ABSTRACT

Adeno-tonsillar hypertrophy is one of the main causes of upper airway obstruction and Obstructive Sleep Apnoea Syndrome (OSAS) in children. Studies have shown that adeno-tonsillectomy significantly improved oxygen saturation in children with sleep-disordered breathing. This study was undertaken to evaluate the effect of adeno-tonsillectomy on quality of life in children with sleep-disordered breathing and on oxygen saturation measured through nocturnal pulse oximetry in children.

Methods: Sixty children suspected of having sleep-disordered breathing and who subsequently underwent adeno-tonsillectomy were randomly selected for this study. Quality of life was evaluated pre- and post-operatively by questionnaire and the symptoms were scored depending on its frequency of occurrence. Pre- and post-intervention nocturnal oxygen saturation was monitored and recorded. Oxygen desaturation index (ODI) as well as desaturation events were recorded. The data was analysed using paired student t-test and Wilcoxon’s Signed Rank Test.

Results: Out of the 60 study population, 36 (60%) were males and 24 (40%) were females. Age distribution of the population ranged from 6 to 12 years with a mean age of 8.2 years. There was a significant improvement in the quality of life of these children after the surgery. The study showed a positive correlation between grade of adeno-tonsillar hypertrophy and ODI (r=0.25). The pulse oximetric parameters improved after adeno-tonsillectomy (p<0.05). There was also significant improvement in the quality of life of these children after the surgery.

Conclusion: Adeno-tonsillectomy was found to be effective in children with sleep disordered breathing. It can be recommended as the primary surgery as it substantially reduced the morbidity and health care utilisation by these children.

Keywords: Sleep-disordered breathing; obstructive sleep apnoea, adeno-tonsillectomy; pulse oximetry.

INTRODUCTION

Sleep medicine has undergone a revolution since the first description of abnormal airway during sleep in patients with Pickwickian syndrome in 1965[1]. Sleep disordered breathing (SDB) refers to a spectrum of disorders that ranges in severity from primary or simple snoring, through upper airway resistance syndrome (UARS) and, in its most severe form, obstructive sleep apnoea syndrome (OSAS)[2]. OSAS was first reported in children by Guillemainault et al. (1976) following which recognition of abnormal breathing has progressed[2].

Sleep disordered breathing

Sleep-disordered breathing is a spectrum of airway obstruction during sleep which encompasses[2].

- Primary snoring (PS).
- Upper airway resistance syndrome (UARS).
- Obstructive sleep apnoea (OSA).

In the general population, OSAS is one of the most prevalent SDB conditions, affecting adults as well as children. Prevalence of OSA in childhood is around 2-
3% affecting all ages; and peaks between 2-8 years. Frequent snoring is reported by parents in 3-15% children, while prevalence of reported apnoeic events is 0.2-4%.

(a) **Primary Snoring:**

Primary snoring has been defined as snoring during sleep without associated apnoea, gas exchange abnormalities, or excessive arousals. Approximately 10% of children snore during sleep on most or all nights, and the majority of these children have primary snoring (PS). The prevalence of primary snoring is estimated to be 3-12%. Major risk factors for snoring in otherwise healthy children are obesity, decreased nasal patency (rhinitis, septal deviation, nasal obstruction), and adenotonsillar hypertrophy.

(b) **Upper Airway Resistance Syndrome**

Upper airways resistance syndrome is a more subtle form of sleep-disordered breathing than OSA. Children with UARS snore and have partial upper airway obstruction that leads to repetitive episodes of increased respiratory effort ending in arousals and sleep fragmentation. This disorder is more common than OSA but is often underdiagnosed. Children with UARS have no evidence of apnoea, hypopnoea, or gas exchange abnormalities on polysomnography.

(c) **Obstructive Sleep Apnoea Syndrome**

OSA is defined by the American Thoracic Society (ATS) as ‘a disorder of breathing during sleep characterized by prolonged partial upper airway obstruction and/or intermittent complete obstruction (obstructive apnoea) that disrupts normal ventilation during sleep and normal sleep patterns’. Approximately 1% to 3% of all children will have OSAS, and as many as 40% of snoring children referred to a sleep clinic or otolaryngologist may have OSA. OSAS is characterized by recurrent episodes of upper airway collapse during sleep.

