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Effect of Adding Electroacupuncture to Standard Triple Antiemetic Therapy on Chemotherapy-Induced Nausea and Vomiting: A Randomized Controlled Clinical Trial

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ABSTRACT

PURPOSE We aim to determine the effectiveness of adding electroacupuncture to standard triple antiemetic therapy for treating chemotherapy-induced nausea and vomiting (CINV).

METHODS From March 2022 to December 2023, a randomized, blind, sham-controlled trial conducted across six Chinese hospitals investigated patients with breast cancer undergoing highly emetogenic chemotherapy (HEC). Patients were randomly assigned to either true electroacupuncture (n = 120) or sham electroacupuncture (n = 119) groups, with both groups receiving standard triple antiemetic therapy. The primary end point was the proportion of complete protection (no vomiting, no need for rescue treatment, and no significant nausea, as evaluated using the visual analog scale [VAS]) within 120 hours after receiving HEC.

RESULTS Among 239 randomly assigned patients, 235 (98.3%) completed the trial. In the full analysis set, compared with the sham electroacupuncture group, the true electroacupuncture group demonstrated a significant increase in the complete protection rate from 34.5% to 52.9% (P = .004). Additionally, true electroacupuncture also showed enhanced total control (4.3% *v* 13.4%; P = .014), no significant nausea (37.9% *v* 58.8%; P = .001), no nausea (4.3% *v* 13.4%; P = .014), and nausea VAS score = 0 mm (4.3% *v* 12.6%; P = .023). However, the occurrence of no vomiting in the overall stage was similar (76.7% *v* 73.9%; P = .622) in both groups. Post hoc exploratory analysis showed a significantly higher rate of complete protection during the delayed stage in the true electroacupuncture group compared with the sham electroacupuncture group, with no significant difference observed during the acute stage.

CONCLUSION Adding true electroacupuncture to standard triple antiemetic therapy significantly enhances the efficacy of CINV treatment in patients with breast cancer receiving HEC.

ACCOMPANYING CONTENT

Data Supplement

Protocol

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INTRODUCTION

Chemotherapy-induced nausea and vomiting (CINV) are among the most feared side effects that can affect patients' quality of life and treatment adherence, potentially affecting prognosis.[1,2] To prevent CINV caused by highly emetogenic chemotherapy (HEC), current antiemetic guidelines have recommended a standard combination of three drugs, and more recently, four drugs, including dexamethasone, a 5-HT3 receptor antagonist, and an NK1 receptor antagonist, with or without olanzapine.[3-6] Certain issues require attention in the treatment and research of CINV. Notably, after the use of effective antiemetic regimens, patients who receive emetogenic anticancer drugs experience nausea more frequently than vomiting.[5] However, most clinical studies tend to focus on vomiting and often overlook nausea.[7] The primary research end point is usually considered as a complete response, defined as no vomiting and no rescue medication.[1,7] Few studies have considered nausea, designating it as the primary research end point.[8-10] Moreover, the effectiveness of these antiemetic regimens does not fully meet the patient needs. In particular, the control of nausea remains elusive.[5,7] Even with the most intensive CINV treatment regimen, which incorporates olanzapine into triplet combination therapy, the proportion of patients with no nausea within 120 hours after chemotherapy was only

CONTEXT

Key Objective

Can true electroacupuncture enhance the efficacy of chemotherapy-induced nausea and vomiting (CINV) treatment in patients with breast cancer receiving highly emetogenic chemotherapy (HEC) along with standard triple antiemetic therapy?

Knowledge Generated

This randomized clinical trial involved 239 patients with breast cancer receiving HEC and standard triple antiemetic therapy. True electroacupuncture significantly improved the complete protection rate from 34.5% to 52.9% ($P = .004$) within 120 hours after chemotherapy compared with sham electroacupuncture. In addition, compared with sham electroacupuncture, true electroacupuncture showed enhanced total control (4.3% *v* 13.4%; $P = .014$), no significant nausea (37.9% *v* 58.8%; $P = .001$), no nausea (4.3% *v* 13.4%; $P = .014$), and nausea visual analog scale score = 0 mm (4.3% *v* 12.6%; $P = .023$).

