A summary of studies in countries other than China on acupuncture in anesthesia and for postoperative complications

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国外针刺用于手术麻醉及预防术后并发症研究概要

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Acupuncture anesthesia was first used for tonsillectomy in 1958 in Shanghai, and was generally used in China for surgical operations such as thyroidectomy, mandible resection, pneumonectomy, gastrectomy, and appendectomy during 1960s and 1970s. An American delegation was invited to watch an acupuncture anesthesia procedure during a surgical operation when Nixon, the 37th president of the United States, visited China for the first time in 1972. After that, acupuncture became popular in America and Europe, and then acupuncture anesthesia started to be used abroad.

In recent ten years, many clinical trials on acupuncture in anesthesia or for postoperative complications have been carried out in countries other than China, some of which are randomized controlled trials.

Rosted et al.¹ investigated segmental acupuncture treatment, given two minutes prior to a regional inferior dental block with prilocaine hydrochloride, in reducing the onset time of a local anesthetic. It appeared that the onset time of local anesthesia was reduced if segmental acupuncture was given prior to the regional inferior dental block. However, it needed to be reproduced including objective measurements.

Kvorning et al.² designed a study to compare differences in movement, dilatation of the pupils, divergence of the eye axes and activity of auditory evoked potentials (AEPS) between patients given and those not given electro-acupuncture (EA) under standardized sevoflurane anesthesia. Forty-five patients, scheduled for laparoscopic sterilization, were randomized for EA or sham procedures between induction of anesthesia and start of surgery. Neuromuscular, oculomotor and AEP responses to skin incision were assessed in patients with and without a bilateral 2-Hz burst EA under steady-state anesthesia maintained with 1.8% of sevoflurane. The results showed that acupuncture patients had more responses to skin incision with movement of the neck or limbs (77% vs 43%, P = 0.021), dilatation of the pupils (77% vs 39%, P = 0.001) and divergence of the eye axes (72% vs 39%, P =

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than sham patients, whereas there was no difference in the A-line ARX (autoregression with exogenous input) index response. At last they drew a conclusion that EA facilitates physiological responses to nociceptive stimulation under sevoflurane anesthesia. Differences in neuromuscular and oculomotor responses between acupuncture and sham patients under general anesthesia were probably not associated with interaction between EA and the depth of anesthesia, as AEP activity was similar in the two groups.

Kvorning et al. designed a study to compare movement in response to surgical incision in anaesthetized patients subjected to EA or sham procedures. In the study, 40 healthy women, scheduled for laparoscopic sterilization at a Swedish county hospital, were randomized to either the EA (n = 20) or sham (n = 20) procedure between the induction of general anesthesia and the start of surgery. They found that the monitored anesthesia care (MAC) for sevoflurane was higher in the group given acupuncture than that in the control group \((2.1 \pm 0.3) \% vs (1.8 \pm 0.4) \%, P = 0.008\) and concluded that EA given during general anesthesia with sevoflurane failed to reduce but instead increased the clinical need for anaesthetic gas, possibly by reducing the anaesthetic effect of sevoflurane, or by facilitating nociceptive transmission and reflex activity.

Taguchi et al. tested the hypothesis that needle stimulation of a combination of four ear acupoints would significantly reduce requirement of anaesthetic. Ten healthy volunteers were anaesthetized with desflurane and randomly assigned to the group with no treatment or acupuncture; the alternative treatment was given on a subsequent study day. Auriculo-acupuncture was performed with needles being placed at the four points on the right ear. Anaesthetic requirement, determined by the Dixon up-and-down method, was defined by the average desflurane concentration that prevented purposeful movement of the extremities in response to noxious electrical stimulation. Volunteers required a greater desflurane concentration to prevent movement on the control than on the acupuncture day \((P = 0.003)\). Acupuncture thus reduced anaesthetic requirement by 8.5%.

Sim et al. evaluated the effect of preoperative EA on intraoperative and postoperative analgesic (alfentanil and morphine) requirement in patients scheduled for gynecologic lower abdominal surgery. Ninety patients were randomly assigned to one of three groups: Group I (control group)—received placebo EA for 45 minutes before induction of general anesthesia (GA); Group II—preoperative EA instituted 45 minutes before induction of GA; Group III—45 minutes of postoperative EA. In conclusion, preoperative EA led to reduced intraoperative alfentanil consumption, though this effect may not be specific, and has a morphine sparing effect during the early postoperative period.

