Effects of dexmedetomidine sedation for magnetic resonance imaging in children: a systematic review and meta‐analysis

Kim JY, Kim KN, Kim DW, et al. J Anesth. 2021;35(4):525-535. doi:10.1007/s00540-021-02946-4

Dexmedetomidine is a popular agent for use in paediatric sedation for imaging. This systematic review and meta-analysis attempts to synthesis the evidence relating to its safety and efficacy.

Studies were included according to selection criteria: those published in English, including patients <20 years undergoing sedation for MRI, evaluating efficacy or safety, with outcomes relating to timing of sedation and recovery, quality of sedation, failure rates and adverse effects. Studies were excluded involving patients with cognitive impairment or combination regimens. Methodological and evidence quality were assessed using risk-of-bias and GRADE evaluations.

Seven studies and a total of 753 patients were included in the meta-analysis which compared dexmedetomidine with propofol, ketamine or midazolam.

Meta-analysis showed significantly longer time from initiation to adequate sedation with dexmedetomidine compared to other agents (weighted mean difference, WMD=8.13 minutes, 95%CI 4.64-11.63), and a significantly prolonged recovery time (WMD=5.22 min, 95%CI 0.35-10.09).

There was no difference between sedation quality (movement in scanner and number of high-quality images) between agents, yet subgroup analysis favoured dexmedetomidine over midazolam. Meta-analysis found no difference between rates of sedation failure.

Mean arterial blood pressure was no different between groups. Subgroup analysis of dexmedetomidine vs each other agent showed significantly lower heart rates in the dexmedetomidine group yet there was no significant difference in rates of bradycardia (defined as >20% decrease HR). No study reported any haemodynamic events requiring intervention.

In the adverse events analysis, rates of desaturation (SpO2 <90-93%) favoured dexmedetomidine compared to other methods (RR=0.42 95%CI 0.20-0.86).

This impact of this meta-analysis is limited by the quality of evidence and heterogeneity of studies. However, it suggests that dexmedetomidine remains an acceptable agent for MRI sedation; whilst it has a longer onset and offset, its efficacy and safety profile is comparable.

Dr Georgia Ellis

Home-Initiated-Programme-to-Prepare-for-Operation: evaluating the effect of an animation video on peri-operative anxiety in children: A randomised controlled trial

Nair T, Choo CSC, Abdullah NS, et al. Eur J Anaesthesiol. 2021;38(8):880-887.
doi:10.1097/EJA.0000000000001385

Virtual pre-operative psychological preparation and education has been postulated to have a positive effect on perioperative anxiety in both children and their carers. This Singapore-based RCT aimed to assess whether 'HIPPO' a home-delivered video programme, was effective at reducing Children's Emotion Manifestation Score (primary aim). Secondary aims were assessing impact on childrens' emotion and behaviour states using a variety of scoring systems (State-Trait Anxiety Inventory for Children, Induction Compliance Checklist, Visual Analogue Scale for anxiety), and the experience of parents or carers via State-Trait Anxiety Inventory and questionnaire feedback.

English speaking elective surgical patients aged 4-10 years at a single centre were invited to participate. Exclusion criteria were atypical cognitive development or previous surgery. Patients were randomised to HIPPO (a short video to be watched daily in the 3 days before surgery accompanied by age-appropriate activity sheet) or standard care (leaflet and pre-operative counselling session). Parents were asked not to reveal their randomisation in hospital. Once admitted, patients received standard care for the institution including premedication if deemed necessary. Blinded researchers and anaesthetists scored patients and carers pre-operatively, at induction and before discharge.

Data from 113 pairs of children and parents were analysed. There was no difference found between observer-reported, self-reported or anaesthetist reported anxiety levels at any point. Similarly, there was no difference between parent/ carer reported outcomes.

This study did not select 'at-risk' patients more likely to benefit from intervention and as such, authors comment that it is possible the effect size may have been too small to detect. However, these interventions are relatively cheap and easy to deliver on a large scale. It is likely that targeted psychological preparation delivered virtually along these lines will be considered a valuable part of some children's pre-operative journey.