Relevance *(C. Zimmermann)*

Electroacupuncture was safe and well tolerated, and could serve as an option for enhanced prevention of CINV when combined with a standard triple antiemetic regimen. Further trials are needed to determine whether electroacupuncture also enhances control of nausea and vomiting when combined with a four-drug regimen including olanzapine.*

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37%.[8] However, the current CINV treatment relies on a multitude of antiemetic drugs.[7] Chemotherapy and antiemetic drugs can both cause certain side effects, and both may lead to side effects such as constipation, fatigue, and dizziness, while excessive use of antiemetic drugs may exacerbate these side effects of chemotherapy. Therefore, exploring nonpharmacologic treatments and considering research end points that include not only vomiting but also nausea can better address patient needs and significantly improve patient care.

Electroacupuncture, as a nonpharmacologic therapy, is minimally invasive, with few side effects, and has demonstrated efficacy in preventing CINV. However, studies on its effectiveness against CINV still yields inconsistent results.[11] Moreover, many studies investigating acupuncture treatment for CINV have certain limitations, including the absence of blinding, insufficient statistical power, and inadequately designed control groups.[11,12] Further well-designed research is warranted to determine the efficacy of combining acupuncture with novel antiemetic NK1 antagonists, especially within the context of standard triple antiemetic regimens used to date.[11] Systematic reviews also emphasize the urgent need for high-quality research.[12,13]

Therefore, we conducted a randomized controlled trial to evaluate the efficacy of electroacupuncture in preventing CINV.

METHODS

Study Oversight

The personalized electroacupuncture treatment trial was an investigator-initiated, multicenter, randomized, two-arm parallel and sham-controlled trial conducted at six centers in China to examine the effects of electroacupuncture on CINV. Each center participating in the trial was required to have two trained acupuncturists, each with over 3 years of experience in oncology. The research protocol received approval from the institutional review boards of each participating institution, and written informed consent was obtained from all participants before enrollment. This study strictly adhered to the reporting guidelines outlined in the Consolidated Standards of Reporting Trials.

Participant Characteristics

Eligible participants for this study included individuals histologically diagnosed with primary invasive breast carcinoma, regardless of their molecular subtype or sex. Patients age 18 years or older scheduled to undergo HEC, including those who are chemotherapy-naïve for early or advanced stages, or those who received neoadjuvant or adjuvant chemotherapy more than three months before starting first-line chemotherapy for advanced stages, with an Eastern Cooperative Oncology Group (ECOG) performance status of 0-2. The HEC regimen used includes anthracyclines plus cyclophosphamide-based or carboplatin (AUC ≥4)-/cisplatin-based chemotherapy.

The main exclusion criteria included patients scheduled to receive non-HEC on day 1, and those who received acupuncture treatments for any other condition within 4 weeks before receiving HEC (see protocol, online only).

Study Intervention

All study participants were randomly assigned to either true electroacupuncture or sham electroacupuncture group in a 1:

1 ratio. The randomization sequence, generated by an independent biostatistician, used blocks of varying sizes and was stratified according to center. Individual randomization codes were enclosed in sequentially numbered opaque envelopes. Allocation of participants was conducted by an acupuncturist. Except for the acupuncturists, the principal investigator, study investigators, participants, outcome assessors, study staff, and statisticians were all blinded to the allocation.

Both groups received standard triplet combination antiemetic prophylaxis therapy, consisting of dexamethasone, a 5-HT3 receptor antagonist, and an NK1 receptor antagonist.

Participants in the true electroacupuncture group received acupuncture therapy at the bilateral Zusanli, Neiguan, and Hegu acupoints once daily. On the first day of chemotherapy, electroacupuncture was administered within 1-2 hours before chemotherapy. From days 2 to 4 of chemotherapy, electroacupuncture was performed every morning from 9:00 to 10:00 for 3 days.

The acupuncture treatment used disposable stainless steel needles and HM6805-III-6 electric acupuncture apparatus (Hengming, Sichuan Hengming Medical Appliance). Manual manipulation was applied to all acupuncture needles to elicit the de qi sensation after needle insertion. Zusanli and Neiguan acupoints were electrically stimulated with a frequency of 2 Hz and a current intensity of <10 mA. On the basis of the participant's tolerance, the electroacupuncture intensity was increased for 30 minutes after 15 minutes of electroacupuncture.

The sham electroacupuncture group referenced the same acupoints as the electroacupuncture group; however, a false acupoint shallow needling method and false electrode method were used. The treatment time and course were the same as those in the electroacupuncture group. To avoid eliciting the de qi sensations, participants received minimally invasive acupuncture with a depth of 2-3 mm at three nonacupoints laterally and horizontally, located approximately 0.8-1.5 inches off the corresponding acupoints. The electrodes were attached to bilateral nonacupoints in a manner similar to the true electroacupuncture group; however, no electric current was applied. Participants from different groups were treated at other wards to avoid communication.