The International Classification of Sleep Disorders 2nd edition (ICSD II) by the American Academy of Sleep Medicine (AASM) defines apnoea as the cessation of airflow for at least 10 seconds over two or more respiratory cycles. Sleep apnoea syndrome is diagnosed when 30 or more episodes occur during a 7-hour sleep period. Hypopnea is defined as a recognizable transient reduction (but not complete cessation) of breathing for 10 seconds associated with oxygen desaturation of 4% or more. The degree of hypoxia is influenced by the duration of the apnoea event, the condition of the cardiopulmonary system and whether a coexisting neuromuscular disorder is present. Apnoea hypopnoea index (AHI) indicates the severity of OSA. It is the number of apnoea and hypopnoea per hour of sleep. It is agreed that an apnoea-hypopnoea index greater than 1 is abnormal in a child.

Sleep-related upper airway obstruction can lead to a variety of night-time and daytime symptoms in children. It causes significant sleep disruption. This can lead to daytime neurobehavioural problems such as an increase in total sleep time, hyperactivity, irritability, bed-wetting and morning headaches. If diagnosis and treatment of OSAS are delayed, sequelae like cor pulmonale, failure to thrive and long-lasting neurobehavioural consequences may occur.

The diagnosis of obstructive sleep-disordered breathing is reached by sleep based history and physical examination. The clinical history and examination will identify most children with sleep disordered breathing. Specific questionnaires are designed to complement the clinical history for screening and identifying severe cases.

The gold standard investigation for sleep disorders is full polysomnography. Pulse oximetry is another screening tool. It relies on indirect measurement of the arterial oxygen saturation using a probe (pulse oximeter), usually applied to the finger. It is minimally invasive, and can be undertaken even at home. Pulse oximetry has a high positive predictive value of approximately 97 percent. It is not effective in mild-to-moderate OSA, with a low negative predictive value of approximately 47 percent. Therefore, children with negative results on screening studies should undergo a more comprehensive evaluation. Since the most common cause of OSAS in children is adenotonsillar hypertrophy, adenotonsillectomy is accepted to be the first line of treatment.

The correlation of adenotonsillar hypertrophy and impact on the quality of life in children is intended to be studied. The overall efficacy of adenotonsillectomy (AT) in treatment of obstructive sleep apnoea syndrome (OSAS) in children is unknown. Although success rates are likely lower than previously estimated, factors that promote incomplete resolution of OSAS after adenotonsillectomy remain undefined.
Aims and Objectives of the study were
1. To study the impact of adeno-tonsillectomy on the quality of life in children with sleep disordered breathing (SDB)
2. To correlate the effect of adeno-tonsillar hypertrophy assessed clinically and radiologically on overnight oxygen saturation.
3. To determine whether adeno-tonsillectomy is effective in improving SDB in children.

REVIEW OF LITERATURE
Since the first report of obstructive sleep apnoea syndrome (OSAS) in children by Guilleminault et al. in 1976, recognition of abnormal breathing during sleep has progressed. Guilleminault et al. reported that in their sample of eight children with excessive daytime sleepiness and learning difficulties at school improved behaviour 3-months post adeno-tonsillectomy and by 6 months improved hyperactivity symptoms.\(^7\)

Methods to help identify SRBDs without the expense of polysomnography could greatly facilitate clinical and epidemiological research. There are several clinical assessment scores to evaluate the quality of life in OSAS in children.

Chervin et al developed and validated a Paediatric sleep questionnaire that can be used to investigate the presence of childhood SRBD.\(^8\) It is a 22-item score with sensitivity of 0.85 and a specificity of 0.87. They concluded that scales for snoring, sleepiness, and behaviour are valid and reliable instruments that can be used to identify SRBDs or associated symptom in clinical research when polysomnography is not feasible.

