What is the Role of Soft Palate Surgery in OSA?

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Acknowledgments

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Disclosures

• No industry disclosures

• I am a surgeon

Question:

Should we do UPPP?
Answer:
Yes…

Role of Palate Surgery
• Treat palatal obstruction
• When CPAP not successful
• With realistic expectations
Should We Do UPPP?

1. What is UPPP
2. The case against UPPP
3. The case for UPPP
4. A synthesis

Normal Oral Exam
Abnormal Oral Exam

Extended Uvulopalatal Flap
UPPP Variants

- Uvulopalatal Flap
- Extended Uvulopalatal Flap
- Expansion Sphincter Pharyngoplasty
- Lateral Pharyngoplasty
- Lateral Palatopexy
- Palatal Advancement Pharyngoplasty

Why We Should Not Do UPPP

- UPPP rarely cures OSA
SLEEP APNEA

Redefining Success in Airway Surgery for Obstructive Sleep Apnea: A Meta Analysis and Synthesis of the Evidence

Adam G Elshaug, MPH, John R Moss, MBBS, BSc, FRACP, Anne Marie Southwell, MBBS, FRACP, Janet E Hiller, MPH, PhD

Study Objectives: The role of upper airway surgery as a treatment for adult obstructive sleep apnea (OSA) remains controversial, with perspectives on treatment efficacy varying considerably. Though debate may occur in the clinical sphere, it is necessary to appreciate the ever-increasing funding and policy focus on cost-effectiveness and "efficacy" in health care.

Design: In this review, we examine contemporary evidence that highlights the importance of "highly effective treatment" over "subtherapeutic treatment" as a necessary to confer improved health outcomes in OSA. We highlight that assumptions of surgical success inherent in most articles fail to substantiate contemporary, clinically significant indicators of success. We performed a literature search and present integrated meta-analyses data from 16 surgical articles. Statistical meta-analyses highlighted how surgical success decreases when new evidence-based criteria of success are applied.

Measurements and Results: Specifically, when the traditional definition is applied (50% reduction in apnea-hypopnea index [AHI] and/or ≤ 20), the pooled success rate for Phase I procedures is 50% (95% CI). However, at AHI ≤ 10, success reduces to 31.5% (26.5% CI) and, at AHI ≤ 5, success is reduced to 3.3% (2.7% CI). According to these definitions, Phase II success (50%) varies from 80% (44%) to 63% (50%) and 43% (57%), respectively.

Conclusions: The evidence for clinical efficacy must define treatment "success." We propose all future surgical metrics report "objective cure" rates with success based on AHI outcomes of ≤ 5 and/or ≤ 10. We hope this paper serves as a catalyst for debate and consensus.

Keywords: Surgery, sleep apnea, evidence, treatment, effectiveness, health outcomes

Citation: Elshaug AG, Moss JR, Southwell A et al. Redefining Success in Airway Surgery for Obstructive Sleep Apnea: A Meta Analysis and Synthesis of the Evidence. SLEEP 2007;30(4):461-467

Surgery Rarely Cures OSA

<table>
<thead>
<tr>
<th>Study</th>
<th>Phase I Success (%)</th>
<th>Success Defined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headley, Costello et al. 2001</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Miller, Wilson et al. 2003</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Vickers, Mordio et al. 2002</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Fisherfield, Shen et al. 2002</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Stock, Maren et al. 2003</td>
<td>90</td>
<td>80</td>
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<tr>
<td>Fergusson, Hefferny et al. 2002</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Somers, Piccon et al. 2002</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Liao, Shroyander et al. 2003</td>
<td>90</td>
<td>80</td>
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<tr>
<td>Berger, Shen et al. 2003</td>
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<td>Berger, Shen et al. 2003</td>
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<tr>
<td>Shen, Jowett et al. 2002</td>
<td>90</td>
<td>80</td>
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<tr>
<td>Stock, Darnell et al. 2002</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>(Caldji and Droge 2004</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Broadbent, Kozian et al. 2005</td>
<td>90</td>
<td>80</td>
</tr>
</tbody>
</table>

Combined

Figure 1
TRUE!

