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Original Article

ADJUNCTIVE EFFICACY OF ELECTROACUPUNCTURE COMBINED WITH AURICULAR ACUPUNCTURE ON THE GERDQ SCORE IN PATIENTS WITH GASTROESOPHAGEAL REFLUX DISEASE AT THONG NHAT HOSPITAL

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ABSTRACT: Electroacupuncture combined with auricular acupuncture is considered a potential adjunctive therapy alongside proton pump inhibitors (PPIs) in the treatment of gastroesophageal reflux disease (GERD). A controlled clinical intervention study was conducted in GERD patients with a GerdQ score ≥ 8, who were randomly allocated to an intervention group (electroacupuncture combined with auricular acupuncture plus Esomeprazole 40 mg/day) and a control group (Esomeprazole alone), with follow-up assessments at baseline (day 0), day 7, and day 14, to investigate baseline clinical characteristics and treatment efficacy using the GerdQ scale and the 4GerdQ score (the four positive-predictive questions within the GerdQ questionnaire). Sixty-one patients completed the study (30 in the control group, 31 in the intervention group), with comparable baseline characteristics between the two groups ($p>0.05$). At baseline, the median GerdQ score was 10.0 in both groups ($p=0.447$); the 4GerdQ score was 8.0 in both groups ($p=0.175$). After 14 days, the GerdQ score decreased significantly within each group ($p<0.001$), and the between-group difference at day 14 was also statistically significant (6.0 versus 7.0; $p=0.011$). Likewise, the 4GerdQ score in the intervention group was significantly lower than in the control group (4.0 versus 5.0; $p=0.008$), and the reduction from baseline was also significantly greater ($p=0.040$). Combined electroacupuncture and auricular acupuncture significantly improved both the overall GerdQ score and the 4GerdQ score compared with PPI monotherapy after 14 days of treatment.

Keywords: gastroesophageal reflux disease; electroacupuncture; auricular acupuncture; GerdQ; 4GerdQ

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1. INTRODUCTION

Globally, gastroesophageal reflux disease (GERD) is now estimated to affect more than 1 billion people, making it one of the most common digestive disorders [1]. In Vietnam, nearly one in four patients presenting with upper gastrointestinal symptoms is diagnosed with GERD [2]. Proton pump inhibitors (PPIs) remain the first-line treatment, but the response varies: 10–40% of patients do not achieve the expected symptom control and require long-term treatment [3]. This creates a pressing need for safer and more effective adjunctive options.

Combining traditional medicine (TM) with modern treatment regimens is increasingly common. TM has no specific name for GERD, but its clinical manifestations closely resemble the syndromes of Ai khi (belching) and Thon toan (acid regurgitation). The 2023 TM expert consensus on GERD classifies the disease along an excess–deficiency spectrum; this provided the theoretical basis for pattern differentiation and for pattern-based modification of acupoints in this study [4].

Several reviews and meta-analyses have shown that combining the two medical systems, particularly through acupuncture techniques, may bring clear benefits in relieving retrosternal burning, reducing reflux and maintaining more stable disease control over time [6]. A recent randomized controlled trial also showed that acupuncture reduced the need for PPI dose escalation in refractory GERD [5]. Among the available acupuncture techniques, electroacupuncture, which combines traditional needling with electrical stimulation at selected acupoints, is the most studied [7]; it has an established place in clinical practice and is recommended by professional societies [17]. Auricular acupuncture, a form of microacupuncture applied to points on the auricle, is simple to perform and has also been reported to provide adjunctive benefit [6], [8]. Although the effects of each technique alone have been documented, few studies have examined electroacupuncture and auricular acupuncture combined in a single regimen. In Vietnam in general, and at Thong Nhat Hospital in Ho Chi Minh City in particular, no study has yet evaluated the efficacy of this combination.

