

# Single-Needle Acupuncture Alleviates Gag Reflex During Transesophageal Echocardiography: A Blinded, Randomized, Controlled Pilot Trial

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## ABSTRACT

**Objectives:** To study the effect of single-needle acupuncture in suppressing gag-reflex in transesophageal echocardiography (TEE).

**Design:** Prospective, blinded trial.

**Settings/locations:** Patients with ischemic stroke or transient ischemic attack undergoing TEE because of presumed cardioembolic origin in a specialized stroke unit of the Johann Wolfgang Goethe-University, Frankfurt/Main, Germany.

**Subjects/Study interventions:** Forty-one (41) patients were studied. Patients received single-needle acupuncture with a  $0.2 \times 13$  mm disposable acupuncture needle (Suzhou Medical Appliances, China), 10-mm deep either at Chengjiang (midline between lower lip and chin) or superficially at a sham point (tip of the chin) during TEE or no acupuncture for alleviating gag reflex.

**Outcome Measures:** Severity of gagging was rated on a visual-analogue scale.

**Results:** The acupuncture group experienced significantly less gagging than the sham group ( $p = 0.037$ ) or the nonacupuncture group ( $p = 0.013$ ).

**Conclusions:** Acupuncture of CV24 is an easy to apply and effective method to reduce gag reflex during TEE.

## INTRODUCTION

Despite the increasing use of acupuncture in Western medicine, only a few clinical indications have been found to be of proven efficacy according to the criteria of evidenced-based medicine by an expert panel (NIH Consensus, 1998). Among these indications are nausea and vomiting postoperatively, caused by chemotherapy, or in hyperemesis gravidarum. Gagging can be evoked by mechanical

stimulation of the pharynx such as in transoral endoscopic procedures, which are therefore considered as uncomfortable by the patients. Benzodiazepines are widely used to improve tolerance of the procedure, but have adverse effects or may be unfavorable in an ambulatory setting. In order to study the effects of acupuncture on mechanically induced gag reflex, we examined the effect of a single needle application in CV24 (Chengjiang) compared to single-site sham acupuncture or no acupuncture before

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and during transesophageal echocardiography (TEE).

## MATERIALS AND METHODS

Forty-one (41) consecutive, acupuncture-naïve patients admitted to the stroke unit of the Department of Neurology at the Johann Wolfgang Goethe-University Frankfurt who were undergoing TEE for presumed cardioembolic ischemic stroke or transient ischemic attack were included in the study during a period of 4 months. TEE was performed using a 10-mm diameter flexible endoscope (Hewlett-Packard 6.2/5.0 MHz) that was passed transorally through the pharynx into the esophagus to verify or exclude intracavitary thrombi. The procedure was always performed by the same acupuncture-naïve cardiologist (D.S.-D.) under topical anesthesia with 0.5% tetracaine spray.

Patients were randomly assigned by a computer-evoked randomization plan ([www.randomization.com](http://www.randomization.com)) to one of three groups (Chengjiang acupuncture, sham acupuncture, or nonacupuncture). After giving informed consent, patients in the acupuncture groups received a 0.2 × 13 mm disposable acupuncture needle (Suzhou Medical Appliances, China), 10-mm deep either at Chengjiang (midline between lower lip and chin), or superficially at a sham-point (tip of the chin) by an experienced acupuncturist and member of the German Physicians Society of Acupuncture, DÄGfA, (A.R. or B.O.) immediately prior to the TEE. Af-

ter insertion, the needle in CV24 was slowly rotated once (clockwise and counterclockwise) two or three times. Needles at the sham point were not rotated or twirled. Needles were left *in situ* during the time of TEE, which was between 10 and 15 minutes. After the procedure, all patients were asked to rate the severity of gagging related to the procedure on a 10-point visual-analogue scale (VAS) to the cardiologist. One patient had to be excluded from analysis because he had received 1 mg of lorazepam for anxiety on the ward shortly before TEE. For group comparison the Kruskal-Wallis H test with Bonferroni-Dunn *post hoc* testing were used.

## RESULTS

The mean age of all patients was 55 years (range, 29–81 years) and the main clinical characteristics are summarized in Table 1. Age, site, or side of the embolic event did not differ significantly among groups. This is particularly important, because infratentorial (i.e., cerebellar or brainstem) infarctions that involve the glossopharyngeal and vagal nerve nuclei might reduce gag reflex and writhing by sensory or motor impairment of the pharyngeal musculature.

The severity of gagging was significantly different between the three groups (H 9.240;  $p = 0.0094$ ). *Post hoc* testing revealed that the Chengjiang group experienced significantly less gagging than the sham group ( $p = 0.037$ )

TABLE 1. DESCRIPTION AND RESULTS OF THE THREE TREATMENT GROUPS

	n	Median age (range)	Infra/supratentorial <sup>a</sup>	TIA/infarction <sup>b</sup>	VAS rating <sup>c</sup>	Kruskal-Wallis	Post hoc <sup>d</sup>
Nonacupuncture	14	58 (46–81)	0/14	1/13	6 (3.5–9)	0.009	] ] ] 0.013 0.037
Sham-acupuncture	13	51 (29–77)	2/11	2/11	6 (5.5–8)		
Chengjiang-acupuncture	14	56 (29–79)	1/13	1/13	2 (1.5–3)		

<sup>a</sup>Infratentorial, brainstem or cerebellar signs;

<sup>b</sup>Bonferroni-Dunn test.

<sup>c</sup>Median (25th/75th percentile).

<sup>d</sup>TIA, transient symptomatology. <24 hours; infarction, radiologically proven infarction with persistent neurologic deficit.

or the nonacupuncture group ( $p = 0.013$ , Table 1). There was one subject experiencing the maximum gagging score of 10 in the Chengjiang group, and two subjects in the sham and one in the nonacupuncture group who did not experience any gagging, leading to the same VAS ranges in all three groups.

## DISCUSSION

Approximately 60% of patients complain of nausea and gagging during TEE and experience this procedure as very uncomfortable. Midazolam premedication has been found to improve the tolerance of TEE (Aeschbacher et al., 1998), but benzodiazepines may cause adverse effects, impair the patients' cooperation during the procedure, or delay discharge from the endoscopy suite. The "perfect" method to suppress mechanically induced gagging should meet three criteria: it should be nonsedating, well-tolerated, and easy to apply.

In general, acupuncture has been shown to be well tolerated (MacPherson et al., 2001), but the applicability depends on the type of acupuncture used. Electroacupuncture at 10 different sites was shown to suppress gag reflex in gastroscopy (Cahn et al., 1978), but is too complicated and time consuming in a clinical setting. CV24 is used in Chinese medicine to treat frontal pain syndromes and Bells palsy, but is also traditionally believed to control gag-reflex (Ogal et al., 1999), although formal clinical studies are lacking. Its location in the middle of the furrow between the lower lip and the chin makes it easy to identify even for a non-experienced acupuncturist. The current study shows that a single-needle acupuncture of CV24 (Chengjiang) immediately prior to and

during the procedure, is effective in suppressing gagging during TEE without causing additional discomfort to the patients. Our findings might be limited by the small sample size studied. Provided that our findings extend to larger patient groups, we feel confident to recommend this method as the "premedication" of choice in patients undergoing transoral endoscopy, in whom sedatives are unwarranted.

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