# Obstructive Sleep Apnea: Care of the Patient in PACU

*Quicklinks*

Sleep Apnea: Postoperative Risk Prediction Model (Appendix A)
STOP-BANG Questionnaire Screening Tool for OSA (Appendix B)
Perioperative Management of Sleep Apnea: Summary (Appendix C)

## Site Applicability

VGH & UBCH PACU

## Practice Level

RN

## Goal

To outline the nursing management of patients with known or suspected OSA in the immediate post anesthetic period

## Policy Statement

- Patients admitted to PACU with Obstructive Sleep Apnea will be cared for in accordance with the Department of Anesthesia's OSA guidelines & PACU Orders: Patients With Diagnosed or Suspected Sleep Apnea
- Patients who have met PACU Phase I discharge criteria & remain in PACU due to Sleep Apnea Protocol will have continuous SpO2 monitoring and vital signs assessed & documented as follows:
    - Respiratory parameters (SpO2, rate, regularity, airway patency) Q15 min
    - BP, HR Q1hour until discharged
- Extended monitoring either in PACU or in another monitored bed is indicated when there is:
    - Identified high baseline risk for complications from sleep apnea as per Postoperative Risk Prediction Model (see Appendix A)
    - Recurrent respiratory events in PACU
    - Newly required positive airway pressure (PAP) therapy
    - Postoperative hypoxaemic (SpO2 less than 90% on room air) and/or hypercarbic (PCO2 > 50 mm Hg) respiratory failure High risk for cardiac ischaemia and/or dysrhythmias
    - Significant opioid and or sedative level including pain-sedation mismatch
- Discharge of sleep apnea patients from PACU occurs in consultation with the anesthesiologist through consideration of the baseline risk and ruling out postoperative risk indicators

- **A monitored bed** provides continuous oximetry monitoring and possibility of early nursing intervention. This is achieved with a dedicated, appropriately trained professional observer in the room (e.g. PACU/SDU/other critical care unit)

## Need to Know

**Obstructive Sleep Apnea (OSA) is characterized by repetitive episodes of partial (hypopnea) and complete (apnea) upper airway collapse during sleep.** Resultant cycles of hypoxia, hypercarbia and increased respiratory effort against the obstructed airway contribute to a variety of adverse health effects, including cardiovascular disorders (e.g. hypertension, ischemic heart disease, CHF, atrial fibrillation and pulmonary hypertension), metabolic disorders (including diabetes), and neurocognitive disorders (including daytime somnolence). The disorder is exacerbated by other states of CNS depression such as residual sedation from general anesthesia, and following opioid and sedative administration.

The first lines of treatment for moderate to severe OSA are lifestyle changes (e.g. weight loss, smoking cessation, avoiding alcohol and other sedatives), and **positive airway pressure (PAP) therapy, e.g. CPAP, BiPAP or APAP.**

OSA is also associated with an **increased risk of perioperative complications**, including difficult/failed intubation, difficult mask ventilation, respiratory complications, cardiac ischemia and dysrhythmias. Since the majority ( greater than 75%) of individuals with OSA are undiagnosed, the use of a clinical prediction formula as a preoperative screening tool is recommended. A score of greater than 5 on the STOP-BANG questionnaire (See Appendix B: STOP-BANG Questionnaire: Screening Tool for OSA) indicates the probability of moderate to severe OSA.

Diagnosed or suspected OSA signals the need for additional perioperative precautions, such as anticipation of a difficult airway, use of short-acting anesthetic agents, alternatives to opioids and other sedative drugs, ensuring full reversal of neuromuscular block prior to extubation, avoiding the supine position during recovery, and timely resumption of positive airway pressure (PAP) therapy. (See Appendix C: Perioperative Management of Sleep Apnea: Summary)

Postoperative risk of complications from OSA can be predicted by considering the following factors: severity of OSA, compliance with PAP therapy, severity of co- morbidities, invasiveness of the surgical procedure and anticipated postoperative opioid requirement (See Appendix A: Sleep Apnea: Postoperative Risk Prediction Model).