The GerdQ questionnaire consists of 6 questions and is widely recommended for diagnosing GERD and monitoring treatment response. Four questions (frequency of heartburn, regurgitation, sleep disturbance due to symptoms, and need for additional rescue antacids) have positive predictive value, while the remaining 2 (epigastric pain, nausea) have negative predictive value and are reverse-scored. The score of the 4 positive predictive questions, referred to in this study as the 4GerdQ score, is not an independent scale but a component index extracted from the GerdQ questionnaire itself; some authors use it to increase sensitivity for detecting changes in specific reflux symptoms.

On this basis, we conducted this study to describe the clinical characteristics of patients with GERD before intervention using the GerdQ and 4GerdQ scores, and to evaluate the improvement in these scores with a combined electroacupuncture and auricular acupuncture regimen.

2. SUBJECTS AND METHODS

Patients who presented for examination and were diagnosed with gastroesophageal reflux disease (GERD) based on a total GerdQ score ≥ 8 between July 2025 and June 2026

2.1. Study subjects

Inclusion criteria: Patients aged 18 to under 70 years with a confirmed diagnosis of GERD based on a GerdQ score ≥ 8 and a TM diagnosis of an excess pattern (Liver Qi invading the Stomach, Spleen-Stomach damp-heat) or a deficiency pattern (Spleen-Stomach weakness, Stomach yin insufficiency), made with the PIGERD tool by trained investigators following a standardized procedure; patients volunteered and agreed to participate in the study.

Exclusion criteria: Patients with acute inflammatory or infectious disease or uncontrolled chronic disease; organic psychiatric disorders or cognitive-behavioral disorders; skin lesions at the planned acupuncture sites; or current participation in another interventional study.

2.2. Study methods

Study design: controlled clinical intervention study with a before-and-after comparison.

Sample size: calculated with the formula for comparing two means in a controlled intervention study [9], based on the change in GerdQ score before and after acupuncture alone in the study by Tang Yuming (decrease from 9.45 ± 2.44 to 7.82 ± 2.21 points) [10]. The minimum sample size was 29 patients per group; allowing for 10% loss to follow-up, each group required 32 patients, for a total of 64 patients. Because no published data exist on the efficacy of this combined regimen, the standard deviation used to estimate the sample size was taken from a single-group (before-after) study rather than from the between-group difference of a randomized controlled trial. The calculated sample size should therefore be regarded as a preliminary estimate.

Study setting and period: Thong Nhat Hospital, Ho Chi Minh City, from July 2025 to June 2026.

Intervention and assessment procedure: The study was designed as a randomized controlled clinical intervention with a 14-day intervention period. Eligible patients were randomly assigned to 2 groups: the control group (n = 32) received Esomeprazole 40 mg/day alone; the intervention group (n = 32) received Esomeprazole 40 mg/day plus electroacupuncture combined with auricular acupuncture. The randomization sequence was generated in Excel (1:1 ratio) and sealed in opaque, sequentially numbered envelopes. Envelopes were opened in order only after the patient had consented, so the recruiter did not know the group assignment when inviting patients to participate.

Electroacupuncture: Sterile single-use acupuncture needles (Khanh Phong brand, stainless steel, 0.30×25 mm) were used. The acupoint prescription common to all clinical patterns comprised Neiguan (PC6), Zusanli (ST36), Taichong (LR3) and Gongsun (SP4), needled bilaterally, combined with Zhongwan (CV12) and Xiawan (CV10). Points were modified by TM pattern: for Liver Qi invading the Stomach, Xingjian (LR2) was added with the reducing method; for Spleen-Stomach weakness, Jiexi (ST41) with the reinforcing method; for Spleen-Stomach damp-heat, Taibai (SP3) with the reinforcing method; and for Stomach yin deficiency, Neiting (ST44) with the reinforcing method. Deqi was confirmed by the patient's report of distension, fullness or heaviness at the needling site, together with the practitioner's sense of needle grasp, before the electrodes were connected. Electrode pairs were connected along the Neiguan–Zusanli, Taichong–Gongsun and Zhongwan–Xiawan axes. Stimulation frequency was 60–100 Hz, intensity was set at the patient's tolerance threshold, and each session lasted 30 minutes, 5 sessions/week (Monday–Friday) for 2 weeks, 10 sessions in total. Procedures were performed by TM physicians trained to a standardized protocol.

