Case Report: Dexmedetomidine for smooth emergence after cochlear implant

Authors: JM McGee, L Georges
Affiliation: UNC Hospitals, Chapel Hill, NC

Introduction: The implantation of cochlear implants is becoming a common treatment for children with sensorineural hearing loss. The otolaryngologists advocate for a smooth emergence from anesthesia with minimal agitation to decrease any rise in intracranial pressure that may compromise the implant. The ability to provide a smooth emergence while maintaining airway reflexes led to the use of 1 mcg/kg of dexmedetomidine prior to emergence.

Case Report: 3 yo Hispanic male with profound sensorineural hearing loss who underwent general anesthesia for revision of left cochlear implant and placement of right cochlear implant. The patient was able to read lips, however his primary language was Spanish. To help with communication during induction, he was accompanied to the operating room by his father and anesthesia was induced with nitrous oxide, oxygen, and sevoflurane. The patient was agitated and combative during the induction. The patient was maintained on Desflurane and did not receive any paralytics during the case. He received ~3.5 mcg/kg of Fentanyl during the procedure.

The inability to communicate with the patient on emergence, combined with the desire to provide the surgical team with a smooth emergence, led to the use of dexmedetomidine to achieve a peaceful emergence. The patient was administered 1 mcg/kg of dexmedetomidine over 10 minutes approximately 15 minutes before emergence. He had a smooth emergence without any combative behavior. The endotracheal tube was removed when he had conjugate gaze and purposeful movements. He was extubated to a face mask and required minimal narcotics in the PACU. His blood pressure and heart rate were unchanged. He did not exhibit any signs of emergence delirium.

Discussion: Some surgeons advocate for a “deep extubation” in order to facilitate an uneventful emergence following cochlear implants. There are inherent risk associated exubating a patient before airway reflexes have recovered and it was our desire to avoid this technique. The inability to communicate with the patient to offer reassurance during extubation increases the likelihood of agitation. Dexmedetomidine was added to help achieve a smooth emergence in this patient.

Dexmedetomidine is a highly selective alpha-2 agonist which has the unique property of providing sedation and analgesia without affecting the respiratory status (1,2). Dexmedetomidine has previously been reported to be effective in emergence delirium (3, 4, 5). In children undergoing surgery using general anesthesia, dexmedetomidine 0.3 mcg/kg administered over 10 min after induction reduced the incidence of emergence agitation from 37% in the control group to 10% in the study group (3). In another study, the effects of a continuous perioperative infusion of 0.2 mcg/kg/hr of dexmedetomidine on the incidence of emergence delirium in 50 children aged 1-10 years scheduled for sevoflurane-based GA was examined. The incidence of delirium was statistically different between the two groups, 26% in the dexmedetomidine group versus 60.8% in the placebo group for a p-value of 0.036 (4). In a double-blinded trial, 42 children undergoing magnetic resonance imaging (MRI) examination were randomly assigned to receive dexmedetomidine 1 mcg/kg or placebo after induction of anesthesia. The incidence of emergence agitation was 47.6% in the placebo group and 4.8% in the dexmedetomidine group with a p-value of 0.002 (5). No adverse effects attributable to dexmedetomidine were observed in either study.
Dexmedetomidine has been reported to be beneficial in extubation following adenotonsillectomy when studied in a double-blinded placebo control to evaluate the incidence of agitation after emergence. This study noted that the number of severe coughs per patient was significantly decreased compared with the control group for a p-value less than 0.05 (6). In another double-blinded placebo study, coughing scores after extubation were recorded after a single bolus dose of dexmedetomidine was given before extubation. Their findings suggested that a single, 0.5mcg/kg, bolus dose of dexmedetomidine administered before tracheal extubation attenuated airway-circulatory reflexes during extubation (7).

Dexmedetomidine has not been reported in the literature as an adjunct to aid in a smooth emergence following cochlear implants, however its unique properties of providing sedation while maintaining airway reflexes and not altering respiratory drive makes this drug beneficial in this scenario.

**Conclusion:** Dexmedetomidine, 1mcg/kg, prior to emergence was effective in providing a smooth extubation after a cochlear implant and revision in our patient.

**References:**