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DEXMEDETOMIDINE FOR AUDITORY BRAINSTEM RESPONSES: ENHANCING PATIENT EXPERIENCE AND IMPROVING THEATRE EFFICIENCY

S. L. Harper, Sheffield Children's Hospital, UK

Background/Context

Auditory Brainstem Responses (ABRs) are used to determine hearing thresholds in children who cannot undergo behavioural testing either because they are too young or they are unable to co-operate. In our institution, ABR is carried out in natural sleep, in clinic.

Problem

Some patients fail to establish natural sleep in a clinic. Existing practice requires these patients to re-book or to attend for ABR under general anaesthesia, typically with a 6 hour stay. This subjects the patient to the risks of anaesthesia, occupies valuable theatre slots and incurs significant costs. More importantly, patients and parents attending for ABR this way have reported disruption, increased anxiety and diagnostic delays.

Strategy for change

The α-2 agonist, dexmedetomidine, has been shown to simulate natural sleep1 and has been used successfully in ABR2.

Following a successful pilot, we developed a protocol for carrying out ABR on the theatre admissions unit (TAU). Patients attended a side room on TAU and after pre-procedure questionnaire, 3mcg/kg (100mcg max.) of dexmedetomidine was administered intranasally. Once sedation was deemed clinically effective, the ABR was completed. The patient was subsequently recovered on TAU and discharged according to existing policy.

Measure of improvement

Quantitative data was collected prospectively using standardised data capture forms. Qualitative data included feedback from parents, audiology staff, nursing and anaesthetists.

Lessons learnt

In our cohort, all 23 patients (aged 18 months to 9 years) underwent ABR successfully with dexmedetomidine. Sedation was reliable and had a more rapid onset than expected (mean time 23 minutes). Testing conditions were improved compared to those conducted in theatre and in clinic, with less electrical/noise interference. More detailed ABR tests could be conducted including additional procedures e.g. blood tests. The average testing time was 33 minutes and mean length of stay was 4 hours 5 minutes, representing a reduction in the typical stay of 6 hours for GA ABR. No adverse events were encountered suggesting that our protocol is safe. Parents praised the organisation of the process, the effectiveness of the sedation and felt reassured by being able to remain with their child.

We have demonstrated improved experience for patients and their care providers whilst reducing the requirement for GA.

Financial analysis demonstrated reduced costs of ABR with dexmedetomidine compared with GA, with respect to like for like costs and also cost saving on repeat attendances for failed ABRs. Income uplift is being planned via newly available theatre slots.

Message for others

Dexmedetomidine is a safe and reliable method of providing sedation for ABR in children. The technique improves the experience for patients and their care providers, avoids the need for GA, and appears to be a financially attractive strategy, utilising theatre time more efficiently.

References:

1. Electrocardiogram spindle activity during dexmedetomidine sedation and physiological sleep. Huupponen E, Maksimov A, Lapinlampi P. Acta Anaesthesiol Scand 2008; 52: 289–94.

2. A randomized controlled trial of oral chloral hydrate vs intranasal dexmedetomidine plus buccal midazolam for auditory brainstem response testing in children. Li BL, Yuen VM, Zhou JL et al. Paediatr Anaesth. 2018 Nov;28(11):1022-1028.