Assessing the anaesthetic and analgesic effects of electroacupuncture in patients undergoing craniotomy

We read with great interest the recent article by Liu et al.1 assessing intraoperative anaesthetic and postoperative analgesic effects of multipoint transcutaneous electrical acupuncture point stimulation (TEAS) in patients undergoing supratentorial craniotomy under total intravenous anaesthesia with propofol and sufentanil. The authors measured sufentanil target plasma concentrations at several time points and total consumption doses during surgery were significantly decreased, and postoperative recovery and pain were significantly improved, in the TEAS group compared to the sham group. Accordingly, they concluded that multipoint TEAS may be clinically effective as an adjunct to intraoperative anaesthesia and postoperative pain treatment. However, in addition to the limitations described in the discussion, we note other issues with this study that make interpretation of their findings questionable.

Firstly, the bispectral index was used to monitor anaesthetic depth and was maintained across a large range between 40 and 60 throughout surgery. The authors did not specify whether the bispectral index values at all observed points were comparable between groups. This is an important prerequisite for correctly comparing the intraoperative consumption of anaesthetic and opioid drugs in the two groups. Moreover, the total sufentanil consumption dose was 95.6±21.8 μg and 117.7±38.0 μg in the TEAS and sham groups, respectively, with a significant decrease of 18.8% in the TEAS group. However, the total sufentanil consumption dose during surgery is best adjusted according to the body weight of the patient before comparison, as previously reported.2 We would like to know whether TEAS significantly decreased the total sufentanil consumption dose when expressed per kg body weight.

Secondly, the authors did not report any sample size calculation, even though this is crucial for minimising the risk of type I and type II statistical errors in a randomised controlled trial.3 A sample size calculation should be performed solely using the primary outcome parameter. Before the sample size calculation, the minimal clinically important difference of the primary outcome parameter must be assessed to determine the power that is required to achieve clinically important inferences. Furthermore, analysis of multiple secondary outcome parameters requires significance levels to be adjusted, for example, using a Bonferroni correction.4 According to data provided in their figure 1, we are concerned whether there really are significant differences between the groups in sufentanil target plasma concentrations at the observed points (such as at keyhole drilling, dura cutting, and 10 and 20 min into the intracranial operation), where intergroup differences in mean concentrations are very small and SDs are large. In addition, the sample size of this study may be underpowered to show intergroup differences in eye-opening time, time to spontaneous movement, and time to reorientation.5

Thirdly, intravenous patient-controlled analgesia was used for postoperative pain management; however, the aim of postoperative pain relief was not described. Thus, it was unclear how patients were instructed to administer the analgesic liquid via the patient-controlled analgesia pump. Furthermore, the authors did not provide the total sufentanil consumption doses used in the postoperative pain management. In the absence of postoperative analgesic drug dosages, directly comparing acute early postoperative pain relief levels between groups is improper. We consider that unbalanced use of analgesic drugs may explain the higher pain scores in the TEAS group on postoperative days 2 and 3. In addition to analgesic drug dosages, the time of first demand for patient-controlled analgesia has been shown to be a useful variable to assess the effect of electroacupuncture on postoperative pain relief.5

Finally, it must be pointed out that the mean intraoperative sufentanil consumption dose was decreased by 22 μg (equivalent to about half an ampoule) during craniotomy with a mean duration of 4 h, and mean postoperative recovery and extubation times were shortened by about 6–9 min in the TEAS group compared to the sham group. Moreover, these outcome measures have highly variable ranges, which suggest that multipoint TEAS can provide only moderate beneficial effects on intraoperative anaesthesia and postoperative recovery. Considering the fact that multipoint TEAS requires board-certified acupuncturists, additional devices and costs, we would argue that further studies are required to assess the cost-effectiveness of this approach to facilitating intraoperative anaesthesia and postoperative recovery in patients undergoing craniotomy under total intravenous anaesthesia.

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