Assessments and Outcomes

The primary end point of the study was the proportion of patients achieving complete protection within 120 hours after receiving HEC. Complete protection was defined as patients experiencing no vomiting, no need for rescue treatment, and no significant nausea, as evaluated using the visual analog scale (VAS). No significant nausea was defined as VAS scores of <25 mm, whereas no nausea was defined as VAS scores of <5 mm.[14-16] The secondary end points included no vomiting in the acute (0-24 hours), delayed (24-120 hours), and overall (0-120 hours) stages; no significant nausea, no nausea, and nausea VAS score = 0 mm in the overall stage; and total control (no vomiting, no rescue treatment, and no nausea) in the overall stage after chemotherapy; and the safety of electroacupuncture. The post hoc exploratory analysis encompassed complete protection and total control at different time intervals, along with the time to significant nausea.

All adverse events except nausea were graded according to the Common Terminology Criteria for Adverse Events version 5.0.

Statistical Analyses

The sample size calculation was based on three studies evaluating the efficacy of standard triple antiemetic regimens, primarily in patients with breast cancer receiving HEC.[14-16] The pooled analysis of complete protection rate in these studies was 57%. We expected that true electroacupuncture can increase the complete protection rate by approximately 18%. The sample size was calculated to be 117 patients per group, with a significance level of 5% in a two-tailed test and a detection power of 80%, assuming a 10% dropout rate.

We analyzed the results using three data sets: the full analysis set, which included all randomly assigned patients who received at least 1 day of electroacupuncture treatment and standard triple antiemetic therapy; the per-protocol set, used for sensitivity analysis, comprised patients without major protocol deviations; and the safety analysis set, which encompassed all patients who received at least one acupuncture session.

We used descriptive statistical methods to summarize the data. Categorical variables were expressed as numbers and percentages. To compare the true and sham electroacupuncture groups, we used the χ^2 test for categorical variables. We also conducted sensitivity analyses to assess the impact of missing data on the results. The time to significant nausea curve was estimated using the Kaplan-Meier method. For post hoc analysis, we performed a log-rank test to analyze the time to significant nausea and obtained the hazard ratios (HRs) and 95% CIs. Logistic regression analysis was used to assess the impact of various factors on the study outcome. After the primary analysis, adjustments were made for age, ECOG status, chemotherapy regimen, and electroacupuncture treatment duration. We analyzed the incidence of CINV every 24 hours for up to 120 hours. All statistical analyses were performed using SPSS version 28.0 (IBM Corp, Shanghai, China) and R version 4.3.2. A two-tailed P value of ≤.05 indicated statistical significance.

RESULTS

Between March 15, 2022, and December 2, 2023, 356 female patients with breast cancer were screened. Of these, 239 were

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randomly assigned to two study groups: 120 to true electroacupuncture and 119 to sham electroacupuncture (Fig 1). All participants were inpatients.

In the true electroacupuncture group, of 120 patients, one (0.8%) withdrew. Among the remaining 119 patients, five (4.2%), three (2.5%), 10 (8.4%), and 101 (84.9%) completed 1, 2, 3, and 4 days of electroacupuncture treatment, respectively. In the sham electroacupuncture group, of 119 patients, one (0.8%) withdrew, one (0.8%) lost contact, and one (0.8%) did not receive triple antiemetic therapy. Among the remaining 116 patients, two (1.7%), three (2.6%), seven (6.0%), and 104 (89.7%) completed 1, 2, 3, and 4 days of electroacupuncture treatment, respectively. The baseline characteristics are presented in Table 1. The patient characteristics were well balanced between the two groups.

Primary Outcome

In the true electroacupuncture group, a notably higher number of patients achieved complete protection against CINV within 120 hours after HEC compared with the sham electroacupuncture group, demonstrating a statistically significant difference (52.9% *v* 34.5%; $P = .004$) in the full analysis set (Fig 2). The per-protocol set showed similar results (52.6% *v* 35.1%; $P = .008$; Data Supplement, Fig S1, [online only]). Furthermore, logistic regression analysis confirmed the findings of the primary analysis (Data Supplement, Table S1).

