

# Otolaryngology -- Head and Neck Surgery

<http://oto.sagepub.com/>

---

## Perioperative Management of Obstructive Sleep Apnea : A Survey of Veterans Affairs Health Care Providers

Reena Dhanda Patil and Yash J. Patil

*Otolaryngology -- Head and Neck Surgery* 2012 146: 156 originally published online 31 October 2011

DOI: 10.1177/0194599811427251

The online version of this article can be found at:

<http://oto.sagepub.com/content/146/1/156>

---

Published by:



<http://www.sagepublications.com>

On behalf of:



[American Academy of Otolaryngology- Head and Neck Surgery](http://www.aao-hn.org)

**Additional services and information for *Otolaryngology -- Head and Neck Surgery* can be found at:**

**Email Alerts:** <http://oto.sagepub.com/cgi/alerts>

**Subscriptions:** <http://oto.sagepub.com/subscriptions>

**Reprints:** <http://www.sagepub.com/journalsReprints.nav>

**Permissions:** <http://www.sagepub.com/journalsPermissions.nav>

>> [Version of Record](#) - Dec 22, 2011

[OnlineFirst Version of Record](#) - Oct 31, 2011

[What is This?](#)

# Perioperative Management of Obstructive Sleep Apnea: A Survey of Veterans Affairs Health Care Providers

Reena Dhanda Patil, MD<sup>1,2</sup>, and Yash J. Patil, MD<sup>1,2</sup>

No sponsorships or competing interests have been disclosed for this article.

## Abstract

**Objectives/Hypothesis.** (1) To determine the presence of Veterans Affairs (VA) institutional guidelines for the perioperative management of obstructive sleep apnea (OSA); (2) to examine current use of preoperative screening tools for OSA in the VA; and (3) to understand current VA practice patterns regarding postoperative disposition of patients with OSA.

**Study Design.** Survey study.

**Setting.** Veterans Affairs hospitals with surgical services; sample size 102 facilities.

**Subjects.** Veterans Affairs health care providers.

**Methods.** The authors surveyed health care providers at VA hospitals using a survey tool developed by the authors.

**Results.** The response rate was 80%. A variety of preoperative screening tools for OSA were used by respondents, most commonly American Society of Anesthesiologists guidelines (53%). A policy for postoperative disposition of known and presumed OSA was present in 26% and 19% of responses, respectively. Of those respondents reporting a formal postoperative care policy, 48% and 30% admitted patients to a monitored ward bed and surgical intensive care unit, respectively. Of the 74% of respondents unaware of an institutional policy, Anesthesia and Surgery worked together to dictate postoperative disposition of patients with known OSA 73% of the time. The degree of OSA was ranked as the most important factor (58%) influencing postoperative disposition. Ten percent of respondents reported a major perioperative complication attributable to OSA in the past year.

**Conclusion.** This survey study elucidates the heterogeneity of preoperative screening for and postoperative care of veterans with OSA. Future investigators may use these data to formalize institutional policies with regard to patients with OSA, with potentially significant impacts on patient care and usage of financial resources.

## Keywords

obstructive sleep apnea, survey, perioperative management

Received June 23, 2011; revised September 27, 2011; accepted September 29, 2011.

Obstructive sleep apnea (OSA) is a syndrome that is expected to steadily increase in prevalence in the United States as our country's population continues to age and become more obese.<sup>1</sup> It is estimated that 2% of women and 4% of men between 30 and 60 years old suffer from symptomatic OSA (apnea-hypopnea score >5 and daytime hypersomnolence).<sup>2</sup> However, these figures underestimate the degree of OSA in the general population, as it is estimated that 82% to 93% of adult patients with moderate to severe OSA are currently not diagnosed.<sup>3</sup> OSA is well known to cause or contribute to a number of medical comorbidities, including hypertension, arrhythmia, pulmonary hypertension, and other cardiac conditions.<sup>4,5</sup> In addition, OSA can significantly decrease quality of life, causing sleepiness and impaired cognition.<sup>6</sup>

