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Study of quality of life outcome after adenotonsillectomy in children with sleep disorderd breathing

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ABSTRACT

Background: This prospective study was conducted in our department with the objective to study the quality of life outcome after adenotonsillectomy in children with sleep disorderd breathing. Sleep-disordered breathing, can lead to substantial morbidities, affecting the central nervous system (CNS), the cardiovascular and metabolic systems, and somatic growth, ultimately leading to reduced quality of life.
Methods: This prospective study was conducted in 47 patients in the Department of Otorhinolaryngology Head and Neck Surgery, Government Medical College and associated SMHS Hospital Srinagar. The study was included the patients with SDB in pediatric age group, who visited in our OPD.OSA-18 questionnaire was used pre-operatively, at 2 and 6 months after surgery.
Results: Our study groups comprised of total 47 patients with majority of patients with in age group of 5-7 years, males were 29 (61.70%) and females were 18 (38.30%). In our study the OSA 18 scale used pre-operatively showed majority of patients 33 (70.21%) having score >80 score, with mean OSA-18 score of 84.15 showing that there was a major impact on quality of life and there was significant improvement in mean OSA-18 score in postoperative period from 30.49 to 26.85 at 2 and 6 months post- operatively and hence improvement in quality of life.
Conclusions: Based on the observation made in the study we concluded that there was a significant improvement in the disease specific postoperative quality of life after both adenotonsillectomy and tonsillectomy. We also concluded that polysomnography results matched with OSA 18 questionnaire scale score done preoperatively.

Keywords: SDB, OSA-18, Adenotonsillectomy

INTRODUCTION

Sleep-disordered breathing (SDB) is a common entity in children and includes a continuum of sleep-related breathing disturbances, SDB encompasses the spectrum of sleep disorders ranging in severity from primary snoring to obstructive sleep apnea(OSA). OSA on the severe end of the spectrum, and is generally diagnosed clinically based on signs and symptoms.[1] Classification of SDB.[2]

- Primary snoring
- Upper airway resistance syndrome (URAS)
- Obstrutive sleep apnoea syndrome (OSAS)

Children with sleep disordered breathing (SDB) can manifest a continuum from simple snoring and upper airway resistance syndrome to obstructive sleep apnea (OSA).[3,4] The peak incidence of OSAS in children occurs between 2-8 years of age and parallels to the prominent growth of lymphoid tissue around the airway during these years however OSAS occurs in children of all ages, as early as neonatal period to the adolescent age group.[5] Snoring and difficulty in breathing during sleep are the most common complaints of parents of children with OSAS.[6-8] Other symptoms include excessive daytime

sleepiness, behavior problems, learning disabilities, right sided heart failure, growth retardation or failure to thrive.

Objective

The objective was to study the quality of life outcome after adenotonsillectomy in children with sleep disorderd breathing.

METHODS

This prospective study was conducted in the Department of Otorhinolaryngology Head and Neck Surgery, Government Medical College and associated SMHS Hospital Srinagar from July 2015 to July 2017. In this study we included the patients with SDB in pediatric age group, who visited in our OPD.

Diagnostic methods that have been scientifically evaluated include history and physical examination, audiotaping or videotaping, pulse oximetry, abbreviated polysomnography, and full polysomnography

- History and physical evaluation.[9-11]
- Sleep history screening for snoring should be a part of routine health care visit. A more detailed history regarding labored breathing during sleep, observed apnea restless sleep, diaphoresis, anuresis, excessive daytime sleepiness and behaviour and learning problem (including attention deficit and hyperactivity disorder) should be obtained. On physical examination finding during wakefulness are often normal. There may be nonspecific finding related to adenotonsillar hypertrophy such as mouth breathing nasal obstruction during wakefulness, adenoid facies and hyponasal speech. Evidence of complication of OSAS may be present such as systemic hypertension and poor growth.
- Video recording.[12]

A home based video recording of apneic episodes for 30 minutes can reliably be screened for OSAS in children.

- Polysomnography in patients who cooperates.[13]

All the patients with adenotonsillar hyperplasia who fail to respond to conservative management were subjected to adeno-tonsillectomy surgery.

- To assess the quality of life with OSAS before and after adenoidectomy or adenotonsillectomy OSA 18 questionnaires were used.[14] The OSA 18 has 18 items in 5 domains including sleep disturbances, physical symptoms, emotional symptoms, daytime functions and caregiver concerns. The question was administered to the patient 2 weeks before and at 2 months and 6 months after surgery. There are total 18 questions and each question score between 1-7 and total score is 126. The impact on the quality of life is classified as mild<60, moderate 60-80 and severe >80. Dramatic improvement in the total score after T&A has been shown in number of studies within 6 months after surgery.

Inclusion criteria

Children age between 2-18 years with disorder of breathing during sleep characterized by prolonged partial upper airway obstruction or intermittent complete obstruction that disrupts normal ventilation during sleep and sleep patterns will be taken up for study. Children with following symptoms will also be evaluated for presence or otherwise of SDB.

a) Snoring
b) Mouth breathing
c) Aggressive behavior and diurnal problems
d) Difficulty in getting up in the morning
e) Excessive sleep during the day.
f) Altered craniofacial development
g) Poor school performance and learning disabilities
h) Growth retardation
i) Children with hyperactive behaviour
j) Children with enuresis

Exclusion criteria

Exclusion criteria for prior adenoidectomy and tonsillectomy include: neuromuscular disease, cleft palate, psychiatric condition/cognitive impairement.

