



Paediatric Adenotonsillectomy, Part 1: Surgical Perspectives Relevant to the Anaesthetist

K.T. Murto, J. Zalan and J-P. Vaccani, BJA Education 2020; 20(6): 184-192

- Obstructive sleep disordered breathing (oSDB) and the Obstructive Sleep Apnoea (OSA) syndrome are different. OSA syndrome is the most severe form of oSDB and is associated with end organ dysfunction. Adenotonsillectomy is performed to arrest or reverse this end organ dysfunction.
- Polysomnography (PSG) is the gold standard for diagnosis of OSA but history and overnight pulse oximetry may also be used to help diagnosis.
- The paediatric pharyngeal airway is smaller in diameter with a higher muscular tone meaning obstructive apnoeas are less common and the Apnoea Hypopnoea Index (AHI) has therefore lower thresholds in children. Airway collapse occurs at a lower more negative critical closing pressure.
- Recurrent tonsillitis is an indication for surgery but there is no agreed consensus on the number or type of infections. In addition, there remains limited evidence to suggest that tonsillectomy for recurrent infections improves quality of life.
- Surgical approaches may include extra capsular tonsillectomy and partial tonsillectomy with comparable efficacy for OSA treatment. No surgical technique has been found to be consistently superior in terms of post-operative pain, bleeding and wound healing.
- Adenotonsillectomy has been shown to normalize sleep studies in 80% of children postoperatively. Long term benefits remain unclear at present.

Reviewed by Dr Katherine Lanigan

Paediatric Adenotonsillectomy, Part 2: Considerations for Anaesthesia

J. Zalan, J-P. Vaccani & K.T. Murto, BJA Education 2020; 20(6): 193-200

- Children scheduled for adenotonsillectomy who are deemed to be at an increased risk of perioperative respiratory adverse events (PRAE) need to be observed postoperatively in hospital. Critical PRAEs are highest within the first 12-24 hours following adenotonsillectomy.
- A suggested approach to risk stratification for overnight monitored admission vs day surgery should include age <3 years, comorbidities, AHI>10 if sleep study available or saturations <80% on PSG. If a sleep study is not available surrogates including at risk questions and overnight pulse oximetry, audiovisual recording and nasal endoscopy may be used.
- The McGill oximetry score is useful in perioperative risk stratification.
- European data suggests age <3 years should be used as a starting point in discussion of risk stratification due to the higher prevalence of severe critical events in this age group

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seen in the literature. Age <3 years alone does not necessarily mandate tertiary paediatric level care.

- Experienced paediatric anaesthetists should look after higher risk children with careful opioid titration.
- Pain management should be multimodal and opioid sparing. Drugs facilitating upper airway muscle relaxation should be used with caution.
- Alpha 2 agonists and ketamine have the least impact on blunting airway neuromotor function. Alternatives to benzodiazepine premedication such as a dose reduction, the use of alpha 2 agonists or parental presence at induction should be considered.
- Multiple factors influence pain scores after adenotonsillectomy including pharmacogenomics. An opioid sparing regime is recommended. Controversy remains regarding the use of NSAIDs. NSAIDs may increase postoperative bleeding but they do significantly improve pain. Other options can include COX2 selective drugs such as celecoxib. If ibuprofen is used delaying administration until after surgery is recommended.
- A single dose of intraoperative dexamethasone can increase bleeding, but the benefits outweigh the risks.
- Local anaesthetics provide only a modest reduction in resting pain. Increased pharyngeal collapsibility may be an unintended consequence.

Reviewed by Dr Katherine Lanigan

Paediatric Anaesthetic Implications of COVID-19 – A Review of Current Literature **Paul Lee-Archer and Britta S von Ungern-Sternberg, Pediatric Anaesthesia April 2020, 1-6, DOI: 10.1111/pan.13889**

This review by Lee-Archer and von Ungern-Sternberg highlights the current information and issues relating to COVID-19 and the paediatric patient. Based on current data, children represent between 1.2 to 2% of all cases and it appears that they are less likely to become infected when exposed. Common symptoms in children include cough, sore throat, fever and gastrointestinal symptoms such as diarrhoea and vomiting. The most common radiological abnormality on CT scanning was unilateral or bilateral opacities or ground-glass opacities. The literature suggests that children experience less severe symptoms than adults and up to 28% may even be asymptomatic.

This review outlines the key aspects of airway management and anaesthesia for children with COVID-19 including appropriate training of staff in particular relating to personal protective equipment and appropriate donning and doffing as well as simulation training. This is vital in protecting healthcare workers. The authors highlight the importance of ensuring that there is appropriate team huddles and checklists in place for these cases. At extubation, there should be extra care as complications such as laryngospasm and the need for re-intubation are likely more common in the paediatric population.

