



ORIGINAL RESEARCH PAPER

ENT

A CLINICAL CORRELATION OF OSA-18 SCORE IN CHILDREN SUFFERING FROM CHRONIC ADENOTONSILLITIS AND SUSPECTED TO HAVE OBSTRUCTIVE SLEEP APNOEA BEFORE AND AFTER SURGERY

KEY WORDS: obstructive sleep apnoea, Adeno tonsillar hypertrophy, Quality of life.

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ABSTRACT

BACKGROUND: The most common cause of obstructive sleep apnoea among children are adenoid and tonsillar hypertrophy. Obstructive sleep apnoea is the most common indication for adenotonsillectomy among children.

OBJECTIVES:

- 1) To evaluate the effects of, adenotonsillectomy on children who have obstructive symptoms due to adenotonsillar hypertrophy.
- 2) To evaluate quality of life using questionnaire.

METHODS AND METHODOLOGY: 106 children aged between 5 to 14 years who have obstructive symptoms due to adenotonsillar hypertrophy are interviewed with obstructive sleep apnoea-18 questionnaire before and after surgery, the severity of the symptoms and quality of life were evaluated before and 1 month after surgery.

RESULTS: The pre and post-operative mean scores were 69.2 ± 5.15 and 24.8 ± 2.15 respectively ('p' value <0.001).

CONCLUSION: Patients with adenotonsillar hypertrophy with obstructive symptoms who underwent adenotonsillectomy experienced significant reduction in severity of symptoms post-surgery. The quality of life improved to a large extent in these children post-surgery.

INTRODUCTION

Tonsils / Palatine tonsils develop from second pharyngeal pouch. They are situated in oropharynx on either side. The adenoids are called as nasopharyngeal tonsils, situated in nasopharynx. The adenoids and tonsils form part of Waldeyer's ring. When tonsils and adenoids are large, they fill the oropharynx and nasopharynx causing obstruction. In children, obstructive sleep apnoea is a sleep-related breathing disorder that is usually caused by adenotonsillar hypertrophy and is characterized by upper-airway obstruction that disturbs sleep and normal respiratory gas exchange. Obstructive sleep apnoea is the most common indication for adenotonsillectomy among paediatric population.¹

Numerous studies have shown potential links between OSA (particularly severe OSA) and adverse outcomes such as poor growth, developmental delay, cardiovascular complications, metabolic and inflammatory conditions, and behaviour and learning problems^{2,3,4,5}.

Obstructive sleep apnoea is one of the commonest indications among children for adenotonsillectomy. In young adults, recurrent infections constitute the main indication for surgery. In patients with Obstructive sleep apnoea the disease has an impact in terms of health related quality of life (HRQL). "Quality of life", an expression used since the 90's, is used to evaluate the impact of diseases on the patients.⁶

OBJECTIVES

- 1. To evaluate the effects of, adenotonsillectomy on children who have obstructive symptoms due to adenotonsillar hypertrophy.
- 2. To evaluate quality of life using questionnaire.

TYPE OF STUDY: Prospective cohort study

INCLUSION CRITERIA:

- 1. All patients diagnosed clinically as chronic adenotonsillitis with obstructive symptoms.
- 2. All patients of chronic adenotonsillitis who were eligible for adenotonsillectomy. (SIGN guidelines)

EXCLUSION CRITERIA:

- 1. Children below 4 years and more than 15 years.
- 2. Tonsillitis infection in past 1 month.
- 3. Children with Bleeding and clotting disorders.
- 4. Children with obesity.

- 5. Patients who are not willing to undergo surgery.
- 6. Nasal deformity causing obstruction of nasal passages.
- 7. Patients who did not turn up for follow up

METHODOLOGY

The study was conducted during the period from November 2015 to August 2017. A total of 121 children were taken in to study out of which 15 did not turn up for follow up were excluded from study. Out of 121 subjects, 106 subjects between the age group from 5 to 14 years were taken into study. Information like age, sex, tonsil size and adenoids size by X-ray soft tissue neck were recorded. Changes in quality of life were determined with OSA-18 questionnaire, health and quality of life related instrument for obstructive sleep apnoea. The OSA-18 questionnaire compose of 5 domains

- 1. Sleep disturbance
- 2. Physical symptoms
- 3. Emotional distress
- 4. Daytime function
- 5. Caregivers concern.