In PACU, additional indicators of postoperative risk for complications include:

1. **Respiratory event(s)**
   - apnea for greater than 10 seconds
   - desaturation to less than 90%
   - respiratory rate less than 8 breaths per minute

   **or**

2. **Baseline hypoxemic and/or hypercapneic respiratory failure** (e.g. room air SpO2 < 90% or PCO2 > 50 mmHg) by time of considered discharge from PACU,

   **or**

3. **Significant opioid requirement and/or sedation level.** (See Appendix A: Sleep Apnea: Postoperative Risk Prediction Model).

Supplemental $O_2$ is indicated by unit protocol (contingent on $SpO_2$), by POPS protocol (all patients on PCA, or with an epidural) or by physician order (e.g. at risk for cardiac ischemia or dysrhythmias). However, supplemental $O_2$ can decrease the hypoxemic respiratory drive, and may thus prolong apnea and exacerbate hypercapnea. Supplemental $O_2$ also hinders the detection of respiratory deterioration by oximetry. Therefore, unless indicated by protocol or physician order, supplemental $O_2$ is ideally discontinued in patients with OSA if the baseline $SpO_2$ is 90% or higher.

## Equipment and Supplies

- CPAP/BiPAP machine as applicable
- $ETCO_2$ monitoring supplies (adapted face mask or nasal prongs) as applicable

## Practice Guideline

### Assessments:

**Assess patient as per PACU standards with special attention to:**

1. **Risk Factors**
   a. Preoperative:
      - diagnosed severity of OSA, or STOP-BANG score greater than 5
        - if compliant with PAP therapy pre- and postoperatively, OSA can be regarded as one level less severe
      - co-morbid disease:
        - ischemic heart disease and dysrhythmias
        - respiratory failure
        - morbid obesity

b. Intraoperative:
   - general anesthesia and/or long-acting opioids (e.g. IT morphine or IV hydromorphone/morphine) and/or sedation (e.g. midazolam)

c. Postoperative:
   - respiratory events
   - related respiratory interventions to manage events (e.g. chin lift/jaw thrust, nasal/oral airways, bag-mask ventilation, PAP therapy application) significant opioid requirement and/or sedation level
   - baseline room air $SpO_2$ less than 90% by time of considered discharge from PACU

**2. Respiratory Events**

**NOTE:**

**Assess SpO2 and respiratory patterns prior to stirring up the patient to verify that acceptable parameters can be**

**Assess For:**

a. Apnea, bradypnea or desaturation events
   - Note if events are severe, frequent or prolonged
   - Signs of intermittent, transient airway obstruction which may occur without desaturation (e.g. snoring, other adventitious upper airway sounds, and/or paradoxical breathing).

**b. Baseline room air $SpO_2$** by time of considered discharge, **with patient undisturbed, preferably sleeping**
   - **do not** initiate room air challenge if $O_2$ supplementation is required for co-morbidity

c. ETCO2 monitoring
   - Consider initiating capnometry in PACU for patients at high risk for respiratory complications from OSA, especially when discontinuing oxygen therapy is not an option

**3. Opiod Requirement/Sedation Level**

a. Significant opioid requirement, for example
   - inpatient – requires more than ordered maximum
   - ambulatory patient - requires more than low dose PO opioid
     - more than codeine 60 mg, or oxycodone 10 mg, or hydromorphone 4 mg Q4H
   - opioid tolerant patient - requires significantly more than baseline opioid

b. Significant sedation level or pain-sedation mismatch (inadequate pain control and sedation score greater than 2)

c. Complex pain management anticipated PLUS spinal anaesthetic

- the anesthesiologist may order extended PACU stay until spinal anesthesia has regressed below level of incision to ensure pain control is achieved in a monitored setting