Secondary Outcomes

Patients who received true electroacupuncture treatment had a considerably higher possibility of achieving total control across the overall stages than those who received sham electroacupuncture treatment (13.4% *v* 4.3%; $P = .014$). Furthermore, patients who received true electroacupuncture were more likely to exhibit no significant nausea (58.8% *v* 37.9%; $P = .001$), no nausea (13.4% *v* 4.3%; $P = .014$), and nausea VAS score = 0 mm (12.6% *v* 4.3%; $P = .023$) across the overall stages compared with those who received sham electroacupuncture (Fig 2). The proportion of patients with no vomiting in the overall stages was similar between the two groups (73.9% *v* 76.7%; $P = .622$). No vomiting in both acute and delayed stages yielded similar outcomes (Data Supplement, Fig S2). 26.1% and 23.3% of patients in the true and sham electroacupuncture groups, respectively, experienced vomiting from day 1 to day 5. In the true

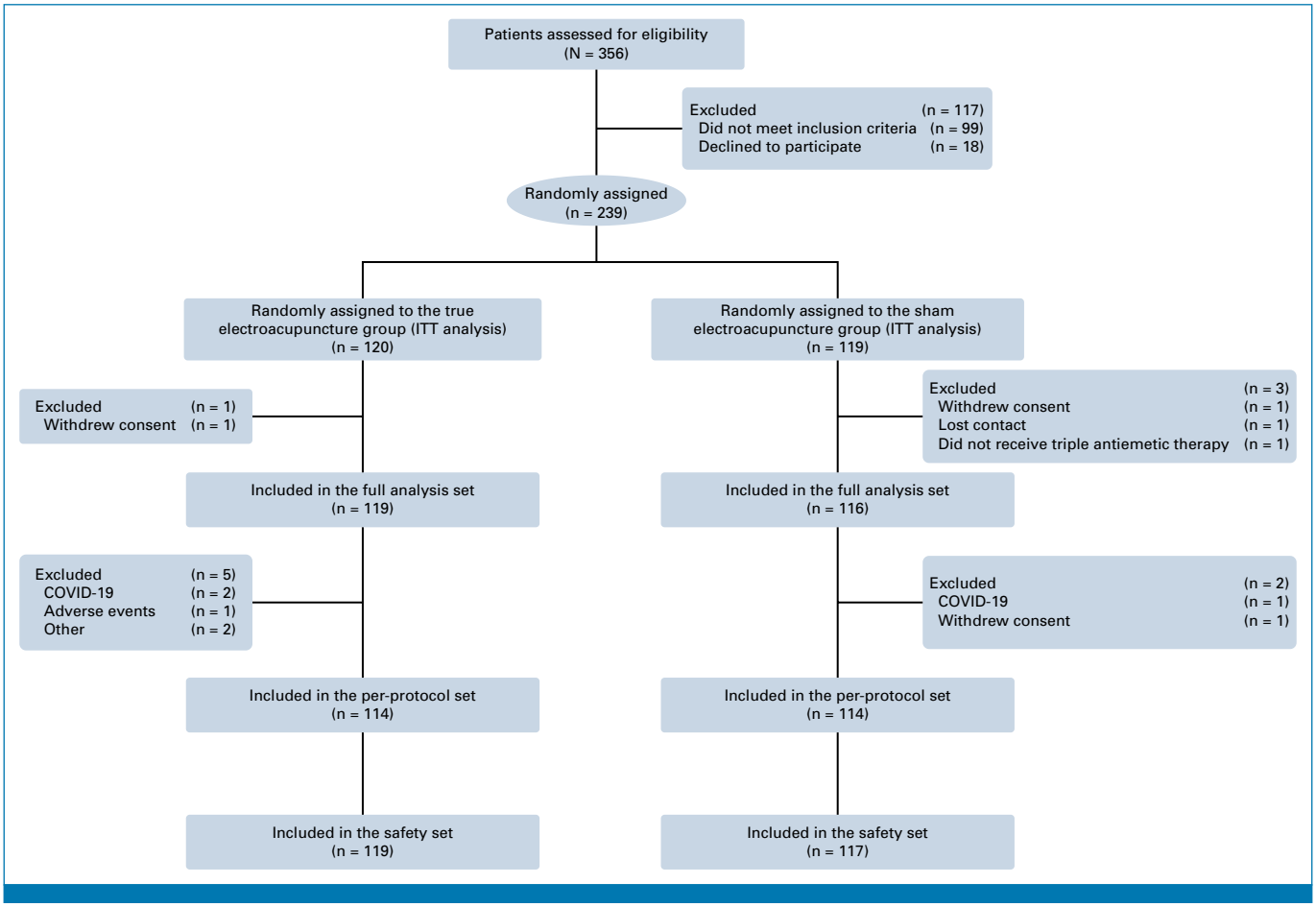

FIG 1. Population included in the study. ITT, intention-to-treat.