Statistical analysis

Data was entered in a Microsoft excel spread sheet. Categorical variables were summarized as frequency and percentage. Continuous variables were summarized as mean and standard deviation. Paired samples t-test was used to compare OSA-18 score at pre-operative, 6 months and 1 year. Two-sided p-values were reported and a $p<0.05$ was considered statistically significant.

RESULTS

This prospective hospital based study was conducted in the Department of Otorhinolaryngology, Head and Neck Surgery, Government Medical College and Associated SMHS Hospital Srinagar. A total of 47 patients were included with following details.

Table 1 showing that our study group comprised of total 47 patients with majority of patients with in age group of 5-7 years. With youngest patient was 3 years and eldest was 15years old.

Table 2 showing that majority of patients in our study males were 29 (61.70%) and females were 18 (38.30%).

Table 3 showing that in our study the majority of patients in male group were within 5-7 years and while in female group the majority came also from 5-7 years.

Table 1: Age wise distribution of patients

Age group (years)	No. of patients	%
2-4	12	25.53
5-7	23	48.94
8-10	8	17.02
11-13	3	6.38
14-16	1	2.23

Table 2: Sex wise distribution of patients.

Sex	No. of patients	%
Male	29	61.70
Female	18	38.30
Total	47	100

Table 3: Age and gender distribution of studied group.

Age (in years)	Male		Female	
	n	%	n	%
2-4	8	27.59	4	22.22
5-7	16	55.20	7	38.89
8-10	5	17.24	3	16.66
11-13	0	0	3	16.66
14-16	0	0	1	5.55

Table 4 showing that in our study group of 47 patients the OSA 18 scale used pre-operative shows majority of patients 33 (70.21%) having score >80 score showing that there was a major impact on quality of life.

Table 4: OSA 18 scale score used to assess the disease specific quality of life in children with SDB, it is used pre-operatively, at 2 and 6 months respectively postoperatively (preoperative score).

OSA 18 score	No. of patients (N=47)	%
<60	0	0
60-80	14	29.79
>80	33	70.21

Table 5: OSA 18 scale used in postoperative period at 2 months and at 6 months.

OSA 18 scale score	2 months (n=45)	%	6 months (n=45)	%
<40	47	100	47	100
40-60	0	0	0	0
>60	0	0	0	0

Table 5 indicates that there is significant improvement in OSA 18 score in postoperative period and hence improvement in quality of life.

Table 6 is showing that our study group of 47 patients mean OSA 18 Score pre operatively, at 2 months and at 6 months were 84.15, 30.4, 26.85 respectively. This signify that there is improvement in OSA-18 score and hence improvement in quality of life. P value was <0.001, which is statistically significant.

Table 6: Comparison of OSA 18 score preoperative, at 2 months and at 6 months.

Descriptive statistics				95% confidence interval	
	Mean	**Std. deviation**	**N**	**Lower bound**	**Upper bound**
OSA-18 preop	84.15	4.433	47	82.847	85.451
OSA-18 2 months	30.49	4.043	47	29.302	31.676
OSA-18 6 months	26.85	3.918	47	25.701	28.001

P value for OSA 18 pre op vs. OSA 18 at 2 months <0.001 (repeated measures ANOVA, Bonferroni post-hoc). P value for OSA 18 at 2 months vs. OSA 18 at 6 months <0.001 (repeated measures ANOVA, Bonferroni post-hoc)

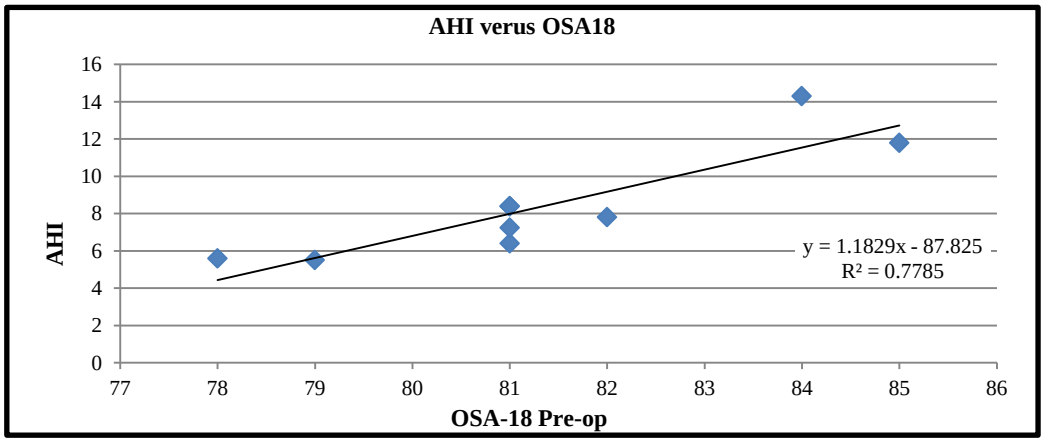

Figure 1: PSG (AHI) score and OSA 18 score.

