Purpose

To develop protocol guidelines for post-op treatment guidelines for Obstructive Sleep Apnea (OSA) patients and those who are at risk for OSA.

Basis for an OSA Protocol

The basis for an OSA protocol is centered largely on the effects of analgesia and anesthesia on patients with sleep apnea. It is well known that anesthetic, opiate and sedative agents are central nervous system (CNS) depressants that increase the tendency for upper airway collapse. Additionally, CNS depressants alter normal ventilatory response to hypercapnia and hypoxemia. Both CNS effects may be significantly worse in OSA patients as the decreased arousal response to breathe leads to prolonged apnea and the potential for respiratory and cardiovascular arrest. Patients with OSA may have an airway that will be more difficult to manage during a crisis event.

**OBSTRUCTIVE SLEEP APNEA (OSA) SCORE TABLE**

<table>
<thead>
<tr>
<th>OSA Score 2 - 3</th>
<th>OSA Score of 4</th>
<th>OSA Score 5 or Greater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor per normal discharge criteria</td>
<td>Perform procedure as early in the day as possible to allow time to evaluate for discharge.</td>
<td>Recommend 23 hour Extended Stay/admission to surgical floor.</td>
</tr>
<tr>
<td>Monitor for ≥ 30 minutes &amp; resting on room air</td>
<td>If patient diagnosed with OSA, apply CPAP &amp; monitor with continuous Pulse Ox and End-Tidal CO₂ Monitoring.</td>
<td>Consider Pulmonary Consult if new CPAP/BiPAP required.</td>
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<tr>
<td></td>
<td>3 hour median LOS longer in PACU/SDU for all patients with OSA</td>
<td>Monitor with continuous Pulse Ox and End-Tidal CO₂ Monitoring.</td>
</tr>
<tr>
<td></td>
<td>Return to baseline saturation while at rest for ≥ 30 minutes</td>
<td>3 hour median LOS longer in PACU/SDU for all patients with OSA</td>
</tr>
</tbody>
</table>
Guidelines for the Surgical Patient with Obstructive Sleep Apnea

Pre-Procedure

Surgeon’s Office
Surgeon’s office schedules for a PEAT visit if the patient answers yes to:
Do you have sleep apnea or has anyone suggested that you have sleep apnea OR
The patient’s BMI is ≥35
↓
Surgery Scheduling
Patient has a BMI ≥35 or history of sleep apnea
↓
Schedule for a PEAT visit with anesthesia
↓
PEAT nurse completed the first page of Sleep Apnea (SA) Protocol (if no PEAT visit, the information will be obtained per telephone prior to the procedure)
↓
PEAT staff requests sleep study if available
↓
Anesthesiologist reviews first page and completes the 2nd page of Sleep Apnea protocol if appropriate
↓
Procedure as planned

Day of the Procedure
Anesthesia reviews the total score for OSA protocol

<table>
<thead>
<tr>
<th>SCORE</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or 3</td>
<td>Monitor for ≥ 30 minutes resting &amp; on room air</td>
</tr>
<tr>
<td>4</td>
<td>Perform procedure as early as possible in the day to allow time to evaluate for discharge</td>
</tr>
<tr>
<td>5 or greater</td>
<td>Recommend extended stay on surgical floor, consider medical evaluation</td>
</tr>
</tbody>
</table>

Patient with known OR suspected sleep apnea
Use home CPAP or BIPAP post-op when available
If not available, contact Respiratory Care for appropriate hospital unit with ordered parameters.

Patient must maintain baseline O₂ sat while sleeping/resting on room air for a median of 3 hours prior to discharge.
If the patient had a hypoxemic episode (O₂ saturation <90%) they must be monitored for a median of 7 hours after the last episode.
If the patient is unable to return to baseline O₂ sat on room air, or has episodes of apnea >10 seconds, the surgeon should be notified, recommend 23 hour extended stay and consider medical evaluation.
End Tidal CO₂ Monitoring

A. **Capnography (End Tidal CO₂) Versus Pulse Oximetry**
   Capnography provides an immediate picture of patient condition. Pulse oximetry is delayed. Capnography will show immediate apnea, while pulse oximetry will show a high saturation for several minutes.

![End Tidal CO₂](image)

**Figure 1: Comparison of EKG (top) Pulse Ox waveform (middle) and End Tidal CO₂ (bottom)**

B. Capnography, measurement of end tidal CO₂, is a more sensitive tool to monitor a patient’s ventilatory status and may indicate hypoventilation and episodes of apnea before it is picked up by changes in heart rate and/or pulse oximetry. In the high-risk, undiagnosed sleep apnea patient, capnography will be utilized as an additional monitor to help insure patient safety.
Care of the patient that is at risk or is diagnosed with sleep apnea

A. If patient is a known Sleep Apnea patient, the patient’s home unit should be applied when the patient is admitted to the PACU by the PACU RN.
   - Apply home unit at their home CPAP/BiPAP pressures.
     a. Add oxygen if patient is on home O₂.
     b. If patient desaturates to less than 92% at home oxygen flow, contact physician.
     c. Contact Respiratory Therapist assigned to PACU if assistance is required.
   - Home CPAP/BiPAP unit should be discontinued at time of discharge from Same Day Unit

B. If the Obstructive Sleep Apnea (OSA) score is 4 or less, the patient can be transferred from PACU to Same Day Unit. Patient may be discharged if there are no identified apnea events (>10 seconds) and the patient is able to maintain oxygen sat at ≥92%, or baseline O₂ saturation on room air or at home oxygen flow rate and End Tidal CO₂ < 60.

