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Zusanli (ST36) acupoint injection for preventing postoperative ileus: A systematic review and meta-analysis of randomized clinical trials

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KEYWORDS
ST36 acupoint injection;
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Meta-analysis;
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Summary
Objective: To evaluate the preventive effect of Zusanli (ST36) acupoint injections with various agents, for postoperative ileus (POI).
Methods: We searched electronic databases for randomized controlled trials from inception to 1st February 2015 evaluating ST36 acupoint injection for preventing POI. Revman 5.2.0 was used for data analysis with effect estimates presented as mean difference (MD) with 95% confidence interval (CI). Statistical heterogeneity was tested using I^2 (defined as significant if $I^2 > 75\%$). We used a random effects model (REM) for pooling data with significant heterogeneity.
Results: Thirty trials involving 2967 participants were included. All trials were assessed as high risk of bias (poor methodological quality). For time to first flatus, meta-analysis favored ST36 acupoint injection of neostigmine (MD −20.70 h, 95% CI −25.53 to −15.87, 15 trials, $I^2 = 98\%$, REM), vitamin B1 (MD −11.22 h, 95% CI −17.01 to −5.43, 5 trials, $I^2 = 98\%$, REM), and metoclopramide (MD −15.65 h, 95% CI −24.77 to −6.53, 3 trials, $I^2 = 94\%$, REM) compared to usual care alone. Meta-analysis of vitamin B1 favored ST36 acupoint injection compared to intramuscular injection (MD −17.21 h, 95% CI −21.05 to −13.36, 4 trials, $I^2 = 89\%$, REM). Similarly, for time to bowel sounds recovery and first defecation, ST36 acupoint injection also showed positive effects.

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Conclusions: ST36 acupoint injections with various agents may have a preventive effect for POI. Safety is inconclusive as few of included trials reported adverse events. Due to the poor methodological quality and likely publication bias further robust clinical trials are required to arrive at a definitive conclusion.

Introduction

Postoperative ileus (POI), is a common condition after abdominal surgery that presents with discomfort, pain, nausea, vomiting, and abdominal distension. It is a major contributory factor to extended hospitalization and increased costs.[1–3] POI is generally defined as a transient impairment of bowel motility after abdominal surgery or other injury.[1] Duration of POI varies from a few hours to several weeks. Recent studies show that, on average, patients with a diagnosis of POI stay 5 days longer in hospital after abdominal surgery than patients without POI.[4] In the US the economic consequences of POI are estimated to surpass one billion dollars each year.[5]

Currently, no effective techniques are available for the management of POI.[1,6] Usually, after abdominal surgery, current practice is to withhold oral feeding until POI resolves,[7,8] but the evidence for this has been questioned recently.[1] Several strategies, including minimizing intestinal trauma during surgery, using midthoracic epidural anesthesia and minimizing the need for opioids in pain management, do shorten the time of POI but it remains a major problem.[6] Pharmacological approaches including metoclopramide, erythromycin, beta blockers, laxatives, neostigmine, and naloxone, have limited clinical efficacy and safety for treating POI.[9–11] Gum chewing is associated with improved gastrointestinal function for preventing POI, but it is limited using in sleepy, drowsy, or older patients or in patients without teeth.[12] Further research is urgently needed to identify and develop new interventions for the prevention of POI.

Acupoint injection therapy emerged in 1950s in China; it originated from intra-muscular injection in western medicine and was gradually integrated into traditional Chinese medicine.[13] After its initial development acupoint injection therapy is widely used in China for a variety of indications including POI, pain, vomiting, nausea and retention of urine.[14] Acupoint injection is an acupoint stimulating technique in which a liquid agent is injected to prevent and/or treat disease. The agents usually used for acupoint injection include bee venom, Chinese herbal extractions, western medications, vitamins, and normal saline.[15] The commonly used acupoint in treating gastrointestinal diseases is Zusanli (ST36).[16,17] ST36 is located on the Stomach Meridian and its action, harmonizes *qi* and blood, adjusts the spleen and stomach, and improves general weakness; its traditional therapeutic properties are ideally suited to treating POI.[18] Electroacupuncture at ST36 at a specific frequency can improve gastrointestinal functional diseases.[19] Agents administrated in acupoints, through the meridians, are thought to play a synergistic effect with acupoint stimulation, and are thought to have a more sustained effect than traditional acupuncture needling or simple intra-muscular injection.[20] ST36 acupoint injections with various agents have been widely used as a preventative method for POI in China for many years but have not been part of standard of postoperative care in clinical practice due to a lack of systematic evidence demonstrating its efficacy and safety. We therefore performed a systematic review and meta-analysis of randomized clinical trials to evaluate the preventive effect of ST36 acupoint injections with various agents for POI.

Methods

Registration number

The protocol of this systematic review was registered in the PROSPERO database (http://www.crd.york.ac.uk/PROSPERO_REBRANDING/display_record.asp?ID=CRD42014007443).

Search strategy

We searched PubMed, the Cochrane CENTRAL, EMBASE, China National Knowledge Infrastructure (CNKI), VIP Database, Chinese Biomedical Database (SinoMed), and Wanfang Database from inception to 1st February 2015. We searched: MeSH term ''postoperative''; key words: ''postoperative ileus'' or ''POI'' or ''gastrointestinal function recovery'' or ''gastrointestinal disorder'' and ''ST36'' or ''zusanli'' and ''acupuncture'' or ''aquapuncture'' or ''*point injection'' or ''acupoint block'' and ''randomiz*''. Clinical trials were set as a limitation for searching. We also searched relevant ongoing trials from the US equivalent Clinical Trials register (http://www.clinicaltrials.gov).

Inclusion/exclusion criteria

Types of studies

Randomized clinical trials (RCTs) were included. Quasi-RCTs (clinical trials allocated participants based on alternation, such as date of birth, hospital medical record number) were excluded. We excluded case series, case reports, reviews and animal studies. There was no limitation on language or type of publication.

Types of participants

Participants who underwent elective or emergent abdominal surgery without experiencing POI or any complications were included. There were no limitations on age, gender, original abdominal disease or type of surgery. We excluded