



Randomized controlled trial on pre-emptive analgesia for acute postoperative pain management in children.

J Lee, E Kim, I Song *et al*

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The usefulness of pre-emptive analgesia for postoperative pain remains controversial. In this prospective randomized controlled trial, 51 children aged 3–7 years, scheduled for corrective osteotomy were randomized into a pre-emptive group (given a fentanyl PCA prior to skin incision) or a control group (where the fentanyl PCA was started 5 minutes thereafter) PCA data, pain scores using verbal rating scale (VRS) and Wong-Baker FACES® (WBFS) pain rating scale, emergence agitation score using the Paediatric Anaesthesia Emergence Delirium (PAED) scale, analgesic requirements, and complications were recorded. The primary outcome, which was pain score at one hour post-operatively, showed no difference between the groups. Both groups did not demonstrate emergence agitation although the emergence agitation score at admission to the recovery unit was lower in the pre-emptive group than in the controls. There were no differences in the delivered volume of PCA fentanyl, frequency of pushing the PCA button, effective push attempts, VRS, WBFS, EAS at discharge from the PACU, additional analgesic requirements, and complications.

<http://onlinelibrary.wiley.com/doi/10.1111/pan.12864/abstract>

Ensuring safe anaesthesia for neonates, infants and young children: what really matters

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Arch Dis Childhood (online)

(accessed 25/3/2016)

The aim of this article is to describe the important perioperative safety issues that matter most to children undergoing surgery and influence outcome in perioperative care. Whilst the focus has been on volatile agents and their potential



neurodevelopmental adverse effects, children undergoing general anaesthesia regularly are at risk of hypotension, hypocapnia, hyperglycaemia/ hypoglycaemia, hypoxaemia and hyponatraemia. Any of these single entities can ultimately affect organ maturation and neurocognitive development in addition to causing serious perioperative cerebral damage, brain death or even death. The particular vulnerability of neonates is discussed, with reference to suggested strategies to address this, namely the NECTARINE trial, the need to define the safe conduct of anaesthesia (safetots), formalisation of training in neonatal anaesthesia and a cross-specialty approach.

<http://adc.bmj.com/content/early/2016/02/02/archdischild-2015-310104.full.pdf>

Usability of dexmedetomidine for deep sedation in infants and small children with respiratory morbidities

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Dexmedetomidine possesses sedative properties with minimal respiratory depression. The medical records of nineteen ASA III children, possessing at least three characteristics of respiratory morbidities and who received dexmedetomidine sedation for MRI scans over a 15-month were retrospectively reviewed. Dexmedetomidine was administered as a bolus of 1 µg/kg over 10 min followed by 1 µg/kg/h infusion. If indicated, an additional bolus dose was given and the infusion rate was increased to 2 µg/kg/h. Respiratory morbidities, haemodynamic parameters, total dexmedetomidine dose, adverse cardiorespiratory events and sedation characteristics were recorded. Of the nineteen included (median age 9 months), seventeen children (89%) had at least four characteristics of respiratory morbidities. All patients completed MRI scans while breathing spontaneously with no airway manipulation. No episodes of adverse respiratory events or haemodynamic instability were observed. Children who were administered a lower dexmedetomidine dose and had a shorter sedation time were more likely to be younger than 1 year of age. The authors conclude that their data demonstrates that dexmedetomidine deep sedation was well-tolerated in children with significant respiratory morbidities. Moreover, children younger than 1 year of age required lower dexmedetomidine dose than older children older for the same level of sedation.

<http://onlinelibrary.wiley.com/doi/10.1111/aas.12715/abstract>



Etiology of postanesthetic and postsedation events on the inpatient ward: data from a rapid response team at a tertiary care children's hospital.

Barry N, M Miller K, *et al.*

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Postoperative events that warrant activation of a crash team or rapid response team (RRT) can occur following paediatric anaesthesia. These American authors have retrospectively reviewed the records of 100 patients for whom the RRT had been activated over a 3-year period in a Paediatric Tertiary Centre.

3.2 per 1000 inpatient encounters triggered a RRT call. 60% of patients were male, 71% were ASA 3 or 4, 5% followed sedation (as opposed to GA) and 4% followed emergency surgery. The average time to RRT call was just over 11 hours. 71 calls were due to respiratory concerns (of which almost 70% of patients were either ex-prem, or had a respiratory disease or recent respiratory illness). 24 calls had cardiovascular concerns (of which over 40% of patients had a cardiac history). 15 calls had neurological concerns (two-thirds had a known neurological condition). Dual concerns occurred in 12 calls. 50% of patients did not require subsequent escalation of care, nor were and further RRT calls necessary. Adeno-tonsillectomy for OSA was done prior to RRT call in 12% of patients. The authors conclude that GA (not sedation), high ASA score, pre-existing acute or chronic conditions and increasing PEWS score may be risk factors for crashing and burning and that respiratory concern is the main cause for RRT activation.