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TABLE 1. Patient Demographics and Baseline Characteristics

Characteristic	True Electroacupuncture Plus Triple Antiemetic Therapy (n = 120)	Sham Electroacupuncture Plus Triple Antiemetic Therapy (n = 119)
Age, years, mean (SD)	51.1 (10.3)	51.1 (9.4)
ECOG performance status, No. (%)		
0	107 (89.2)	97 (81.5)
1	13 (10.8)	22 (18.5)
Cancer type, No. (%)		
Breast cancer	117 (97.5)	116 (97.5)
Breast phyllodes tumors	3 (2.5)	3 (2.5)
Disease stage, No. (%)		
Early	105 (87.5)	102 (85.7)
Advanced	15 (12.5)	17 (14.3)
5-HT3 receptor antagonist[a], No. (%)		
Ondansetron	19 (16.0)	17 (14.7)
Palonosetron	100 (84.0)	99 (85.3)
NK1 receptor antagonist[a], No. (%)		
Fosaprepitant	114 (95.8)	110 (94.8)
Aprepitant	5 (4.2)	6 (5.2)
Chemotherapy regimen[a], No. (%)		
EC-based	74 (62.2)	74 (63.8)
Carboplatin-based	37 (31.1)	32 (27.6)
Cisplatin-based	8 (6.7)	8 (6.9)
Other HEC	0	2 (1.7)
Concurrent antitumor drugs[a], No. (%)		
Anti–HER2-targeted drugs	25 (21.0)	21 (18.1)
Immune checkpoint inhibitors	11 (9.2)	7 (6.0)

Abbreviations: EC-based, epirubicin and cyclophosphamide-based; ECOG, Eastern Cooperative Oncology Group; HEC, highly emetogenic chemotherapy; HER2, human epidermal growth factor receptor 2; SD, standard deviation.
[a]On the basis of the full analysis set (n = 235).

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electroacupuncture group, there were two cases of grade 2 vomiting, all other cases were grade 1, with no grade 3 or higher vomiting in either group.

Post Hoc Exploratory Analysis

A significantly higher rate of complete protection during the delayed stage was observed in the true electroacupuncture group compared with the sham electroacupuncture group (65.5% *v* 50.9%; $P = .025$). However, no significant difference was observed during the acute stage (72.3% *v* 63.8%; $P = .208$; Fig 3). The total control showed positive results only in the overall stage (Data Supplement, Fig S3).

The difference between true and sham electroacupuncture was statistically significant in the Kaplan-Meier plot (Fig 4; HR, 0.56 [95% CI, 0.39 to 0.81]; $P = .001$).

Blinding Statement

In the true electroacupuncture group, 79.8% of patients believed that they received true treatment, 15.1% were unsure, and 5.1% believed that they received sham treatment. In the sham electroacupuncture group, the corresponding proportions were 73.3%, 19.8%, and 6.9% ($P = .493$).

Adverse Events

Patients who received true or sham electroacupuncture reported bruising as the most common adverse event. A higher proportion of patients experienced grade 1 bruising in the true electroacupuncture group (22/119, 18.5%) than in the sham electroacupuncture group (10/117, 8.5%; $P = .026$). Only one of 119 (0.8%) patients in the true electroacupuncture group discontinued treatment because of an adverse event, whereas no patients in the sham electroacupuncture group discontinued.

DISCUSSION

To the best of our knowledge, this is the first study to demonstrate the favorable impact of true electroacupuncture combined with standard triple antiemetic regimens on CINV in patients with cancer. Our findings suggest that true electroacupuncture is considerably more effective in mitigating CINV than sham electroacupuncture,

