastrointestinal motility through activation of the α7nAChR-mediated JAK2/STAT3 signaling pathway. Therefore, the mechanism by which acupuncture promotes POI recovery needs to be further studied.

POI is a common post-surgical complication that affects patients' quality of life and prolongs their hospital stay. The concept of ERAS runs through the preoperative, intra-operative, and post-

operative stages. It refers to the use of evidence-based medical strategies through multidisciplinary cooperation to optimize perioperative management measures to reduce surgical stress, pain, and complications, restore the function of all organs as soon as possible, and facilitate their postoperative rehabilitation process. A study on the effect of preoperative walking on POI found that preoperative walking reduced the time to first defecation and bowel movement after gynecological surgery and decreased the incidence of POI, but the exact mechanism was not clear, perhaps related to faster colonic and rectal transit time for physical activity [17]. There is a large body of clinical research on post-surgical interventions to reduce the duration of intestinal paralysis and less research on preoperative prehabilitation. Preoperative prehabilitation can avoid the limitation of postoperative incision to local treatment, and whether it can prevent POI, or accelerate gastrointestinal rehabilitation, is a direction worthy of further research efforts in the future, and provide new ideas for clinical treatment.

Conclusion

POI is a common postoperative complication mediated by inflammation, which is characterized by high morbidity, high utilization of medical resources, low quality of life, and prolonged hospital stay, with postoperative inflammatory infection as its main cause. A recent multicenter randomized clinical trial successfully confirmed the effectiveness of EA for POI [18], similar to the intervention in this case. EA can accelerate the recovery of gastrointestinal function in POI patients, greatly shorten their hospitalization time, improve their quality of life, and have no clinical adverse effects, which is a guiding meaning for clinical treatment. We can further study the clinical mechanism of EA and add evidence for evidence-based medicine.

Conflict of interest statement: No conflict of interest.

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References

1. Iyer S, Saunders WB, S. Stemkowski. Economic burden of postoperative ileus associated with colectomy in the United States. J Manag Care Pharm. 2009; 15: 485-94.
2. Bragg D, et al. Postoperative ileus: Recent developments in pathophysiology and management. Clin Nutr. 2015; 34: 367-76.
3. Tevis SE, et al. Postoperative Ileus-More than Just Prolonged Length of Stay? J Gastrointest Surg. 2015; 19: 1684-90.
4. Kurz A, DI Sessler. Opioid-induced bowel dysfunction: Pathophysiology and potential new therapies. Drugs. 2003; 63: 649-71.
5. Watanabe J, et al. Effect of Postoperative Coffee Consumption on Postoperative Ileus after Abdominal Surgery: An Updated Systematic Review and Meta-Analysis. Nutrients, 2021; 13.
6. Eamudomkarn, N, et al. Effect of postoperative coffee consumption on gastrointestinal function after abdominal surgery: A systematic review and meta-analysis of randomized controlled trials. Sci Rep. 2018; 8: 17349.
7. Short V, et al. Chewing gum for postoperative recovery of gastrointestinal function. Cochrane Database Syst Rev. 2015: CD006506.
8. Oodit R, et al. Guidelines for Perioperative Care in Elective Abdominal and Pelvic Surgery at Primary and Secondary Hospitals in Low-Middle-Income Countries (LMIC's): Enhanced Recovery After Surgery (ERAS) Society Recommendation. World J Surg. 2022; 46: 1826-1843.
9. Ouyang H, JD Chen. Review article: Therapeutic roles of acupuncture in functional gastrointestinal disorders. Aliment Pharmacol Ther. 2004; 20: 831-41.
10. Yang JW, et al. Effect of acupuncture on postoperative ileus after laparoscopic elective colorectal surgery: A prospective, randomised, controlled trial. E Clinical Medicine. 2022; 49: 101472.
11. Chen KB, et al. Electro acupuncture or transcutaneous electro acupuncture for postoperative ileus after abdominal surgery: A systematic review and meta-analysis. Int J Surg. 2019; 70: 93-101.
12. Alsharqawi N, et al. Validity of the I-FEED score for postoperative gastrointestinal function in patients undergoing colorectal surgery. Surg Endosc. 2020; 34: 2219-2226.
13. Luo, D, et al. Electro acupuncture at acupoint ST-36 promotes contractility of distal colon via a cholinergic pathway in conscious rats. Dig Dis Sci. 2008; 53: 689-93.
14. Fang JF, et al. Electro acupuncture treatment partly promotes the recovery time of postoperative ileus by activating the vagus nerve but not regulating local inflammation. Sci Rep. 2017; 7: 39801.
15. Yang NN, et al. Effects of electro acupuncture on the intestinal motility and local inflammation are modulated by acupoint selection and stimulation frequency in postoperative ileus mice. Neurogastroenterol Motil. 2020; 32: e13808.
16. Yang, N.N, et al. Electro acupuncture ameliorates intestinal inflammation by activating α 7nAChR-mediated JAK2/STAT3 signaling pathway in postoperative ileus. Theranostics. 2021; 11: 4078-4089.
17. Özdemir İA, et al. Impact of pre-operative walking on post-operative bowel function in patients with gynecologic cancer. Int J Gynecol Cancer. 2019; 29: 1311-1316.
18. Wang Y, et al. Electro acupuncture vs Sham Electro acupuncture in the Treatment of Postoperative Ileus After Laparoscopic Surgery for Colorectal Cancer: A Multicenter, Randomized Clinical Trial. JAMA Surg. 2023; 158: 20-27.