Using the OSA-18 quality of life survey, Goldstein and associates found similar improvements in quality of life, again with the most significant improvements seen in the domains of sleep disturbance, caregiver concerns and physical discomfort, with concomitant improvements in behaviour after adeno-tonsillectomy.\(^9\) In their study they found children with a positive clinical assessment of OSA but negative polysomnography (PSG) have significant improvement after adeno-tonsillectomy, thus validating the clinicians role in the diagnosis. They evaluated 30 snoring children referred to a paediatric otolaryngology clinic using a focused history and physical examination in addition to a review of audiotaped breathing of the children during sleep.

Mitchell and co-workers assessed behavioural abnormalities in children with OSAS using the Behavioural Assessment System for Children before adeno-tonsillectomy, and again within 6 months after surgery and 9 to 18 months after surgery.\(^10\) These investigators found improvements in behavioural measures after adeno-tonsillectomy that seemed to persist during long-term follow-up, although to a lesser degree than seen shortly after surgery. It is not clear, however, if the cognitive and behavioural complications of OSAS are completely reversible.

De Serres and colleagues reported the results of a multicentre study of quality of life changes after adeno-tonsillectomy in children who had adeno-tonsillectomy for treatment of obstructive sleep disorders\(^11\). Large changes in quality of life were documented in almost 75% of children, with the most improved domains being sleep disturbance, caregiver concerns, and physical suffering.

Brietzke and co-workers in a systematic review of the literature and meta-analysis on the effectiveness of tonsillectomy and adenoidectomy in the treatment of Paediatric Obstructive Sleep Apnoea Syndrome found adeno-tonsillectomy to be effective in the treatment of OSA. They found that 11 of 12 articles in the literature concluded that clinical assessment is inaccurate in the diagnosis of childhood OSAS.\(^12\) Although the clinical history may not be diagnostic, a thorough evaluation of daytime and night-time symptoms is helpful in planning subsequent studies and interpreting the findings. They found a post-surgery reduction in AHI by approximately 14 events per hour. The summary success rate was 83%.

Gozal and Kheirandish reported a cure rate of 77% in a recent review but noted residual OSAS in up to 45% of children after adeno-tonsillectomy in their own prospective study.\(^13\) More snoring and increased inspiratory effort during sleep were noted in teenagers studied 12 years after adeno-tonsillectomy. This finding emphasizes the need for long-term study of both the natural history of and treatment outcomes for OSAS in children.

Several studies show behavioural and neurocognitive improvement following adeno-
tonsillectomy in children with sleep disordered breathing.

Chervin and co-workers in their study found that children undergoing adeno-tonsillectomy for any clinical indication with suspected sleep-disordered breathing had increased hyperactivity, inattention, and daytime sleepiness were more likely to be diagnosed with attention deficit-hyperactivity disorder than control children undergoing other surgical procedures [14]. Avior et al assessed attention in 19 children with SDB before and 2 months after adeno-tonsillectomy, demonstrating that neurocognitive changes occur within the first 2 months after treatment [15].

Sohn H and co-workers in their study on Quality of life of children with obstructive sleep apnoea after adeno-tonsillectomy found that the relationship between the OSA-18 summary score and respiratory distress index remained significant [16].

Gottelib DJ et al assessed the prevalence of SDB symptoms in 5 year old children and found it to be associated with an increased risk of problem behaviours, attention-deficit hyperactivity disorder [17].

**METHODOLOGY**

This study was undertaken in the department of ENT, Bangalore Medical College & Research Institute, Bangalore from August 2014 to July 2016. Sixty (60) children aged 6-12 years with symptoms and signs suggestive of adeno-tonsillar hypertrophy and SDB, who met the inclusion criteria were randomly enrolled for the study. Demographic data, medical history, concomitant medications, clinical examination including recording of vital signs, lab investigations and details were recorded in the study proforma. The study was conducted prior to adeno-tonsillectomy until three months (12 week) after the surgery. Patient’s physical parameters like weight and height, BMI were recorded. Radiological study of Nasopharynx was done to know nasopharyngeal air-way. Measurement of oxygen saturation was done by nocturnal pulse oximetry. The children were programmed for evaluation by pulse oximetry 1-2 days before and 3 months after the surgery, by keeping the child in observation room. Pulse oximeter, which has a memory upto72 hours, was used for this study. Oximetric monitoring both pre- and post-operatively was carried out. The following variables were studied:

- Total number of desaturations of > 4%,
- Oxygen desaturation index (ODI)
- Mean saturation and
- Minimum saturation.