Auricular acupuncture: Press needles (0.25×1.3 mm) were inserted at the ear points Shenmen (F4), Cardia, Stomach (CO4) and Subcortex (AT4), alternating between ears (right ear in week 1, left ear in week 2). Needles were retained continuously for 5 days each week, with a 2-day break at the weekend. Patients were instructed to keep the ear dry and attended scheduled follow-up visits for checking and early detection of local reactions.

Both groups received lifestyle counseling using a standardized information sheet, with periodic adherence checks. Treatment efficacy was assessed with the GerdQ questionnaire (total score of the 6 items) and the 4GerdQ score (total score of the 4 positive predictive items) at D0 (before intervention), D7 and D14. Investigators actively monitored adverse events throughout the intervention.

2.3. Data analysis

Data were analyzed with SPSS Statistics. Quantitative variables are presented as mean ± standard deviation or median (interquartile range), depending on their distribution; qualitative variables are presented as frequencies and percentages. Appropriate tests were used for comparisons between the two groups and over follow-up; statistical significance was set at $p<0.05$. Between-group comparisons at each time point used the Mann-Whitney test, and within-group comparisons across the three time points used the Friedman test. ANCOVA was also performed to compare D14 scores between the two groups, adjusted for D0 scores.

2.4. Research ethics

The ethical aspects and safety of the study were approved by the Biomedical Research Ethics Committee of Thong

Nhat Hospital, decision No. 120/2025/CN-BVTN-HĐĐĐ dated 21 July 2025.

3. RESULTS

From July 2025 to June 2026, we screened and enrolled 64 patients who met the selection criteria and randomly assigned them to the control group (n=32) and the intervention group (n=32). During follow-up, 3 patients withdrew (attrition rate 4.7%): 1 in the intervention group (lost to contact on day 8) and 2 in the control group (1 lost to contact on day 6 and 1 non-adherent to treatment on day 10). Thus, 61 patients completed the study and were included in the analysis: 30 in the control group and 31 in the intervention group. The efficacy analysis was performed in patients who completed the full course of treatment; because the attrition rate and its distribution were similar between the two groups (1/32 and 2/32), the risk of bias was judged to be limited.

3.1. General characteristics of the study participants

Table 1. General characteristics of the study participants

Characteristic		Control (n=30)	Intervention (n=31)	p
Age (mean - SD)		49.0 (11.8)	44.9 (14.3)	0.232*
Sex n (%)	Male	12 (40.0%)	14 (45.2%)	0.684**
	Female	18 (60.0%)	17 (54.8%)	
Occupation n (%)	White-collar	14 (46.7%)	13 (41.9%)	0.896**
	Manual labor	7 (23.3%)	7 (22.6%)	
	Retired	9 (30.0%)	11 (35.5%)	

*Independent Samples t-test **Chi-Square Test

The results [Table 1] show that the two groups had similar baseline characteristics. The mean age of the control and intervention groups was 49.0 ± 11.8 and 44.9 ± 14.3 years, respectively (p=0.232). Women predominated in both groups (60.0% and 54.8%; p=0.684). Regarding occupation, white-collar workers made up the largest proportion in both groups (46.7% and 41.9%), followed by retirees and manual workers; the difference in occupational distribution between the two groups was not statistically significant (p=0.896). Overall, no statistically significant differences in baseline characteristics were found between the two groups (p>0.05), which provides the comparability needed to compare treatment efficacy in the subsequent analyses.

3.2. Distribution of traditional medicine patterns

Table 2. Distribution of traditional medicine patterns

TM pattern	Control n (%)	Intervention n (%)	p*
Excess – Liver Qi invading Stomach	12 (70.6)	16 (84.2)	0.434
Excess – Spleen-Stomach damp-heat	5 (29.4)	3 (15.8)	
Deficiency – Spleen-Stomach weakness	8 (61.5)	9 (75.0)	0.673
Deficiency – Stomach yin insufficiency	5 (38.5)	3 (25.0)	

*Fisher's Exact Test

The distribution of excess/deficiency patterns was similar between the two groups (p>0.05), ensuring comparability when evaluating treatment efficacy.