**Intervention**

**Implement measures to support adequate oxygenation & ventilation as per PACU standards. In addition:**

- **Positioning**
  - care for patient in semi-fowler's and/or lateral position if possible
  - **NB: AVOID supine position with HOB flat**
- **PAP Therapy**
  a. On home PAP - CPAP, BiPAP or APAP preoperatively
     1. initiate preoperative PAP therapy immediately if patient is drowsy – VGH Sedation Score greater than 1; UBCH LOC/Sedation Score less than 2 - and/or experiencing REs
        - discontinue supplemental oxygen if baseline $SpO_2$ 90% and above
     2. if PAP initiated:
        - maintain PAP therapy throughout PACU stay and following discharge from PACU if PACU Sedation Score VGH greater than 1/UBCH less than 2 and/or experiencing REs
        - consult with anesthesiologist regarding need for monitored versus unmonitored bed for ongoing care (consider baseline risk +/- presence of postoperative risk indicators as per Appendix A and Appendix C)

  b. **Newly required PAP** therapy (if not on PAP preoperatively)
     1. initiate CPAP or BiPAP as per Anesthesiology orders
     2. if possible, wean PAP as patient rouses
        - goal is unsupported respirations and SpO2 greater than 90% on room air without stimulation
     3. if ongoing REs, maintain PAP and consult Respirology
     4. consider ongoing care in a monitored bed even if weaning from PAP therapy is possible
- **Oxygen Supplementation**
  a. Unless ordered by physician, or required by comorbidity or protocol, discontinue $O_2$ supplementation if **baseline** $SpO_2$ 90% and above
  b. **Supplemental $O_2$ indicated by comorbidity** (e.g. hypoxemic respiratory failure, or at risk for myocardial ischemia):
     1. maintain supplemental $O_2$

2. monitor for respiratory events (while unstirred, preferably asleep)
3. consider capnometry monitoring in PACU

c. **Supplemental $O_2$ indicated by protocol only** (e.g. if on PCA or epidural):

- at beginning of one hour extended stay, discontinue supplemental O2 and:
  - determine **baseline** $SpO_2$ (i.e. $SpO_2$ between respiratory events)
  - monitor for respiratory events (while unstirred, preferably asleep)
- if no respiratory events after 15 minutes on room air and patient maintains baseline $SpO_2$ at 90% or more, resume protocol $O_2$ therapy and discharge patient from PACU when one hour extended stay elapses
- if respiratory events occur during 15 minute observation period or patient unable to maintain baseline $SpO_2$ at minimum 90%, resume protocol $O_2$ therapy and consult with anesthesiologist regarding need for extended monitoring

**4. Pain Management**

a. Use non-opioid analgesia in preference to opioids if possible and appropriate

b. Use caution with concomitant administration of opioids and other medications with known sedative or CNS depressant properties, e.g., midazolam, droperidol, dimenhydrinate or methotrimeprazine.

**5. Discharge from PACU**

a. Initiate extended stay as per Anesthesiology orders when patient has met routine PACU discharge criteria

b. Notify Anaesthesiologist of the following:

- **All respiratory events** (including severity, duration & frequency of apnea, bradypnea and desaturation events )
- **Interventions** required to manage respiratory events (e.g. stirring up, chin lift/jaw thrust, nasal/oral airway, bag-mask ventilation, or PAP therapy)
- **Significant opioid** requirement or sedation level including pain-sedation mismatch (high sedation and pain scores concurrently)
- **Baseline room air $SpO_2$** less than 90% at time of considered discharge from PACU

c. Ensure appropriate consults initiated and/or completed

- Respirology consult must be done in PACU unless the patient is discharged to a monitored bed

d. Confirm that receiving unit has appropriate capability if monitored bed required, i.e.:

- Nursing unit provides continuous $SpO_2$ monitoring
- RN or other qualified personnel can hear and respond to oximetry alarm immediately

## Expected Outcomes

The patient will maintain an unobstructed airway and adequate ventilation and oxygenation postoperatively.