ODI is defined as the total number of desaturation events divided by the total duration of sleep in hours. A desaturation event was considered when the haemoglobin saturation level (SaO2) fell below 4% from baseline saturation. Falls in oxygen saturation to >4% in the interval 90–100% of saturation was also considered as desaturations. ODI was obtained for each patient with three cut off points; >5: (ODI-5), >10: (ODI-10), >15: (ODI-15). The data collected were analysed in oximetric and heart rate distribution tables. Validity of the test was approved if the duration of oximetric monitoring was 6 hours or more and if oxygen saturation data was reliable and compatible with pulse rate according to the pulse rate variable recorded in the memory of pulse oximeter. After obtaining fitness for surgery patients were taken up for adeno-tonsillectomy under general anaesthesia. All surgical procedures were performed under general anaesthesia with orotracheal intubation. After surgery, the children were closely monitored for any probable bleeding and complications for atleast 24 hours. Thereafter, they were re-evaluated in 3 months’ period.

Assessment tools: Treatment response was assessed by

OSA-18 survey on quality of life improvement before and after the surgery.

Pulseoximetric evaluation of the subjects pre- and postoperatively to assess the improvement in oxygen saturation.

Statistical analysis: Pre- and post-operative oximetric variables were analysed using paired student t-test or Wilcoxon’s signed rank test depending on the variables. Correlation between variables was considered using Pearson correlation test.

**RESULTS**

Out of the 60 study population, 36 were males (60%) and 24 were females (40%). Age distribution of the population ranged from 6 to 12 years with a mean age of 8.2 years.

Most of the patients were between 6-8 years of age. Majority of study population (58.3%) had grade
III tonsils (enlarged tonsils that come in contact with uvula).

Majority of study population (50%) had Grade III adenoids (enlarged adenoids filling from 2/3rd of vertical portion of choanae to nearly complete obstruction). The correlation between grades of adenotonsillar hypertrophy and ODI score was assessed using Pearson correlation test. The test showed correlation coefficient r 0.25 indicating a positive correlation.

ODI grade: The Oxygen Desaturation Index (ODI) was graded as shown below and the pre-operative and post-operative values were compared.

<table>
<thead>
<tr>
<th>GRADE</th>
<th>PRE OP</th>
<th>POST OP</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>&lt;5</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>5-10</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>10-15</td>
<td>20</td>
<td>33.33</td>
</tr>
<tr>
<td>&gt;15</td>
<td>26</td>
<td>43.33</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

Table: showing Oxygen Desaturation Index

Pre-operatively most of the patients had ODI grade >15 (43.33%) while post-operatively majority have ODI grade <5 (80%). Paired-t test was used to analyse whether the postoperative ODI had significantly reduced compared to preoperative ODI. Average ODI score preoperatively was 15.11 ± 5.4 and that postoperatively was 3.48 ± 2.3. p value was significant (p < 0.05).

Evaluating the Quality of life pre-and post-operatively among study population.

To evaluate the continuous scores of quality of life questionnaire non-parametric Wilcoxon’s Signed Rank Test was used. The following observations were made:

Snoring:
Preoperatively most of the patients (45%) had snoring very often and postoperatively majority (58.3%) had snoring sometimes. The p-value was significant (p < 0.05)

<table>
<thead>
<tr>
<th>Snoring</th>
<th>PRE OP</th>
<th>POST OP</th>
<th>Wilcoxon’s Signed Rank test p VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0 %</td>
<td>0 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Almost none</td>
<td>0 %</td>
<td>18 %</td>
<td>30 %</td>
</tr>
<tr>
<td>Sometimes</td>
<td>9 %</td>
<td>15 %</td>
<td>35 %</td>
</tr>
<tr>
<td>Often</td>
<td>18 %</td>
<td>30 %</td>
<td>7 %</td>
</tr>
<tr>
<td>Very often</td>
<td>27 %</td>
<td>45 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Every time</td>
<td>6 %</td>
<td>10 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Total</td>
<td>60 %</td>
<td>100 %</td>
<td>60 %</td>
</tr>
</tbody>
</table>

