

ANTERIOR PALATOPLASTY: EFFECTIVENESS FOR TREATMENT OF SIMPLE SNORING AND MILD OSAS

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ARTICLE INFO

Article history:

Received 14 February 2017

Revised 25 March 2017

Accepted 12 April 2017

Keywords:

OSAS, Pharyngoplasty, Snoring, Multilevel surgery

Abbreviations:

OSAS: obstructive sleep apnea syndrome; ENT: ear nose and throat; PAP: Positive airway pressure; BMI: Body Mass Index; ESS: Epworth Sleepiness Scale; N: nose; O: oropharynx; H: hypopharynx; CPAP: continuous positive airway pressure

ABSTRACT

Positive airway pressure is the treatment of choice among obstructive sleep apnea syndrome patients. Among surgical options, multilevel approach is a good option in patients with an involvement of all tract of first airway. The aim of the present work is to establish the efficacy of anterior palatoplasty in the treatment of selected patients with mild obstructive sleep apnea syndrome or simple snoring, within a multilevel surgery. The group was composed of 16 mild obstructive sleep apnea syndrome adult patients collected from January 2015 to June 2016 at University of Palermo, Ear, Nose and Throat Department. To make diagnosis of obstructive sleep apnea syndrome, we employed polysomnography, the Epworth Sleepiness Scale and an endoscopic study of aerodigestive tract in order to identify the sites of collapse. All patients underwent to inferior turbinate reduction, anterior pharyngoplasty and hyoid suspension. After treatment, 11 patients had Apnea Hypopnea Index ≤ 5 and 4 patients less than 50% compared to the starting one. According to Epworth Sleepiness Scale, the daytime sleepiness enhanced from 12.6 to 8.6 post-operative average. Pre-operative mean value of Muller's maneuver was N (nose):2.6, O (oropharynx): 3.4, H (hypopharynx):2.5 Before performing surgical procedure each patient was subjected to sleep endoscopy to evaluate better the pattern of collapse. The post-operative mean outcomes of Mueller's Maneuver was: N 1.5, O 1.3, H 1.3. Barbed Anterior pharyngoplasty, combined with other surgical procedures, can be considered a valid surgical option to relieve snoring, and mild apnoic events. Our preliminary results, show that the anterior palatoplasty, combined with other surgical procedures, can be considered a valid surgical option to relieve snoring and mild apnoic events.

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1. Introduction

Obstructive sleep apnea syndrome (OSAS) is a sleep disorder caused by an excessive narrowing of pharyngeal airway that also collapses during inspiration, resulting in increased negative intrathoracic pressure, which in turn exacerbates the conditions [1]. Continuous Positive airway pressure (CPAP) is the gold standard for mild, moderate and severe OSAS and should be offered as an option to all patients. Alternative therapies like surgery and MAD may be offered depending on the severity of OSAS and the patient's anatomy, risk factors, and preferences [2-3]. Surgical treatments are limited to selected patients. In the last decades, multilevel surgery, obtained a widespread diffusion since introduction of endoscopic technique, besides thanks to sleep endoscopy, it is possible to evaluate upper airway carefully, in order to identify all sites of collapse. Multilevel OSAS surgery was mentioned for the first time by Waite and colleagues

in 1982 [4]. He referred to nasal surgery, palate surgery and trans oral tongue surgery. Nowadays, it's well-known that OSAS is often caused by an involvement of all tract of first airway, so multilevel surgery represents the gold standard. The aim of the present work is to establish the efficacy of anterior palatoplasty in the treatment of selected patients with mild OSAS or simple snoring, within a multilevel surgery [5].

