Radiofrequency Volume Reduction of Tongue Base: A 12-Year Experience

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Otolaryngology -- Head and Neck Surgery 2012 147: P122
DOI: 10.1177/0194599812451438a274

The online version of this article can be found at:
http://oto.sagepub.com/content/147/2_suppl/P122.3
of minimum cross-sectional-area and response trended toward significance \( r = .202; -0.26, .410; P < .1 \).

**Conclusion:** Success with oral appliance therapy is not predicted by identification of the region of maximal upper airway collapse as measured by acoustic pharyngometry. OA therapy achieves reasonable objective response and cure rates in patients with primary retropalatal, retroglossal, or retroepiglottic obstruction at the time of initial titration-polysomnography.

**Sleep Medicine**

**OSA Diagnosis by Peripheral Arterial Tonometry**

Michael Friedman, MD (presenter); Christian G. Samuelson, MD; Craig S. Hamilton, MD

**Objective:** To assess the correlation between respiratory sleep indices as measured by portable sleep testing using peripheral arterial tonometry (PAT) and respiratory sleep indices as measured by formal polysomnography (PSG). Thereby assess the validity of PAT devices as diagnostic tools for obstructive sleep apnea in the adult population.

**Method:** PubMed, MEDLINE, Cochrane Trial Registry (through 12/2011), and relevant article bibliographies were searched. Articles were assessed by 3 reviewers. Systematic review and meta-analysis of studies assessing correlation of respiratory sleep indices between PAT devices and PSG in adults (>18 years) was conducted. Included studies provided an \( r \) value for correlation.

**Results:** Eleven studies met inclusion criteria and had data suitable for pooling (775 patients). Of these, 10 studies were “blinded” in that PAT and PSG were conducted simultaneously in either the home or laboratory setting. One study contained 2 trial phases for the same patient group \( (n=21) \), 1 laboratory and 1 home-based, which were analyzed separately. Overall correlation of respiratory sleep indices was high \( (r = .867, .836-.892, P < .001) \). Studies comparing respiratory disturbance index (RDI) had a combined \( r = .854 (.823-.880, P < .001) \), and those comparing apnea-hypopnea index (AHI) had a combined \( r = .890 (.833-.929, P < .001) \). Analysis of publication bias revealed a nonsignificant Egger’s regression intercept.

**Conclusion:** Respiratory indices calculated using PAT-based portable devices correlate well with those calculated from the scoring of formal PSG. The strength of this correlation is supported by the “blinded” nature of the majority of the included studies. This technology represents a viable alternative to PSG for confirmation of clinically suspected sleep apnea.

**Sleep Medicine**

**Reflux Disease and Proton Pump Inhibitor Therapy: Impact upon Sleep Disturbance**

Elliot Regenbogen, MD (presenter); Alex Helkin; Rachel Georgopoulos; Tajender Vasu, MD; A. Laurie W. Shroyer, MD

**Objective:** To perform a systematic literature review that evaluates the impact of proton pump inhibitor treatment of gastro-esophageal reflux disease upon sleep disturbance-related outcomes.

**Method:** PubMed, Web of Science, and Cochrane databases were searched from 1989 to present, identifying all randomized placebo-controlled clinical trials where both proton pump inhibitor use and outcome measures of sleep disturbance were reported for esophageal reflux disease patients. Using pre-established systematic review protocol 4 co-authors independently reviewed all articles.

**Results:** The original search identified 20 articles; 9 were not directly relevant, and 3 were not placebo controlled. Sample sizes varied from 15 to 642; mean age was 47.4 ± 4.56; mean body mass index was 29.4 ± 2.90; the proportion of women varied widely across studies. Esomeprazole was studied most frequently. Over 50% of publications permitted rescue antacids. Two studies reported polysomnography outcomes, without statistically significant improvement. All studies reported nonpolysomnography outcomes; 7 identified statistically significant improvements demonstrating drug treatment superiority over placebo.

**Conclusion:** The existing evidence supports the use of proton pump inhibitor as a treatment for esophageal reflux disease to improve quality of life sleep disturbance-related outcomes. While variability in treatments and outcomes prevented direct comparisons, this conclusion appears robust for 7 of 8 studies, including the highest 3 quality studies.

**Sleep Medicine**

**Radiofrequency Volume Reduction of Tongue Base: A 12-Year Experience**

Yi H. Kao, MD (presenter)

**Objective:** 1) To report on the evolution and success rate of radiofrequency volume reduction of the tongue base over a 12-year period. 2) Introduce a novel method for deploying the RFVR probes to the tongue base without pulling the tongue forward. 3) Show reduced complication rates by avoiding nerves and vessels. 4) Show increased success rate with increased number of lesions per treatment session. 5) Demonstrate the possibility of treating the genioglossus and geniohyoid muscles to shorten these muscles and retract the tongue anteriorly.

**Method:** In an IRB-approved prospective study at a community hospital, over 400 patients with obstructive sleep apnea over a 12 year period were selected for RFVR of the tongue base when there is evidence of hypopharyngeal involvement. Treatment evolved from single pronged to a double pronged probe with the rapid lesion mode and from to 2 lesions to 14 lesions. RFVR is usually performed in conjunction as part of multilevel treatment. Polysomnography prior to and 3 months after treatment were analyzed. Complications were recorded. Success is defined as RDI less than 20 and a greater than 50% reduction from preoperative levels.
Results: Success rates increased from 58% to 68% while the number of sessions of treatment decreased from 4 to 1 as the number of lesions increased from 2 to 14. There were no major complications.

