

# INPLASY PROTOCOL

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## The effects of transcutaneous electrical acupoint stimulation on cognitive dysfunction and postoperative recovery in gastrointestinal tumours: a systematic review and meta-analysis of randomized controlled trials

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**Condition being studied:** Gastrointestinal tumours are one of the common malignant tumours. With the accelerated pace of life and changes in modern eating habits, the prevalence of gastrointestinal tumours is gradually increasing. Transcutaneous electrical stimulation at acupoints (TEAS) is a method of acupoint stimulation. The effectiveness of perioperative TEAS for early recovery and prevention of cognitive dysfunction in gastrointestinal tumour surgery is currently controversial.

**Information sources:** Searching databases such as PubMed, Cochrane Library, EMBASE, ClinicalTrials.gov, CNKI, VIP and Wanfang databases since the establishment of the database to September 2022. The search terms were: "transcutaneous electrical acupoint stimulation", "gastric cancer", "bowel cancer", "cognitive functions", and "post-operative recovery", and the search strategy used a combination of subject terms and free words.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 October 2022 and was last updated on 20 October 2022 (registration number INPLASY2022100080).

### INTRODUCTION

**Review question / Objective:** This study evaluates the effectiveness of TEAS on postoperative recovery and cognitive function in gastrointestinal tumours through meta-analysis to provide evidence-

based evidence for clinical treatment options.

**Condition being studied:** Gastrointestinal tumours are one of the common malignant tumours. With the accelerated pace of life and changes in modern eating habits, the prevalence of gastrointestinal tumours is

gradually increasing. Transcutaneous electrical stimulation at acupoints (TEAS) is a method of acupoint stimulation. The effectiveness of perioperative TEAS for early recovery and prevention of cognitive dysfunction in gastrointestinal tumour surgery is currently controversial.

## METHODS

**Search strategy:** Randomized controlled trials investigating the effectiveness of TEAS on postoperative functional and cognitive function in gastrointestinal tumours published until September 2022 were identified by searching comprehensive databases. Data analysis was performed using RevMan 5.3 software. The random-effects model and the fixed-effects model were used to perform the meta-analysis on the experimental group and control group.

**Participant or population:** Patient.

**Intervention:** TEAS.

**Comparator:** sham-TEAS.

**Study designs to be included:** Randomized controlled trials.

**Eligibility criteria:** RCT studies.

**Information sources:** Searching databases such as PubMed, Cochrane Library, EMBASE, ClinicalTrials.gov, CNKI, VIP and Wanfang databases since the establishment of the database to September 2022. The search terms were: "transcutaneous electrical acupoint stimulation", "gastric cancer", "bowel cancer", "cognitive functions", and "post-operative recovery", and the search strategy used a combination of subject terms and free words.

**Main outcome(s):** Cognitive function: Mini-Mental State Examination (MMSE), Ramsay Sedation Rating Scale; Postoperative pain: Visual Analogue Scale (VAS), Numerical Rating Scale (NRS).

**Additional outcome(s):** Postoperative gastrointestinal function: first bowel movement, bowel movement, bowel sounds, water intake and time to first bed movement; Safety indicators: adverse reactions and complications.

**Quality assessment / Risk of bias analysis:** Funnel plotting based on postoperative time to exhaustion suggests a possible bias in this study. As is shown in figure 14.

**Strategy of data synthesis:** Two independent researchers screened the literature according to the nadir criteria, identified the final RCTs for inclusion, extracted data and information, and a third researcher could be involved in the assessment if there was a dispute about the exclusion of the literature. The quality of the literature for the RCTs was assessed using low risk, high risk, and uncertain risk according to the seven dimensions in the Cochrane Risk of Bias Assessment Tool.

**Subgroup analysis:** Two independent researchers screened the literature according to the nadir criteria, identified the final RCTs for inclusion, extracted data and information, and a third researcher could be involved in the assessment if there was a dispute about the exclusion of the literature. The quality of the literature for the RCTs was assessed using low risk, high risk, and uncertain risk according to the seven dimensions in the Cochrane Risk of Bias Assessment Tool.

**Sensitivity analysis:** Five studies [7,10,11,12,19] reported on the time to first postoperative bowel movement in patients, with heterogeneity between studies ( $P < 0.00001$ ,  $I^2 = 93\%$ ), and analysis using a random effects model showed that the TEAS group reduced the time to first postoperative bowel movement compared to the control group, with a statistically significant difference [MD = -24.55, 95% CI (-35.16, -13.95),  $P < 0.00001$ ]. After sensitivity analysis, the remaining four studies [7,10,11,19] were homogeneous ( $P = 0.28$ ,  $I^2 = 21\%$ ) after excluding the study by Chen Jing [12] and were analysed using a fixed effects model. As shown in Figure 8 and 9.

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**Country(ies) involved:** China.

**Keywords:** Transcutaneous electrical acupoint stimulation; Postoperative recovery; Postoperative gastrointestinal tumor; Cognitive dysfunction, Meta analysis.

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