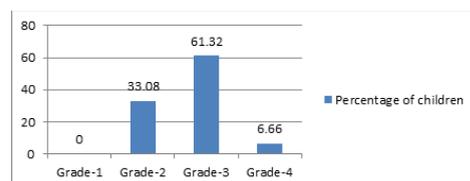
Each main domain again contains question related to it and parents rate the questions based on how they felt the symptoms affect the child from 1 (none of the time) to 7 (all of the time). All the subjects underwent adenotonsillectomy and the parents/guardians are asked to complete the OSA-18 questionnaire one day before the surgery and one month after adenotonsillectomy.

DATA ANALYSIS AND STATISTICAL METHOD:

STATA version 14.0 is used for calculation. Paired 't' test is applied for deriving values.

RESULTS AND DISCUSSION

In our study, 34 patients had Grade 2 adenoids, 65 had Grade 3 and 7 children had Grade 4 adenoids.



Pre-op and Post-op assessment of all domains of OSA-18 questionnaire

Domain	Pre-op Mean	Pre-op std.deviation	Post-op mean	Post-op std.deviation	'p' value
Sleep disturbance	17.8	2.7	4.4	0.6	<0.001
Physical symptoms	17.6	2.1	4.8	0.8	<0.001
Emotional distress	9.6	2.6	6.0	1.6	<0.001
Daytime function	5.5	1.4	4.2	1.0	<0.001
Caregiver concerns	18.7	2.9	5.2	1.1	<0.001

Mean and Standard deviation score of OSA-18

S.no	Variable	Mean pre-op	Std.deviation pre-op	Mean post-op	Std.deviation post-op
1	Loud snoring	5.13	0.99	1.1	0.31
2	Breath holding/pauses	4.21	1.1	1.12	0.32
3	Choking or gasping	3.96	1.5	1.08	0.28
4	Fragmented sleep	4.4	1.4	1.11	0.31
5	Mouth breathing	4.9	1.3	1.13	0.34
6	Frequent colds or URIs	5.5	0.7	1.19	0.40
7	Rhinorrhoea	4.3	1.0	1.27	0.62
8	Dysphagia	2.7	1.0	1.21	0.41
9	Mood swings or tantrums	3.5	1.5	1.80	0.83
10	Aggression/hyperactivity	3.1	1.4	2.12	1.09
11	Discipline problems	2.9	1.3	2.16	0.89
12	Daytime drowsiness	1.8	0.84	1.25	0.45
13	Poor attention span	2.0	1.06	1.90	0.96
14	Difficulty awakening	1.6	0.83	1.11	0.34
15	Caregiver worried over child health	5.1	1.0	1.29	0.56
16	Caregiver concerned not enough air	4.7	1.6	1.21	0.45
17	Caregiver missed activities	4.6	1.3	1.18	0.51
18	Caregiver frustration	4.1	1.7	1.52	0.75

Several disease-specific scores, including Obstructive Sleep Disorders- 6 (OSD-6) and OSA-18 have been developed for childhood obstructive sleep disorders. OSA-18 is the widely used survey for pediatric OSA and has been tested as an evaluative and discriminative instrument.

Adenotonsillectomy is the first choice for otherwise healthy children diagnosed with adenotonsillar hypertrophy related OSAS. Such surgery can be expected to relieve sleep-related airway obstruction in the great majority of children and it remains the mainstay of treatment for childhood OSAS.

The statistical data revealed significant improvement in quality of life among children post adenotonsillectomy. In clinical medicine quality of life is now recognised as an important health measure.

In our study male to female ratio was found out to be 1.3:1. There is slight male predominance in this study. The most predominant symptoms were snoring, nasal obstruction and mouth breathing. All 100% of the patients had these symptoms. 92% (46) of the patients had restless sleep. 66% of the patients had swallowing disturbance and shortness of breath. 64% (32) of the patients had speech problems.

