

## Study of the regulatory effect of acupuncture on rotation-induced gastric dysrhythmia in rabbits

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### Abstract

**AIM:** A model of experimental gastric dysrhythmia in rabbits was set up to evaluate the effect of different acupoints on regulating gastric dysrhythmia in rabbits so as to promote acupuncture treatment for this kind of disease.

**METHODS:** A model of gastric dysrhythmia in rabbits was established by the rotation method using the basic electrical rhythm (BER) as an objective index. After puncturing at the points of Zusanli (ST36), Neiguan (PC6), Tiaokou (ST38) and Tianquan (PC2) in the four groups of experimental gastric dysrhythmia rabbits, the difference in regulatory effects on the disturbance and frequency of the gastric electric slow wave was observed.

**RESULTS:** Before needling at the specific acupoints Zusanli and Neiguan, the percentage of disturbance electric slow wave for the Zusanli and Neiguan groups was  $57.0785 \pm 10.644$  and  $55.5173 \pm 6.0500$ , respectively; after such needling, the percentage was  $43.7823 \pm 10.1518$  and  $43.5147 \pm 6.8983$  for the Zusanli and Neiguan groups, respectively, while the frequency of electric slow

wave for the Zusanli and Neiguan groups was  $2.2870 \pm 0.3800$  and  $2.4020 \pm 0.3536$ , respectively, before needling and after needling, the frequency was  $2.7090 \pm 0.5865$  and  $2.9220 \pm 0.4923$  for the Zusanli and Neiguan groups, respectively. Comparing the percentage and frequency for the Zusanli and Neiguan groups before and after needling, the result shows that both groups have a significant difference statistically ( $P < 0.05$ ) but between the Zusanli and Neiguan groups, there was no significant difference. Before and after needling the nonspecific acupoints of Tiaokou and Tianquan, there was no difference between the Tiaokou and Tianquan groups. Between the Zusanli and Tiaokou groups and the Neiguan and Tianquan groups, there are significant differences in regulating gastric dysrhythmia.

**CONCLUSION:** This model is suitable for the observation of gastric dysrhythmia. The specific acupoints of Zusanli and Neiguan have good effects on the treatment of gastric dysrhythmia.

**Key words:** Stomach; Acupuncture; Electrophysiology; Zusanli Neiguan disease models, Animal

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### INTRODUCTION

Our previous studies demonstrated that acupuncture can treat gastric dysrhythmia very well. In order to observe the differences of different acupoints in treating gastric dysrhythmia, we established a model of gastric dysrhythmia by the rotation method and treated the dysrhythmia by puncturing at different acupoints. By comparing the differences of regulating gastric dysrhythmia between using specific and nonspecific acupoints, an experimental basis is provided for treating motion sickness and gastric dysrhythmia syndrome by acupuncture treatment.

### MATERIALS AND METHODS

All 60 rabbits were implanted with two silver electrodes beneath the serous coat 2 cm from the pylorus of the curvatura ventriculi major with the distance of the two electrodes at 1 cm. The conducting wire goes out from the neck. The experiment was carried out after the rabbits recovered.

The gastric dysrhythmia model was established by the rotation method; the speed of rotating apparatus was 0.5C/S, rotating in the same direction for 20 min.

The gastric dysrhythmia rabbits were divided randomly into four groups of 15 rabbits; the specific acupoint Zusanli (ST36), Neiguan (PC6), nonspecific acupoint Tiaokou (ST38) and Tianquan (PC2) groups. Each acupoint was stimulated for 10 min with manipulation given evenly. An electrogastrogram (EGG) was recorded for 5 min before and after acupuncture. In accordance with our previous study, we regarded 3.00-3.95 C.P.M as a normal slow wave frequency, with out of this range regarded as an abnormal slow wave frequency. The experimental data were calculated using the *t* test.

## RESULTS

Rabbits were studied after fasting for 12 h. Head and body shaking vibrated the rabbits' eyes after the rabbits were rotated for 20 min. The EGG showed that before rotation, the percentage of disturbance slow wave was  $36.051 \pm 8.0388$  and frequency was  $3.3426 \pm 0.2523$  C.P.M. After rotation, the percentage of disturbance wave was  $51.6914 \pm 5.9842$  and frequency was  $2.670 \pm 0.4541$  C.P.M. Comparing before and after rotation, the percentage of disturbance wave and frequency was significantly improved ( $P < 0.001$ ), with the disturbance of EGG lasting more than two hours.

### **Regulatory effect of acupuncture on gastric dysrhythmia by using different acupoints**

Before acupuncture, there was no significant difference in the percentage of disturbance slow wave and frequency of the four groups ( $P > 0.05$ ). After acupuncture, the gastric dysrhythmia in the Zusanli and Neiguan groups was greatly improved and almost recovered to normal. Zusanli and Neiguan groups had a similar regulatory effect. In comparing before and after acupuncture in the Tiaokou and Tianquan groups, there was no significant

improvement of gastric dysrhythmia ( $P > 0.05$ ). There appeared to be some differences between the Zusanli and Tiaokou groups. Zusanli had a better regulatory effect than Tiaokou and Neiguan had a better regulatory effect than Tianquan.

### **The significance of the rotation induced model**

In previous studies, researchers often used injections or surgery to establish a gastric dysrhythmia model. These methods are useful but have limitations to a certain degree as they may disturb or even destroy the subjects' neurohormonal regulatory system and are usually not consistent with the disease in clinical practice.

By viewing the situation as a whole, our study imitated the pathogenesis of motion sickness and disturbed the vestibular system by rotating so as to establish a gastric dysrhythmia model in rabbits. The model is steady and easy to repeat and suitable to investigate the acupuncture effects on gastric dysrhythmia.

### **Specific acupoints**

Based on TCM theory, acupoints have functions in common and specific acupoints have their specific character. The effects of acupuncture are closely related to different acupoints for different diseases. Zusanli, with a sophisticated function of regulating gastric dysrhythmia, is indicated for treating gastric disorders. The Tiaokou group served as a control group. The results showed that the acupuncture effect of Zusanli is better than its same channel nonspecific acupoint Tiaokou and thus Zusanli has its specific effect on gastric disorders.

For a long time, many researchers have paid more attention to using Neiguan to treat cardiac disease, but there are few reports on treating gastric diseases. Our study showed that Neiguan has fine effects on treating gastric diseases and a better effect than the nonspecific acupoint Tianquan.

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