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This article highlights that multidisciplinary systems need to be in place to deal with these patients and anaesthetists are well placed to lead airway management and anaesthesia of these children with the key principles being careful planning and training with good organization and communication.

Reviewed by Dr Su May Koh

Incidence of paediatric unplanned day-case admissions in the UK and Ireland: a prospective multicentre observational study

Zoe Green et al., British Journal of Anaesthesia, 2020, 124 (4): 463-472

This comprehensive prospective multicentre evaluation of unplanned admissions from paediatric day-case procedures across the UK and Ireland identified an unplanned admission rate of 2.5% (95% CI 2.3-2.6%). Failure to discharge after planned day-case surgeries can have negative impacts on patients and families and interferes with hospital bed management planning.

Methods

All children aged 16 and under over a 6-week period in 2017 undergoing general anaesthesia for a procedure were recruited. De-identified patient data were collected including surgical procedure type and duration along with anaesthesia risk factors and reasons for unplanned admissions.

Results

25986 cases were recruited from 93 hospitals across the UK and Ireland, of which 640 (2.5%) were unplanned admissions. Independent risk factors for unplanned admissions were higher ASA physical status, duration of procedure and surgical specialty (ENT, cardiology, orthopaedics/trauma and general surgery). The commonest reasons for admission were unexpected surgical complexity, pain, postoperative nausea and vomiting and late finish. Potential limitations were the fact that patients were excluded if they arrived into recovery after 2100, which may not capture the truly over-running lists and prolonged procedural duration which would highlight inappropriate surgical case selection. Readmission rates were also not examined as patients may potentially have been discharged but readmitted later that day with potential complications of early discharge.

Conclusions

Paediatric patient ASA physical status (3/4 vs 1/2) and particular surgical specialties and cases (e.g. ENT adenotonsillectomies) as well as duration of surgery were common risk factors for unplanned day surgery admissions. The most common group of reasons for unplanned admissions was surgical (38.4%) with unexpected surgical complexity being the most frequent cause. Postoperative discomfort (36.2%), post-operative nausea and vomiting (10.7%) and social factors (20.2%) also contributed to unplanned admissions.

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Take home messages

This is a large prospective observational study looking at an important issue. It certainly highlights areas which we can target in the future including increased preoperative assessments prior to the day of surgery to help identify these higher ASA patients and more complex surgeries as well as potential social factors that may impact on the day of surgery. It is important to note that the odds of an unplanned admission for ASA 3 or 4 patients were almost three times higher than that for ASA 1 patients. This study also found that with every 15-minute increase in duration of surgery, the odds of an unplanned admission increased by 4%.

Reviewed by Dr Su May Koh

Ultrasonographic evaluation of gastric emptying after ingesting carbohydrate-rich drink in young children: A randomized crossover study

Yan-Ling Zhang et al., *Pediatric Anesthesia* 2020; 30(5): 599-606

This article explores the issue of preoperative drinks and what constitutes a safe method of offering children preoperative hydration and minimizing the metabolic effects of fasting without increasing the risk of aspiration. The researchers conducted a small randomised crossover study using real time ultrasound to examine gastric emptying at certain time periods post ingestion of a carbohydrate (CHO) rich drink compared to 5 % glucose solution. Additional subjective outcomes included taste and perceived hunger. Only data from 16 individuals were analyzed. The study concluded that compared to 5% glucose solution, gastric emptying was slower with CHO drinks, with gastric volumes returning to baseline after 90 minutes in the CHO group. However, for both drinks at 60 minutes following a 5ml per kg fluid drink, there is minimal gastric fluid volume which is not deemed to pose an aspiration risk. Interestingly the perceived degree of thirst was lower in the 5% glucose group than the CHO rich drink group. This study focused on healthy children with no history of gastric pathology or use of medications. More research is required to apply this to a hospital population.

Reviewed by Dr Renee Burton

Sugammadex and Neuromuscular Reversal: Special Focus on Neonatal and Infant populations

Eliot Grigg, *Current Opinion in Anesthesiology*; 2020; 33(3): 374-80

- Review of sugammadex pharmacology but only small section specific to infants and neonates, largely due to the scant literature available.
- FDA approval obtained in 2015 but not for use in children. In Europe, sugammadex is approved in children 2-17 years old for routine reversal only.
- Higher dosing for the reversal of vecuronium may be warranted as lower affinity results in delayed recovery of TOF 0.9 (by <2 mins) and potential recurrence of neuromuscular blockade.

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- Incidence of hypersensitivity is around 0.1% in children.
- Multiple studies demonstrating similar times to TOF 0.9 in infants/children as in adults.

Take home messages

Current literature suggests that sugammadex is well tolerated and very effective in children older than 2 years. However, overall literature in children less than 2 years old remains scant.

Reviewed by Dr Philip Cheung

Edited by Dr Su May Koh

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