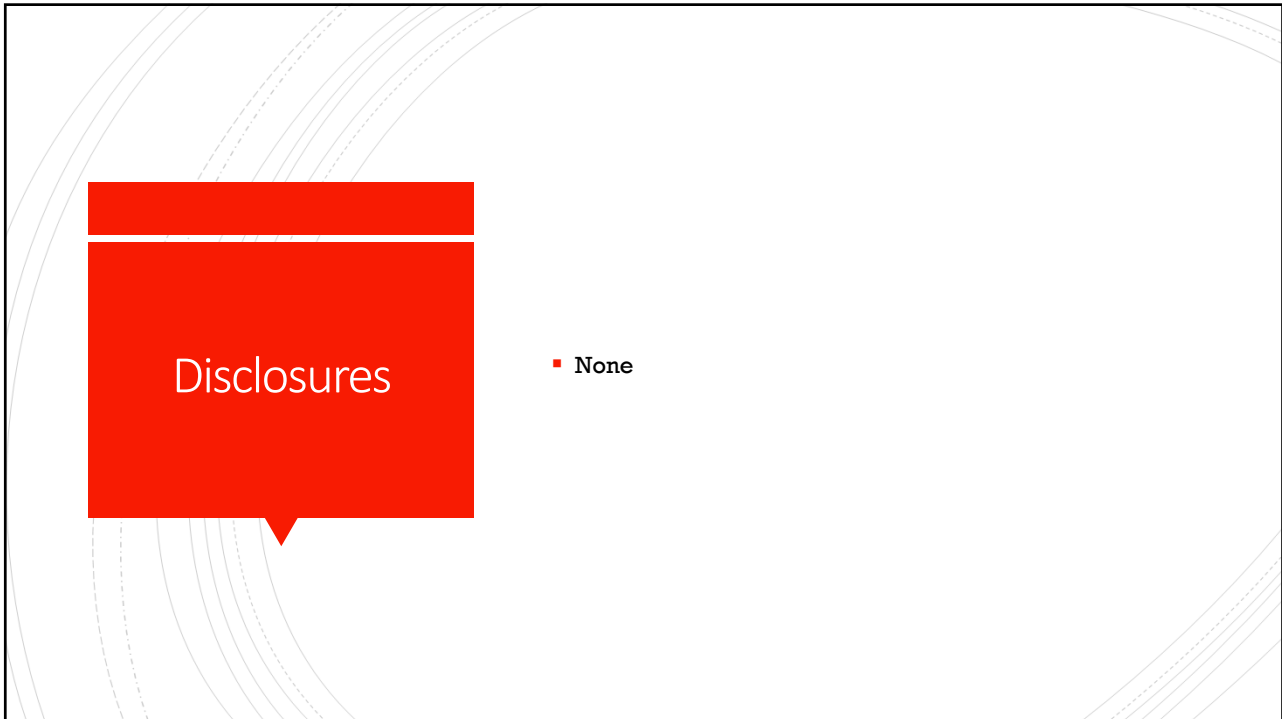


Perioperative Management of Obstructive Sleep Apnea (OSA) in Adults

Travis Flath

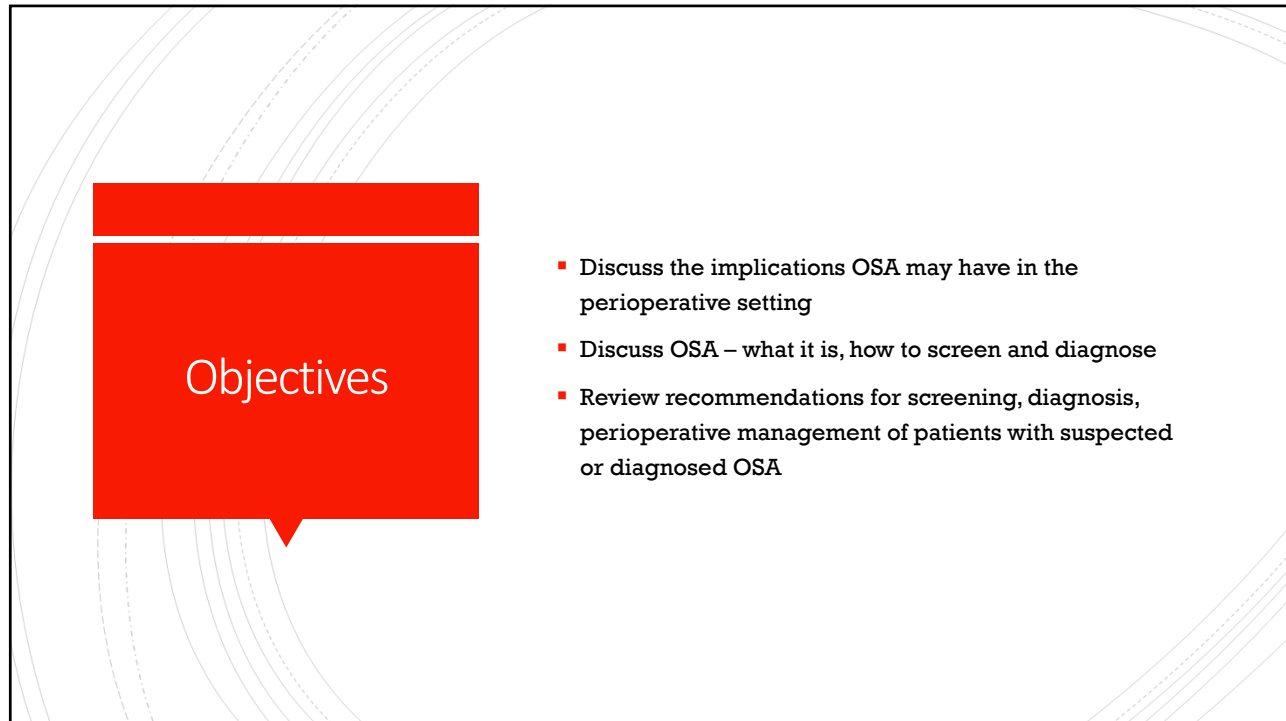