But…

Surgery Helps OSA

Figure 1

Elshaug, Sleep 2007;30:461-7
Appropriate Goals of Salvage Surgery

- If UPPP is PRIMARY therapy:
  - CURE is an appropriate goal

- If UPPP is SALVAGE therapy:
  - IMPROVEMENT is an appropriate goal

Appropriate Goals of Salvage Surgery

Improve CLINICAL OUTCOMES:
- Mortality risk
- Cardiovascular disease risk
- Motor vehicle accident risk
- Quality of life
Mortality in severe sleep apnoea/hypopnoea syndrome patients: impact of treatment


ABSTRACT: The aim of this study was to determine mortality in patients with sleep apnoea/hypopnoea syndrome (SAHS) according to the treatments employed and compliance.

An historical cohort of patients with SAHS diagnosed at a university hospital between 1982 and 1992 and followed until 1996 was studied. From a total of 478 SAHS patients, 444 (94%), with a mean 38 apnoea/hypopnoea index at diagnosis of 55±27, were located and included in the study. SAHS treatments employed were: surgery (36), weight loss (134), continuous positive airway pressure (124) and 98 patients were not treated.

By the end of follow-up, 49 patients had died. According to Cox regression analysis, mortality in treated patients was lower than in those not treated, but higher in those with a history of severe chronic obstructive pulmonary disease. Mortality in untreated patients compared with that of the general population, adjusted for age and sex, showed excessive mortality, which decreased in treated patients. Stratification by age showed a greater mortality rate ratio in patients <50 yrs. These findings were maintained when mortality from cardiovascular causes was compared.

In conclusion, a rise in mortality was found in untreated sleep apnoea/hypopnoea syndrome patients compared with the general population, whereas mortality in those treated for sleep apnoea/hypopnoea syndrome did not differ significantly from that of the general population.

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Keywords: Cardiovascular diseases, mortality, sleep apnoea/hypopnoea syndrome, therapies.

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**OSA Survival**

- **Follow-up yrs**: 0, 2, 4, 6, 8, 10
- **Survival %**: 100, 90, 80, 70, 60, 50

**Figure 1**

Marti, Eur Resp J 2002;20:1511-18

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**OSA Mortality**

- **Adjusted* Hazard Ratio of Death**:
  - **None (N=98)**: 1.00
  - **CPAP (N=124)**: 0.20
  - **UPPP (N=88)**: 0.00
- **P = 0.05**

*Adjusted for age, sex, smoking, BMI, AHI, AHT, CHD, COPD.

**Adapted from Table 4**

Marti, Eur Resp J 2002;20:1511-18
How Can It Be?

• PSG outcomes modest vs. clinical outcomes good
  – AHI misses important effects

Sleep-disordered Breathing and Cardiovascular Disease
An Outcome-based Definition of Hypopneas
Naresh M. Punjabi, Anne B. Newman, Terry B. Young, Helaine E. Resnick, and Mark H. Sanders

The adjusted prevalent odds ratios for quartiles of the hypopnea index using a 4% desaturation criterion were as follows: 1.00 (<1.10 events/h), 1.10 (1.01–3.20 events/h), 1.33 (3.21–7.69 events/h), and 1.41 (>7.69 events/h). Hypopnea measures based on less than 4% oxyhemoglobin desaturation or presence of arousals showed no association with cardiovascular disease.
How Can It Be?

- PSG outcomes modest vs. clinical outcomes good
  - AHI misses important effects
    - Reduced desaturations
    - Conversion of apneas to hypopneas
    - Improved sleep architecture (REM)

How Can It Be?

