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OBSTRUCTIVE SLEEP APNOEA: RETROSPECTIVE AUDIT

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ABSTRACT

Objective: A clinical audit of medical records of all patients diagnosed as OSA and undergoing surgery.
Materials And Methods: A retrospective audit of 41 patients diagnosed as OSA was included in the study. The demographic data, co-morbidities, pre-operative and post-operative evaluation and surgical techniques used were collated and statistically analyzed.
Results: It was noted that 73.17% of Obstructive sleep apnea undergoing surgery were males, clinically at presentation. Patients apart from the apneic spells commonly presented with snoring (78.05%) and elongated uvula (19.51%). Most common surgical technique followed was laser assisted uvulopalatopharyngoplasty (UPPP) (56.10%). A follow up after 3 months of postoperative subjective and objective quality of outcome was assessed and compared to preoperative assessment which was statistically significant.
Conclusion: In our subcontinent most patients who suffered from OSA were obese with BMI of 30.7kg/m2. Laser UPPP is most commonly performed surgery used by otolaryngologists in the management of OSA. Pre and post-operative AHI scores gives us an idea of definitive outcome but long term results need to be evaluated to determine the role of surgery. Surgery has a definitive role in improving AHI score in immediate short term follow up.

KEYWORDS

Obstructive sleep apnea (OSA), Retrospective Audit, Surgical parameters

INTRODUCTION

Sleep Obstructive Apnoea syndrome was first described by Cristian Guilleminault in 1973. Obstructive sleep apnea (OSA) is defined as Apnea- hypopnea index (AHI) of 5 or greater with associated symptoms or AHI of more than 15 without any symptoms .[1] OSA involves a decrease or complete cessation of breathing at least 5 episodes per hour of sleep [2] caused by the narrowing or obstruction of upper airway including nasal cavity, pharynx and larynx.[7] This leads to partial reductions (hypopneas) and complete cessation (apneas) in breathing for at least 10 seconds during sleep. Most cessations last for 10 to 30 seconds but some may last for more than a minute.[3] Apnea is defined as cessation of airflow for less than 10 seconds. Hypopnea is defined as reduction in airflow with resultant desaturation of less than or equal to 4. AHI is defined as average frequency of apnea and hypopnea events per hour of sleep [1]. Alcohol and smoking are strongly associated with progression of the disease. Studies have shown that smoking has three folds increase in risk of OSA compared to non- smokers. [9-11]

Prevalence of Obstructive sleep apnea in male is 3% to 7% and female is 2% to 5% in the United States. [1] Patients with BMI of more than 28 have 40% chances of OSA.[4] It is a chronic disorder which needs to be diagnosed and managed appropriately to avoid cardiovascular consequences, hypertension, stroke and Type II diabetes.[5] Sleep disordered breathing (SDB) and Upper airway resistance syndrome (UARS) are different terminologies used in sleep disorders which lie intermediate between the spectra of SDB and OSA. [6]

Various physical features may contribute to OSA likely obesity, narrowed pharyngeal wall, elongated uvula, retrognathia, macroglossia and facial deformities. First line of treatment is Continuous positive airway pressure (CPAP) but the patient's compliance levels range from 50% to 60% because of various drawbacks of CPAP. Alternatively, oral appliances or surgical interventions can be done. [8]

UPPP is the most commonly performed surgical procedure with a success rate of 40.70% based on a meta-analysis by Sher et al [11]. Nasal surgeries are recommended when nasal pathology is the major cause of symptoms. [12] Various surgical methods are adenotonsilectomy, septoplasty,laser vulopalatopharyngoplasty, lateral pharyngoplasty,expansion sphincteroplasy, laser midline glossectomy and linguloplasty used to surgically correct the various anatomical obstructions.

OSA is a challenge to the anaesthetist for intubation as well as post-operative extubation due to the changes in anatomy of upper airway, varied lung volumes, driving pressure changes and body mass index. Few studies have showed unanticipated post operative ICU transfers due to respiratory failure [13, 14].

MATERIALS AND METHODS:

Retrospective audit of patients surgically treated for OSA over the period of 5 years based on the medical records in the university hospital in South India. Out of 184 patients who were diagnosed of OSA, 41 patients opted for surgical management and rest continued on CPAP. Age group between 25 to 60 years who were diagnosed of OSA and treated surgically, failed CPAP, AHI >5 based on international classification of sleep disorders (ICSD-2, 2nd ed.) were included in this study. Patients who were unfit for surgery, age of more than 60 years, chronic obstructive pulmonary diseases, anatomical variations of mandible (micrognathia and retrognathia) and swallowing disorders and those lost to follow up were excluded from the study.