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Disclosures

- None

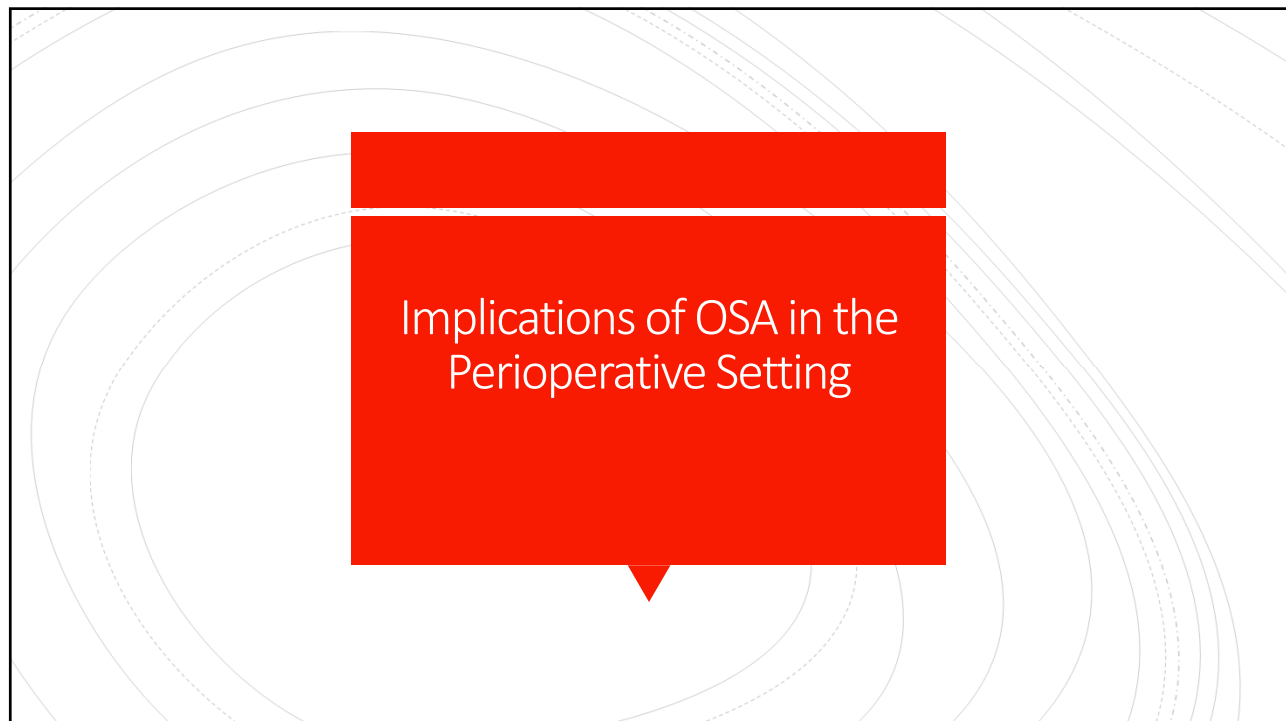
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Objectives


