

## Anti-Emetic Effect of Oculo-Acupuncture on Dogs with Xylazine Induced Vomiting

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**Abstract:** The present study was conducted in order to clarify the anti-emetic effect of oculo-acupuncture (OA) on dogs with xylazine-induced vomiting, and also to compare the anti-emetic effect of OA and body acupuncture (AP). Twelve dogs induced to vomit by xylazine were selected from total 29 mongrel dogs in preliminary experiment and were used as subjects in this study. This study was comprised of two experiments. In experiment 1, the anti-emetic effects of OA on dogs were examined in the stomach/spleen region (experimental group I), the zhongjiao region (experimental group II), and the stomach/spleen region plus the zhongjiao region (experimental group III) using 12 dogs induced to vomit for one week interval repeatedly. On the other hand, needle acupuncture (AP) (BL20 + BL21, experimental group A) and OA (stomach/spleen and zhong jiao regions) combined with needle AP (BL20 + BL21) (experimental group B) were examined using 6 vomiting dogs, for one week interval repeatedly in experiment 2. As a result, the vomiting rates of experimental group I (50%,  $p < 0.05$ ), experimental group II (58.3%) and experimental group III (41.6%,  $p < 0.01$ ) were lower than that of control (100%), respectively in experiment 1. The vomiting rates of both experimental group A (50%,  $p < 0.05$ ) and experimental group B (50%,  $p < 0.05$ ) were lower than that of control (100%) in experiment 2. The starting vomiting time in experimental groups was similar to that of the control groups in experiment 1 and 2. This study demonstrated that OA had anti-emetic effects on dogs with xylazine-induced vomiting and OA in the stomach/spleen region plus the zhongjiao region was the most effective in anti-emesis among the experimental groups. In addition, body AP and OA combined with body AP had a similar anti-emetic effect on dogs with xylazine-induced vomiting.

**Keywords:** Anti-Emetic; Oculo-Acupuncture; Dogs; Xylazine.

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## Introduction

Vomiting and nausea are not diseases but are symptoms of many different conditions such as gastrointestinal diseases (gastritis, enteritis and gastrointestinal obstruction, etc.), food poisoning, motion sickness, overeating, blocked intestine, concussion or brain injury, appendicitis, and migraine. Vomiting and nausea can sometimes appear as symptoms of more serious diseases such as kidney or liver disorders, central nervous system disorders, brain tumors, and some forms of cancer (Kim *et al.*, 2005; Twedt, 2005).

Severe vomiting can cause dehydration and electrolyte disturbance. The treatment of vomiting and nausea in veterinary practice would often consist of infusion therapy for the prevention of dehydration, sedatives, narcotics, and anti-emetics (Twedt, 2005). In recent veterinary practice, however, acupuncture (AP) treatment has been used for the therapy of vomiting (Dill, 1994; Kim *et al.*, 2005).

It is well-known that traditional oriental medicine has therapeutic effects in human and animal diseases (Gurfinkel *et al.*, 2003). Acupuncture (AP) therapy is classified into needle-AP, injection-AP, laser-AP and electro-AP (EA) (Gurfinkel *et al.*, 2003; Jang *et al.*, 2003). Oculo-acupuncture (OA) is the new modality of AP therapy. It uses 13 special points on eight parts around the eye's orbit (Zhao, 1997). OA has good therapeutic effects on vomiting (stomach/spleen region plus the zhongjiao region), acute muscular sprain, apoplexy and hemiplegia, and pain in human medicine (Zhao, 1997).

As for the anti-emetic effect of needle AP in small animal clinical practice, Yoon *et al.* (2005) reported that BL20-pishu and LIV13-zhang men had a better anti-emetic effect than that of the control group, and that LIV13 also had a better anti-emetic effect than that of BL20 on xylazine-induced vomiting dogs. In human clinical practice, Zhao (1995) reported that OA had good therapeutic effects on 60 cases of human patients with vomiting. The therapeutic effects of OA were mainly examined in human diseases in China. However, there was no report about the therapeutic effect of OA in veterinary clinical practice up till now.