Out of 106 children who undergone x- ray of nasopharynx lateral view and adenoids graded based on Cohen et al 34 were having grade 2 adenoid hypertrophy, 65 children had grade-3 adenoid hypertrophy and 7 children were having grade-4 adenoid hypertrophy. Majority of them had grade-3 hypertrophy in this study. The least statistically derived mean pre-operatively was day time function which was 5.5 and standard deviation of 1.4.

In this study the post-operative highest mean was seen in emotional distress which was 6.08 with standard deviation of 1.6. The domain day time function has post-operatively lowest statistically derived mean that is 4.2 with standard deviation of 1.02. Even though the difference between preoperative and postoperative mean domain scores for day time function was less, it was statistically significant('p' value).

The Child Health Questionnaire (CHQ) is a reliable tool for global quality of life measurement in children. Previous studies have used CHQ to compare health status among healthy children, children with OSA and children with chronic disease. Stewart et al. ⁷ and Georgalas et al. ⁸ showed that children with OSA had worse CHQ scores than healthy children and scores in children with OSA resembled those in children with juvenile rheumatoid arthritis. Rosen et al. ⁹ reported pediatric OSA associated with poorer CHQ scores, particularly in domains related to physical health outcomes. Furthermore, disease-specific quality of life surveys enable physicians to quantify disease-specific changes in quality of life before and after the treatment and thus are widely used.

In a study done by Ryuichi Kobayashi et al the OSA- 18 mean scores and standard deviation for all domains pre-operatively and post-operatively were Sleep disturbance 15.8 (5.0) and 6.0 (1.5), Physical symptoms 14.1 (3.8) and 7.1 (2.1), Emotional distress 8.1 (4.1) and 5.7 (2.1), Daytime function 9.2 (3.6) and 5.7 (1.5), Caregiver concerns 13.9 (4.5) and 5.9 (1.4) respectively. All parameters showed significantly improved values after surgery compared with before surgery (p < 0.001). The OSA-18 score were useful for evaluating surgical treatments. The appropriate cut-off OSA-18 score to screen for pediatric OSA was 40. ¹⁰

In a study done by Larisa Kovacevic et al on improvement of quality of life using OSA -18 scores pre-operatively and post-operatively among two groups one was sleep disorder breathing and the other nocturnal enuresis with adenotonsillar hypertrophy. The mean and standard deviation for the domains in OSAS are Sleep disturbance 20.3(1.8) and 6.5 (0.8), Physical symptoms 16.2 (1.6) and 7.5 (0.9), Emotional distress 8.8 (1.7) and 7.0 (1.1), Daytime function 12.0(1.2) and 6.7 (1.0), Caregiver concerns 19.6(1.4) and 8.3 (1.0) respectively. There is a significant improvement in QoL among children with OSA after adenotonsillectomy. There is significant improvement among all the domains. Adenotonsillectomy has a positive impact on children's QOL. ¹¹

The highest of all domains was sleep disturbance and lowest was day care function. He reported that the assessment of QOL in children was important because it reflects an individual's overall well-being including physical, emotional and social aspects of health. OSAS-18 is a validated instrument that assesses Sleep Disordered Breathing (SDB) - related quality of life and has become an important outcome measure in children with SDB.

The quality of life significantly improved among children who have undergone adenotonsillectomy and out of all domains the care givers concern and sleep disturbance mean scores were having more significant differences pre and post- operatively followed by physical symptoms, emotional distress and daytime functioning. OSA-18 all the domain in this study the mean scores and standard

deviation pre-operatively and post-operatively significantly decreased.

In a study conducted by Jin Ye et al the mean total OSA-18 score was 77.6 before surgery and 32.5 after surgery ($p < 0.001$). There was significant improvement in quality of life after adenotonsillectomy regardless of severity of the disorder and QOL instruments may have a role in identifying children who will develop persistent OSAS, postoperative follow-up PSG may be more practical and consistent.¹²

The findings of the present study indicated that children with SDB and recurrent infection have better quality of life after adenotonsillectomy. Parents reported improvement in sleep disturbance, physical suffering, emotional distress, caregiver concern, daytime problem following adenotonsillectomy. The total score of OSA-18 survey, as well as each domain's score, improved significantly after surgery ($P < 0.001$).