Figure 1 is showing that there were positive correlation between PSG (AHI) score and OSA 18 score with coefficient of determination=0.778. (The dots represent the number of patients and the line defines the linear trend).

DISCUSSION

Sleep-disordered breathing (SDB) represents a spectrum of sleep-related diseases resulting in nocturnal breathing difficulty, ranging from intermittent and habitual snoring (HS) to obstructive sleep apnea syndrome (OSAS).SDB is extremely common; estimates suggest that HS and OSAS occur in 10% and 2% to 4% of children, respectively.[15] Untreated pediatric SDB is associated with numerous comorbidities that include lowered IQ, decreased executive function, behavioural problems, secondary nocturnal enuresis, and cardiopulmonary dysfunction.[16]

In the present study, we had 47 patients with majority of patients were males 29 (61.70%) and females were 18 (38.30%), with majority of patients were in the age group of 5-7 yrs (48.94%) (Table 1 to 3). Jose mario de lima jr et al also found in their study that 56.2% were males and 43.8% were females with mean age of 6 yrs and 6 months.[17] Ron et al also found in their study that 51% were males and 49% were females with mean age of 6.3 yrs i.e. the male preponderance.[18] Valerie et al found in their study that 53% were females and 47% were males with mean age of 6 yrs.[19] It is a consensus among various authors that adenoid or adenotonsillary hyperplasia is the main cause of SDB among children.[20-23] Adenoidectomy (or adenotonsillectomy) have been, therefore, procedures of choice for the treatment of most cases of SDB in the pediatric population. These procedures have shown positive results in reverting the physical effects of SDB.[24-27] Adenoidectomy/adenotonsillectomy not only revert the organic changes caused by SDB, but also have shown their value in improving the quality of life of children and the perception of this quality by their caretakers. Recent papers are evidence of this important theme.[28-33] In the present study of 47 patients 41 (87.23%), 4 (8.51%) underwent adenotonsillectomy and tonsillectomy respectively.

PSG (polysomnography) is recognized as the gold standard for establishing a diagnosis of OSA, constraints such as its limited availability and expense have left many clinicians searching for more and more widely available and less costly diagnostic tool.[34] Numerous studies investigating the validity of using history and physical examination alone to establish an OSA diagnosis have found that they are poor predictors of OSA.[35-42] Additional studies have evaluated the usefulness of questionnaires to identify OSA. One such questionnaire is the OSA-18, which is a disease-specific quality-of-life questionnaire commonly used by pediatric otolaryngologists.[43] Because this survey includes a number of symptom-specific questions and was validated against 90-minute, daytime-nap sleep studies, two investigations examined its utility as a potential diagnostic tool. The OSA-18 questionnaire, developed by Franco Jr. et al was applied in three moments to the caretakers of children including in this study to assess the quality of life of these patients.[28] In the first of these moments - a preoperative - a baseline score was obtained as a parameter for assessing the quality of life of children before adenoidectomy or adenotonsillectomy. According to Franco Jr et al, patients scoring below 60 experience low impact on their quality of life.[28] Patients scoring between 60 and 79 are moderately affected; if the score is 80 points or over, there is major impact on the quality of life. The OSA-18 questionnaire was applied at 2 months and at 6 months after surgery; the aim was to assess the long-term effects on the quality of life of children.

In the present study of 47 patients OSA-18 questionnaire was used pre-operatively, at 2 months, at 6 months. OSA-18 questionnaire when used pre-operatively showed majority of patients 33 (70.21%) having score >80, and 14 (29.79%) patients having score between 60-80. No patient was below 60 score. Mean OSA-18 score pre-operatively was 84.15 Table 4 and 6. OSA-18 score at 2 months and at 6 months were 30.06 and 26.40 respectively, which showed a lot of improvement in post-operative score and hence the post –operative quality of life Table 5. De Lima Junior et al in their prospective study of 48 patients found that before surgery, the average OSA-18 score was 82.83 (SD=12.57).[17] Within thirty days after surgery, the average OSA-18 score was 34.3 (SD=9.95), both showing significant reduction ($p<0.001$). Thus they concluded that surgery improves quality of life of children with OSD, which is consistent with the results of our study. Valerie et al in their study used OSA-18 questionnaire pre and post –operatively.[19] OSA-18 scores showed improvement post-operativly in all domains, which is consistent with our study. Franco et al in their study also found that there was a great improvement in quality of life in patients undergoing adenotonsillectomy, which is consistent with our study.[28] de Serres et al performed a multi-institutional study to evaluate the quality of life in children undergoing adenotonsillectomy using OSA-6 which showed improvement in the quality of life.[30]

CONCLUSION

Based on the observation made in the study we concluded that there was a significant improvement in the disease specific postoperative quality of life after both adenotonsillectomy and tonsillectomy. We also concluded that polysomnography results matched with OSA 18 questionnaires scale score done preoperatively (Figure 1).

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