Surgery in patients with OSA poses a unique set of risks with regard to airway and cardiovascular management. Patients are at higher risk for perioperative morbidity due to a vulnerable cardiopulmonary system stressed by postoperative hypoxemia and hypercapnia.<sup>7</sup> From a respiratory standpoint, patients with OSA are often perceived by caregivers to possess a "difficult" airway whose instability may be compounded by pharyngeal collapse and reduced ventilatory drive resulting from anesthetic drugs and opioid analgesics.<sup>1,8</sup> In addition, respiratory complications are predisposed by obesity in many patients with OSA, which can lead to reduced functional residual capacity and decreased oxygen reserves in the perioperative period.<sup>7,8</sup> Patients undiagnosed with OSA but determined to have high propensity for OSA during preoperative screening have a higher risk of perioperative events, such as increased difficulty of intubation and need for supplemental oxygen.<sup>9</sup>

<sup>1</sup>University of Cincinnati Department of Otolaryngology-Head and Neck Surgery, Cincinnati, Ohio, USA

<sup>2</sup>Cincinnati VA Medical Center, Cincinnati, Ohio, USA

## Corresponding Author:

Reena Dhanda Patil, MD, Department of Otolaryngology, University of Cincinnati, 231 Albert B. Sabin Way, M.L. #528, Cincinnati, OH 45267-0528  
 Email: reenadhanda@aol.com

To properly identify patients with OSA, a number of validated preoperative screening tools for OSA are now in use, including the ASA (American Society of Anesthesiologists) guidelines, the Berlin questionnaire, and the STOP questionnaire.<sup>10-12</sup> Another significant concern regarding patients with OSA revolves around the presence (or absence) of an appropriate admission or discharge policy after surgery. In some institutions, patients are routinely managed in an intensive monitored setting, consuming expensive resources because of concerns about potential postoperative respiratory and cardiac complications. In other settings, patients may be discharged home after a general anesthetic, which may open them to postoperative respiratory or cardiac complications. In response to the need for a standardized protocol for perioperative management of OSA patients, a task force from the ASA published practice guidelines in 2006.<sup>13</sup>

Despite agreement among surveyed anesthesia providers in Canada and the United Kingdom supporting the development and implementation of institutional guidelines dictating postoperative care, management of OSA patients continues to be heterogeneous across practice settings.<sup>14,15</sup> There are currently few studies and a lack of experience with available evidence-based practice guidelines to assist in formalizing postoperative treatment protocols in both the outpatient and inpatient care settings.

The US Department of Veterans Affairs (VA) currently treats 6 million veterans across a wide variety of inpatient and outpatient facilities.<sup>16</sup> Given the demographic composition of the veteran population, the VA potentially treats a large number of patients with both known and undiagnosed OSA.<sup>2,3</sup> Recent advances in VA health care over the past decade have led to recognition of VA leadership with regard to patient safety and quality assurance.<sup>17</sup> Given a common electronic health record (EHR) and the needs of its patient population, the VA system is poised to establish standardized management plans for the perioperative management of patients with OSA.

In this survey study of VA health care providers, the objectives were 3-fold: (1) to determine the current presence or absence of institutional guidelines for the perioperative management of veterans with presumed or known obstructive sleep apnea, (2) to examine the current usage of a preoperative screening tool to determine the likelihood of obstructive sleep apnea in patients with suspected or undiagnosed sleep apnea, and (3) to better understand current practice patterns regarding the postoperative disposition of patients with presumed or diagnosed sleep apnea.

## Materials and Methods

### Questionnaire

The study was conducted using a survey tool designed by the authors to be completed in less than 10 minutes (see appendix, available at [otojournal.org](http://otojournal.org)). Nine questions, mostly closed-ended, focused on preoperative screening tools, the existence of formal institutional policies regarding postoperative management of patients with OSA, and the postoperative care setting for these patients. The study was approved by the

**Table 1.** Percentage of Responses by Type of Provider

Provider Type	% Respondents
Chief of anesthesia	79
Staff anesthesiologist	10
Certified registered nurse anesthetist	7
Chief of staff	3
Chief of surgery	1

combined University of Cincinnati and Cincinnati VA Institutional Review Board and the Cincinnati VA Research and Development Service.

### Sampling/Administration

The survey was distributed electronically by the VA Central Office Share Point application to each regional VA network, which then sent the survey to all 128 surgical VA facilities with responses required from each facility. The electronic request was directed to the chief of anesthesiology at each institution. However, if a chief was not available, responses were then collected from another clinician deemed appropriate by that institution.