Accordingly, the present study was performed to clarify the anti-emetic effects of OA at the stomach/spleen and zhongjiao regions, and to compare these effects with body AP at BL20 and BL21 on dogs with xylazine-induced vomiting.

## Animals and Methods

### *Experimental Animals*

Twelve dogs (female: 7 and male: 5, 1–2 years old) induced to vomit were selected from total 29 mongrels (between the ages of 4 months to 5 years old, ranging from 2 to 10 kg in body weight), were used in the present study. The study was composed of two experiments. In experiment 1, the 12 dogs with vomiting were assigned into the control group (12 dogs), experimental group I (12 dogs), experimental group II (12 dogs) and experimental group III (12 dogs). As for the treatment in each group, the control group did not receive

any treatment, experimental group I was stimulated at the stomach/spleen region, experimental group II was stimulated at the zhongjiao region, while experimental group III was stimulated at the stomach/spleen region plus the zhongjiao region. The experiment in each group was performed using 12 vomiting dogs one week intervals, repeatedly.

In experiment 2, the vomiting dogs were divided into three groups: the control group (6 dogs), experimental group A (6 dogs) and experimental group B (6 dogs). The control group did not receive any treatment, needle AP (BL20 + BL21) was used in experimental group A, and OA (stomach/spleen + zhong jiao regions) combined with needle AP (BL20 + BL21) were used in experimental group B. The experiment in each group was using 6 vomiting dogs, in one week interval repeatedly.

### *Oculo-Acupuncture and Body Acupuncture*

The acupoints of OA and body AP selected in the present study were similar regions (OA: stomach/spleen region → body AP: BL20/BL21). OA in the stomach/spleen and zhongjiao regions of the eye were performed according to the method used on human OA (Zhao, 1997). In OA, the 13-mm needle (the diameter of needle: 0.45 mm, Hwato<sup>®</sup>, Suzhao Medical Appliance Factory, China) is inserted into the stomach/spleen region (oblique direction from BL01) and the zhong jiao region (horizontal direction from ST01) (Fig. 1). The acupoints, BL20 (at the 12th intercostal space which is lateral the longissimus thoracis and iliocostalis thoracis) and BL21 (both tips of the transverse process of the first lumbar vertebrae), were used in experimental groups A and B (Fig. 2). An acupoint detector (Ittorator, Itto Electric Co., Japan) was used for detecting the correct acupoints. A general AP needle (the diameter of needle: 0.45 mm, Hangrimseowon, Korea) was used for body AP. The AP needle was maintained for 20 minutes in the OA and body AP treatment. The present study was performed according to the rules of the ethics Committee for Experimental Animal, Chungnam National University.

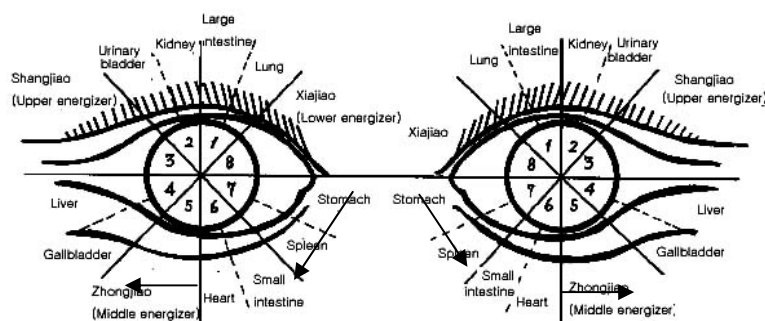


Figure 1. Acupoint of eye AP. (↑: Direction of needle insertion. The handle of the needle was slightly pulled upward or gently twisted with an angle of 10°. The needle was inserted about 13 mm depth.)

