

Korean hand acupressure reduces postoperative vomiting in children after strabismus surgery

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A double-blind, randomized, placebo-controlled study was conducted to investigate the effectiveness of Korean hand acupuncture in preventing postoperative vomiting in children scheduled for strabismus surgery. In one group, acupressure was performed 30 min before induction of anaesthesia by applying an acupressure disc onto the Korean hand acupuncture point K-K9; the disc remained *in situ* for at least 24 h. The second group functioned as placebo group. The treatment groups did not differ with regard to patient characteristics, surgical procedure and anaesthetic administered. In the acupressure group, the incidence of vomiting was significantly lower (20%) than in the placebo group (68%). We conclude that Korean hand acupressure of the acupuncture point K-K9 is an effective method for reducing postoperative vomiting in children after strabismus repair.

Br J Anaesth 2000; **85**: 267–70

Keywords: anaesthesia, paediatric; acupuncture; vomiting; surgery

Accepted for publication: January 20, 2000

Postoperative vomiting (POV) is a common problem in anaesthesia.^{1–3} Several pharmacological and non-pharmacological studies have been performed in search of a means to prevent POV. Well investigated non-pharmacological methods for reducing the incidence of POV are acupuncture and acupressure.⁴ Both acupuncture and acupressure of the Chinese acupuncture point Pericard 6 (P6) have been reported to represent an effective non-pharmacological, antiemetic therapy.^{5–9}

In contrast to Chinese acupuncture, Korean hand acupuncture is a new method, first developed and described by the Korean physician Dr Yoo.¹⁰ While this method is widely used in Korea, Western medicine has hardly taken any notice of it and little research is being performed in this field.

The Korean hand acupuncture point K-K9 corresponds but is not identical to the Chinese acupuncture point P6, whose antiemetic effect has been ascertained in numerous studies. Therefore, we assumed that K-K9 produces a similar antiemetic effect as P6.

In children undergoing strabismus surgery, POV is one of the most frequent complications.¹¹ In contrast to pharmacological antiemetic substances, no adverse side effects have been reported for acupressure. Therefore, acupressure could be a useful method for preventing POV, particularly in paediatric patients. However, acupressure of P6 has failed to prevent POV in children in the past.¹²

We investigated the antiemetic effect of acupressure applied onto the Korean hand acupuncture point K-K9 in children undergoing strabismus surgery. This form of acupuncture is painless and thus especially useful in awake children.

Methods

This study was approved by the Ethics Committee of the University of Innsbruck, Austria. Written, informed consent was obtained from the parents. The number of patients required was determined by power analysis (power 0.9). We assumed the incidence of vomiting to be 65% in the control group and 25% in the acupuncture group.

We studied 50 children aged 3–12 yr, ASA physical status I and II, scheduled for strabismus surgery. Children with gastric or intestinal diseases, emesis and vomiting in the week before surgery as well as patients receiving any medical treatment immediately prior to surgery were excluded.

In this double-blind, prospective study each child was allocated randomly to one of the two study groups. Acupressure was performed on the Korean hand acupuncture point K-K9, located on both hands on the middle phalanx of the fourth finger (Fig. 1A).

Patients in group A underwent acupressure on K-K9. We used a special Korean acupressure disc called 'AB-Bong' (Fig. 1B), which was fixed onto K-K9 using an adhesive tape. Acupressure was performed on K-K9 on both hands for a period of 30 min before induction of anaesthesia and was maintained for at least 24 h.

In group B a tape but no acupressure disc was fixed on both fourth fingers. The children and their parents as well as the anaesthetist and the nursing staff were unaware of the group the children were allocated to. Both acupressure and placebo treatment were performed by the same investigator.

All patients were allowed solid food or clear fluids up to 6 h before anaesthesia. Oral premedication with midazolam 0.4 mg kg^{-1} and atropine 0.02 mg kg^{-1} was administered 1 h before the expected start of anaesthesia. To facilitate a painless placement of an i.v. cannula, ELMA[®]-5%-Cream (Astra, Austria) was applied to a vein in the left cubita or to the back of the left hand of each child.

