

Review

Open Access, Volume 1

Obstructive Sleep Apnea: How to Select the Proper Surgical Treatment

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Review

Obstructive Sleep Apnea (OSA) need to be treated to avoid its serious complication such as hypertension, pulmonary hypertension, stroke or sudden death [1]. Moreover, OSA may affect growth of children [2]. Choice of the proper surgical treatment is the way for satisfactory outcome.

OSA requires proper evaluation to choose the proper management plan. Evaluation includes good history taking, examination, polysomnography (PSG), awake nasoendoscopy with Muller maneuver and Drug Induced Sleep Endoscopy (DISE). Examination should give data on Body Mass Index (BMI), tonsil size, Friedman staging, nasal and laryngeal examination.

For patients suspected to have OSA, PSG should be done to exclude central sleep apnea that should not treated surgically and to report PSG data particularly Apnea Hypoapnea Index (AHI) detecting OSA severity.

It should be stressed that severe OSA (AHI > 30) especially more than 50 indicate multilevel OSA. In addition, surgery should be postponed till patient BMI less than 35 [3].

Site specific airway surgery and the concept of expansion and stabilization rather than removal of collapsible tissue are the main evolution in surgical treatment of OSA. Failure of palatal surgery for OSA could be mostly attributed to uncorrected hypopharyngeal and/or retroglossal collapse or obstruction. Thus, presurgical determination of sites of obstruction or collapse is

mandatory. Therefore, the first step of surgical treatment of OSA is the detection of site(s) of the upper airway collapse depending on awake nasoendoscopy with Muller maneuver and DISE.

If examination reveals static obstruction such as adenoid enlargement ($\geq 70\%$ of the nasopharynx), large tonsil (T3, T4), nasal polypi, hypertrophied tongue base lymphoid tissue, then removal of this local cause of obstruction is needed.

If dynamic obstruction (collapse) is detected by nasoendoscopy at one or more sites, each collapsible area is required to be surgically targeted selectively.

Basically, the classification of the upper airway into different levels of obstruction goes back to Fujita [4] who discriminated between retropalatal and retrolingual obstruction. On the basis of this definition, [5] developed the concept of multilevel surgery. As single level oropharyngeal surgery is often not able to cure OSA [6,7], oropharynx and hypopharynx are the main locations of obstruction, while nasal obstructions could aggravate the condition.

Upper airway collapse was classified into three types: Retropalatal collapse alone (type I), both retropalatal and hypopharyngeal collapse (type II) and, hypopharyngeal collapse alone (type III) [8,9]. Retropalatal region is considered the most common site of obstruction in patients with snoring and OSA. The era of surgical treatment began in 1981 when Fujita described uvulopalatopharyngoplasty (UPPP). Since that time, the technique was widely applied with reported success rate of less than 50% and high incidence of comorbidities. Therefore, different views and

Manuscript Information: Received: March 06, 2020; Accepted: March 30, 2020; Published: March 31, 2020

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Citation: El-Anwar MW. Obstructive Sleep Apnea: How to Select the Proper Surgical Treatment. *J Surgery*. 2020; 1(1): 1004.

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modifications have been suggested [10].

The ideal palatal procedure for the treatment of the palatal component of OSA should be effective; anatomically based; and non-destructive with minimal complications.

For retropalatal collapse, suspension sutures [11,12] and modified anterior palatoplasty [13] were proved as effective minimally invasive, tissue-preserving non-ablative surgery to expand and stabilize the collapsible soft palate and lateral pharyngeal walls.

For retrolingual/ hypopharyngeal collapse, if it is laterolateral hypopharyngeal collapse, then hyoid-thyroidpexy is indicated [3,13,14]. While when antero-posterior (central) obstruction (collapse) is reported, it should be differentiated by DISE into; 1- Hypertrophic tongue base lymphoid tissue that necessitate excision, 2- High tongue base collapse that indicate genioglossus advancement, and 3- Low tongue base collapse that requires tongue base reduction procedure [15].

In most cases of severe OSA (AHI > 30), both retropalatal and hypopharyngeal collapse (type II) is detected that indicate single stage multi-level surgery [13,16,3].

If there is a cause of nasal obstruction, it should be treated during single stage multi-level surgery because it leads to significant improvement for the patients' AHI and snoring [15].

If DISE, shows epiglottic collapse (a condition that worsen by CPAP), so epiglottoplasty is required.

The proper selection of the surgical procedure for each OSA patient is the key to achieve the proper outcome.

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