Transcutaneous electric nerve stimulation over acupoints for patients with diarrhea-predominant irritable bowel syndrome

Protocol for systematic review and meta-analysis

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Abstract

Background: At present, drug therapy for diarrhea-predominant irritable bowel syndrome (IBS-D) has made great progress; however, it does not often produce a satisfying curative effect. Transcutaneous electric nerve stimulation over acupoints (Acu-TENS) might be more effective in improving patient’s symptoms and producing fewer side-effects as a result.

Although with a great progress of the drug therapy for IBS-D, it is often hard to achieve its satisfactory curative effect. Acu-TENS that may be effective to improve patients’ symptoms and fewer side-effects will be sought. There is no systematic review concerning the efficacy of Acu-TENS for IBS-D published. Therefore, this review aims to systematically evaluate the efficacy of Acu-TENS on IBS-D.

Methods: Four English (PubMed, EMBASE, The Cochrane Library, Web of Science) and 4 Chinese electronic databases (Biomedical Literature Database, CNKI, VIP, Wanfang Database) will be searched from their inception to November 26, 2018. Randomized controlled trials that evaluated the effect of Acu-TENS on patients with IBS-D will be included. The primary outcome measures will include average weekly stool frequency, visual analog scale (VAS), and the Bristol scale. The secondary outcome measures will include the MOS 36-item short-form health survey (SF-36), IBS Quality of Life Questionnaire (IBS-QOL), severity of IBS symptoms (IBS-SSS), and rectal perception. Quality evaluation and data extraction will be independently undertaken, respectively. The data from the eligible trials will be analyzed by RevMan5.3.

Results: For patients with IBS-D, this systematic review will provide evidences related to the efficacy of Acu-TENS in these evaluation aspects, stool frequency, VAS and the Bristol scale, SF-36, IBS-QOL, IBS-SSS, and rectal perception.

Conclusion: This evidence may be useful to medical workers with regard to the use of Acu-TENS in the treatment of IBS-D. PROSPERO registration number: PROSPERO CRD42018109294.

Abbreviations: Acu-TENS = transcutaneous electric nerve stimulation over acupoints, CI = confidence interval, IBS = irritable bowel syndrome, IBS-QOL = IBS Quality of Life Questionnaire, IBS-SSS = severity of IBS symptoms, RR = the relative risks, SF-36 = MOS 36-item short-form health survey, VAS = visual analog scale.

Keywords: irritable bowel syndrome with diarrhea, meta-analysis, protocol, systematic review, transcutaneous electric nerve stimulation over acupoints

1. Introduction

Irritable bowel syndrome (IBS) is a common chronic functional gastrointestinal disorder characterized by recurrent abdominal pain and/or bloating related to defecation without reliable biological markers.\cite{1} The prevalence of IBS in Asia using Rome criteria was approximately 4.6% to 21.2% in adults, global prevalence of IBS was demonstrated in a meta-analysis of 11%,\cite{2–4} IBS is associated with substantial burden, such as higher levels of anxiety, lost productivity at work, work absenteeism.\cite{14} IBS-D is the common subtype, which accounts for 23.4% to 40% of all IBS patients.\cite{14} IBS-D poses a substantial economic burden on the global healthcare system. Patients with IBS-D compared with the unaffected controls had significantly higher total all-cause healthcare costs ($9436 vs $7169, P < .001).\cite{15} Although with a great progress of the drug therapy for IBS-D which have been proven to be effective in relieving symptoms and improving quality of life for patients with IBS-D, it is often hard to achieve the satisfactory curative effect. These drugs include antidepressants, antibiotics, probiotics, and serotonin receptor modulators.\cite{7,8} The temporary
and limited effect remains to be a difficult problem on account of
the mechanisms by which symptoms that arise are poorly
understood.\textsuperscript{[9]} Owing to limited effect and the side effects of
medications, patients with IBS-D often cannot get satisfying
curative effect.\textsuperscript{[10]} Therefore, an increasing number of patients tend
to use complementary and alternative therapy.\textsuperscript{[11–13]}

As an alternative therapy, transcutaneous electric nerve
stimulation (TENS) has been increasingly studied in clinical
practice, a Western treatment acts on the afferent nerve fibers to
stimulate the nerves for therapeutic purposes.\textsuperscript{[14] TENS over
acupoints (Acu-TENS) is a coordinated intervention merging
TENS with acupuncture. Compared with traditional acupuncture
and electro-acupuncture, it is not necessary to insert a needle
into acupoints for stimulation. In recent years, it has been widely
used in clinical practice.\textsuperscript{[15–17]}

Considering there is a limited evidence concerning its efficacy
for IBS-D, we performed this review that aims to systematically
evaluate the efficacy of Acu-TENS for IBS-D and thus to provide
a reliable evidence for clinical decision.

