Tonsillectomy and adenoidectomy in children with sleep-related breathing disorders: consensus statement of a UK multidisciplinary working party

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ABSTRACT

During 2008, ENT-UK received a number of professional enquiries from colleagues about the management of children with upper airway obstruction and uncomplicated obstructive sleep apnoea (OSA). These children with sleep-related breathing disorders (SRBDs) are usually referred to paediatricians and ENT surgeons.

In some district general hospitals, (DGHs) where paediatric intensive care (PICU) facilities to ventilate children were not available, paediatrician and anaesthetist colleagues were expressing concern about children with a clinical diagnosis of OSA having routine tonsillectomy, with or without adenoidectomy.

As BAPO President, I was asked by the ENT-UK President, Professor Richard Ramsden, to investigate the issues and rapidly develop a working consensus statement to support safe but local treatment of these children.

The Royal Colleges of Anaesthetists and Paediatrics and Child Health and the Association of Paediatric Anaesthetists nominated expert members from both secondary and tertiary care to contribute and develop a consensus statement based on the limited evidence base available.

Our terms of reference were to produce a statement that was brief, with a limited number of references, to inform decision-making at the present time.

With patient safety as the first priority, the working party wished to support practice that facilitated referral to a tertiary centre of those children who could be expected, on clinical assessment alone, potentially to require PICU facilities. In contrast, the majority of children who could be safely managed in a secondary care setting should be managed closer to home in a DGH. BAPO, ENT-UK, APA, RCS-CSF and RCoA have endorsed the consensus statement; the RCPCH has no mechanism for endorsing consensus statements, but the RCPCH Clinical Effectiveness Committee reviewed the statement, concluding it was a 'concise, accurate and helpful document'.

The consensus statement is an interim working tool, based on level-five evidence. It is intended as the starting point to catalyze further development towards a fully structured, evidence-based guideline; to this end, feedback and comment are welcomed. This and the constructive feedback from APA and RCPCH will be incorporated into a future guideline proposal.

This consensus statement is also being published by all the working party host organisations and will appear in the *RCoA Bulletin*, *Clinical Otolaryngology* and on the RCPCH website

KEYWORDS

Consensus statement – Children – Sleep-related breathing disorders – Tonsillectomy – Adenoidectomy

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In the UK, 12% of children aged 4–5 years of age snore on a regular basis.¹ They may have associated nocturnal and day-time symptoms; a small proportion develop complications including failure to thrive, poor school performance, secondary enuresis, and rarely, cor pulmonale.

The snoring child forms a continuum of disease severity from primary snoring without impairment of oxygenation or ventilation and without sleep disruption to obstructive sleep apnoea (OSA).

OSA is a disorder of breathing during sleep characterised by

prolonged partial upper airway obstruction and/or intermittent complete obstruction that disrupts normal ventilation during sleep and normal sleep patterns.² Upper airway obstruction may result in distinct apnoeic events, or hypopnoea, or increased work of breathing seen in upper airway resistance syndrome, all of which come under the umbrella of sleep-related breathing disorders (SRBDs). This document deals with SRBD related to upper airway obstruction. Of children presenting with clinically significant SRBDs, 80% have their symptoms effectively managed by adenotonsillectomy.

The natural history of SRBD, where a child changes from normality to abnormality, and where the risks of developing complications of the condition outweigh the risks of surgical intervention, has not been established.

It is not known which children with relatively mild forms of SRBD benefit from adenotonsillectomy. In the UK, the decision to operate is usually a clinical one, based on the severity of symptoms (both day- and night-time) and presence of complications.

Studies from North America report high rates of respiratory complications of 20–25% following adenotonsillectomy.^{3–5} However, these studies involved selected populations with high levels of co-morbidity and OSA proven on polysomnography.

There are no published case series from the UK. There are two case series published from the US describing children undergoing adenotonsillectomy (one for SRBD only) with relatively low levels of co-morbidity where the decision to operate on the children was made clinically.^{6,7} These studies are more consistent with the situation in the district general hospital (DGH) in the UK; they quote significant respiratory complication rates of 1.3% and 2.3%. From these studies and personal experience, we may conclude that, for the majority of children, adenotonsillectomy for SRBD may safely be undertaken in the DGH.