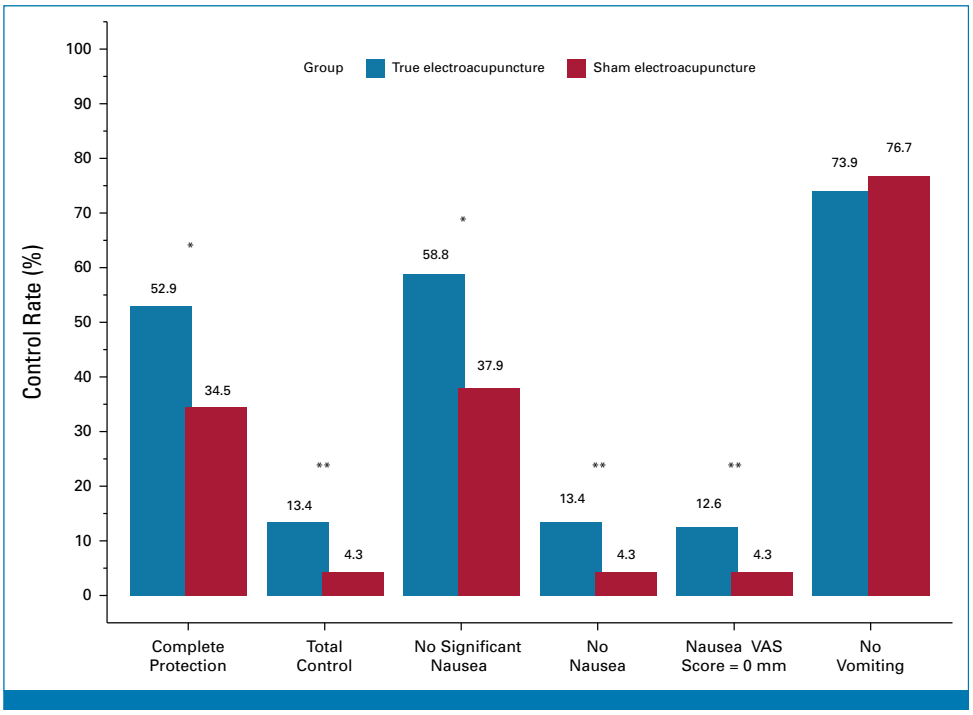

FIG 2. Comparison of observation outcomes between the true electroacupuncture group and the sham electroacupuncture group. VAS, visual analog scale. *P < .01; **P < .05.

resulting in superior enhancement of complete protection, total control, no significant nausea, and no nausea. These results can be used to facilitate clinical decision making when treating patients.

According to a systematic review and a most recent meta-analysis,[11,12] the assessment of acupuncture as an adjunctive treatment for CINV revealed that only a small number of studies were considered to have a low risk of bias,[17-19] whereas most studies exhibited a high risk of bias. These studies had significant methodologic limitations, including (but not limited to) selection bias, lack of blinding, small sample size, and lack of information regarding the acupuncturist.[11,12] Only one well-designed three-arm parallel-group randomized controlled trial (N = 104, including electroacupuncture group [n = 37], sham electroacupuncture group [n = 33], and antiemetic medication group [n = 34]) reported positive results in controlling CINV in patients with breast cancer receiving HEC; this study is considered to have a low risk of bias. However, electroacupuncture was only combined with prochlorperazine, lorazepam, and diphenhydramine, and was finished >20 years ago.[17] That meta-analysis indicates that acupuncture—when added to standard care—can improve the complete control of CINV (both acute and delayed). However, the certainty of evidence is deemed very low. It is worth noting that only three studies, with small sample sizes, used sham acupuncture as a control, potentially maintaining patient blinding,[20-22] and there remains a significant lack of large-sample studies using sham acupuncture as a control. Moreover, no significant effect was observed when true acupuncture was compared with sham acupuncture.[11] Additionally, all previous studies have only

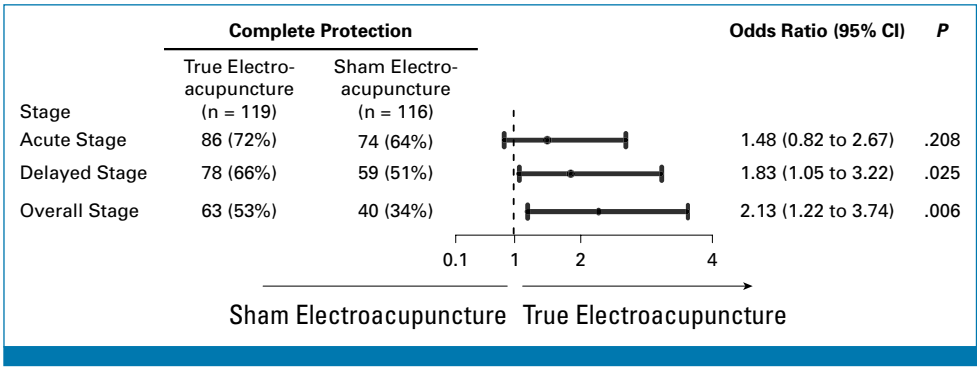

FIG 3. The complete protection rate of the true electroacupuncture group and the sham electroacupuncture group in different stages.