2. Methods and analysis

2.1. Inclusion criteria for study selection

All randomized controlled trials evaluating the effect of Acu-
TENS comparing no interventions, placebo control, sham Acu-
TENS on IBS-D will be included. Participants who are diagnosed
with IBS-D according to the Rome II, III, or VI criteria will be
included, regardless of their age, gender, and ethnicity. We will
exclude those who had an acute exacerbation within 1 week
before the study.

2.2. Outcome measures

Primary outcome measures will include average weekly stool
frequency, visual analog scale (VAS), and the Bristol scale.\textsuperscript{[13]}
Secondary outcome measures will include SF-36, IBS-QOL, IBS-
SSS, and rectal perception.\textsuperscript{[18–21]} Rectal sensory thresholds will
be evaluated by rectal balloon distension.

2.3. Literature search

Four English (PubMed, Embase, The Cochrane Library, Web of
Science) and 4 Chinese electronic databases (Biomedical
Literature Database, CNKI, VIP, and Wanfang Database) will
be searched from their inception to November 26, 2018. There
was no limit to the type of language. Reference lists of eligible
studies will be reviewed to discover further eligible studies. We
have drawn up detailed search strategies for each electronic
database to identify eligible studies totally. The search strategy is
shown in Table 1.

2.4. Study selection

Two review authors (B-YH, Q-FS) will screen and extract
independently titles and abstracts, then select potentially eligible
studies. Finally, the full-text of literature will be reviewed
carefully according to the inclusion and exclusion criteria.
Disagreements and inconsistency will be resolved by a third
review author (YC). The study flow diagram is shown in Fig. 1.

2.5. Data extraction

Two researchers will independently extract the data, the
following content will be included: first author, the year of
publishing, diagnosis criteria, study population, treatment
protocol, outcome measurements, duration of treatment, dura-
tion of the follow-up period, and baseline characteristic. A third
review author will resolve divergences through discussion.

2.6. Risk of bias assessment

The Cochrane risk of bias tool will be used to evaluate
methodologic quality, which is described in the Cochrane
Handbook of Systematic Reviews of Interventions:

- Sequence generation (selection bias)
- Allocation sequence concealment (selection bias)
- Blinding of participants and personnel (performance bias)
- Blinding of outcome assessment (detection bias)
- Incomplete outcome data (attrition bias)
- Selective outcome reporting (reporting bias) and other
potential sources of bias

2.7. Statistical analysis

The data of all the eligible trials will be analyzed by RevMan5.3.
Continuous data will be calculated by the mean differences and
95% confidence interval (95% CI), and dichotomous data will be
calculated by the relative risks (RRs) and 95% CI. Heterogeneity
will be assessed by the I-squared (I\(^2\)) statistic. We will regard as
substantial heterogeneity when I\(^2\) > 50% or \(P < .05\), and a
random effect model will be chosen. Otherwise, a fixed effects
model will be applied to calculate the pooled RR. We will conduct
subgroup analysis and sensitivity analysis if necessary.
2.8. Grading the quality of evidence

The Grading of Recommendations Assessment, Development, and Evaluation will be used to assess the quality of evidence for the outcomes. The quality of outcome measures will be categorized into 4 levels: high, moderate, low, and very low quality.

3. Discussion

Owing to less high-level evidence-based medical research evaluating the efficacy of Acu-TENS on IBS-D, Acu-TENS has been gradually accepted and widely used in the treatment of IBS-D. To our knowledge, this is the first systematic review to investigate the efficacy of Acu-TENS for IBS-D. This review will provide evidence related to the efficacy of Acu-TENS in these evaluation aspects, stool frequency, VAS and the Bristol scale, SF-36, IBS-QOL, IBS-SSS, and rectal perception. It may be useful to medical workers considering the use of Acu-TENS in the treatment of IBS-D.

Author contributions

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