- PSG outcomes modest vs. clinical outcomes good
  - AHI misses important effects
  - OSA progression slowed, even if not halted
Mortality of Veterans with Sleep Apnea: Untreated versus Treated
Weaver EM, Maynard C, Yuen B

Introduction: Untreated obstructive sleep apnea (OSA) appears to increase mortality. The effect of treatment on mortality risk is unclear, and a previous review analyzed small samples and did not adequately control for comorbidity. We sought to determine whether providing a continuous positive airway pressure (CPAP) device or positioning (tracheoplasty/glossectomy) (UPPP) is associated with a decreased mortality rate relative to providing no treatment for OSA, in a large cohort with control for comorbidity.

Methods: This retrospective inception cohort study included all patients diagnosed with OSA at any Veterans Affairs (VA) hospital facility 1991-2001 or respiratory facility 1997-2001. Subtypes were identified by ICD-9 diagnostic codes at the VA hospital's dependent treatment sites. Treatment status (none, CPAP, UPPP, or tracheoplasty) was determined by ICD-9 or CPT procedure codes in these databases. Patients without a code for CPAP, UPPP, or tracheoplasty were considered untreated. Patients undergoing tracheoplasty were not included in this analysis, because indications for this procedure could not be determined. CPAP patients were provided a CPAP device, but usage data were not available. Sleep apnea severity data were not available. The Charlson Comorbidity Index was calculated from ICD-9 diagnostic codes from the year prior to inception into the cohort. Mortality data were extracted from VA Death Files. Survival time was calculated from the date of first diagnosis of OSA to date of death or 9/30/2012. Treatment groups were compared on mortality based with Cox regression, adjusting for age, sex, race, comorbidity, and insertion year.

Results: The cohort consisted of 140,207 veterans, age 27-92 (mean 75 ± 10) years, 97% male. By September 2002, 30,907 of 116,476 untreated patients (14.5%), 1,258 of 23,012 CPAP patients (14.4%) and 204 of 3,977 UPPP patients (9.9%) were dead (untreated vs. treated, p=0.001). Patients with the diagnosis of OSA were more likely to be treated (p=0.004). After adjusting for the variables listed, untreated patients had 1.9 (95%CI 1.8-2.0, p<0.001) times greater hazard of dying at any time relative to treated patients. UPPP patients had a lower mortality rate (p=0.005). Mean survival (p=0.003), and mean hazard of death (adjusted hazard ratio 0.87, 95%CI 0.85-0.91, p<0.002) relative to CPAP patients.

Conclusion: Treatment with CPAP or UPPP confers a survival advantage over no treatment, after adjustment for age, sex, race, comorbidity, and type of OSA diagnosis. Our results, however, are consistent with the results of other published studies on the relative efficacy of CPAP and UPPP because CPAP usage data were not available.

Survival

UPPP = 3,977
CPAP = 28,612
No Tx = 116,678

Level 2 Weaver, Sleep 2004;27:A208
How Can It Be?

• PSG outcomes modest vs. clinical outcomes good
  – AHI misses important effects
  – OSA progression slowed, even if not halted
  – Effect occurs 100% of time
  – Snoring reduced

UPPP & Cardiovascular Dz
Increased Incidence of Cardiovascular Disease in Middle-aged Men with Obstructive Sleep Apnea
A 7-Year Follow-up

Yuksel Peker, Jan Hedner, Jeanette Norum, Holger Kraiczi, and Jan Carbon
Sleep Laboratory, Department of Pulmonary Medicine, Sahlgrenska University Hospital, Gothenburg, Sweden