Analysis of demographic data such as gender, height, weight, BMI and average age of the subjects and results were statistically analyzed. Symptoms like snoring, mouth breathing, nasal block, daytime sleepiness, lethargy along with apneic spells were present as a combination of symptoms was noted. Risk factors like alcoholism, smoking and Comorbidities like diabetes, systemic hypertension, hypothyroidism and cardiovascular diseases were enumerated to see the correlation of systemic illness and severity of OSA.

Preoperatively patients severity of OSA was documented subjectively and objectively based on Epworth sleepiness scale(ESS) over a score of 18, where scores of more than 10 were considered for sleep study referral and Apneic hypopnic index (AHI) was assessed based on PSG respectively. Examination findings, drug induced sleep endoscopy, dynamic MRI were done to assess the level of obstruction preoperatively for planning as well as to analyse the commonest level of obstruction. Anaesthetic evaluation of the Mallampatti grading, ASA and anticipated ICU care postoperatively was analysed to relate

the disease severity and AHI values preoperatively. Surgical techniques, complications and outcomes were documented and analysed. Postoperatively a follow up for 3 months was done to assess complications and objective analysis of AHI ratio and subjective analysis of ESS scoring. This was done in order to verify the quality of life of the patient postoperatively.

RESULTS:

Demographic Analysis:

In our study total number of patients diagnosed of OSA was 184 out of which 41 patients operated for surgery and the rest 130 patients continued on CPAP. There were 13 patients who were lost to follow up. From the sample group 73.17% were males and 26.83% were females with an M: F ratio of 30:11. The average mean age group was 39.68 ± 13.68.OSA is a highly dependent on the BMI of the individual. In our study the average BMI was 30.71 ± 5.41kg/m 2. (Table 1)

Table 1: Table Shows Mean +/- Standard Deviation For Height, Weight And BMI In Study Population (N=41)

Parameter	Mean ±SD
Height	163.43 ± 9.55
Weight	82.42 ± 17.4
BMI	30.71 ± 5.41

Clinical Features:

Patients presented with apneic spells along with other symptoms like snoring (66%), mouth breathing (10%), nasal block (7%), day time sleepiness (7%), difficulty in breathing (7%) and insomnia (3%). ***On examination*** the commonest sign was narrow nasopharyngeal isthmus (24%), edematous elongated uvula (20%) lax soft palate (17%), macroglossia (17%), lateral pharyngeal collapse (15%) followed by DNS (7%). (Table 2).

Table 2: Table Showing Frequency And Percentages Of Symptoms And Signs In Study Population (N=41)

Symptoms	Frequency	Percentage
Snoring	27	66%
Mouth breathing	4	10%
Insomnia	1	3%
Nasal block	3	7%
Day time sleep	3	7%
Difficulty in breathing	3	7%
Signs	**Frequency**	**Percentage**
Lateral pharyngeal band	6	15%
Edematous elongated uvula	8	20%
DNS	3	7%
Lax soft palate	7	17%
Macroglossia	7	17%
Narrow Nasopharyngeal isthmus	10	24%

Co - morbidities:

In our study, 7 cases (17.07%) had diabetes mellitus. OSA is commonly associated with hypertension and cardiovascular diseases. In our study 4 cases (9.75%) had hypertension and 1 case (2.43%) had cardiovascular disease. Out of 41 cases, 17 patients had history of smoking and drinking, 5 were only smokers and 3 patients were occasional alcoholics.

Investigations:

In our study all patients underwent dynamic MRI and Drug Induced Sleep Endoscopy, narrowing was graded based on the VOTE system of classification by Friedman. The commonest site of narrowing was velum with anteroposterior collapse in 29 cases followed by retroglossal region in 6 cases. (Table 3)

Table 3: Table Shows Percentage Of Levels Of Obstruction Using VOTE Grading In Study Population (N=41)

Level	Frequency	Percentage
Velum (Anteroposterior Collapse)	29	71%
Oropharynx (Concentric narrowing)	5	12%
Tongue Base (Anteroposterior narrowing)	6	15%
Epiglottis (Anteroposterior narrowing)	1	2%

Anesthetic Evaluation:

Based on the preoperative ASA and Mallampati grading intraoperative complications due to intubation and postop extubation with or without ICU care could be predicted.32 (78.04%) out of 41 patients were marked ASA II and 7 cases (17.07%) were ASA III. Based on Mallampatti staging, 20 patients (48.78%) belonged to grade III. All patients who were graded ASA III and Mallampati IV required post-operative ICU care.

