

# Anaesthetic management of children with obstructive sleep apnoea syndrome

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## Citation

S Shanbhag, J Montgomerie. *Anaesthetic management of children with obstructive sleep apnoea syndrome*. The Internet Journal of Anesthesiology. 2007 Volume 18 Number 2.

## Abstract

### Introduction:

Children with obstructive sleep apnoea syndrome (OSAS) are at significant risk of perioperative complication. Diagnostic tests like polysomnography and nocturnal pulse oximetry may be limited due to constraints of resource and staffing. Diagnosis by clinical symptoms like snoring and witnessed apnoeas is commonly used. There is risk of missing cases of OSAS who are asymptomatic or symptoms not noticed by the parents. OSAS associated with certain clinical conditions further increases risks associated with anaesthetic

### Methods:

The aim of the study was to look at anaesthetic management of OSAS in our hospital. We looked at management of 32 patients with OSAS over the 1 year retrospectively using patient notes, anaesthetic charts and operative records.

### Results:

The diagnosis of OSAS in majority of the children was based on clinical symptoms. There was no variation from normal anaesthetic practice in most patients. Difficult laryngoscopy was encountered in some patients and fiberoptic intubation was needed in 1 patient. Some patients required admission to high dependency unit postoperatively for intensive monitoring.

### Discussion:

There are no guidelines for use of investigations like polysomnography for accurate diagnosis and risk stratification of children with OSAS. Successful conduct of anaesthetic requires careful planning and anticipation of potential problems.

## INTRODUCTION

Obstructive Sleep Apnoea (OSA) has an incidence of 1.5 - 3 % in children <sup>1</sup>. It is commonest between the ages of 3 - 7 years although it can occur at any time after 4 months of age. The male: female ratio is 2:1. 85% of sleep apnoeas in children are obstructive in origin <sup>1</sup>. About 10% are central and 5% mixed <sup>1</sup>. Common symptoms include snoring, noisy breathing, observed apnoeas and day time somnolence. Polysomnography is used to assess the severity of the disease <sup>2</sup>. OSA is defined as an oxygen saturation drop of more than 2% associated with an apnoea of more than 10 seconds and a decrease in airflow of at least 50% <sup>2</sup>. A breathing related arousal (BRA) is defined as a drop in airflow of more than 30% with a change in breathing pattern and an arousal and at least a 1% drop in oxygen saturation. Respiratory disturbance index (RDI) is the sum of these two (OSA & BRA) per hour. A RDI greater than 10 is a risk factor for postoperative complications. OSAS is obstructive sleep apnoea accompanied by day time symptoms like

excessive somnolence. Associated risk factors include young age (< 3years), failure to thrive, cor-pulmonale, neuromotor disease, craniofacial abnormalities, chromosomal abnormalities, history of prematurity, recent respiratory infections, obesity etc <sup>3</sup>. Postoperative paediatric intensive care unit (PICU) admission may be required in these patients. Polysomnography is a gold standard investigation in children with OSA. It is useful for accurate diagnosis and severity grading <sup>4</sup>. Nocturnal pulse oximetry is another useful diagnostic tool.

Risks associated with the anaesthetic include difficult airway, difficult intubation, hypoxia, cardiovascular instability, residual action of drugs used during anaesthesia, and postoperative apnoeas.

## METHODS

The aim of this audit was to look at anaesthetic management of children with OSAS

in our hospital. The audit was registered with the hospital clinical audit committee and ethics committee approval was deemed not necessary. We retrospectively identified patients with OSAS who had an anaesthetic for any type of surgery or diagnostic scan from August 2006 to August 2007.

Details of the demographic data, preoperative factors, intraoperative anaesthetic management, and postoperative care were collected from the anaesthetic chart, operative record, and patient notes.

**RESULTS**

We identified 32 children with OSAS who had anaesthetic for surgery or diagnostic scan in 1 year (August 2006-August 2007).

**PREOPERATIVE FACTORS**

Age groups varied from 11 months - 5 years

Male /female ratio was 24 / 8.

**Figure 1**

Table 1: Case Distribution

Anaesthetic for	no. of patients
ENT surgery	27
Neurosurgery	2
Craniofacial surgery	1
Paediatric Investigations	2

**Figure 2**

Table 2: Diagnosis of OSAS by

Speciality	no. of patients
ENT consultant	17
Respiratory Physician	8
General Practitioner	5
Others	2

**Figure 3**

Table 3: Diagnostic Criteria used

Diagnostic Criteria	no. of patients
Polysomnography	6
Nocturnal pulse oximetry	2
Polysomnography and nocturnal pulse oximetry	2
Clinical symptoms	22

Complex congenital anomaly in association with OSAS was seen in 3 children and 1 required home continuous positive airway pressure (CPAP).

**INTRAOPERATIVE FACTORS**

There was even distribution between gas induction (17/ 32) and intravenous anaesthetic induction (15/ 32). Tracheal intubation was used for airway management in all patients. Fibreoptic bronchoscope was used for intubation in 1 patient with history of difficult intubation during previous anaesthetic. Grade 3 views on laryngoscopy were seen in 2 patients requiring anterior tracheal pressure and gum elastic bougie to achieve intubation.

**Figure 4**

Table 4: Laryngoscopy Grades (Cormack & Lehane)

Laryngoscopy grades	no. of patients
Grade 1	25
Grade 2	4
Grade 3	2
Grade 4	0

Opioid analgesics were used in 31/ 32 patients. Fentanyl and codeine were most commonly used opioids. No major intraoperative complications were encountered apart from transient oxygen desaturation in 2/ 32 patients.

**POSTOPERATIVE FACTORS**

Paediatric intensive care unit (PICU) admission for observation was required in 2/ 32 patients. Majority of the patients were looked after in the ward with overnight pulse oximetry requested in 6/ 32 patients. Postoperative CPAP was required in 1 patient who was on home CPAP

**DISCUSSION**

Difficult intubation is common in children with OSA. Every patient diagnosed with OSAS or with clinical suspicion of OSAS, should be considered to have a difficult airway, until proven otherwise and consequently has increased risk of anaesthesia.

The universal availability of investigations like Polysomnography is constrained by resource and staffing issues. There are no guidelines for use of investigations like polysomnography in children with OSAS. Polysomnography is useful for risk stratification and its use is limited to OSA with associated high risk factors. Preoperative assessment should identify any high risk associations with OSAS. Difficult intubation trolley should be readily available in theatre. Opioids should be used with caution and regional analgesic techniques may be useful. Risk groups require PICU admission and intensive postoperative monitoring.

**SUPPORT**

Support was provided only from department sources.

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