The Laryngoscope
© 2010 The American Laryngological, Rhinological and Otological Society, Inc.

The Triological Society
Best Practice

Is Nasal Surgery an Effective Treatment for Obstructive Sleep Apnea?

David E. Rosow, MD; Michael G. Stewart, MD, MPH

BACKGROUND

Nasal obstruction is thought to contribute to sleep-disordered breathing and obstructive sleep apnea (OSA), and some have found an association between the presence of nasal obstructive symptoms and OSA. Although considerable research exists in the otolaryngology literature regarding the effectiveness of surgery in OSA, it is unclear to what extent nasal surgery alone benefits these patients.

LITERATURE REVIEW

Several prospective trials have been undertaken that examine pre- and postoperative polysomnograms (PSGs) of patients with OSA undergoing corrective nasal surgery. There were four case series (level 4 evidence) and one randomized controlled trial (level 1 evidence).

In 2000, Friedman et al. carried out a prospective study of septoplasty with and without turbinate reduction in 50 patients who had OSA documented on a preoperative PSG.[1] Overall, the authors found no improvement in the objective measures respiratory disturbance index (RDI) and lowest oxygen saturation levels. Mean RDI actually increased from 31.6 to 39.5, and lowest saturation improved from 82.5% to 84.3%, but neither change was statistically significant. However, they did find that continuous positive airway pressure levels required to alleviate obstruction were reduced significantly after surgery (from 9.3 to 6.7 cm H_2O, $P < .01$). The authors also commented that the majority of the patients reported subjective symptomatic relief (of sleep disturbance) after surgery; however, this was based on a simple survey and without the benefit of a standardized instrument or a control group.

Verse et al. prospectively evaluated the effects of nasal surgery in 26 patients with either OSA or simple snoring.[2] Surgeries included in the study were septorhinoplasty, septoplasty, septoplasty with bilateral sinus surgery, nasal tip surgery, and bilateral nasal valve surgery. They found no significant improvement in the apnea-hypopnea index (AHI) (31.6 to 28.9, $P = .52$) or oxygen desaturation index (40.3 to 39.7, $P = .89$), but there were significant reductions in both the Arousal Index and the Epworth Sleepiness Scale (ESS); mean ESS improved from 11.9 to 7.7 ($P = .0004$), which represents a clinically and statistically significant improvement.

In 2008, Nakata et al. reported a prospective study of 49 patients with OSA and chronic hypertrophic rhinitis.[3] Patients underwent isolated nasal surgery, consisting of inferior turbinectomies in combination with septoplasty, endoscopic sinus surgery, or both. Patients subjectively experienced a significant improvement in daytime sleepiness after surgery, as measured by the ESS (11.7 to 3.3, $P < .001$). With regard to objective measures, surgery did not significantly improve the AHI (44.6 to 42.5). The authors did report statistically significant reductions in the duration of time patients' oxygen desaturation was below 90% (58 minutes vs. 44 minutes, $P < .05$), as well as the nadir oxygen saturation level (76.2% vs. 78.8%, $P < .01$). However, despite statistical significance, the clinical relevance of these objective improvements is unclear, particularly because the saturation nadir was still below 80%.

To date, the only level 1 evidence on the subject of nasal surgery in OSA was published by Koutsourelakis et al. in 2008.[4] The authors undertook a double-blinded,

From the Department of Otorhinolaryngology, Weill Cornell Medical College, New York, New York, U.S.A.

The authors have no funding, financial relationships, or conflicts of interest to disclose.

Send correspondence to Michael G. Stewart, MD, MPH, Department of Otorhinolaryngology, Weill Cornell Medical College, 1305 York Avenue, New York, NY 10021. E-mail: mgs2002@med.cornell.edu

DOI: 10.1002/lary.20954

randomized control trial in which 49 patients with OSA and nasal septal deviation underwent either septoplasty—with or without submucous turbinate resection—or sham surgery. There was no significant reduction of AHI in the surgery group as compared to baseline, or to the placebo group. In the surgery group, mean AHI was 31.5 before and after surgery; in the placebo group, mean AHI changed from 30.6 to 32.1 after sham surgery. The authors did report statistically significant improvement in ESS score in the surgical group and not in the placebo group: surgery ESS, 13.4 to 11.7 ($P < .01$); placebo ESS, 13.7 to 12.5 ($P =$ not significant). Despite statistically significant improvement, however, the ESS score was still in the abnormal range after treatment.

A study by Li et al. focused on whether nasal surgery in patients with OSA resulted in a quantifiable improvement in patients' quality of life.[5] The authors undertook a prospective study of 51 patients with OSA and nasal obstruction due to nasal septal deviation. Patients completed the Snore Outcomes Survey (SOS), the Spouse/Bed Partners Survey (SBPS), the ESS, and Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) before and after septoplasty with partial inferior turbinate resection. The study found statistically significant improvements in generic quality of life after nasal surgery, as measured by several subscales of the SF-36: role-physical, vitality, role-emotional, social functioning, generic health, and mental health. There were also significant improvements in disease-specific quality of life, as measured by the ESS, SOS, and SBPS after nasal surgery. The mean SOS scores improved from 42.7 to 61.1, and mean SBPS scores improved from 40.9 to 61.5. These changes are consistent with clinical and statistical significance. The mean ESS score improved from 10.0 to 8.0 ($P < .001$), which was statistically significant and also meant that patients moved from an abnormal to a normal range of sleepiness. The authors also reported PSG data from their subjects, and the AHI (37.4 to 38.1) and minimum saturation (78.3% to 79.5%) did not show significant change after nasal surgery.

BEST PRACTICE

There is no evidence that patients with OSA will experience improvement in the defining objective measures of OSA—AHI or minimum oxygen saturation—after nasal surgery alone. This is consistent with the prevailing consensus that the obstruction in OSA is multifactorial, with multiple potential areas of pathological anatomic obstruction. There is evidence, however, that OSA patients with nasal obstruction will experience subjectively better sleep, less sleepiness, and improved quality of life following corrective nasal surgery.

LEVEL OF EVIDENCE

One of the referenced studies in this review was a randomized control trial (level 1). The other four were prospective case series (level 4).

BIBLIOGRAPHY

1. Friedman M, Tanyeri H, Lim JW, Landsberg R, Vaidyanathan K, Caldarelli D. Effect of improved nasal breathing on obstructive sleep apnea. *Otolaryngol Head Neck Surg* 2000;122:71–74.
2. Verse T, Maurer JT, Pirsig W. Effect of nasal surgery on sleep-related breathing disorders. *Laryngoscope* 2002;112:64–68.
3. Nakata S, Noda A, Yasuma F, et al. Effects of nasal surgery on sleep quality in obstructive sleep apnea syndrome with nasal obstruction. *Am J Rhinol* 2008;22:59–63.
4. Koutsourelakis I, Georgoulopoulos G, Perraki E, Vagiakis E, Roussos C, Zakynthinos SG. Randomised trial of nasal surgery for fixed nasal obstruction in obstructive sleep apnoea. *Eur Resp J* 2008;31:110–117.
5. Li HY, Lin Y, Chen NH, Lee LA, Fang TJ, Wang PC. Improvement in quality of life after nasal surgery alone for patients with obstructive sleep apnea and nasal obstruction. *Arch Otolaryngol Head Neck Surg* 2008;134:429–433.