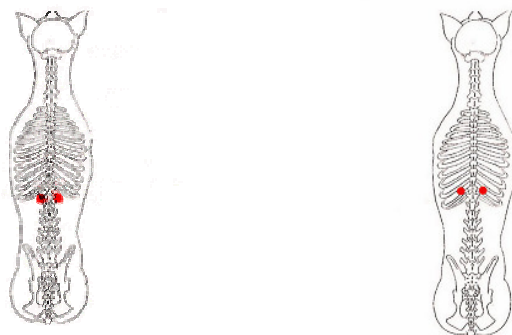


Figure 2. Acupoint of body AP. (A: BL21 — both tips of the transverse process of the first lumbar vertebrae; B: BL20 — the 12th intercostals space, lateral to the longissimus thoracis and iliocostalis thoracis.)

### *Induction of Vomiting*

Vomiting was induced by intramuscular injection with 2% xylazine (Rompun<sup>®</sup>, Bayer Korea, Korea, 2.2 mg/kg, IM) 20 min after AP treatment, and observed for 15 min.

### *Statistical Analyses*

The significant difference between groups was analyzed through paired student's t-test with a database (SPSS v. 12.0, K).

## **Results**

### *Anti-Emetic Rates and Starting Time of Vomiting in OA Treatment*

The vomiting rate of control group was 100% and the anti-emetic rates were 50%, 41.6% and 58.3% in experimental group I, group II, and group III, respectively (Table 1). The anti-emetic rates of experimental groups I ( $p < 0.05$ ) and III ( $p < 0.01$ ) were significantly higher than that of the control group. The starting times of vomiting were  $3.2 \pm 0.6$ ,  $3.8 \pm 1.1$  and  $3.3 \pm 0.8$  min in experimental group I, II, and III, respectively. There was no significant difference among the starting time of vomiting in all groups.

### *Comparison of Anti-Emetic Rates and Starting Time of Vomiting Between OA and Body AP Treatments*

The vomiting rate in the control group was 100%, and the anti-emetic rates were 50% ( $p < 0.05$ ) in both body AP, and OA plus body AP (Table 2). The anti-emetic rates of the experimental groups were also significantly higher than those of the control group. Furthermore, based on the starting time of vomiting in the experimental group in experiment II, the OA plus body AP had a little bit longer starting time of vomiting than those of the other groups, but it was not significant.

Table 1. Anti-Emetic Effect by Eye Acupuncture at Stomach/Spleen and Zhongjiao

Groups	Control	Experimental Groups <sup>b</sup>		
		Group I	Group II	Group III
Number of vomiting (%)	12/12 <sup>a</sup> (100)	6/12 (50)	7/12 (58.3)	5/12 (41.6)
Number of not vomiting (%)	0	6/12* (50)	5/12 (41.6)	7/12** (58.3)
Starting time of vomiting (mean ± SD, min)	3.1 ± 0.8	3.2 ± 0.6	3.8 ± 1.1	3.3 ± 0.8

<sup>a</sup>Number of vomiting/examined dogs; <sup>b</sup>group I: stimulated stomach/spleen region, group II: stimulated zhong jiao region, group III: stimulated stomach/spleen region plus zhong jiao region; \*p < 0.05, \*\*p < 0.01.

Table 2. Anti-Emetic Effects by Eye Acupuncture and Body Acupuncture

Groups	Control	Experimental Groups	
		Body Acupuncture	Eye + Body Acupuncture
Number of vomiting (%)	6/6 <sup>a</sup> (100)	3/6 (50)	3/6 (50)
Number of not vomiting (%)	0	3/6* (50)	3/6* (50)
Starting time of vomiting (mean ± SD, min)	3.9 ± 1.1	3.1 ± 2.3	4.3 ± 2.3

<sup>a</sup>Number of vomiting/examined dogs; \*p < 0.05.