### Statistical Analysis

Data were analyzed using Microsoft Excel 2008 for Mac. Results are described as descriptive statistical analyses and percentages.

## Results

The response rate for this study was 80% (102/128). The distribution of responses from different types of providers is shown in **Table 1**.

### Institutional Guidelines

Patterns of postoperative discharge policies for patients with OSA are shown in **Table 2**.

### Preoperative Screening

Tools used by respondents in preoperative screening for OSA are shown in **Table 3**.

### Current Practice Patterns Regarding Postoperative Discharge

For the 27 respondents who were aware of a formalized admission/discharge policy in their individual institutions, routine admission patterns are shown in **Table 4**. Seventy-eight respondents were not aware of a formal discharge policy, with anesthesia dictating the postoperative disposition of the patient with known or presumed OSA 18% of the time, surgical service making the decision 9% of the time, and a combination of the two services formulating a plan in 73% of cases. Heterogeneity was noted in the level of respiratory monitoring of patients admitted to a non-intensive care unit (ICU) setting after surgery (see **Table 5**).

**Table 2.** Percentage of Respondents Aware of an Institutional Postoperative Discharge Policy for Patients with Obstructive Sleep Apnea (OSA)

	Yes, %	No, %
Respondents aware of a formal postoperative admission/discharge policy in patients with known/diagnosed OSA	26	74
Respondents aware of a formal postoperative admission/discharge policy in patients with suspected/presumed OSA	19	81

**Table 3.** Obstructive Sleep Apnea (OSA) Screening Tools Used by Respondents

Preoperative Tool Used to Screen for OSA	% Respondents
American Society of Anesthesiologists criteria	52
STOP questionnaire	10
Berlin questionnaire	4
Flemons criteria	0
Other	18
None	17

**Table 4.** Postoperative Admission Setting

Admission Setting	% Respondents
Monitored floor bed	48
Surgical intensive care unit	30
Twenty-three-hour postanesthesia observation unit	4
Medical intensive care unit	4
Other (including transitional care setting and postanesthesia care unit)	15

### Ranking Factors Influencing Postoperative Disposition

Respondents were asked to rank the top 3 factors that helped them decide whether to admit a patient with suspected OSA to the hospital after surgery, shown in **Table 6**.

### Perioperative Complications

Ten percent (10/102) of respondents reported a major complication they perceived to be attributable to OSA in a surgical patient in the past 12 months. Comments are as follows:

1. "One instance of hypoxemia on the ward, successfully recognized and managed."
2. "At least one reintubation necessary in PACU [postanesthesia care unit] in a patient with OSA."
3. "Patient required re-intubation due to airway obstruction and hypoxemia."
4. "Respiratory arrest."
5. "A patient with OSA had eye surgery with sedation. He was discharged home and died a couple of days later."

**Table 5.** Level of Respiratory Monitoring in Non-Intensive Care Unit Admissions

Monitoring	% Respondents
Pulse oximetry connected to a central alarm	52
Pulse oximetry not connected to a central alarm	22
No pulse oximetry monitoring	10
Other	16

**Table 6.** Top 3 Factors Influencing Respondents' Decision Making with Regard to Postoperative Disposition

Factors Influencing Postoperative Disposition	% Respondents Ranking Factor First in Importance
Degree of obstructive sleep apnea	58
Type of surgery performed	48
Drugs administered	19

6. "Patient received a Depodur injection and required reintubation post operatively in the intensive care unit."
7. "Morbidly obese patient with OSA desaturated on POD#2 [postoperative day 2] while in monitored status but not using an assistive device secondary to nausea. Sinus bradycardia to arrest with inability to rescue due to inability to ventilate and difficult intubation."
8. "An orthopedic patient with history of OSA was given routine analgesics and suffered a respiratory arrest necessitating emergent intubation. This was the impetus for developing our pre-anesthetic OSA flag system."
9. "Needed to reintubate the patient in the PACU after surgery."
10. "Apnea during monitored anesthesia care."