<http://www.ncbi.nlm.nih.gov/pubmed/26972832>



Interventions designed using quality improvement methods reduce the incidence of serious airway events and airway cardiac arrests during pediatric anesthesia.

Spaeth JP, Kreeger R, *et al.*

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Here's a feel-good success story from a Tertiary Paediatric Centre in Cincinnati. Baseline data showed that 2 per 1000 anaesthetics resulted in a serious airway event (anaesthetic-related event that led to an unplanned intubation or admission) or airway cardiac arrest. Enter a Quality Improvement team that planned to reduce by 50% the incidence of serious airway events. They examined current clinical practice and held discussions with front-line staff, after which three improvement interventions were developed: (1) suxamethonium and atropine to be readily-accessible (drawn up) for all cases; (2) nondepolarizing muscle relaxants to be used for intubation in cases over 30 minutes for children under 3 years old; (3) ventilation to be assessed by auscultation or with end-tidal CO₂ prior to PACU transfer (for those anaesthetised at the outpatient facility extubation to occur in awake patients, or otherwise anaesthetist to be present during emergence).

Over 2.5 years, muscle relaxant use increased from 52% to 78% at the base campus and 14% to 81% at the outpatient facility. Cases with readily-available atropine and suxamethonium increased from 55% to 90% at the base campus and 89% to 100% at the outpatient facility. Ventilation was assessed following extubation in 100% at the base campus. Serious airway events and airway cardiac arrests were reduced by 44% and 59% respectively. Happy days!

<http://www.ncbi.nlm.nih.gov/pubmed/26693705>



Changes in intracuff pressure of cuffed endotracheal tubes while positioning for adenotonsillectomy in children.

Olsen GH, Krishna SG *et al.*

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Over-inflation of an endotracheal tube (ETT) cuff can compromise perfusion of the tracheal mucosa. Yet under-inflation comes with risks too and during adenotonsillectomy, utilisation of electrocautery may fuel an airway fire. These authors undertook a prospective study to explore the effect on intratracheal cuff pressure of surgical positioning and preparation for adeno-tonsillectomy. 84 patients were intubated with a Microcuff ETT and cuff pressure was continuously monitored via a modified arterial line transducer on the pilot balloon. Cuff pressures were recorded prior to and following extension of the neck, insertion of a Crowe-Davis retractor and suspension on a Mayo stand. The mean intracuff pressures in the neutral position were 16 H₂O, versus 19 H₂O after positioning for surgery. Interestingly, in a third of patients cuff pressure decreased and in 55% of patients cuff pressure increased after positioning, alarmingly exceeding 30 cm H₂O in almost 15% (in 4 patients this even exceeded 40 cm H₂O). Does this study now further 'pressure' us into using continuous manometry when using a Microcuff ETT? In the UK, the newer Boyle-Davis is generally preferred over the Crowe-Davis but who knows if that makes any difference!

<http://www.ncbi.nlm.nih.gov/pubmed/26956620>



Major Trauma: Assessment and Initial Management.

London: National Institute for Health and Care Excellence (UK); 2016 Feb.

We now have new NICE guidelines on the assessment and initial management of major trauma. There is overlap between adults and children and some aspects applicable to both groups are henceforth described, with an emphasis on those features unique in children.

Pre-hospital management of major trauma should include consideration for intra-osseous access as first-line in children where peripheral access is anticipated to be difficult. Regards assessment of chest trauma, ultrasound or chest XR (not CT scan) should be considered first-line investigation. Chest decompression for tension pneumothorax should only be performed prior to imaging if haemodynamic or severe respiratory instability exists. For active bleeding in hospital a restrictive volume strategy to target maintenance of central circulation should be employed. Do not use crystalloids or tetrastarches (Volulyte / Voluven), rather a ratio of 1 part packed cells to 1 part plasma. With associated traumatic brain injury, cerebral perfusion should be targeted during volume resuscitation. Whole-body CT scans should not routinely be used. Instead, clinical judgement should target suspect areas. Intranasal diamorphine or ketamine should be considered if IV access is not yet established. Family members should be allowed to remain within eyesight of the child and information and support should be provided to family members (including siblings). Staff should receive training on matters such as radiation risk, safeguarding, team work, and managing distressed families.