Discussion

A review of past research on the anti-emetic effects of AP treatments showed that the treatments by needle-AP and injection-AP at BL-21 and CV-12 (Kim *et al.*, 2005), BL-20 and LIV-13 (Yoon *et al.*, 2005), and PC-6 and BL-21 (Kim *et al.*, 2005) have already been used in canine-induced vomiting. Kim *et al.* (2005) reported that the stimulation at BL21 showed a more effective anti-emesis than that at CV12 by needle-AP. It was also found that BL21 stimulation was more effective than that at PC-6 in canine xylazine-induced vomiting (Kim *et al.*, 2005). Furthermore, Yoon *et al.* (2005) reported that BL20 and LIV13 had a better anti-emetic effect in the experimental group than that of the control group, and that LIV13 had a better anti-emetic effect than BL20 on dogs with xylazine-induced vomiting. Both needle-AP and injection-AP had anti-emetic effects in canine-induced vomiting, but those of OA have not yet been examined in the veterinary clinical practice until now.

OA has good therapeutic effects on vomiting (stomach/spleen region plus the zhongjiao region), acute muscular sprain, apoplexy and hemiplegia, and pain in human medicine in China (Zhao, 1997). As for OA, Fu *et al.* (2002) reported that its therapeutic effect was better than that of body AP, and was also similar to the effects of drug administration in human patients with asthma. Wang *et al.* (2004) reported that the OA treatment of the liver, heart, and kidney regions could cause improvements in memory disorder and dysmnnesia,

and could change the ultrastructure of hippocampus neurons among experimental rats with vascular dementia. Meanwhile, Zhang and Shi (2002) reported that the OA treatment of the liver, kidney, and shangjiao regions could increase the therapeutic effect of drug medications on sudden deafness. In addition, Zhao (1995) reported that OA showed good therapeutic effect on 60 cases of human patients with severe vomiting.

In the present study, the vomiting rate of the control group was 100%. However, this was reduced by the application of OA in the experimental groups. The anti-emetic effect of OA on the artificially induced vomiting of dogs was lower than that found by Zhao (1995) in human patients with severe vomiting. But it was similar to what Kim *et al.* (2005) and Yoon *et al.* (2005) reported. The differences between anti-emetic effect of OA in present study and that of body AP reported by Kim *et al.* (2005) and Yoon *et al.* (2005) may be caused by the different acupoint regions (one was in eye's orbit, the other was in body). However, it was clarified that OA had an anti-emetic effect in canine-induced vomiting.

The OA we selected in the present study were the stomach/spleen region and the zhongjiao region. The stomach/spleen region starts at BL01-jingming, and it is the first acupoint in the urinary bladder meridian. It is related to the stomach meridian, the large intestine meridian and the small intestine meridian. As for the zhongjiao region, the insertion of the needle starts at ST01-chengqi and it is the first acupoint in the stomach meridian. It is related to all acupoints in the stomach meridian. These acupoints which were used in the present study played certain roles in the anti-emetic effect of OA. In addition, Lee *et al.* (2000) described the increase in small intestine movement because of ST-36 stimulation. Therefore, it was theorized that the anti-emetic effects at BL20, BL21, and OA might be caused by the acceleration of gastric emptying time. However, further research on more clinical cases with vomiting should be conducted in the future to verify this mechanism.

In present study, the vomiting rates of experimental group I (50%,  $p < 0.05$ ), experimental group II (58.3%) and experimental group III (41.6%,  $p < 0.01$ ) were lower than that of the control (100%), respectively in experiment 1. The vomiting rates of experimental group A (50%,  $p < 0.05$ ) and experimental group B (50%,  $p < 0.05$ ) were lower than that of control (100%) in experiment 2. The vomiting times of experimental groups were similar to those of the control groups in both experiment 1 and 2. These results suggested that OA (in the stomach/spleen, zhong jiao, and stomach/spleen plus zhong jiao regions) had anti-emetic effects on dogs with xylazine-induced vomiting, and OA in the stomach/spleen plus the zhongjiao regions was the most effective in anti-emesis among the experimental groups. In addition, body AP (BL20 + BL21) and OA combined with body AP had a similar anti-emetic effect in dogs with xylazine-induced vomiting.

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