### Discussion

The VA health care system spans all geographic areas of the United States, providing care to a large veteran population that is predominantly male with a high prevalence of obesity.<sup>18,19</sup> Thus, it represents a significant portion of health

care delivery to US patients in a demographic category that may have OSA based on prevalence studies.<sup>2,3</sup> Our results show that, despite the presence of a unified health care system with a rigorous system of quality assurance and performance measures, there is currently no formalized institutional policy across the VA nationally with regard to management of surgical patients with OSA. A minority of survey respondents (26%) were aware of an individual hospital policy for postoperative admission of patients with known OSA, whereas only 19% knew of a policy for patients with presumed OSA.

In those VA hospitals with a formal policy for management of patients with OSA, there was little agreement regarding the appropriate postoperative setting. In hospitals without a departmental policy, anesthesia and surgery collaborated to determine postoperative disposition in 73% of responses. This is significant in that both groups are invested in this decision and have real input in dictating the postoperative care settings for patients with OSA. Our survey also showed little agreement across VA anesthesia providers with regard to a standard preoperative screening tool. Just over half of respondents (53%) used ASA guidelines to consider a presumptive diagnosis of OSA in patients who had not undergone polysomnography, whereas the remainder used a wide variety of questionnaires or other tools.

Our results are consistent with 2 previous survey studies examining similar questions. One study surveyed Canadian anesthesiologists to examine the presence of guidelines and evidence in decision making regarding the postoperative care of patients with OSA. Seventy-two percent of respondents reported an absence of departmental policies for care of OSA patients, whereas 82% reported that guidelines would assist them in caring for these patients.<sup>11</sup> Another survey study in the United Kingdom revealed significant variation in preoperative assessment and postoperative care of patients with OSA.<sup>10</sup> No published survey studies on this subject are noted in the US literature.

Interestingly, our data showed a high rate (10%) of respondents reporting at least 1 major perioperative complication as a direct result of diagnosed or presumed OSA in surgical patients in the past 12 months. A number of published studies have sought to understand the incidence of significant complications in patients with OSA undergoing general anesthesia, with widely varying results. One study by Gupta et al<sup>20</sup> regarding postoperative complications in 101 patients with OSA undergoing joint replacement cites a 24% incidence of serious complications compared with 9% in a control group. On the other hand, a much larger study by Kezirian et al<sup>21</sup> examined the incidence of serious complications after uvulopalatopharyngoplasty in 3130 patients using VA National Surgical Quality Improvement Data (NSQIP) data and arrived at a 1.5% incidence of serious nonfatal complications and 30-day mortality of 0.2%. Our data strengthen our concern that anecdotal experience and lack of consistent evidence may create heterogeneity in managing surgical patients with OSA across a variety of

institutions and contribute to either unsafe discharge practices in one setting or an unnecessary exhaustion of scarce inpatient resources in another.

Although this study benefited from a relatively large sample size (102) and a high response rate (80%), the study design and data were subject to significant limitations. Selection bias is inherent in the study, given that only 79% of responses were obtained from the target population of chiefs of anesthesia. The remainder of responses (21%) came from providers associated with either anesthesia and surgery (chief of surgery, staff anesthesiologist, and certified registered nurse anesthetist) or hospital leadership (chief of staff). This may skew results, as 21% of respondents possess a different fund of knowledge about OSA than a chief of anesthesia and a different perspective on management of surgical patients with OSA based on administrative vs clinical experience. In addition, the study is subject to recall bias, particularly with regard to the question asking respondents to describe a major perioperative complication within the past 12 months. Respondents may be more likely to recall or overemphasize a negative outcome than a positive one, erroneously resulting in a relatively high percentage of reported complications attributable to OSA. Finally, the purpose of a portion of the survey was to understand the *awareness* (not necessarily actual presence) of policies dictating perioperative care of patients with OSA. Responses may be skewed because of recall bias in this instance as well as certain subgroups within the sample group may have more knowledge of written policy (eg, those at a service chief level).