## Patient Education

Reinforce the following information as applicable:

- Importance of and rationale for PAP postoperatively
- Rationale for extended stay in PACU
- Rationale for transfer to monitored unit following PACU discharge
- Ambulatory patient – increased risk of respiratory depression and apnea/hypopnea events if prescribed opioid dose exceeded or opioids taken in conjunction with ETOH or over the counter sedating medications

## Documentation

On PACU record or Special Clinical Record (as applicable), document time & type of the following:

- apnea, bradypnea and desaturation events
- episodes of airway obstruction
- interventions initiated to maintain airway, oxygenation and ventilation (manual airway support, oral or nasal airway, PAP therapy, stirring up) patient education

## Related Documents

BIPAP: Administration and Management of the Patient on Non-Invasive Ventilation

Care of the Post Anaesthetic Patient – Phase I

Discharge of the Post Anaesthetic Patient – Phase I

Care and Discharge of the Ambulatory Surgical Patient – Phase 2/3

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## Alternate Search Terms

OSA

# Appendix A: Sleep Apnea: Postoperative Risk Prediction Model

## Prediction of Postoperative Risk of Complications from OSA:

### Baseline Risk & Postoperative Indicators

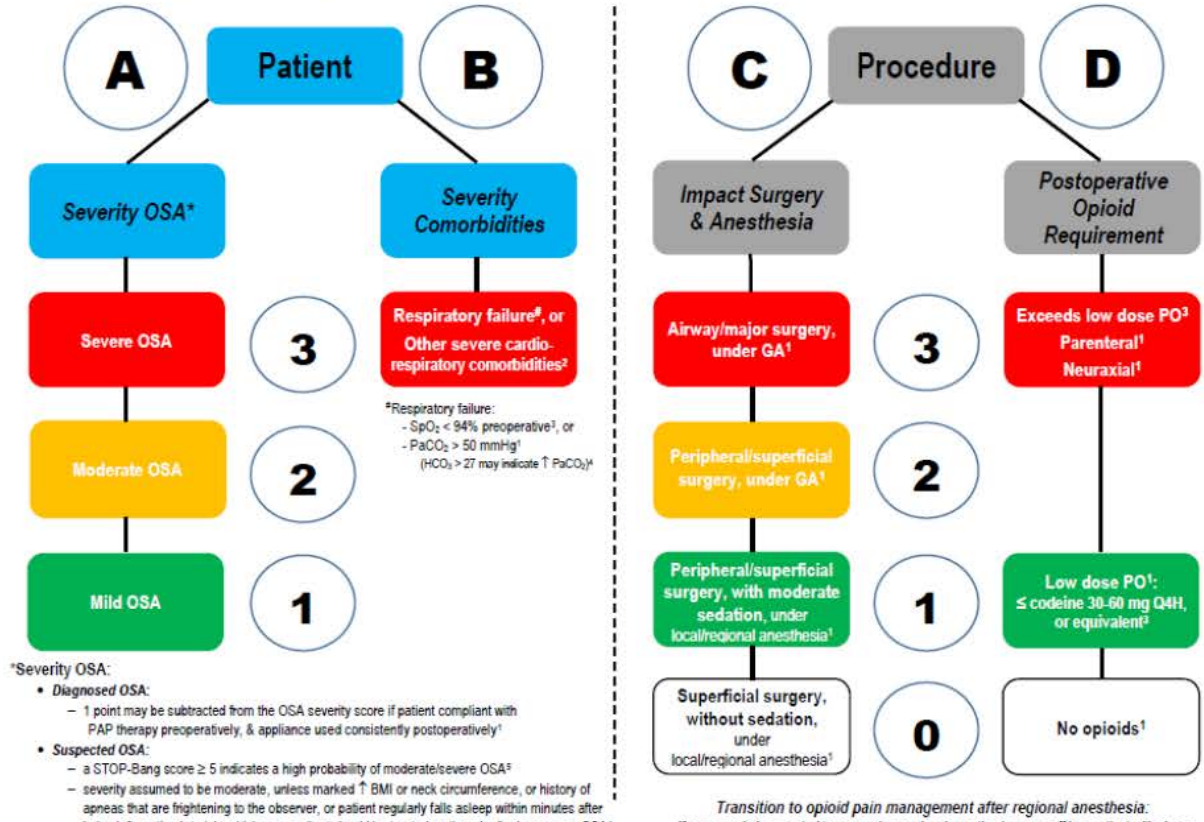
*Vancouver Acute Department of Anesthesia and Perioperative Care - January 2014*