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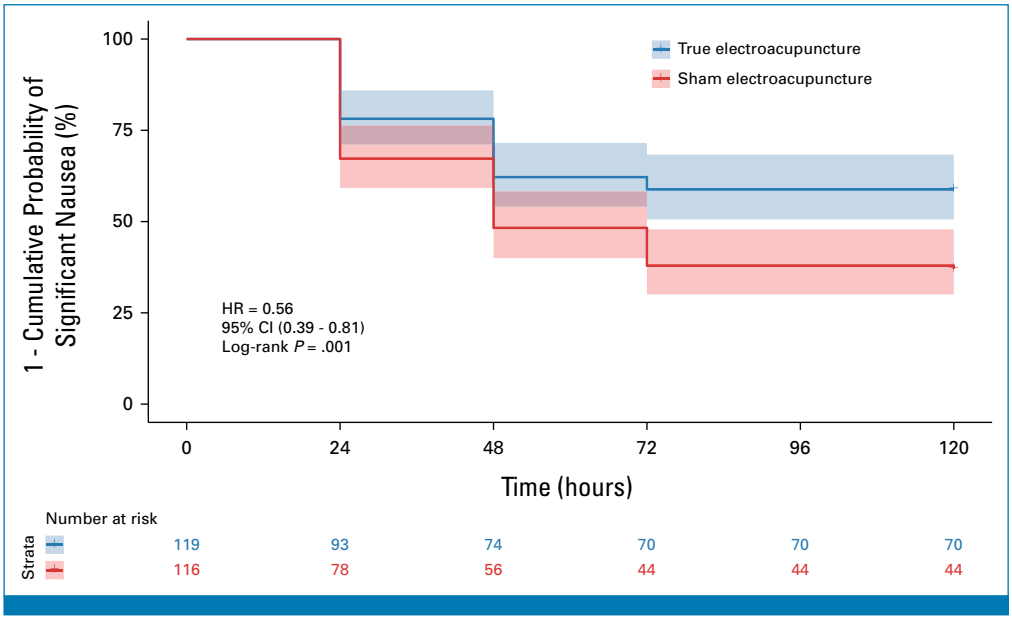

FIG 4. Kaplan-Meier analysis of the probability of significant nausea between the true electroacupuncture group and the sham electroacupuncture group in the overall stage. HR, hazard ratio.

examined acupuncture combined with conventional antiemetic regimens, and there is still a lack of studies on acupuncture in combination with the current novel triple-standard antiemetic regimens. Therefore, well-powered and well-designed randomized controlled trials, standardized treatment protocols, and core outcome measures are warranted.[11,12,23]

We conducted this randomized trial to further explore whether electroacupuncture can improve the outcome of CINV. Our study included patients undergoing HEC, both chemotherapy-naïve and those who had received neoadjuvant or adjuvant chemotherapy more than 3 months before first-line chemotherapy for advanced stages. We used a sham-controlled design. Moreover, all acupuncture practitioners involved in the study had extensive experience in acupuncture. We blinded the investigators, participants, outcome assessors, study staff, and statisticians, and conducted follow-up and adherence assessments to ensure the high quality and strict control of our research. Our results robustly demonstrated that combining electroacupuncture with a triple antiemetic regimen can further enhance the effectiveness of CINV treatment. This finding aligns with current clinical practices and holds valuable implications in guiding patient care, offering a new evidence-based treatment option.

Despite prophylactic treatment with standard triple antiemetic regimen, approximately 25% of patients receiving HEC continue to develop vomiting.[24] In particular, nausea remains a significant issue for many patients, and the mechanism of nausea might differ from that of vomiting.[5] Although triple antiemetic regimen can effectively control early and delayed vomiting in patients receiving moderately emetogenic chemotherapy or HEC, their effectiveness in controlling nausea appears to be less pronounced.[5,7] To address vomiting and nausea comprehensively, we established complete protection as the primary study end point, combining both symptoms to better reflect patient and physician needs. The complete protection rate increased from 34.5% to 52.9%. Notably, considering a similar number of vomiting events in both groups, electroacupuncture does not seem to reduce the incidence of vomiting. Additionally, the study revealed that electroacupuncture can significantly decrease the incidence of significant nausea and nausea. Therefore, we believe that the primary role of electroacupuncture is to reduce the occurrence of post-chemotherapy nausea. Our results are not completely consistent with those of a previous meta-analysis.[11] This inconsistency may primarily be attributed to differences in sample sizes included in different studies, variations in study designs, and differences in treatment modalities.