C. If patient is unable to maintain O₂ saturation ≥92% or End Tidal CO₂ < 60, notify Anesthesia for consideration of Respiratory Care Auto CPAP Protocol. If ordered, notify Respiratory Care to implement.

D. Notify physician who performed procedure of patient’s inability to maintain oxygenation and/or ventilation and request further orders.

E. Special notes:
   1. Medical Center staff should not make adjustments to a patient’s home unit CPAP/BiPAP unit.
   2. If the patient is to be admitted to the hospital notify the PACU Respiratory Therapist and coordinate transport to help ensure proper continuation of the ordered CPAP/BiPAP device.
   3. Respiratory Care Services will monitor inpatients on Home CPAP/BiPAP units.
      a. Day shift will monitor once/shift and PRN. Evening Respiratory Staff will check once per shift and at HS to see if patient requires assistance. Night shift Respiratory Staff will check once/shift and PRN.
      b. If O₂ is required physician is to write order for O₂ bleed-in.
      c. Respiratory Care Staff document rounding information on department record and in Meditech.

ANESTHESIA POST-OP SLEEP APNEA ORDERS
1. □ Monitor with continuous pulse oximetry.
2. □ Monitor continuous End Tidal CO₂ and label chart with the sleep apnea sticker.
3. □ Apply home CPAP /BiPAP pressures at home settings as needed. Apply oxygen as needed to maintain O₂ saturation ≥ 92%.
4. Notify ordering physician if sustained O₂ saturation <92%, with the exception of a baseline sat of 90% or 91% which is acceptable or End Tidal CO₂ > 60.
5. Monitor in PACU for __________ hours or until released by anesthesia.
6. If the patient had a hypoxemic episode (O₂ saturation <90%), patient must be monitored for median of 7 hours after the last episode.
7. If the OSA score is 5 or greater consider extended recovery and follow additional post-operative sleep apnea orders for extended stay.
8. If patient is unable to maintain O₂ saturation ≥ 92% or End Tidal CO₂ ≤ 60, notify anesthesia for consideration of Respiratory Care Auto CPAP Protocol. If ordered, notify Respiratory care to implement.

**Same Day Unit:**
1. Monitor continuous pulse oximetry and End Tidal CO₂.
2. Use patient’s own CPAP / BIPAP machine.
3. Monitor in Same Day until discharged by anesthesia or for ________ hours then discharge.

**Extended Stay and Inpatient Admissions:**
1. Monitor continuous Pulse Oximetry.
2. Monitor continuous End Tidal CO₂.
3. If the patient is on Oxygen/CPAP/BiPAP in PACU, may continue when transferred with current settings.
4. End Tidal CO₂ monitoring may be discontinued upon physician order or once the patient is not taking parenteral narcotics and:
   - The patient has had no identified apnea events (>10 seconds in duration) in the last 24 hours; and
   - The End Tidal CO₂ has not had a sustained value greater than 60 for the last 24 hours; and
   - The patient’s vital signs are stable.
5. Per policy, pulse oximetry monitoring will be continued for patients who remain on a PCA pump.
6. Notify Surgeon when:
   - Oxygen saturations <92%
   - CO₂ >60

______________________________________________ ______________ ______
Anesthesiologist’s Signature    Date    Time

**Respiratory Care Auto CPAP Treatment Protocol**
1. Requires physician order for implementation.
2. Implement Auto CPAP Unit with Oxygen as needed.
3. Adjust low Auto CPAP pressure limit to 5 cmH20.
4. Adjust high Auto CPAP pressure limit to 15 cmH20.
5. Respiratory Therapist to assess and use best type patient interface (mask) based upon patient facial features and tolerance to device.
6. Adjust oxygen flow to maintain O2 saturation to ≥92%.
   a. May adjust O2 flow through Auto CPAP unit up to 10 l/m. If flows greater than 10 l/m are required, inform ordering physician.
   b. Connect O2 bleed-in flow source at CPAP unit flow outlet port or patient interface.
7. If patient’s oxygen saturation drops to a sustained value of less than 92% and is therefore not correcting, the ordering physician should be informed and orders clarified.
8. If the patient is witnessed to have a significant apnea event (> 10 seconds), the ordering physician should be informed and orders clarified.
9. The Auto CPAP device may be discontinued at discharge or with a physicians order.