**A. Baseline Risk Score: add greatest score under either column A or B, to greatest score under either column C or D**

*= adaptation of the OSA risk scoring system proposed in the 2006 and 2014 ASA Guidelines on the Perioperative Management of OSA*

*- can be predicted preoperatively and updated postoperatively*

*- meant only as a guide, and clinical judgment should be used to assess the risk of an individual patient*




#Respiratory failure:
- $SpO_2$ < 94% preoperative[3], or
- $PaCO_2$ > 50 mmHg[1]
($HCO_3$ > 27 may indicate ↑ $PaCO_2$)[4]

*Severity OSA:
- ***Diagnosed OSA:***
  - 1 point may be subtracted from the OSA severity score if patient compliant with PAP therapy preoperatively, & appliance used consistently postoperatively[1]
- ***Suspected OSA:***
  - a STOP-Bang score ≥ 5 indicates a high probability of moderate/severe OSA[5]
  - severity assumed to be moderate, unless marked ↑ BMI or neck circumference, or history of apneas that are frightening to the observer, or patient regularly falls asleep within minutes after being left unstimulated, in which case patient should be treated as though s/he has severe OSA[1]

*Transition to opioid pain management after regional anesthesia:*
*If severe pain is expected to occur when regional anesthesia wears off in a patient with sleep apnea, the transition to opioid pain management should ideally occur in a monitored setting*

| Baseline Risk Score | Postoperative Risk[1] | Minimum Observation Level |
|---|---|---|
| 5-6 | (?) significantly ↑ | monitored bed† |
| 4 | (?) ↑ | ward |
| 2-3 | (?) not ↑ | home |

†continuous pulse oximetry & possibility of early nursing intervention, e.g. PACU, SDU or other Critical Care Unit (or remote oximetry by telemetry on surgical ward)[3]

**B. Postoperative Risk Indicators (monitored bed indicated, irrespective of Baseline Risk Score):**

- **recurrent respiratory events**[6] (apneas ≥ 10 s, or bradypneas < 8/min, or desaturations to < 90%, or airway obstruction interventions), **or**
- **newly required PAP therapy**[7], **or**
- **respiratory failure**[1] (baseline room air $SpO_2$ < 90%, or increasing $FiO_2$ requirement, or $PaCO_2$ > 50 mmHg) , **or**
- **significant risk of myocardial ischemia or dysrhythmia**[8] (cardiac monitoring indicated) , **or**
- **opioid or sedative requirement not stabilized** (e.g. uncontrolled pain or delirium) , **or**
- **pain-sedation mismatch**[6] (high pain & sedation scores concurrently)

## Appendix B: STOP BANG Questionnaire: Screening Tool for OSA

| | | YES | NO |
|---|---|---|---|
| S | Do you **snore** (loud enough to be heard through closed doors)? | ☐ | ☐ |
| T | Do you often feel **tired**, sleepy or fatigued during daytime? | ☐ | ☐ |
| O | Has anyone **observed** you stop breathing during your sleep? | ☐ | ☐ |
| P | Do you have or are you being treated for high blood **pressure**? | ☐ | ☐ |
| B | **BMI** greater than 35 kgm/$m^2$? | ☐ | ☐ |
| A | **Age** greater than 50 years old? | ☐ | ☐ |
| N | **Neck** circumference greater than 40 cm? | ☐ | ☐ |
| G | Male **gender**? | ☐ | ☐ |

**TOTAL "YES" equal to or greater than 5: high probability of OSA**

# Appendix C: Postoperative Management of Sleep Apnea: Summary

## Perioperative Management of Sleep Apnea: Summary

*Vancouver Acute Department of Anesthesia and Perioperative Care - February 2014*