

several methodological aspects of this investigation are worthy of further discussion in order to improve the prevention and treatment of PONV using PC6 stimulation.

Firstly, modern management of PONV is directed at prevention (rather than treatment of the condition once established). PONV has a multifactorial aetiology and can be triggered by stimulation of various peripheral and central receptors, including the chemoreceptor trigger zone (CTZ) in the area postrema, which causes activation of the emetic centre in the brain stem. Once activated, the emetic centre responds poorly to antiemetic drugs, which makes the treatment of PONV difficult.

The choice of anaesthetic is an important consideration in the prevention of PONV. Perioperative use of volatile anaesthetics and opioid analgesics, and failure to use propofol (an anaesthetic drug with known antiemetic effects), are the three main modifiable risk factors in the development of PONV.²

In the study by Liodden *et al*,¹ the administration of volatile anaesthetics and opioid analgesics *before* acupuncture at PC6 may have triggered the CTZ, initiating the onset of PONV. This pathophysiological assumption is supported by clinical data on PC6 stimulation for prevention and treatment of PONV, where the anti-emetic effects of acupuncture were attenuated or completely lost when the treatment was applied after the induction of anaesthesia, as compared with a variety of control conditions.³

Another reason to apply PC6 stimulation before induction of general anaesthesia is that both anaesthetic and analgesic agents can attenuate or completely abolish the effects of acupuncture.

Indeed, acupuncture is now widely accepted as a form of peripheral sensory stimulation, which, in the case of PONV, hypothetically influences the emetic centre in the brain stem via neural pathways. It has been demonstrated using functional MRI that general

anaesthesia per se (eg, administration of propofol) reduces the neurophysiological response to acupuncture stimulation.⁴

Thus, the insertion of acupuncture needles (without stimulation) at PC6 *after* induction of general anaesthesia in the study by Liodden *et al*,¹ in which the CTZ was likely to have already been triggered and the neural pathway blocked by anaesthetics and opioid analgesics, was probably insufficient to exert the necessary physiological and clinical effects in order to prevent PONV in the children after surgery.

Although tonsillectomy is not among the types of surgery with the highest risk of PONV, we would regard it as a strong stimulus/trigger of vagal afferents that can activate the emetic centre with subsequent PONV, especially in children, who have a naturally higher vagal tone and thus are prone to nausea and vomiting.

In order to achieve the optimal antiemetic effect in this clinical setting, we would recommend the use of indwelling fixed needles (IFN) for PC6 stimulation in the context of an evidence-based multimodal concept of PONV prevention and treatment.⁵ The insertion of 1.5 mm long needles embedded in adhesive tape, which were originally designed for auricular acupuncture, produces sufficient afferent stimulation (as the epidermis is the layer with the richest innervation) and allows continuous stimulation, especially after general anaesthesia when the IFN can be stimulated by means of massage. Additionally, children, who are often afraid of procedures involving needles, do not generally react to IFN with needle phobia. We tell the children that they will receive 'stickers with mosquito bite' rather than needles per se. In our institution we insert the IFN at PC6 for PONV prevention before the administration of sedative and analgesic agents for anaesthesia, and instruct the patients (or parents in the case of young children) to

Appropriate timing and intensity of PC6 stimulation for the prevention of postoperative nausea and vomiting

We read with interest the recent article by Liodden *et al*¹ on the use of PC6 acupuncture for the prevention of postoperative nausea and vomiting (PONV) in children after tonsillectomy/adenoidectomy. We feel that

stimulate the needles by means of massage after the anaesthesia in the event of nausea or vomiting.

Given that the apparent point specificity of PC6 has been confirmed in a number of randomised controlled trials (RCTs) in comparison with placebo and sham control procedures,³ the pragmatic design of 'acupuncture plus standard therapy' versus 'standard therapy alone' chosen by Liodden *et al*¹ satisfies the ethical, scientific and clinical requirements of an RCT in this clinical setting.

In summary, we make the following recommendations regarding future RCTs of PC6 stimulation for the prevention of PONV in children undergoing tonsillectomy/adenoidectomy under general anaesthesia:

- ▶ Use of standardised general anaesthesia, preferably total intravenous anaesthesia with propofol for all study participants
- ▶ Use of IFN (1.5 mm length) embedded in adhesive tape 'stickers'
- ▶ Insertion of IFN before induction of anaesthesia
- ▶ Instruction of the parents on how to stimulate the IFN in the event of PONV
- ▶ Pragmatic 'PC6 versus standard therapy' or 'PC6 plus standard therapy versus standard therapy alone' design.

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