Clinical management considerations

The majority of children who develop peri-operative problems following adenotonsillectomy have conditions that are readily apparent. They can be easily identified as an ‘at-risk’ group on clinical assessment in the out-patient clinic (*e.g.* underlying syndrome, severe co-existent condition, extremes of weight). The ‘normal child with severe OSA’ is also at-risk of peri-operative problems but is much more difficult to identify. Proxy clinical information includes frequent sleep disturbance, obstructed mouth breathing and severe difficulty chewing and swallowing solid food.

In the normal child with severe nocturnal symptoms including a history of witnessed apnoea, investigations short of polysomnography may help to identify severe OSA. Overnight oximetry will identify a child with repeated falls in saturation below 80%.⁸ If repeated desaturations are identified, 12-lead electrocardiogram and plain chest radiography may be helpful in identifying pulmonary hypertension, which may ultimately lead to right heart failure.

Table 1 Indications for paediatric respiratory investigations

- Diagnosis of OSA unclear or inconsistent
- Age < 2 years
- Weight < 15 kg
- Down’s syndrome
- Cerebral palsy
- Hypotonia or neuromuscular disorders
- Craniofacial anomalies
- Mucopolysaccharidosis
- Obesity (body mass index > 2.5 standard deviation scores or > 99th centile for age and gender)
- Significant co-morbidity such as congenital heart disease, chronic lung disease
- Residual symptoms after adenotonsillectomy

Both these groups of ‘at-risk’ children require treatment in a specialist centre and should be referred for further investigation and surgical management.

Otherwise-well children requiring surgery (usually tonsillectomy and/or adenoidectomy) for symptoms suggestive of mild obstructive sleep apnoea/hypopnoea,⁹ can generally be managed safely in a DGH setting. Where these children are managed as day-case admissions, this should be on a morning operating list, where the anaesthesia and surgery are delivered or appropriately supervised by consultants with expertise and experience in managing children undergoing these operations. These children should be managed in a children’s day-surgery ward or unit and operated upon during dedicated children’s operating lists, where all staff have the requisite training and experience.

It is well recognised that a proportion of children with severe OSA are acutely sensitive to the respiratory depressant effects of opioids and inhalational anaesthetic agents.¹⁰ Avoidance or careful titration of opioids is advised.

A proportion of children with SRBD develop respiratory complications in the peri-operative period, severe enough to require an increased level of postoperative care (up to and including postoperative ventilation) not routinely provided in UK general hospitals. Only a limited number of clinical studies have been undertaken and they provide an incomplete picture to guide clinical care.

Children with severe OSA or significant co-morbidity must be referred for pre-operative paediatric respiratory assessment; these children will usually require surgical management in a paediatric centre with direct and immediate access to PHDU and PICU, when required.

This consensus position statement represents a summary of expert opinion, based on limited evidence, to provide clinical guidance on which children might potentially safely

Table 2 Children at risk from respiratory complications unsuitable for DGH adenotonsillectomy

- Age < 2 years
- Weight < 15 kg
- Failure to thrive (weight < 5th centile for age)
- Obesity (body mass index > 2.5 standard deviation scores or > 99th centile for age and gender)
- Severe cerebral palsy
- Hypotonia or neuromuscular disorders (moderately severely or severely affected)
- Significant craniofacial anomalies
- Mucopolysaccharidosis and syndromes associated with difficult airway
- Significant co-morbidity (e.g. congenital heart disease, chronic lung disease, ASA 3 or above)
- ECG or echocardiographic abnormalities
- Severe OSA (described by polysomnographic indices including Obstructive Index > 10, Respiratory Disturbance Index > 40, and Oxygen saturation nadir < 80%)

undergo adenotonsillectomy in a general hospital setting, and which should be referred to centres with PICU facilities.

Conclusions

- Our knowledge of the epidemiology, pathophysiology, complication rate and threshold for surgical treatment of SRBD in children is incomplete.
- Postoperative severe respiratory complications requiring paediatric intensive care unit facilities (and postoperative ventilation) in children undergoing adenotonsillectomy for SRBD occur, but, in a typical non-selected population presenting to a UK DGH, are probably uncommon. This should allow the majority of children to be managed in the DGH setting by appropriately trained personnel with sufficient caseload to maintain skills.

- A relatively discrete population (Table 2) is at additional risk and should be operated on in the regional/sub-regional centre able to provide an additional tier of post-operative respiratory care.
- The identification of the otherwise normal child with severe OSA is difficult clinically. They have an increased risk of postoperative respiratory problems and may be picked up by nocturnal pulse oximetry.
- Additional research is required in a UK setting to answer many of the questions relating to the snoring child.

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Appendix 1: Working party members

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