Strabismus repair was performed under general anaesthesia. Anaesthesia was induced with i.v. thiopental 5 mg kg^{-1} , rocuronium bromide 0.6 mg kg^{-1} and fentanyl $2 \mu\text{g kg}^{-1}$. After intubation, anaesthesia was maintained with 2–3% sevoflurane and nitrous oxide in 33% oxygen under controlled ventilation. Fluid deficit was replaced i.v.

by a mixture of three parts of Ringer's lactate solution and two parts 5% dextrose.

At the end of anaesthesia, once the children were fully awake with stable postoperative observations, they were transferred to the ward. Paracetamol suppositories were given for postoperative analgesia and 50 mg dimenhydrinate suppositories for antiemetic rescue therapy.

The incidence of vomiting was recorded by the nursing staff in the recovery room and on the ward. Documentation covered a period of 24 h after starting anaesthesia. All patients remained in the clinic for at least 24 h following surgery.

Statistical analysis

Statistical analysis was performed with SPSS 8.0 (SPSS Inc.[®]). Fisher's exact test was used to determine the incidence of vomiting, and the unpaired Student's *t*-test to analyse patient characteristics. A *P*-value of less than 0.05 was regarded as statistically significant.

Results

There were no statistical differences between the groups with respect to age, gender, ASA physical status, weight, duration of anaesthesia, and duration or extent of surgery (Table 1).

Compared with the placebo group, the incidence of vomiting in the acupressure group was significantly lower ($P=0.001$). During the first 24 h after surgery, vomiting occurred in five patients (20%; 95% CI: 0.03–0.36) in the acupressure group and 17 patients (68%; 95% CI: 0.48–0.87) in the placebo group. Data on first incidences of vomiting after surgery are shown in Table 2.

Two children receiving acupressure and 10 children in the placebo group required antiemetic rescue therapy.

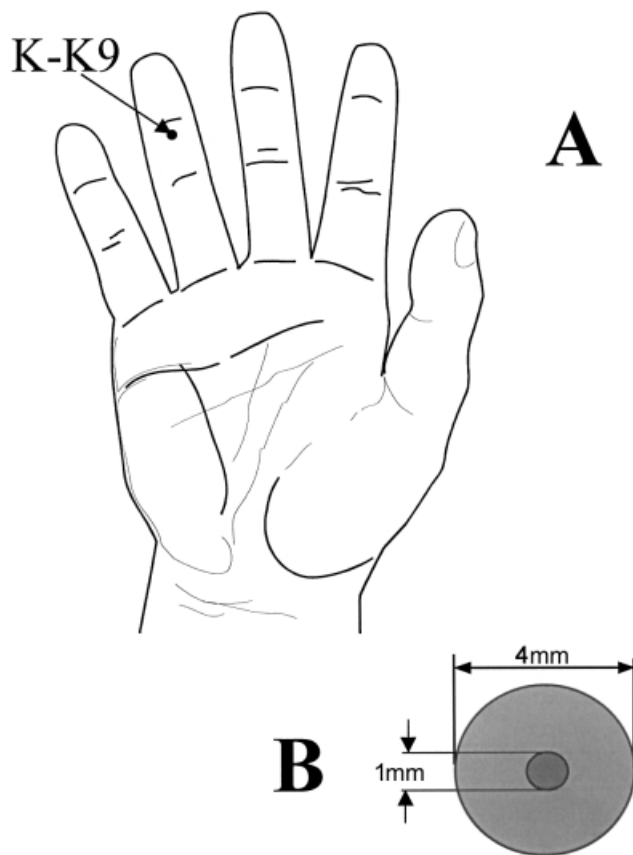


Fig 1 (A) Location of the Korean acupuncture point K-K9. (B) Korean acupressure disc 'AB-Bong' with a central dot (1 mm high and 1 mm in diameter).