Treatment:

Surgery was done based on the site of obstruction and the commonest surgical management was Laser assisted UPPP in 25 cases (61%)

Preoperative And Postoperative Analysis:

Subjective and objective analysis of all patients was done preoperatively and 3 months postoperatively by Epworth sleepiness score and polysomonography respectively. The p value was significant ***<0.001*** for both subjective and objective AHI scores . Out of 41 patients, 14 (34.15%) showed AHI reduction of less than 50% but 27 (65.85%) patients showed a reduction of more than 50% after surgery.

DISCUSSION:

Obstructive Sleep Apnea (OSA) has become a major burden to public health as most patients lie below the iceberg. It is a multilevel and a multifactorial disorder where both anatomical variation as well as physiology plays a vital role. Age, sex, BMI and habits are suitable risk factors for increase in incidence and prevalence of the disorder. In our study M:F ratio was 30:11 with an average age group of 40.2 +/- 9.6 and a BMI of 26.4 +/- 2.8 similar to Michael Friedman et al [15] and other authors like Han- Ren et al,2009 [16] and John et al [1]. Male predominance has been evidenced as they seek more medical attention. The lifestyle modifications and eating habits have varied drastically which in turn has clinical evidence on the increase in BMI and co morbidities that influence OSA on a greater scale. Patients were counselled to quit smoking and drinking as they have proven to be the risk factors for OSA.

Hypertension is most common co morbidity stated by most authors unlike in our study where Diabetes mellitus accounts to 17.07%. In our study snoring was present in 78% which has been reported as the commonest cause for surgical treatment (16.9%) by Janette M Carpenter et al, 2008 [20]. OSA is influenced by physical activity as well as lifestyle; studies have proven that trial of exercises has improved the AHI percentage upto 39%. All patients were given a trial of stomatognatic functional exercises, oropharyngeal and tongue exercises for duration of eight minutes, thrice daily for three months and followed up before any intervention. [22,23]

Drug induced sleep endoscopy and dynamic MRI was done to study the anatomical obstruction and to treat accordingly. Based on our study retropalatal obstruction was commonly observed in 70.74% of the study population similar to study by Joon Moon, MD et al, 2010 [21]. In our study Laser assisted UPPP was done in 56.10%. UPPP is the most common procedure done in most of the studies. Janette et al states in her article that patients who underwent UPPP were satisfied the maximum.

Preoperative Polysomnography (PSG) screening has reduced the chances of postoperative ICU monitoring [19]. In our study out of 41 patients 6 patients with BMI more than 32 and ASA of III and Mallampatti grade IV required postoperative ICU care in view of desaturation, respiratory failure and cardiac events. Similar scenario has been explained in detail by Friedman et al [15].

Polysomnography is considered a gold standard investigation in diagnosing the quality of life pre and post operatively by calculating the AHI value. In this test the patient is monitored overnight for 12 physiological variables like body posture, limb movements, oxygen saturation, ECG and respiratory rate and effort, EEG , EOG with EMG and oronasal airflow [8,18]. As similar to the study by Ji Ho Choi et al,2017 [17]; AHI ratio preoperatively and postoperatively had a significant reduction (>0.001) AHI percentage in our study ranged from 35% to 65% postoperatively .

The quality of life is given more importance in today's patient centered health care environment hence, postoperative patient satisfaction scoring done using ESS and objective analysis of AHI showed very good results over 85-90% with a significant p value of 0.001 similar to the study by Han-Ren Hsiao et al, 2009 [16].

CONCLUSION:

As most of the patients lie under the iceberg, a screening may be done

to prevent co morbidities due to OSA such as systemic hypertension and cardiovascular disorders. As BMI, smoking and alcohol are risk factors that cause OSA life style modifications of exercises and abstinence must be warranted by the patient. Most commonly involved age group is middle age group. Snoring, the most common symptom with elongated uvula as a clinical feature we must be vigilant in investigating for OSA. UPPP having a success rate of 35% to 65% and is it a commonly done procedure for OSA. But based on the level of obstruction the surgery can be planned which ranges from septoplasty to mandibulectomy and tracheostomies. CPAP is the main treatment for OSA only patients who do not tolerate CPAP and prefer for a surgical correction are surgically managed. AHI predictor tells us about pre and postoperative outcome. AHI of less than 0.001 p value. Pre and post-operative AHI scores give us an idea of the definitive outcome. Surgery has a definitive role in improving AHI score in immediate short term follow up but long term results need to be evaluated to determine the role of surgery.

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