<http://www.ncbi.nlm.nih.gov/pubmed/26913320>



IV Fluids in Children: Intravenous Fluid Therapy in Children and Young People in Hospital.

London: National Institute for Health and Care Excellence (UK); 2015 Dec

Another NICE guideline, this time on fluid management of children. The guidelines are neatly summarised into six algorithms. Regarding evaluation of hydration status, the role of utilising body surface area, rather than weight, is explored. For fluid resuscitation, an isotonic fluid (tetrastarches should be avoided) of bolus 20 ml/kg over less than 10 minutes is advocated, though more judicious volumes for neonates or children with kidney or heart disease are proposed. When ADH secretion comes into play during routine maintenance, isotonic solutions must be used at 50 to 80% of the Holliday-Segar equation. Neonates are treated differently, particularly in the first 5 days of life. Replacement fluid guidelines consider potassium losses. Outside use in neonates, glucose-containing solutions are not recommended, though it is noted that prolonged starvation times or neuraxial blocks may predispose children to hypoglycaemia. Further research is advocated regarding which group of children might benefit from glucose-containing solutions as well as what glucose concentration is most likely to avoid both hypo- and hyper-glycaemia. Some ideas here for the experimenters and investigators amongst us?

<http://www.ncbi.nlm.nih.gov/pubmed/26741016>



Parecoxib sodium reduces the need for opioids after tonsillectomy in children: a double-blind placebo-controlled randomized clinical trial

Li X, Zhou M, et al.

Canadian Journal of Anaesthesia 2016 Mar;63(3):268-274.

There are issues with administering opioids after tonsillectomies. But what are we left with if non-selective COX inhibitors are not universally utilised either, due to platelet aggregation concerns? These authors sought to determine the analgesic effects of a selective COX-2 inhibitor on children undergoing tonsillectomy.

60 children between 3 and 7 years old were randomised into receiving either placebo saline or 1mg /kg parecoxib (max 40mg) immediately after induction of anaesthesia. All patients underwent a standardised anaesthetic technique. In the parecoxib group, the number of children requiring rescue morphine was significantly lower. The mean amount of morphine given was also significantly lower, as was the time to first rescue morphine dose. There was a significantly lower incidence of PONV too.

The authors note that the safety of parecoxib in larger trials has not yet been established. And the BNF doesn't currently recommend it in children under 18 years old. Gaining ethical approval in Sichuan doesn't seem to have been too much of an issue though.

<http://www.ncbi.nlm.nih.gov/pubmed/26684457>



Preoperative evaluation and comprehensive risk assessment for children with Down's syndrome.

Lewanda AF, Matisoff A, *et al.*

Paediatric Anaesthesia 2016 Apr;26(4):356-62.

A thorough review summarising Down's syndrome (DS), useful not only for interviews. Herewith a brief summary.

Almost 50% of DS children have congenital heart disease, with AVSD the most common defect. Need for endocarditis prophylaxis (IE) should be determined by AHA guidelines (Pediatric Anesthesia is an American journal after all – see the previous edition of Article Watch regarding IE prophylaxis). Just over a quarter of DS children develop bradycardia on sevoflurane induction, and atropine should be immediately available. DS children are predisposed to developing pulmonary hypertension via a number of possible routes, including left to right shunt, upper airway obstruction or lower airway obstruction.

Airway obstruction can occur at a multitude of possible levels, and OSA is common. Subglottic stenosis may be congenital or acquired, so an uncuffed ETT two sizes smaller than predicted is recommended when an LMA is unsuitable. Alternatively a small cuffed tube is used by some practitioners.

Cervical spine instability should be considered and neurological examinations performed pre- and postoperatively. Instability is asymptomatic in 98% and radiological assessment is challenging. The American Academy of Pediatrics no longer recommend routine cervical spine X-rays in children with DS and the value of preoperative flexion and extension cervical spine X-rays is moot, though can be considered. For those with increased atlanto-axial distance, intubation practices vary amongst anaesthetists, from in-line stabilisation to fiberoptic intubation. Positioning for intubation and surgery should be given due regard.

One quarter of DS babies are premature and herewith come associated problems. Haematological disturbances, including thrombocytopaenia and polycythaemia are common, particularly in neonates and infants. Ask parents if they've been administering Piracetam. It's promoted as an enhancer of cognitive function but inhibits platelet function.



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