Stener-Victorin et al. performed a prospective randomized study of electro-acupuncture versus alfentanil as anesthesia during oocyte aspiration in in-vitro fertilization (IVF). The aim of the study was to evaluate the anaesthetic effect during oocyte aspiration of a paracervical block (PCB) in combination with EA or intravenous alfentanil. One hundred and fifty women undergoing IVF and embryo transfer were randomized to receive EA plus PCB or alfentanil plus PCB. Visual analogue scales (VAS) were used to evaluate subjective experiences during oocyte aspiration and IVF outcome parameters were recorded. No differences in pain directly related to oocyte aspiration, adequacy of anesthesia during oocyte aspiration, abdominal pain, or degree of nausea were found between the two groups in the VAS ratings. Before oocyte aspiration, the level of stress was significantly higher in the EA group than that in the alfentanil group \((P < 0.05)\), and the EA group experienced discomfort for a significantly longer period during oocyte aspiration \((P < 0.01)\). Compared with the alfentanil group, the EA group had significantly higher implantation rate \((P < 0.05)\), pregnancy rate \((P < 0.05)\), and take-home baby rate \((P < 0.05)\) per embryo transfer. In conclusion, EA had been shown to be as good an anaesthetic method as alfentanil during oocyte aspiration, and the authors suggested that EA may be a good alternative to conventional anesthesia during oocyte aspiration.

Pokodenko-Chudakova investigated the use of acupuncture analgesia in maxillofacial surgery. In this study acupuncture was applied in 120 patients. In 20 of these, surgery was carried out under general anesthesia in combination with acupuncture. In 100 patients, acupuncture analgesia was applied in addition to traditional postoperative analgesia. When acupuncture was used, the pulse rate and blood pressure during surgery generally remained stable. In this study, serum cortisol was also measured and showed only minor elevation. He concluded that acupuncture anesthesia could be a useful adjunct to conventional anesthesia in maxillofacial surgery.

Chu et al. undertook a study to evaluate the efficacy of acupuncture anesthesia in inguinal hernia repair, and they concluded that acupuncture anesthesia was a feasible anaesthetic option.

Litscher et al. performed a randomized, controlled and partly blinded cross-over trial to investigate the effects of acupressure, manual acupuncture and laser needle acupuncture on electroencephalographic bispectral index and spectral edge frequency in 25 healthy volunteers aged \(25.5 \pm 4.0\) years. They found that bispectral index and spectral edge frequency values both decreased significantly \((P < 0.01)\) during acupressure on EX HN3 (Yingtang) to values of \(62.9 \pm 13.9\) bispectral index and to \((13.3 \pm 8.1)\) Hz (spectral edge frequency right).
and (13.8 ± 7.3) Hz (spectral edge frequency left), respectively. Bispectral index was also significantly affected by laser needle acupuncture and acupressure on the control point \((P < 0.05)\). But the changes were not clinically relevant, 95.4 ± 4.0 and 94.2 ± 4.8, respectively. All interventions significantly reduced verbal sedation score (Yintang; \(P < 0.01\); control point; \(P < 0.05\)). The study highlights the electroencephalographic similarities of acupressure-induced sedation and general anesthesia as assessed by bispectral index and spectral edge frequency.

Surgery performed under general anesthesia is associated with a high incidence of postoperative nausea and vomiting (PONV), so some studies are accomplished to observe the effects of acupuncture for prophylaxis of postoperative nausea and vomiting.

Streitberger et al.\(^{10}\) conducted a randomized, placebo-controlled, patient and observer blinded trial to determine whether acupuncture at the acupuncture point PC6 (Neiguan) was effective in preventing PONV as compared with placebo acupuncture. Female patients scheduled for gynecological or breast surgery were randomly assigned into two groups receiving either acupuncture \((n = 109)\) or placebo acupuncture \((n = 111)\). Each group was stratified for type of surgery and included two subgroups receiving intervention either before or after induction of anesthesia. The incidence of PONV and/or antiemetic rescue medication within 24 h after surgery was the main outcome measure which showed no statistically significant difference between groups \((43.7\%\) acupuncture, 50.9\% placebo, \(P = 0.27\)). The differences were more pronounced for patients having gynecological surgery (48.9\% acupuncture, 67.6\% placebo, \(P = 0.07\)) than for those having breast surgery (38.7\% acupuncture, 40.3\% placebo, \(P = 0.88\)). The secondary outcome, vomiting, was significantly reduced by acupuncture from 39.6\% to 24.8\% \((P = 0.03)\). Subgroup analysis showed no difference between applications of acupuncture before as compared with after induction of anesthesia.

Fujii\(^{12}\) and Oonman et al.\(^{12}\) reported that acupuncture at PC6 (Neiguan) point could effect-ively prevent or reduce the incidence of PONV.

Schlager et al.\(^{12}\) also reported that laser stimulation of acupuncture point Neiguan could reduce postoperative vomiting in children undergoing strabismus surgery.

REFERENCES


