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Ephedrine, phenylephrine and BIS during propofol anaesthesia
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EDITOR:

We congratulate Takizawa and colleagues [1] on their interesting study examining the effect of commonly used vasopressors on bispectral index scores (BIS) during propofol anaesthesia supplemented with high-dose fentanyl. This has complemented the earlier work of Ishiyama and colleagues [2] who performed a similar study with sevoflurane. Both these studies have demonstrated a statistically significant increase in BIS following ephedrine administration for intraoperative hypotension, which is an everyday occurrence, particularly following induction of anaesthesia. Therefore, the question posed by Takizawa is important. What is not clear, however, is whether this apparent ‘lightening’ of anaesthesia with ephedrine is clinically significant or not. Clearly, with a reported incidence of awareness of 0.07–0.18% [3], a much larger cohort of patients would be required to demonstrate clinically significant changes in the incidence of awareness. However, we have some concerns regarding the methodology of the reported study.

The effect of opioids on BIS is less well characterized compared with volatile and intravenous anaesthetic agents. Barr and colleagues [4] found that patients given fentanyl 10 μg kg⁻¹ supplemented with 0.5 mg kg⁻¹ propofol at induction, lost consciousness at a much higher BIS (median 91; range 78–98), compared with patients given fentanyl alone (median 80; range 45–94). The ‘deeper’ plane of anaesthesia was maintained for 10 min after induction. In the current study, clinicians were free to give fentanyl 10–20 μg kg⁻¹ at induction. Although this is a routine practice for cardiac patients, data on fentanyl dosage between groups would have perhaps added weight to the finding that BIS scores were higher in the ephedrine group. In this way, any pharmacological interaction between propofol and fentanyl could be accounted for.

Eight patients (40%) in the ephedrine group had BIS scores greater than 60, 10 min after the ephedrine was given. The inference is that these patients were at risk of awareness. There is no report by the authors of postoperative interviews with these patients to check for any recall, either implicit or explicit. Therefore, although the authors’ conclusions are just and BIS has been shown to reduce the incidence of awareness in high-risk patients [5] (e.g. off-pump coronary artery bypass), the clinical ramifications of this study remain unclear. Indeed, it would seem counterintuitive to administer ephedrine for hypotension and then to have to deepen the anaesthetic for fear that the patient became aware.

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References


In this study, we examined whether ephedrine increased BIS values during propofol anesthesia. We found that ephedrine decreased propofol concentrations. In our previous study, we showed decreases in propofol concentrations following dopamine administration. As suggested by McCahon and colleagues, the clinical significance in the effect of ephedrine on BIS is not clear from our study. Further work on anaesthetic depth is required concerning the clinical significance of the effect of drugs that act on the central nervous system.

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