The incidence of cardiovascular disease (CVD) was explored in a consecutive sleep clinic cohort of 202 middle-aged men (mean age, 46 ± 9.5 years; range, 30-69 years in 1991) with or without obstructive sleep apnea (OSA). All subjects were free of hypertension or other CVD, pulmonary disease, diabetes mellitus, psychiatric disorder, alcohol dependency, or smoking habits at baseline. The incidence of cardiovascular events was followed for up to 8 years. In 2001, the total number of cardiovascular events was 22 of 46 (47.8%) cases with OSA (mean age, 61 years) compared with 10 of 120 (8.3%) subjects without OSA (p < 0.001). In a multiple logistic regression model, independent predictors of cardiovascular events in OSA patients were body mass index (odds ratio [OR] 4.9; 95% confidence interval [CI], 1.8-13.6), age (OR 2.0; 95% CI, 1.1-3.7), and smoking (OR 2.6; 95% CI, 1.1-6.1). After adjustment for BMI, SBP, and OSA at baseline, the OSA group had a significantly higher incidence of cardiovascular events (p < 0.001). The number of cardiovascular events was 13 of 52 (25%) in OSA patients compared with 17 of 49 (34.7%) in Non-OSA subjects (p = 0.07). In conclusion, this study demonstrates that the incidence of cardiovascular events is increased in middle-aged OSA subjects independently of age, BMI, SBP, and smoking. Furthermore, efficient treatment of OSA reduces the excess CVD risk and may be considered also in relatively mild OSA without regard to daytime sleepiness.

UPPP & Cardiovascular Dz

![Graph showing the comparison between CPAP and UPPP treatment effectiveness]

- CPAP: 64% efficiency, 36% not treated
- UPPP: 50% efficiency, 50% not treated

Figure 2
UPPP & Cardiovascular Dz

Figure 2

Peker, AJRCCM 2002;166:159-65

UPPP & Motor Vehicle Accidents
Does Uvulopalatopharyngoplasty Inhibit Automobile Accidents?

Per-Olle Haraldsson, MD; Christer Carenfelt, MD; Michael Lydahl, MD; Claes Tingvall, PhD

Patients with rhinopathy, which includes obstructive sleep apnea syndrome (OSAS), who report sleeping spells at the wheel do poorly on simulated monotonous driving tests and have a twofold to threefold increase in traffic accidents. To assess whether drivers with rhinopathy (heavy snoring, sleep disturbances, and daytime sleepiness) cough fewer automobile accidents after uvulopalatopharyngoplasty (UPPP), the event rate for the first 5 years after surgery was compared to the rate of the 5 years immediately before the operation. Data were collected by means of a self-report questionnaire. Fifty-six patients with rhinopathy were compared to 142 controls without rhinopathy who had been subjected to nasal surgery. The response rates were 96% and 98%, respectively. The reported habitual sleepiness while driving had disappeared in 87% (P<0.001) of drivers who had the problem preoperatively. The accident risk reduction (corrected for mileage) in patients was almost four times greater than the reduction in controls (P<0.001) after surgery. The relative rate of patients involved in any single-car accident fell by 77% (P<0.05), and the relative rate of single-car accidents fell by 83% (P<0.001). It is concluded that drivers with rhinopathy have an increased risk for car accidents, especially single-car accidents, but that this risk returns to normal after UPPP.

Corrected for driving exposure. P<0.001.

UPPP & Quality of Life

Studying Life Effects & Effectiveness of Palatopharyngoplasty (SLEEP) Study: Subjective Outcomes of Isolated Uvulopalatopharyngoplasty

Edward M. Weaver, MD, MPH, B. Tucker Woodson, MD, Bevan Yueh, MD, MPH, Timothy Smith, MD, MPH, Michael G. Stewart, MD, MPH, Maureen Hannley, PhD, Kristine Schulz, MPH, Miledh M. Patel, MS, David Witsell, MD, MHS, and the SLEEP Study Investigators

Objective. To test the hypothesis that uvulopalatopharyngoplasty (UPPP) improves sleepiness-related quality of life (measured on the Functional Outcomes of Sleep Questionnaire [FOSQ]) at 3 and 6 months follow-up. Secondary objectives were to test (1) the stability of the outcomes at 6 months, (2) the effect of on global sleepiness quality-of-life change, and (3) the effectiveness of sleep apnea symptoms.