Table 2: Showing preoperative and postoperative snoring among study population

Restlessness at night:

<table>
<thead>
<tr>
<th>Restlessness at night</th>
<th>PREOP</th>
<th>POSTOP</th>
<th>Wilcoxon’s Signed Rank test p VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0 %</td>
<td>0 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Almost none</td>
<td>4 %</td>
<td>5 %</td>
<td>3 %</td>
</tr>
<tr>
<td>Sometimes</td>
<td>1 %</td>
<td>2 %</td>
<td>7 %</td>
</tr>
<tr>
<td>Often</td>
<td>3 %</td>
<td>11.66 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Very often</td>
<td>7 %</td>
<td>0 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Every time</td>
<td>0 %</td>
<td>0 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Total</td>
<td>6 %</td>
<td>100 %</td>
<td>6 %</td>
</tr>
</tbody>
</table>

Table 3: Showing preoperative and postoperative restlessness at nights among study population

Preoperatively most of the patients (61.66%) often had restlessness at nights and postoperatively majority (88.33%) almost never had restlessness at nights. The p value was significant p < 0.05.
Mouth breathing:

<table>
<thead>
<tr>
<th></th>
<th>PREOP</th>
<th>POSTOP</th>
<th>Wilcoxon’s Signed Rank test p VALUE &lt;0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0 0</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>Almost</td>
<td>0 0</td>
<td>18 30</td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td>2 3.33</td>
<td>36 60</td>
<td></td>
</tr>
<tr>
<td>Often</td>
<td>1 3</td>
<td>21.6  6</td>
<td></td>
</tr>
<tr>
<td>Very often</td>
<td>3 5 58.3 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every time</td>
<td>1 0 16.6 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6 0 100</td>
<td>60 100</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Showing preoperative and postoperative mouth breathing among study population

Preoperatively most of the patients (58.33%) had mouth breathing very often and postoperatively majority (60%) had mouth breathing sometimes. The p-value was significant p < 0.05

Irritability on waking up:

<table>
<thead>
<tr>
<th></th>
<th>PREOP</th>
<th>POSTOP</th>
<th>Wilcoxon’s Signed Rank test p VALUE &lt;0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0 0</td>
<td>38 63.33</td>
<td></td>
</tr>
<tr>
<td>Almost</td>
<td>3 5</td>
<td>12 20</td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td>28 46.66</td>
<td>10 16.66</td>
<td></td>
</tr>
<tr>
<td>Often</td>
<td>24 40</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>Very often</td>
<td>5 8.33 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every time</td>
<td>0 0 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60 100</td>
<td>60 100</td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Showing preoperative and postoperative irritability on waking-up among study population

Preoperatively most of the patients (48.33%) had irritability on waking-up sometimes and postoperatively majority (60%) almost never had irritability on waking-up. The p-value was significant (p < 0.001).

DISCUSSION

Paediatric sleep-disordered breathing is a relatively new field, and a number of questions remain unanswered. One of the most important questions in paediatric sleep-disordered breathing is the outcome of patients with OSAS. We do not know the clinical correlates of mild obstructive apnoea, or what degree of OSAS warrants treatment. The long-term relationship between primary snoring, UARS, and OSAS has not been studied. Although polysomnography is widely used, it is not known which polysomnography parameters predict morbidity. We used Quality of life questionnaire and Pulse oximetry to assess the improvement of symptoms following adeno-tonsillectomy in the children in our study.

The correlation was assessed using Pearson correlation test. The test showed a positive correlation between grade of adeno-tonsillar hypertrophy and ODI. This indicates that the size of adenoids and tonsils aids in assessing the severity of sleep disordered breathing and the same can be used to select children for surgical intervention.

These findings were in par with similar studies such as those conducted by Li AM et al.[18] Mitsuhiko Tagaya et al[19].