Conclusion: RFVR of tongue base has evolved over a 12-year period to become a more efficacious and integral part of multilevel treatment for OSA.

Sleep Medicine

Safety of Outpatient Surgery for Obstructive Sleep Apnea

Reginald F. Baugh, MD (presenter); Bonnie Burke; Brian Fink, MD; Richard Garcia, MD; Alan Kominsky, MD; Kathleen L. Yaremchuk, MD

Objective: This retrospective cohort study of adult Medicaid obstructive sleep apnea (OSA) patients undergoing head and neck airway surgery sought to determine their safety experience. Physicians will: 1) Gain insight into inpatient and ambulatory management considerations for OSA. 2) Understand how administrative data sets can be used to answer quality questions.

Method: Four hundred fifty-two patients (404 ambulatory, 48 inpatient) receiving head and neck surgery from 01/01/2009 to 06/30/2011. Four safety indicators were reported from administrative data for 30 days: ER visit, inpatient admission, observation day, and 3 or more PCP visits. MI, DVT, stroke, PE, tracheostomy, or transfusions were noted.

Results: OSA subjects (3.29 ambulatory, 3.78 inpatient) had greater risk scores (sicker) than plan members (P < .05). The majority (89%) of the surgeries were ambulatory. No difference in safety indicator rates was identified between ambulatory and inpatient groups (P > .61). ER visit was the most common adverse outcome (19% overall). Median time to first ER visit was significantly longer among ambulatory patients (7 days) than inpatients (3 days) (P = .03). The observed catastrophic complication rate among ambulatory patients was zero (95% CI: 0.0%-1.1%). Administrative data sets can be used to provide insight into practice safety questions.

Conclusion: Contrary to guidelines, OSA patients are undergoing ambulatory head and neck airway surgery. Administrative data sets can be used to provide insight into practice safety questions. Further study is warranted of ambulatory head and neck airway surgery. Administrative data sets can be used to provide insight into practice safety questions.

Sleep Medicine

Sleep Architecture Patterns in Enuretic Children with OSA

Prasad J. Thottam, DO (presenter); Larisa Kovacevic, MD; David Madgy, DO; Ibrahim Abdulhamid, MD

Objective: Nocturnal enuresis (NE) has been described in children with obstructive sleep apnea (OSA) related to adeno-tonsillar hypertrophy. For those affected adeno-tonsillectomy has demonstrated to improve both NE and OSA in many patients. Our objective is to determine if preoperative sleep architecture is associated with complete resolution of NE after adeno-tonsillectomy.

Method: A prospective study of 18 pediatric patients (1/2011-2/2012) with primary NE who underwent adeno-tonsillectomy for OSA was conducted. Both preoperative polysomnograms (PSG) and pre- and postoperative reports of NE were recorded. Resolved vs unresolved postoperative nocturnal enuresis (RNE vs UNE) was the outcome evaluated. Data was assessed via chi-square/t test analyses.

Results: Mean child age was 8.28 (SD = 2.3 years). All children reported presurgical primary NE. No RNE vs UNE age/gender differences were identified. Postsurgery, over half of participants reported NE resolution. Significant improvement of NE was identified in children with higher preoperative AHI (RNE mean = 21.4; UNE mean = 3.6; t = 2.33, P = .03) and lower preoperative oxygen saturations (RNE lowest % = 78.1; UNE lowest % = 89.6; t = 2.72, P = .03). All children with prolonged stage 2 sleep reported postsurgical NE resolution, whereas two-thirds of the children with prolonged delta sleep and all with above normal REM reported persistent postsurgical NE.

Conclusion: Adeno-tonsillectomy is a treatment option for OSA with NE. Preliminary data demonstrates that children with high AHI, significant oxygen desaturations, and abnormally prolonged stage 2 sleep have a high resolution rate of NE postoperatively. There are significant differences in preoperative sleep architecture between UNE and RNE patients with OSA.

Sleep Medicine

Targeted Hypoglossal Neurostimulation in Obstructive Sleep Apnea

Philippe Rombaux, MD, PhD (presenter); Gisele Mwenge, MD; Benoit Lengelé, MD; Daniel Rodenstein, MD

Objective: Airway management is the standard approach for the treatment of obstructive sleep apnea (OSA). CPAP remains the gold standard to treat OSAS, but about one-quarter of the patients are poorly compliant or tolerant to the mask. The aim of the study was to evaluate the safety and efficacy of targeted neurostimulation of the hypoglossal nerve (THN Sleep Therapy) in CPAP non-compliant subjects using the aura6000™ System from IntThera Medical Inc.

Method: The study was a single arm, prospective feasibility study on 13 OSA subjects. Apnea-hypopnea indices (AHI) were measured at 3 and 12 months. A multi-contact cuff electrode was implanted unilaterally on the proximal hypoglossal nerve and an implantable pulse generator placed subcutaneously in the ipsilateral upper chest wall.