Dr Georgia Ellis

Videolaryngoscopy vs. Direct Laryngoscopy for Elective Airway Management in Paediatric Anaesthesia – a prospective randomised controlled trial

Klabusayova E, Klucka J, Kosinova M et al. *European Journal of Anaesthesiology* 2021;38:1-7

Background

Intubation success with video (VL) and direct laryngoscopy (DL) in elective paediatric patients are compared in this study. The primary outcome is first attempt intubation success rate. Secondary outcomes include time needed to successful intubation and impact on length of anaesthetic practice. The null hypothesis was that the first attempt success rate would be higher in VL, with superiority margin set at 3% based on pilot data from the same centre.

Methods

The study was conducted in a single centre in which all anaesthetists had been trained in both DL and VL (C-MAC and McGrath). Paediatric patients (aged 30 days to 19 years), without a predicted difficult airway, were randomised to either VL or DL. Power calculation guided target sample size was 1000 but an interim analysis after 500 patients would stop the trial if the superiority margin had not been reached (futility).

Results

The trial was stopped after the interim analysis (501 patients) for futility - first attempt success rate was lower in the VL group (86.8% vs 92.65). Mean time to intubation was longer (39 vs 23.6s). Anaesthetists practising longer had higher success rates with DL but equal rates with VL to those practising for a shorter time, these were non-significant. Other secondary outcome results were non-significant and largely similar. Demographics between the groups were similar.

Discussion

This study's results were opposite to expected based on results from previous studies. There are several possible reasons for this including population disparity between studies and the level of training of operators on VL but there is not enough information or adequate sample size here to draw definitive conclusions. I think, however, this study highlights several important points – better glottic visualisation is not equal to higher successful intubation, VL is therefore not a panacea and adequate training in VL is vital.

Dr Katherine Brooks

Vaping and E-Cigarette Use in Children and Adolescents: Implications on Perioperative Care from the American Society of Anesthesiologists Committee on Pediatric Anesthesia, Society for Pediatric Anesthesia, and American Academy of Pediatrics Section on Anesthesiology and Pain Medicine.

Rusy DA, Honkanen A, Landrigan-Ossar MF et al. *Anesthesia and Analgesia* 2021;133(3): 562-568

This narrative review summarises the clinical sequelae of use of electronic cigarettes ('vaping') by young people. Uncertainties remain but it seems clear adolescent vaping is common; this may become an increasingly significant consideration for paediatric anaesthetists.

In the USA 27.5% of high school aged children vaped in the past 30 days, 21% of these daily. There is likely to be similar interest amongst adolescents in the UK. The clinical consequences of vaping vary widely. E-cigarettes often contain more nicotine than tobacco cigarettes and may be more addictive. 'E-cigarette or vaping product-use associated lung injury' (EVALI) is a novel lung condition which has a varied (often multisystemic) presentation. Respiratory symptoms are most common, severe cases can proceed to ARDS. Treatment is supportive, covering the entire spectrum of possible treatments for respiratory failure including ECMO. Deaths have been reported, albeit infrequently. After clinical and radiological resolution increased airway reactivity can remain for 2-6 weeks.

Risk factors for EVALI are still emerging; one report found 22% of patients had asthma, vaping more frequently also appears to be a risk factor. In adults, a large cohort study showed vaping was also associated with non-EVALI lung conditions including chronic bronchitis - more common if cannabis is vaped than nicotine.

In terms of definitive peri-operative risks it appears vaping is no better than cigarette smoking for wound healing – likely related to a detrimental effect on tissue oxygenation. Additionally, asymptomatic vapers have ventilation-perfusion mismatching on V-Q scans.

The article recommends all adolescents are screened for vaping at pre-operative assessment and if EVALI is suspected discussion with a respiratory physician and consideration of imaging. At present there is little evidence on management of patients who vape peri-operatively as there is a paucity of data upon which to draw firm conclusions. In summary, be aware and watch this space!

Dr Katherine Brooks

Edited by Dr Kira Achaibar