3.3. Treatment efficacy by GerdQ and 4GerdQ scores

Table 3. Changes in GerdQ and 4GerdQ scores over time in the two groups

Scale	Time point	Control (n=30) Median (25-75%)	Intervention (n=31) Median (25-75%)	p*
GerdQ	D0	10.0 (9.0-11.0)	10.0 (9.0-11.0)	0.447
	D7	9.0 (9.0-10.0)	9.0 (8.0-10.0)	0.760

	D14	7.0 (6.8-8.0)	6.0 (6.0-7.0)	0.011
	p across 3 time points**	<0.001	<0.001	-
	Reduction D7-D0	1.0 (0.0-1.3)	0.0 (0.0-1.0)	0.093
	Reduction D14-D0	2.5 (2.0-3.0)	3.0 (2.0-4.0)	0.053
4GerdQ	D0	8.0 (8.0-9.0)	8.0 (7.0-9.0)	0.175
	D7	7.0 (6.8-8.0)	7.0 (6.0-8.0)	0.820
	D14	5.0 (4.8-6.0)	4.0 (4.0-5.0)	0.008
	p across 3 time points**	<0.001	<0.001	-
	Reduction D7-D0	1.0 (1.0-2.0)	1.0 (1.0-2.0)	0.172
	Reduction D14-D0	3.0 (1.8-4.0)	3.0 (3.0-4.0)	0.040

*Mann-Whitney Test; **Friedman Test

At D0, GerdQ and 4GerdQ scores were similar between the two groups (p=0.447 and p=0.175), reflecting comparable baseline symptom severity. Over time [Table 3], both scores decreased significantly within each group (p<0.001). At D14, the intervention group had significantly lower scores than the control group for both GerdQ (6.0 vs 7.0 points; p=0.011) and 4GerdQ (4.0 vs 5.0 points; p=0.008). The reduction from D0 to D14 was also greater in the intervention group than in the control group; the difference was statistically significant for 4GerdQ (p=0.040) but did not reach significance for GerdQ (p=0.053).

Table 4. ANCOVA comparing GerdQ and 4GerdQ scores at D14 between the two groups, adjusted for D0 scores

Score (D14)	Regression coefficient*	95% CI	p
GerdQ	-0.62	-1.08 to -0.15	0.010
4GerdQ	-0.59	-1.06 to -0.12	0.015

After adjustment for baseline D0 scores (a negative coefficient indicates lower scores in the intervention group than in the control group), the between-group difference at D14 was statistically significant for both scales [Table 4], consistent with the repeated-measures mixed-effects regression model (group×time interaction: p=0.034 for GerdQ; p=0.036 for 4GerdQ).

3.4. Adverse events

No adverse effects related to Esomeprazole were recorded. In the intervention group, 1/31 patients (3.2%) had mild local pain at the auricular needle site, which resolved spontaneously and did not affect study participation. No needle fainting, bleeding, allergy/infection or other technical incidents were recorded.

4. DISCUSSION

4.1. General characteristics of the study participants

The study included 61 patients with GERD who were randomly assigned to the control group (n=30) and the intervention group (n=31). At baseline, the two groups were similar in age, sex and occupation (p>0.05). This balance provides the objectivity needed to evaluate treatment efficacy.

The mean age of the control group (49.0±11.8) and the intervention group (44.9±14.3) was similar to that in epidemiological surveys of GERD in Vietnam that used the same symptom score [2]. Women made up the majority in both groups, which is common in studies that recruit patients based on functional symptoms rather than endoscopic lesions [2].

Regarding occupation, white-collar workers made up the largest proportion. This is consistent with reports in the literature on the association between psychological stress, lifestyle habits and the risk of GERD flare-ups in adults [11]. In addition, the classification of excess/deficiency patterns in this study was based on a TM pattern assessment tool for GERD that has been standardized in Vietnam [12], which provides a sound practical basis for selecting and modifying acupoints in the intervention regimen.