Despite its limitations, the data from this survey study reveal that the VA is one representative health care organization among many that suffers from a lack of organizational guidelines on the management of surgical patients with OSA. The Clinical Practice Review Committee of the American Academy of Sleep Medicine (AASM) published a 2007 statement, "Patient care protocols should be reviewed by individual institutions to help determine whether they are appropriate for the care of patients with OSAS [OSA syndrome]. Alterations in protocols should be made if current protocols do not provide for adequate postoperative monitoring."<sup>13</sup> In addition, the Joint Commission proposed a National Patient Safety Goal for 2008, focused on preoperative screening as well as protocols for perioperative management of OSA.<sup>22</sup> Responding to these needs, a number of groups are developing and implementing a perioperative OSA protocol in individual institutions.<sup>23-25</sup> These efforts use a variety of preoperative screening tools, several of which have been recently validated, as well as a number of disparate postoperative clinical pathways in deciding what postoperative setting is appropriate for each patient with known or presumed OSA. One example of such a tool is the STOP questionnaire, which consists of 4 questions and has been validated with a sensitivity of 79.5% in patients with an apnea-hypopnea index (AHI) >30.<sup>26</sup> Other examples of validated tools include ASA guidelines and the Berlin questionnaire, both of which possess similar sensitivity values.<sup>27</sup>

The VA health care system currently does not have a unified evidence-based protocol for preoperative screening of patients and postoperative care guidelines. However, given the size and organizational structure of the VA as well as its centralized EHR and experience with other national quality initiatives, the VA is well positioned to initiate a clinical care pathway for patients with OSA undergoing surgery. With regard to preoperative screening, the EHR can be used to document efforts to preoperatively screen for OSA during all presurgical interviews, allowing caregivers to tailor anesthetic management during surgery, choose the appropriate postoperative setting, and advise patients on the need to continue toward workup of presumed OSA to optimize their overall health. In a similar vein, a cost analysis can be performed in a representative sample of hospitals using such a clinical protocol. It remains to be seen if a heterogeneous approach to treatment of this large and growing population of patients with OSA is more or less expensive than treatment based on a standardized clinical pathway. From a financial standpoint, it is important to understand what, if any, cost benefits can be gained from a standardized discharge policy and usage of respiratory monitoring in an appropriate care setting.

## Conclusion

This survey study elucidates the heterogeneity of preoperative screening for and postoperative care of veterans with OSA, a syndrome that is rising in prevalence and that can cause significant morbidity in patients undergoing surgery. Future investigators may use these data to formalize institutional policies with regard to patients with OSA, with potentially significant impacts on patient care and usage of financial resources.

## Author Contributions

**Reena Dhanda Patil**, designed study, gathered data, and wrote manuscript; **Yash J. Patil**, contributed to survey design, analyzed results, and reviewed and edited manuscript.

## Disclosures

**Competing interests:** None.

**Sponsorships:** None.

**Funding source:** None.

## Supplemental Material

Additional supporting information may be found at <http://oto.sagepub.com/content/by/supplemental-data>