COMPARISON OF RESULTS WITH OTHER STUDIES

STUDY	Pre-op mean	Post-op mean	'p' value
Naraghi Mohsen et al ¹³	61.65	28.01	<0.001
Larisa Kovacevic et al ¹⁴	64.60	30.87	<0.001
Jin Ye et al ¹²	77.6	32.5	<0.001
Ryuichi Kobayashi et al ¹⁰	61.1	30.4	<0.001
This study	69.28	24.8	<0.001

CONCLUSION

Patients with adenotonsillar hypertrophy with obstructive symptoms who underwent adenotonsillectomy experienced significant reduction in severity of symptoms post adenotonsillectomy.

The quality of life improved to a large extent in these children post operatively.

OSA -18 questionnaire can be used as an office based tool for the quality of life for children undergoing adenotonsillectomy with OSA symptoms and evaluating the symptoms severity among children with adenotonsillar hypertrophy.

In this study the mean pre-operative and post-operative scores were statistically significant in all the 5 domains.

But the diagnosis of OSA cannot be done using OSA-18 score alone which can be used as an adjunct to Polysomnography, which is gold standard in diagnosing obstructive sleep apnoea. Further studies in a larger group of patients for longer time are mandatory and under evaluation in our Institution.

REFERENCES

- Guilleminault, CPelayo R. Sleep-disordered breathing in children. *Ann Med* 1998; 30:350-6.
- Morton RP. Quality of life assessment: integral to clinical practice. *Clin Otolaryngol*. 1996; 21:1-2.
- Suen, JSArnold, JEBrooks. Adenotonsillectomy for treatment of obstructive sleep apnea in children. *Arch Otolaryngol Head Neck Surg* 1995; 121:525-30.
- Tradling, J Thomas, GWarley A. Effect of adenotonsillectomy on nocturnal hypoxaemia, sleep disturbance, and symptoms in snoring children. *Lancet* 1990; 335:249-53.
- Croft, C Brockbank, MWright A. Obstructive sleep apnoea in children undergoing routine tonsillectomy and adenoidectomy. *Clin Otolaryngol* 1990; 15:307-14.
- Marcus C. Management of obstructive sleep apnea in childhood. *Curr Opin Pulm Med* 1997; 3:464-9.
- C. Georgalas, N. Tolley, J. Kanagalingam, Measuring quality of life in children with adenotonsillar disease with the Child Health Questionnaire: a first U.K. study, *Laryngoscope* 114 (2004) 1849–1855.
- C.L. Rosen, T.M. Palermo, E.K. Larkin, S. Redline, Health-related quality of life and sleep-disordered breathing in children, *Sleep* 25 (2002) 657–666.
- Gary D. Josephson, MD, MBA; Laurie Duckworth, PhD; Jobayer Hossain, PhD. Proposed Definitive Grading System Tool for the Assessment of Adenoid Hyperplasia. *Laryngoscope* DOI: 10.1002/lary.21215.
- Ryuichi Kobayashi et al.Evaluation of adenotonsillectomy and tonsillectomy for pediatric obstructive sleep apnea by rhinomanometry and the OSA-18 questionnaire.*ActaOtolaryngologica*. doi10.3109/00016489.2014.905703
- Paulussen C, Claes J, Claes G, Jorissen M. Adenoids and tonsils, indications for surgery and immunological consequences of surgery. *Acta Otorhinolaryngol Belg* 2000; 54:403-8.
- Jin Ye, PhD et al .Outcome of Adenotonsillectomy for Obstructive Sleep Apnea Syndrome in Children.*Annals of Otolology, Rhinology & Laryngology*.Doi 10.1177/000348941011900802.
- Naraghi Mohsen et al.Sleep related quality of life before and after adenotonsillar

surgery in pediatric population.*International Journal of Pediatric Otorhinolaryngology*.doi.org/10.1016/j.ijporl.2013.12.003.

14. Larisa Kovacevic et al .Adenotonsillectomy improves quality of life in children with sleep-disordered breathing regardless of nocturnal enuresis outcome.2015 *Journal of Pediatric Urology Company*. Published by Elsevier Ltd.doi.org/10.1016/j.jpuro.2015.03.021.