4.2. Clinical characteristics of GERD

at baseline

At D0, the baseline symptom burden was similar between the two groups, as shown by the median GerdQ score (10.0 points; p=0.447) and 4GerdQ score (8.0 points in both groups; p=0.175).

The study used a GerdQ score ≥ 8 as the inclusion criterion, following the recommendation of the American College of Gastroenterology (ACG, 2022) [13], to recruit patients with clear symptoms who were suitable for evaluating the intervention regimen. Of note, the 4GerdQ score covers only the 4 positive predictive questions and leaves out the 2 reverse-scored (negative predictive) questions. This makes 4GerdQ more sensitive to small symptom changes and overcomes the limited sensitivity of the total GerdQ score analyzed by Hurr (2022) [14]. GerdQ is a symptom-based screening tool with moderate sensitivity/specificity; a diagnosis based only on this threshold, without endoscopy or pH monitoring, may limit the generalizability of the results.

4.3. Treatment efficacy by GerdQ and 4GerdQ scores

GerdQ and 4GerdQ scores decreased significantly in both groups over time (p<0.001). At D14, the intervention group had significantly lower scores than the control group on both scales (GerdQ: 6.0 vs 7.0 points, p=0.011; 4GerdQ: 4.0 vs 5.0 points, p=0.008). This indicates a relatively consistent adjunctive effect of the combined electroacupuncture and auricular acupuncture regimen, even though standard Esomeprazole 40 mg/day had already controlled most symptoms from the first week [3]. Because 4GerdQ uses only the 4 positive predictive questions, it removes the influence of the 2 reverse-scored questions, which may explain why it was more sensitive than the total GerdQ score when comparing reductions from D0 (p=0.053 for GerdQ vs p=0.040 for 4GerdQ) [14].

The reduction in GerdQ from D0 did not differ significantly between the groups by the Mann-Whitney test (p=0.053). However, ANCOVA adjusted for baseline scores showed a statistically significant between-group difference at D14 for both GerdQ and 4GerdQ [Table 4]. The repeated-measures mixed-effects regression model gave similar results. Still, the estimated improvement of about 0.6 points is modest relative to the range of the scale. 4GerdQ in particular is an exploratory index derived from GerdQ and needs further confirmation with validated scales.

This finding agrees with the trial sequential meta-analysis by Yin J (2025), which showed growing evidence for the effect of acupuncture on GERD symptoms, including when combined with PPIs [15]. Mechanistically, key acupoints such as Zusanli (ST36) and Neiguan (PC6) are linked to the vagus nerve; electroacupuncture at these points activates the vagal-adrenal axis and regulates inflammatory responses and the autonomic nervous system [16]. The results are in line with the WFAS (2024) recommendation of acupuncture as an adjunct to standard PPI therapy [17], and with the report by Dickman et al. of benefits equivalent or superior to doubling the PPI dose in patients with refractory disease [18].

Our results can also be compared with the study by Lam Nguyen Thuy An et al. (2025) in 66 patients with the Liver Qi invading the Stomach pattern who received thread embedding combined with auricular acupuncture for 4 weeks (MD in GerdQ -2.15; 95% CI -2.69 to -1.62) [19]. The improvement in the present study was more modest, possibly because it included all four patterns rather than a single pattern and because the intervention period was shorter (2 weeks vs 4 weeks). Both studies combined auricular acupuncture and used the PIGERD tool for pattern differentiation, which supports the role of auricular acupuncture in GERD treatment regimens.4.4. Limitations of the study

This study has several limitations: the sample size was not adjusted for prior PPI use, the design was not blinded, and the short follow-up limits generalizability. Multicenter, larger, double-blind studies with long-term follow-up are needed to confirm these results.

5. CONCLUSION

Adding electroacupuncture and auricular acupuncture to PPI therapy significantly improved GerdQ and 4GerdQ scores compared with PPI monotherapy after 14 days, consistently across several statistical methods (additional improvement ~0.6 points; 95% CI 0.1–1.1). This is a modest but meaningful adjunctive benefit with potential for clinical use, which needs confirmation in

larger, more rigorously designed studies.

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