Subjects and Methods. The cohort included 48 patients from 17 practices, with a mean ± standard deviation age of 44 ± 12 years and mean sleep apnea-index of 35 ± 21 events/hour. All patients underwent UPPP, defined as an open procedure modifying the shape and size of the palate, pharynx, and uvula, with or without tonsillectomy. Baseline data were collected on site before surgery and outcomes were collected by mail 3 and 6 months after surgery, with follow-up rates of 51% and 50%, respectively.

Results. FOSQ scores improved from 14.3 ± 3.4 (scale: 0–20, normal = 17.4) at baseline to 17.7 ± 3.7 at 3 months (mean improvement 2.4; 95% confidence interval 1.8–4.0, P < .001) and 17.5 ± 2.5 at 6 months (mean improvement 3.1; 95% confidence interval 2.8–4.2, P < .001). All quality-of-life and symptom measures improved significantly at 3 and 6 months (all P < .05).

Conclusion. This prospective, multicenter, university- and community-based study provides evidence that UPPP significantly improves disease-specific quality of life and sleep apnea symptoms in patients with sleep apnea. Validity may be limited.
UPPP: Quality of Life

* p<0.001

**Table 2. Outcomes Between Baseline, 3 Months, and 6 Months**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Baseline, Mean ± SD</th>
<th>3 Months, Mean ± SD</th>
<th>6 Months, Mean ± SD</th>
<th>PValue* (0-3 mo)</th>
<th>PValue* (0-6 mo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional Outcomes of Sleep Questionnaire (0-20)</td>
<td>14.3 ± 3.4</td>
<td>17.2 ± 2.7</td>
<td>17.5 ± 2.5</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epworth Sleepiness Scale (0-24)</td>
<td>12.9 ± 5.5</td>
<td>7.0 ± 4.7</td>
<td>6.9 ± 4.2</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Sleep apnea symptoms (0-5)</td>
<td>3.7 ± 1.1</td>
<td>1.1 ± 1.5</td>
<td>1.5 ± 1.7</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Awakening with headache, d/iwk</td>
<td>1.7 ± 2.3</td>
<td>1.0 ± 2.1</td>
<td>1.0 ± 1.9</td>
<td>.048</td>
<td>.008</td>
</tr>
<tr>
<td>Sleep apnea problem VAS (0-100)</td>
<td>68 ± 30</td>
<td>24 ± 28</td>
<td>24 ± 27</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Snoring VAS (0-100)</td>
<td>53 ± 32</td>
<td>8 ± 12</td>
<td>18 ± 22</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Global sleep apnea QOL change, −7 to +7</td>
<td>—</td>
<td>3.5 ± 2.6</td>
<td>2.5 ± 2.7</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Which Is Better?

Untreated Sleep Apnea

Partially Treated Sleep Apnea

Which Is Better?

Untreated Sleep Apnea

Partially Treated Sleep Apnea
Realistic Expectations

- Improved clinical outcome
- NOT cure
- Difficult acute recovery
- Complications

Complications

- Pain
- Bleeding
- Velopharyngeal Incompetence
- Dysphagia
- Stenosis
- Voice change
- Failure
- Life-threatening complications
Why We Should Not Do UPPP

- UPPP risks too much harm

Surgery for Snoring and OSA

Effects and Side-Effects of Surgery for Snoring and Obstructive Sleep Apnea – A Systematic Review

Carl Franklin, MD, PhD; Mark Czermak, MD; Suanna Gaskins, BS; Thorunn Galisson, MD, PhD; Sheila MacCallum, MD, PhD; Kurt Myers, MD

Level 4

Study Objectives: Many patients undergo surgery for snoring and sleep apnea, although the efficacy and safety of such procedures have not been clearly established. Our aim was systematically to review studies of the efficacy and adverse effects of surgery for snoring and obstructive sleep apnea.