A post hoc exploratory analysis revealed that the primary effect of electroacupuncture is reducing the number of delayed stage complete protection events. Combined with the findings that electroacupuncture can significantly decrease the incidence of nausea, it appears that the main effect of electroacupuncture is reducing the occurrence of delayed stage nausea. Delayed nausea is more prevalent than acute nausea, often more severe, and tends to be resistant to medication treatment.[5] Electroacupuncture therapy might have more advantages in addressing delayed nausea. This study also revealed that electroacupuncture can significantly enhance total control, with the magnitude of its improvement being extremely similar to that of the most recently reported quadruple antiemetic regimen containing olanzapine.[25]

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Acupuncture is one of the few effective nonpharmacologic methods for managing CINV, a recommendation supported by several guidelines.[5,6,26] The mechanism by which acupuncture affects CINV has not yet been fully elucidated. Some potential explanations include the effects of acupuncture on the endogenous opioid system and alterations in serotonin transmission, influence on gastric myoelectrical activity, increased vagal modulation, and impact on cerebellar vestibular activity.[13,27] Our study selected Zusanli (ST36), Neiguan (PC6), and Hegu (LI4) as the acupoints for electroacupuncture treatment. In traditional Chinese medicine, ST36 can boost the immune system and improve gastrointestinal function[18,28]; PC6 is a highly utilized acupoint for nausea, potentially increasing gastric motility, and studies suggest its effectiveness rivals that of antiemetic agents in reducing nausea and vomiting[11,29]; LI4 is regarded as beneficial for alleviating nausea, possibly inducing a calming effect.[30] Furthermore, a meticulously designed randomized controlled trial, along with a previous meta-analysis and a comprehensive systematic review, collectively concluded that electroacupuncture is effective in treating CINV, leading to the adoption of electroacupuncture in this study.[12,17,31] Electroacupuncture at the abovementioned acupoints can balance yin and yang,[32] regulate the organs, and promote the smooth flow of meridians, thereby assisting digestion and improving gastrointestinal function, ultimately reducing the occurrence of nausea and vomiting. Furthermore, acupuncture is usually less expensive than the additional use of antiemetic medications.

A notable strength of the research lies in its highly effective blinding. Patients could not accurately determine their group assignment, ensuring reliable distinctions between true electroacupuncture and sham electroacupuncture.

However, our study has several limitations. First, although both patient groups received HEC regimens, some were administered with immune checkpoint inhibitors and anti–human epidermal growth factor receptor 2–targeted drugs, potentially influencing the results. Nevertheless, the CINV reactions related to these drugs were extremely mild, and the impact appeared well balanced between the two groups. Second, although about 85%-90% of patients in both the intervention and control groups completed all four consecutive days of acupuncture treatment after the first cycle of chemotherapy in this study, it is unclear whether similar retention rates can be maintained across multiple chemotherapy cycles, especially for patients who need to travel long distances to receive acupuncture treatment. Furthermore, given that all patients in this study were inpatients, it might be challenging for those undergoing outpatient chemotherapy to attend the clinic for four consecutive days of acupuncture. Third, all patients included in this study are of Asian race, with no representation from non-Asian populations, and the results may not necessarily be generalizable to more diverse patient populations. Finally, this study used a three-drug regimen as the standard, while the current standard for HEC comprises a four-drug regimen including olanzapine.

In conclusion, adding electroacupuncture to the standard triplet antiemetic therapy significantly enhances the effectiveness of managing CINV in patients with breast cancer undergoing HEC. It is safe, well tolerated, and could serve as a valuable option for clinicians and patients seeking treatment for CINV, potentially improving patient adherence and overall care. A new study has been initiated comparing the combination of electroacupuncture and standard quadruple antiemetic therapy with standard quadruple antiemetic therapy alone (ClinicalTrials.gov identifier: NCT06200168).

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DISCLAIMER

The funder had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review or approval of the manuscript; and decision to submit the manuscript for publication. The lead author affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; no important aspects of the study have been omitted; and any discrepancies from the study as originally planned have been explained.

EQUAL CONTRIBUTION

G.S., D.R., F.Z., M.W., Z.L., and X.F. contributed equally to this work.

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CLINICAL TRIAL INFORMATION

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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DATA SHARING STATEMENT

The data generated from our research and used in this study will be made accessible in accordance with the legal and ethical requirements.

AUTHOR CONTRIBUTIONS

Conception and design: Guoshuang Shen, Dengfeng Ren, Fuxing Zhao, Miaozhou Wang, Zhen Liu, Yongzhi Chen, Jiuda Zhao
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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Effect of Adding Electroacupuncture to Standard Triple Antiemetic Therapy on Chemotherapy-Induced Nausea and Vomiting: A Randomized Controlled Clinical Trial

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