2. Material and methods

Oculomotor This prospective study involved adult patients affected by mild OSAS at polysomnography, undergoing to inferior turbinate reduction, anterior palatoplasty and hyoid suspension from January 2015 to June 2016 [5]. All patients recruited had formerly been subjected to tonsillectomy. In order to make the selection of population, was taken a general history, a Body Mass Index (BMI) calculation and an ear nose and

throat (ENT)'s history, with particular attention to sleep disorder (nocturnal snoring, daytime sleepiness, cardiovascular disorders). A complete head and neck examination with moreover a fiber optic endoscopy static and during Muller's maneuver was requirement to identify the sites of collapse. For a better evaluation of the sites of collapse every each patients was subjected to sleep endoscopy showing a retropalatal snoring with mainly antero-posterior pattern of closure (Table1). The evaluation of daytime somnolence was obtained by the Epworth Sleepiness Scale (ESS) [6]. All polysomnographic data were collected and, lastly, an a visual analogue scale was administered to OSAS patients bed partners, because the intense noise, aroused by snoring, during the night, represents an important discomfort [7]. Therefore, we have candidate to anterior palatoplasty the patients who had rejected the alternative proposal by MAD or had contraindications to their use [2, 5]. Anterior palatoplasty is a modified technique invented by Pang that consists of the removal of a portion of rectangular mucosa between the soft palate and uvula which it is then sutured that incorporate also part the muscle layer below, thus promoting the raising of the soft palate which also happens following the wound healing [5]. To evaluate postoperative outcomes, we employed a visual analogue pain scale administered in the first week after upper airway surgery, the incidence of postoperative complications, and the presence of difficulty swallowing. Long-term post-operative check, over 90 days from surgery, included ENT examination, static and dynamic endoscopic evaluation of the upper aerodigestive tract, and polysomnography. Therefore inclusion criteria were nasal obstruction due to hypertrophy inferior turbinates; OSAS grade mild or simple snoring at polysomnography; previous tonsillectomy; oropharyngeal collapse grade 3 to grade 4 on Muller's maneuver under fibre optic endoscopy; BMI <28. Patients with different features were not recruited.

Sleep Endoscopy
N2O3apH2tL0
N3O4apH2tL0
N2O4apH3tL0
N3O3apH1apL0
N3O3apH1apL0
N2O3apH2tL0
N2O3apH3tL0
N3O3apH3tL0
N3O3apH4tL0
N3O3apH2tL0
N3O3apH3tL0
N3O3apH3tL0
N3O4apH2tL0
N3O4apH3tL0
N3O4apH3tL0
N3O4apH2tL0
N2O4apH3tL0

Table 1 - Sleep Endoscopy pattern's of closure

3. Results

The trochlear The group was composed of 16 mild OSAS adult patients, 14 men and 2 women, with mean age of 51 years. The preoperative polysomnographic AHI value was average of 12.4. After treatment, 11 patients (68%) had AHI \leq 5, 4 patients (25%) registered an AHI less than 50% compared to the starting reply, successful results according to Sher [8]. Only in one case, post operative AHI score was not so improved compared to the initial one: 7.3 versus 11.7, although the patient had relief of symptoms (Table 2). Thus, the treatment was successful in 15 of 16 patients (93.75%). According to ESS, the daytime sleepiness enhanced from 12.6 to 8.6 post-operative average. Considering Muller's maneuver, pre-operative mean value of each site was: N (nose) 2.6, O (oropharynx) 3.4, H (hypopharynx) 2.5; post-operative mean outcomes were: N 1.5, O 1.3, H 1.3 (Table 3). The results of analogue scale administered to OSAS patients bed partners, demonstrated an average of 20 (very annoying snoring) before treatment, getting 5 (admissible snoring) after surgery. All patients complained subjective discomfort to swallow, disappeared within 4 days after treatment, indeed was administered liquid and semi-liquid diet for the first 2 days, anyway no one required analgesic.