Study Design: Systematic review

Measurements: PubMed and Cochrane databases were searched in September 2007. The identification of cases was limited to surgery or conservative treatment in adults, with daytime sleepiness, quality of life, sleep-related indices, and snoring as outcomes were included. Observation studies were also reviewed to assess adverse effects. Evidence was required to be at least two studies of moderate and high quality reporting the same result.

Results: Four studies of 315 patients and 43 studies of adverse effects were included. There was no significant effect on daytime sleepiness and quality of life after laser-assisted uvulopalatopharyngoplasty and radiofrequency ablation. The patients reported a significant reduction in snoring in one trial after radiofrequency ablation. No trial investigating the effect of any other surgical modality met the inclusion criteria. Persistent side effects occurred after uvulopalatopharyngoplasty and radiofrequency ablation, which are likely to affect more than half the patients and may be difficult to manage.

Keywords: snoring, adenotonsillar hypertrophy, surgery, adverse effects, quality of life

Conclusions:

We call for research of randomized, controlled trials of surgery other than uvulopalatopharyngoplasty and uvulopalatoplasty, as they are related to a high risk of long-term side-effects, especially difficulty swallowing.

Table 4—Side-Effects After Uvulopalatopharyngoplasty

<table>
<thead>
<tr>
<th>Persistent side-effects</th>
<th>Author</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hagert 2000</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>Grontved 2000</td>
<td>42%</td>
</tr>
<tr>
<td>Difficulty swallowing</td>
<td>Hagert 2000</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>Grontved 2000</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>Lysdahl 2002</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Jäghagen 2004</td>
<td>29%</td>
</tr>
<tr>
<td>Voice changes</td>
<td>Hagert 2000</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>Grontved 2000</td>
<td>7%</td>
</tr>
<tr>
<td>Taste disturbances</td>
<td>Hagert 2000</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Li 2006</td>
<td>1%</td>
</tr>
</tbody>
</table>
Why We Should Not Do UPPP

- UPPP risks too much harm

FALSE!
Patients asked if satisfied with surgery: 11% not satisfied

Benefits Outweigh Harms

- Few regretted surgery
  - Patients informed
  - Side effects minor
  - Side effects often temporary
  - Patients adapted or not bothered
  - Benefits outweighed harm
Mortality Risk

- Overall survival improved
  - Low 30-day mortality risk (low risk of harm)
  - Improved long-term benefit (large benefit)
  - Immediate net benefit

Incidence of Serious Complications After Uvulopalatopharyngoplasty

Kezirian, Laryngoscope 2004; 114:450-3

**Objectives:** Uvulopalatopharyngoplasty (UPPP) is the most common surgical treatment for obstructive sleep apnea (OSA). Anatomic and physiologic abnormalities associated with OSA can make perioperative management difficult. Only single-site case series provide current estimates of the incidence of perioperative complications, with a pooled crude serious complication rate of 2.5% and a crude mortality rate of 0.4%. The primary objective of this study was to calculate the incidence of perioperative mortality and morbidity in a large, multicenter cohort of UPPP patients. **Study Design:** Prospective cohort study of adults undergoing inpatient UPPP with or without other concurrent procedures. **Methods:** The serious complication and death mortality rates were calculated from the Department of Veterans Affairs (VA) National Surgical Quality Improvement Program database of prospectively collected outcomes of all VA inpatient surgeries nationally 1999 to 2001. Serious complications were defined by 15 specific life-threatening complications. Deaths were captured whether the patient was in the hospital or discharged. **Results:** Veteran patients (n = 3130) had a mean age of 56 years and were predominantly male (87%). The serious nonfatal complication rate was 1.2% (95% CI 1.0%, 1.4%). The 30-day mortality rate was 0.2% (95% CI 0.1%, 0.4%). There was no significant effect of year of surgery or patient age on the risk of serious complications or death. **Conclusions:** The incidence of serious nonfatal complications and 30-day mortality after UPPP are 1.2% and 0.2%, respectively, in a large cohort of UPPP patients at veteran hospitals. Key Words: obstructive sleep apnea, complications, mortality, palate surgery, uvulopalatopharyngoplasty, veterans, VA. **Laryngoscope, 114:450-453, 2004**