Li AM, Wong E, Kew J, Hui S, Fok TF conducted a study in 35 children referred consecutively for...
suspected OSA secondary to tonsillar hypertrophy.\textsuperscript{18} Their results showed that in children with OSA, tonsillar hypertrophy as assessed by lateral neck radiograph correlates positively with the severity of obstructive sleep apnoea.

Mitsuhiko Tagaya, et al in their study of 58 children with SDB found that adenoid grade and apnoea index correlated significantly in preschool children \((r = 0.45, \ p < 0.01)\).\textsuperscript{19}

Comparing pre-and post-operative pulse oximetric parameters among study population.

All the pulse oximetric parameters improved significantly after the intervention. The mean ODI pre-operatively was 15.11 and that post-operatively was 3.48. The \(p\) value was \(<0.001\). Since \(p\) value is \(<0.05\), we conclude that ODI have significantly improved postoperatively.

The mean SPO2 preoperatively was 90.83 and that postoperatively was 95.02 Standard deviation of pre-operative mean SPO2 and post-operative mean SPO2 was 1.54 and 1.66 respectively. The \(p\) value \(<0.001\). Hence we can say that mean SPO2 significantly improved postoperatively.

These all indicates that there is an objective evidence of post-surgical improvement in the nocturnal arterial oxygen saturation of children with SDB. These findings were in par with similar studies such as those conducted by Arrarte JL et al, Kargoshaie A and colleagues.

Arrarte JL et al conducted a pre- and post-intervention study using nocturnal pulse oximetry. A total of 27 children completed the study. Out of these, 23 children (85.2\%) presented class III or class IV hyperplasia of the palatine tonsils. There was significant improvement in the post-operative period over the pre-operative period in terms of the oxygen desaturation rate.\textsuperscript{20}

Kargoshaie A and colleagues carried out a similar study. The study revealed a significant improvement in the postoperative oxygen desaturation index \((1.60 \pm 3.22)\) compared with the preoperative oxygen desaturation index \((3.98 \pm 4.93; \ p < 0.01)\).\textsuperscript{21}

Evaluating the Quality of life pre-and post-operatively among study population.

Quality of life questionnaire was assessed using Wilcoxon’s Signed Rank test. The \(p\)-value was significant \(<0.001\) for all the symptom scores except that of discipline problems. We used the OSA-18, an 18-item QOL survey with known test-retest reliability, internal consistency, and validity. Survey domains included sleep disturbance, physical suffering, emotional distress, daytime problems, and caregiver concerns. All the symptoms of SDB and chronic adeno-tonsillar hypertrophy improved significantly among the study population post-operatively. From this we can conclude that adeno-tonsillectomy has a significant impact on the quality of life of these children. Also, that the OSA-18 is a reliable, and responsive QOL measure.

CONCLUSION

There is a positive correlation between grade of adeno-tonsillar hypertrophy and ODI. This indicates that the size of adenoids and tonsils aids in assessing the severity of sleep disordered breathing and the same can be used in selecting children for surgical intervention.

There is significant improvement after adeno-tonsillectomy in all the pulse oximetric parameters namely ODI, mean SPO2, minimum SPO2 in children with SDB and chronic adeno-tonsillar hypertrophy. This indicates that there is also an objective evidence of improvement in the nocturnal arterial oxygen saturation of children with SDB. The results of the previous studies strongly support our study and emphasize the effectiveness of adeno-tonsillectomy as a first line management of children with SDB.

There is significant improvement in the quality of life of children with SDB after adeno-tonsillectomy. Adeno-tonsillectomy can be recommended as the primary surgical modality for children with sleep disordered breathing as it substantially reduced the morbidity and health care utilisation by the children. Despite more than 20 years of treating children with this condition, we have limited information on the long-term consequences of paediatric OSAS. It is a frequent but under diagnosed problem in children. The immediate consequences of OSAS in children include behavioural disturbance and learning difficulties, pulmonary hypertension, and compromised somatic growth. However, if not treated promptly and early in the course of the disease, OSAS may also impose long-term adverse effects on neurocognitive and cardiovascular functions of the children, providing a strong rationale for effective treatment.

DISCLOSURES:

a) Competing interests/Interests of Conflict- None
b) Sponsorships – None
c) Funding - None
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