Table 1 Patient characteristics expressed as numbers or means (SD)

	Acupressure (n=25)	Placebo (n=25)
Age (yr)	6.5 (2.0)	6.1 (1.9)
Sex (M/F)	12/13	12/13
Weight (kg)	22.8 (5.5)	22.9 (8.4)
Anaesthesia duration (min)	69.6 (15.4)	72.2 (17.3)
Surgery duration (min)	47.1 (13.5)	51.1 (16.7)
No. of muscles repaired	2.22 (0.9)	2.52 (0.8)

Table 2 Time of first vomit after surgery. Results expressed in numbers (%) of patients

	0–3 h	0–6 h	0–12 h	0–24 h
Acupressure (n=25)	3 (12%)	5 (20%)	5 (20%)	5 (20%)
Placebo (n=25)	10 (40%)	14 (56%)	17 (68%)	17 (68%)

Discussion

Korean hand acupuncture is rarely applied in Western medicine. Only a very limited number of studies on the efficiency of Korean hand acupuncture are currently available and no data concerning its antiemetic effect have been published.

The Korean acupuncture point K-K9 is comparable to the well-investigated Chinese acupuncture point P6. Whereas K-K6 is located on the fourth finger, the point P6 is located at the wrist between the tendons of palmaris longus and flexor carpi radialis, 2 Cun proximal from the distal palmar crease. One Cun is equivalent to the width of the patient's thumb across the interphalangeal joint.

Needle acupuncture of P6 effectively reduces postoperative nausea and vomiting.^{4,13} However, needle acupuncture of P6 is unpleasant and therefore not useful in routine clinical practice in awake children. The correct timing of acupuncture and acupressure is of great importance. It has been shown that the correct timing of acupuncture further improves the effectiveness of P6 and reduces postoperative vomiting.^{14,15} Stimulation of P6 performed before the induction of anaesthesia produced antiemetic effects. Dundee and colleagues¹⁴ found that P6 had no antiemetic effect when opioids had been administered previously. Several investigators were unable to demonstrate an antiemetic effect in paediatric patients when performing acupuncture during general anaesthesia.^{4,16-18} We found that, in order to achieve a satisfactory antiemetic effect, stimulation of acupuncture points must be performed before the induction of anaesthesia.^{9,15}

In contrast to acupuncture, acupressure is painless, easy to perform and well tolerated by children, as observed in our study. Hence, it seems to be a useful method for preventing POV in paediatric patients.

Nevertheless, the use of acupressure of P6 to prevent postoperative nausea and vomiting has produced inconsistent results. Most investigations in adult patients have reported an effective reduction of POV.^{6,7,19,20} However, the method failed in paediatric patients undergoing strabismus surgery.¹² Lewis and colleagues¹² used elastic wrist bands with a plastic stud on the inner aspect of the bands ('sea-bands') for continuous acupressure of P6 and found no difference in the incidence of POV after strabismus surgery compared with a placebo group. In contrast, we found that following acupressure of K-K9, POV in children undergoing strabismus surgery was significantly reduced. An incidence of 72% of POV in children after strabismus surgery without antiemetic therapy, as seen in our study, is consistent with the findings of previous studies.²¹⁻²⁵ Acupressure of K-K9 reduced the incidence of POV to 20%. Because the evaluation of nausea is very difficult in younger children, we did not examine nausea in this study.

The antiemetic effect of K-K9 stimulation by acupressure correlates with that of pharmacological antiemetics admin-

istered in various studies to reduce POV in children undergoing strabismus surgery.^{22,23,25-27} Pharmacological therapy with drugs such as ondansetron, droperidol and metoclopramide is often associated with side effects such as drowsiness, extrapyramidal symptoms and headache.²⁸ Unlike these pharmacological antiemetics, acupressure of K-K9 has been found to have no side effects to date.

In conclusion, acupressure of the Korean hand acupuncture point K-K9 is a cheap and effective method for reducing the incidence of POV in children undergoing strabismus surgery. Korean hand acupuncture has been scarcely investigated so far, but its effectiveness has been clearly demonstrated in this study.

Acknowledgements

The authors gratefully acknowledge the assistance of the nursing staff of the paediatric ward at the Clinic for Ophthalmology and Optometry, Innsbruck, in carrying out this study.

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