30-d Mortality Rate: 7/3130 = 0.2% (95% CI 0.1%, 0.4%)

Level 2

Kezirian, Laryngoscope 2004; 114:450-3
Mortality of Veterans with Sleep Apnea: Untreated versus Treated
Weaver EM,1,4,5,3 Maynard C,3,5 Yuen B1,2,4,6

Introduction: Untreated obstructive sleep apnea (OSA) appears to increase mortality. The effect of treatment on mortality risk is unclear.

Methods: This retrospective inception cohort study included all patients diagnosed with OSA at any Veterans Affairs (VA) sleep center facility 1991 - 2001 or semiconductor facility 1997 - 2001. All patients were identified by ICD-9 diagnostic codes in the VA electronic and outpatient treatment files.

Treatment status (CPAP, UPPP, No Tx) was determined by ICD-9 or CPT procedure codes in these databases. Patients without a code for CPAP, UPPP, or treatment were considered untreated. Patients undergoing tracheotomy were not included in this analysis, because indications for tracheotomy could not be determined. CPAP patients were provided a CPAP device, but usage data were not available. Sleep apnea severity data were not available. The Charlson Comorbidity Index was calculated from ICD-9 diagnostic codes from the year prior to inception into the cohort. Mortality data were extracted from VA Death Files. Survival time was calculated from the date of first diagnosis of OSA to date of death or 2001. Treatment groups were compared on mortality using Cox regression, adjusting for age, sex, race, comorbidity, and insurance status.

Results: The cohort consisted of 49,297 veterans, aged 17-12 (mean±SD) years, 97% male. By September 2002, 36,967 of 10,728 untreated patients (14.4%), 1,256 of 23,612 CPAP patients (12.4%) and 314 of 3,977 UPPP patients (9.9%) were dead (untreated v. treated, p<0.001). From the date of OSA diagnosis, untreated patients survived 5.4±±2.5 years, CPAP patients survived 5.6±±2.5 years, and UPPP patients survived 5.2±±2.5 years (untreated v. treated, p<0.001). After adjusting for the variables listed, untreated patients had 1.8±±1.8 (p<0.001) times greater hazard of dying at any time relative to treated patients. UPPP patients had a lower mortality rate (p=0.004). Inverse survival (p=0.003) and inverse hazard of death (adjusted hazard ratio 0.97, 95%CI 0.95-0.99, p<0.002) relative to CPAP patients.

Conclusions: Treatment with CPAP or UPPP confers a survival advantage over no treatment, after adjustment for age, sex, race, comorbidity, and year of OSA diagnosis. Our current data conclusions about the relative efficacy of CPAP and UPPP because CPAP usage data were not available.
Surgery Survival

1 month

Which Is Worse?

Risk of Surgery

Risk of Untreated Sleep Apnea

Level 2

Weaver, Sleep 2004;27:A208

UPPP
CPAP
No Tx
Which Is Worse?

Risk of Surgery

Risk of Untreated Sleep Apnea

Why We Should Not Do UPPP

- UPPP rarely cures OSA
- UPPP risks too much harm
Why We **Should** Do UPPP

- UPPP improves outcome
- UPPP benefits outweigh harms

Role of Palate Surgery

- Treat palatal obstruction
- When CPAP not successful
- With realistic expectations
  - Benefits
  - Potential harms
What is the Role of Soft Palate Surgery in OSA?

REFERENCES CITED IN SYLLABUS


ADDITIONAL SUPPORTING REFERENCES NOT CITED IN SYLLABUS


