OPIOID-FREE ANAESTHESIA FOR SUPRATENTORIAL CRANIOTOMY FOR BRAIN TUMOR RESECTION

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Introduction

Opioids are frequently used for intra- and postoperative analgesia, and often unavoidable for major surgery. However, the side effects of systemic opioids, including postoperative nausea and vomiting, postoperative hyperalgesia, central nervous system and cardiorespiratory depression and more recently, an association with tumor angiogenesis and recurrence are of major concern.

Opioid-free anaesthesia is an appealing concept, and several non-opioid analgesic adjuncts may help achieve that. Post-craniotomy pain is generally described to be of moderate to severe intensity, but an anaesthetic technique relying primarily on regional scalp block and dexmedetomidine infusion is proposed as a means to obviate the use of opioids. Dexmedetomidine is a highly selective α -2 agonist with analgesic and sedative properties with the ability to preserve cognition and ventilatory drive. A case report of craniotomy and excision of brain tumour using an opioid-free anaesthetic technique is presented.

Methods

Post-craniotomy pain is generally described to be of moderate to severe intensity, but an anaesthetic technique relying primarily on regional scalp block and dexmedetomidine infusion is proposed as a means to obviate the use of opioids.

Case Description

A 50-year-old female patient, ASA 2 for iron-deficiency anaemia underwent left craniotomy and excision of sphenoid wing meningioma under general anaesthesia. Intra-operative monitoring instituted were 3-lead ECG, SpO₂, invasive arterial BP, end-tidal CO₂, FiO₂, bispectral index, rectal temperature and urine output. After a loading dose of IV 75 μ g (equivalent to 1 μ g/kg) dexmedetomidine over 10 min, induction of anaesthesia was conducted with propofol TCI (effect-site, Schnider model) incrementally. IV rocuronium 50mg was administered for tracheal intubation. Maintenance was achieved using total intravenous anaesthesia (TIVA-TCI) with Ce (propofol) range 2.3–4 μ g/ml and dexmedetomidine infusion between 0.2–0.7 μ g/kg/hr, and atracurium infusion at 20mg/hr. Left-sided scalp block using landmark technique with 12ml 0.5% bupivacaine was performed. Intra-operative analgesia was afforded by IV dexmedetomidine infusion totalling 206 μ g, IV magnesium sulphate 20mmol, IV paracetamol 1g and the scalp block. Other intra-operative drugs given include IV cefazolin 4g, IV dexamethasone 8mg, IV labetalol 25mg, IV leviracetam 500mg and IV 20% mannitol 150ml, ondansetron 4mg. The surgical procedure was completed in 5 hours and the patient was transferred to the neurointensive care unit for controlled extubation the following day in view of significant peri-tumoral odema. Postoperatively, she spent one day in the NICU requiring two doses of IV 1g paracetamol before transfer to the general ward, where she required two doses of PO 1g paracetamol. She required no further analgesia (including no opioid medications) during her six day hospitalization and was discharged well.

Anaesthesia and Scalp Block

Conclusion

Dexmedetomidine is useful as part of multi-modal pain management and is a practical strategy to achieve opioid-free anaesthesia and satisfactory opioid-free postoperative analgesia. When dexmedetomidine is used to replace remifentanyl for neuroanaesthesia, the problem of opioid hyperalgesia may be averted. Opioid-free anaesthesia is an appealing concept, and non-opioid analgesic adjuncts including dexmedetomidine in conjunction with scalp regional block may sufficiently achieve opioid-free brain tumor surgery.

References

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