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Journal search and commentary

Article reviewed: Morbidly obese patients with severe obstructive sleep apnea: is airway reconstructive surgery a viable treatment option?☆

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Objective

To assess the outcome of upper airway surgery in the treatment of severe obstructive Sleep Apnea-Hypopnea (SAH) in morbidly obese individuals.

Study design

Retrospective, consecutive case series.

Study population

Twenty-one morbidly obese patients (BMI: 45 ± 5.4) with severe SAH (RDI: 83 ± 30.1), consecutively treated with airway reconstructive surgery.

Methods

Consecutive morbidly obese patients who underwent phase I reconstruction (uvulopalatopharyngoplasty (UPPP), genioglossus advancement and/or hyoid re-suspension) and/or Phase II: (maxillomandibular advancement, MMA) at Stanford University were reported. Five patients had previously undergone nasal surgery and UPPP at other institutions. The reason for electing surgical intervention in these patients was not stated. All patients had fiberoptic nasopharyngoscopy and lateral cephalometric radiographs before the surgery. For nine patients elective tracheotomy was performed before the reconstructive surgical procedure due to the severity of oxyhemoglobin desaturation. Two additional patients had previously undergone tracheotomy. Pre-operative polysomnograms (PSG) were performed. It is not explicitly stated if the tracheotomy was plugged during the diagnostic PSG in these particular patients. PSG evaluation was repeated 6 months following the initial airway reconstructive procedure. If a tracheotomy was present, it was plugged for 5–7 days prior to the PSG. If there was persistent, unacceptable SAH or if the patient was unable to tolerate occlusion of the tracheotomy tube, the second surgical phase was offered. PSG was performed six months following the final procedure. Reduction of the RDI to <20 and no 'significant' (the definition of significant was not provided) desaturation to $<90\%$ constituted justification for decannulation. Specific information related to definition of apnea and hypopnea was not provided.

The five patients who had previously undergone nasal surgery and UPPP had simultaneous MMA and genioglossal advancement. Sixteen patients initi-

☆ K. Li, N.B. Powell, R.W. Riley, A. Zonato, L. Gervacio, C. Guilleminault, (Laryngoscope 2000;110(6):982-987).

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ally had Phase I procedures and all 21 individuals ultimately 'completed the airway reconstruction' (presumably including Phase II procedures).

According to the table provided, 12 of the 21 patients had baseline abnormal craniofacial metrics.

Results

For the group, the RDI decreased significantly from 83 ± 30.1 to 10.6 ± 10.8 ($P < 0.001$) The nadir of oxyhemoglobin saturation increased from $63.9 \pm 17.7\%$ to $86 \pm 7.9\%$ ($P < 0.01$). 81% of the patients achieved an RDI <20 and 'minimal' desaturation $<90\%$. The definition of 'minimal' was not provided. All but two of the patients who had undergone tracheotomy were decannulated.

The BMI decreased from the time of initial diagnostic PSG to the final PSG (BMI: 45 ± 5.4 vs. 43 ± 4.4, $P < 0.001$).

Five patients experienced complications including infection of an advanced genial tubercle requiring debridement and removal. Two patients experienced loosening of fixation screws requiring removal. One individual experienced velopharyngeal insufficiency that improved over the subsequent 6 months. One patient required another operative procedure because of what the authors termed insufficient fixation and skeletal instability. One patient had recurrence of SAH with weight gain. The presence of Obesity-Hypoventilation Syndrome was considered to be elemental in causing treatment failure in two patients.

Conclusion

The investigators concluded that upper airway reconstruction is a treatment option in managing morbidly obese patients with SAH. They added that the presence of Obesity-Hypoventilation Syndrome is associated with a greater likelihood of poor outcome and pre-operative evaluation for this condition should be performed.

Comment

For those of us who participate in the care of SAH patients, those who are morbidly obese can be among the most challenging, particularly those who do not tolerate positive airway pressure therapy. Outcomes of other medical therapies may not be known or may be generally inadequate. Moreover, these individuals may be higher risk candidates for major abdominal bariatric procedures. Furthermore, the data outlining the degree to which morbid obesity may diminish the likelihood of successful outcome of other surgical procedures directed toward stabilization of the upper airway is inconsistent. Recent information regarding the cardiovascular risk of SAH suggests that providing no treatment also appears likely to be associated with this and, as we know, a wide spectrum of other health risks. For these reasons and because morbidly obese SAH patients who are intolerant of medical therapy or in whom medical intervention is inadequate are commonly encountered in clinical practice, the surgical alternatives advanced by Li and coworkers deserve consideration as an treatment option. This group has reported successful surgical intervention for SAH over more than the last decade. Recognizing the fact that the reconstructive procedures are not without potential for complications, the information provided in this report merits attention and perhaps optimism. However, there has been the suggestion that the authors' previously reported surgical successes in other SAH patient populations is not shared across all centers and this diversity of experience merits as careful consideration as does the excellent results reported by the surgeons at the Stanford Sleep Disorders and Research Center.

The issues related above highlight the need to consider to how information is developed in this area of sleep medicine. Evidence-based outcome studies of medical interventions are difficult, but similar studies of surgical efficacy are even more difficult. Controlled trials are often difficult to design and in addition to biologic variability within study populations, there are non-uniformity of recording and analytical techniques and potential heterogeneity in surgical techniques. We may never fully overcome inter-operator differences in surgical technique but the other issues can and must be addressed. A key element, as pointed out by Li et al. is patient selection. Variance in this regard may be largely responsible for inconsistent surgical results across centers. This paper by Li and coworkers examined craniofacial configuration but did not make note of the fact that nearly half

the patient population were abnormal in this regard. Thus, this data-set was not only derived from morbidly obese patients, but many of them also had abnormal bony anatomy. This could be an important determinant of outcome. Changes in weight must be thoroughly examined as potential contributors to outcome. Standardization of recording and analytical techniques is also a critical factor if we are going to learn who will and will not benefit from any given therapy. Authors must meticulously describe recording and analysis techniques in great detail if the results are to be reproduced. Ideally, multicenter studies will address the issue of treatment assessment and in this way, optimal efforts can be made to standardize monitoring and data analyses. Li and colleagues unfortunately failed to provide adequate description of their analytical methodology.

In summary, the surgical method performed by Li and colleagues in morbidly obese SAH patients appears promising, but, unfortunately, before results from these methods can be generalized to apply to a specific population of patients across all clinical centers, more attention needs to be paid to conducting scientifically sound studies. Advancing sleep medicine requires developing and using tools and procedures that meet the rigors of the scientific method.