Pre-AHI	Post-AHI
14.00	6.5
14.09	3.8
13.8	2.9
13.7	6.0
14.5	6.5
12.6	4.6
11.7	7.3
13.8	0.0
12.5	2.8
15.2	7.2
11.8	3.5
12.4	5.1
11.8	4.8
9.7	3.2
8.9	4.5
9.3	4.7

Table 2 - Value of pre- and postoperative AHI (AHI: apnea and hypopnea index)

Pre-Muller's maneuver	Post-Muller's maneuver
N203apH2t	N201apH1t
N304apH2t	N201apH1t
N204apH3t	N102apH2t
N303apH1ap	N102apH1t
N303apH1ap	N102apH1t
N203apH2t	N102apH1t
N203apH3t	N102apH1t
N303apH3t	N102apH1t
N303apH4t	N201apH1t
N303apH2t	N201apH2t
N303apH3t	N101apH1t
N303apH3t	N202apH1t
N304apH2t	N101apH2t
N304apH3t	N101apH2t
N304apH3t	N201apH1t
N304apH2t	N102apH2t
N204apH3t	N101apH2t

Table 3 - Results of pre and post-operative Muller's maneuver

4. Discussion

The effects of chronic hypoxia, during sleep, results in alterations in the normal physiology of several organ systems in the body [9]. For this reason OSAS is considered a systemic disease and in the last decades attention to persistent snoring, particularly when associated with apnea syndrome, has increased hugely. Regardless the worldwide increasing interest on OSAS, the treatment is surely the most developed field. First of all, it is important to encourage the patient to change some habits like consumption of alcohol and sedative and reduce the body weight. About medical treatments, CPAP (continuous positive airway pressure) is the treatment suggested in each case of OSAS diagnosis, independently from the grade. CPAP efficacy is limited by highly variable patient compliance to therapy. In the literature, the reported adherence to CPAP ranges from 30 to 70 [10-11]. Alternative therapies may be offered depending on the severity of OSAS and the patient's anatomy, risk factors, and preferences [3]. The oral appliance therapy despite being widely diffused is not free from long-term complications [12]. Several techniques have been described in the literature. As previously mentioned, multilevel OSAS surgery was cited for the first time by Waite and colleagues in 1982, it is definitely to be considered effective in the treatment of OSAS therapy. Generally, procedures that carry less severe risks and potential complications are performed initially [13]. Tunçel compared pre- and postoperative AHI of OSAS patients underwent combined or unilevel surgery, demonstrated that multilevel surgery group exhibited statistically significant improvements in AHI [14]. Richard reported that one stage multilevel surgery is a valuable addition to the therapeutic armamentarium and can be considered a viable alternative as primary treatment in well selected patients with moderate to severe OSAS with an AHI <55 [5]. Multilevel approach represents a first choice in the case of mild and moderate OSAS, but it can also be submitted in case of severe OSAS, especially in patients with a BMI <30 and / or not compliant to CPAP or to Oral Appliance. As it regards mild forms recourse to the

anterior pharyngoplasty as oropharyngeal time can be considered valid alternative, and in those with closing anterior-posterior pattern on Muller's maneuver. The anterior palatoplasty was presented in 2009 by Pang, showed the effectiveness of this procedure considering both obstruction and snoring, in the treatment of 77 patients with mild or moderate OSAS [15-16]. The results obtained by us, although a still modest series, show a resolution of the apnoic events in 68% of the cases and a decrease of over 50% at AHI (surgical success criteria according Sher) in 25% of patients. anterior palatoplasty has many advantages: simplicity of execution, little or no post-operative complications, moderate postoperative pain, early swallowing through natural ways [5]. Therefore, anterior palatoplasty, can be considered in the treatment of mild OSAS and in carefully selected cases, oropharyngeal procedure of choice in the context of a multilevel surgical approach.

5. Conclusion

On the basis of these encouraging preliminary results, we believe that the anterior palatoplasty, combined with other surgical procedures, can be considered a valid surgical option to relieve snoring, and mild apneic events, especially in cases in which the patient refuses the mad, in cases in which it has already had the long-term effects of collateral oral appliance or when these are contraindicated [5]. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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