## References

1. Benumof JL. Obstructive sleep apnea in the adult obese patient: implications for airway management. *J Clin Anesth.* 2001;13:144-156.
2. Young T, Palta M, Dempsey J, Skatud J, Weber S, Badr S. The occurrence of sleep-disordered breathing among middle-aged adults. *N Engl J Med.* 1993;328:1230-1235.
3. Young T, Evans L, Finn L, Palta M. Estimation of the clinically diagnosed proportion of sleep apnea syndrome in middle-aged men and women. *Sleep.* 1997;20:705-706.
4. Grote L, Ploch T, Heitmann J, Knaack L, Penzel T, Peter JH. Sleep-related breathing disorder is an independent risk factor for systemic hypertension. *Am J Respir Crit Care Med.* 1999;160:1875-1882.
5. Shahar E, Whitney CW, Redline S, et al. Sleep-disordered breathing and cardiovascular disease: cross-sectional results of the Sleep Heart Health Study. *Am J Respir Crit Care Med.* 2001;163:19-25.
6. Strollo PJ, Rogers RM. Obstructive sleep apnea. *N Engl J Med.* 1996;334:99-104.
7. Adesanya AO, Lee W, Greulich NB, Joshi GP. Perioperative management of obstructive sleep apnea. *Chest.* 2010;138:6.
8. Meoli AL, Rosen CL, Kristo D, et al. Upper airway management of the adult patient with obstructive sleep apnea in the perioperative period—avoiding complications. *Sleep.* 2003;26:1060-1065.
9. Stierer TL, Wright C, George A, et al. Risk assessment of obstructive sleep apnea in a population of patients undergoing ambulatory surgery. *J Clin Sleep Med.* 2010;6:467-472.
10. Chung F, Yegneswaran B, Liao P, et al. Validation of the Berlin Questionnaire and American Society of Anesthesiologists checklist as screening tools for obstructive sleep apnea in surgical patients. *Anesthesiology.* 2008;108:822-830.
11. Chung F, Elsaid H. Screening for obstructive sleep apnea before surgery: why is it important? *Curr Opin Anesth.* 2009;22:405-411.
12. Gali B, Whalen F, Gay P, et al. Management plan to reduce risks in perioperative care of patients with presumed obstructive sleep apnea syndrome. *J Clin Sleep Med.* 2003;3:582-588.
13. Gross JB, Bachenberg KL, Benumof JL, et al. Practice guidelines for the perioperative management of patients with obstructive sleep apnea: a report by the American Society of Anesthesiologists Task Force on Perioperative Management of Patients with Obstructive Sleep Apnea. *Anesthesiology.* 2006;104:1081-1093.
14. Olumuyiwa AB, Chung AS, Khalaf WM, Dwyer BJ, Alfa JA, Tierney NM. Survey of perioperative care of adults with obstructive sleep apnoea. *Eur J Anaesthesiol.* 2009;26:706-708.
15. Turner K, VanDenKerkhof E, Lam M, Mackillop W. Perioperative care of patients with obstructive sleep apnea: a survey of Canadian anesthesiologists. *Can J Anesth.* 2006;53:299-304.
16. National Center for Veterans Analysis and Statistics. February 2011. [http://www.va.gov/vetdata/docs/Quickfacts/4X6\\_winter11\\_sharepoint.pdf](http://www.va.gov/vetdata/docs/Quickfacts/4X6_winter11_sharepoint.pdf). Accessed June 9, 2011.
17. Asch SM, McGlynn EA, Hogan MM, et al. Comparison of quality of care for patients in the Veterans Health Administration and patients in a national sample. *Ann Intern Med.* 2004;141:938-945.
18. Das SR, Kinsinger LS, Yancy WS, et al. Obesity prevalence among veterans at Veterans Affairs medical facilities. *Am J Prev Med.* 2005;28:291-294.
19. US Department of Veterans Affairs National Center for Veterans Analysis and Statistics. January 12, 2010. [http://www.va.gov/vetdata/Veteran\\_Population.asp](http://www.va.gov/vetdata/Veteran_Population.asp). Accessed June 9, 2011.

20. Gupta RM, Parvizi J, Hanssen AD, Gay PC. Postoperative complications in patients with obstructive sleep apnea syndrome undergoing hip or knee replacement: a case-control study. *Mayo Clin Proc.* 2001;76:897-905.
21. Kezirian EJ, Weaver EM, Yueh B, et al. Incidence of serious complications after uvulopalatopharyngoplasty. *Laryngoscope.* 2004;114:450-453.
22. HealthLeaders Media. JCAHO announces potential 2008 National Patient Safety Goals. December 2006. <http://www.healthleadersmedia.com/content/HOM-85527/JCAHO-announces-potential-2008-National-Patient-Safety-Goals.html>. Accessed June 10, 2011.
23. Finkel KJ, Searleman AC, Tymkew H, et al. Prevalence of undiagnosed obstructive sleep apnea among adult surgical patients in an academic medical center. *Sleep Med.* 2009;10:753-758.
24. Moos DD, Prasch M, Cantral DE, Huls B. Are patients with obstructive sleep apnea syndrome appropriate candidates for the ambulatory surgical center? *AANA J.* 2005;73:197-205.
25. Gali B, Whalen FX, Gay PC, et al. Management plan to reduce risks in perioperative care of patients with presumed obstructive sleep apnea syndrome. *J Clin Sleep Med.* 2007;3:582-588.
26. Chung F, Yegneswaran B, Liao P, et al. STOP questionnaire: a tool to screen patients for obstructive sleep apnea. *Anesthesiology.* 2008;108:812-821.
27. Chung F, Yegneswaran B, Liao P, et al. Validation of the Berlin questionnaire and American Society of Anesthesiologists checklist as screening tools for obstructive sleep apnea in surgical patients. *Anesthesiology.* 2008;108:822-830.