- Discuss the implications OSA may have in the perioperative setting
- Discuss OSA – what it is, how to screen and diagnose
- Review recommendations for screening, diagnosis, perioperative management of patients with suspected or diagnosed OSA

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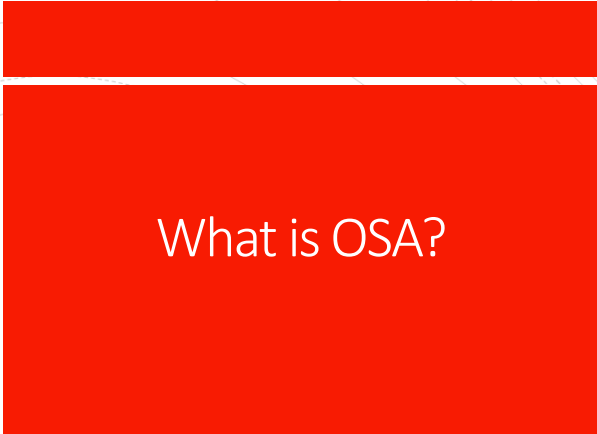
Implications of OSA in the Perioperative Setting

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- **Anesthetic management:**
 - Independent predictor of difficult airway
 - Sensitivity to decreased respiratory drive effect of opioids and sedatives
- **Respiratory: Both Hypercapneic and Hypoxemic Respiratory Failure**
 - Atelectasis
 - Decreased Respiratory Drive
 - Post-operative obstructive events
 - Need for reintubation
 - Pulmonary embolism
- **Cardiac**
 - Arrhythmia
 - Myocardial injury/infarction
 - CHF

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What is OSA?

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Definition

- Sleep-induced, arousal-relieved upper airway obstruction

	AHI
Normal	<5
Mild	5-14
Moderate	15-29
Severe	≥ 30

- ❖ Considerations include RDI
- ❖ AHI = Apnea/Hypopnea Index

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Definition

- Complications of OSA:
 - (i) hypoventilation syndromes,
 - (ii) severe pulmonary hypertension
 - (iii) resting hypoxemia in the absence of other cardiopulmonary disease
- Daytime sleepiness, cognitive dysfunction
- AHI does not correlate strongly with adverse post-op outcomes

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Diagnosis

- **Screening**
 - STOP-Bang questionnaire (and others)
 - We'll come back to this
- **Formal Diagnosis through polysomnography**
 - Enough data must be gathered to satisfy the definition (AHI of greater than 5, sleep-induced and arousal-relieved upper airway obstruction)
 - Minimum of a Level III sleep study required for diagnosis (where Level I collects the most data and Level IV collects the least data)

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Note on diagnosis

- No need to delay surgery for formal diagnosis (weak recommendation by SASM)



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Screening

- Who to screen?
 - All patients – Weak recommendation by the SASM
 - Some patient groups may benefit more from routine screening (eg. The obese patient group)

- How to screen?
 - Tools include STOP-BANG, Berlin Questionnaire, ASA Checklist, P-SAP score
 - All are recommended as a potential tool by the SASM
 - Most validated tool is STOP-BANG

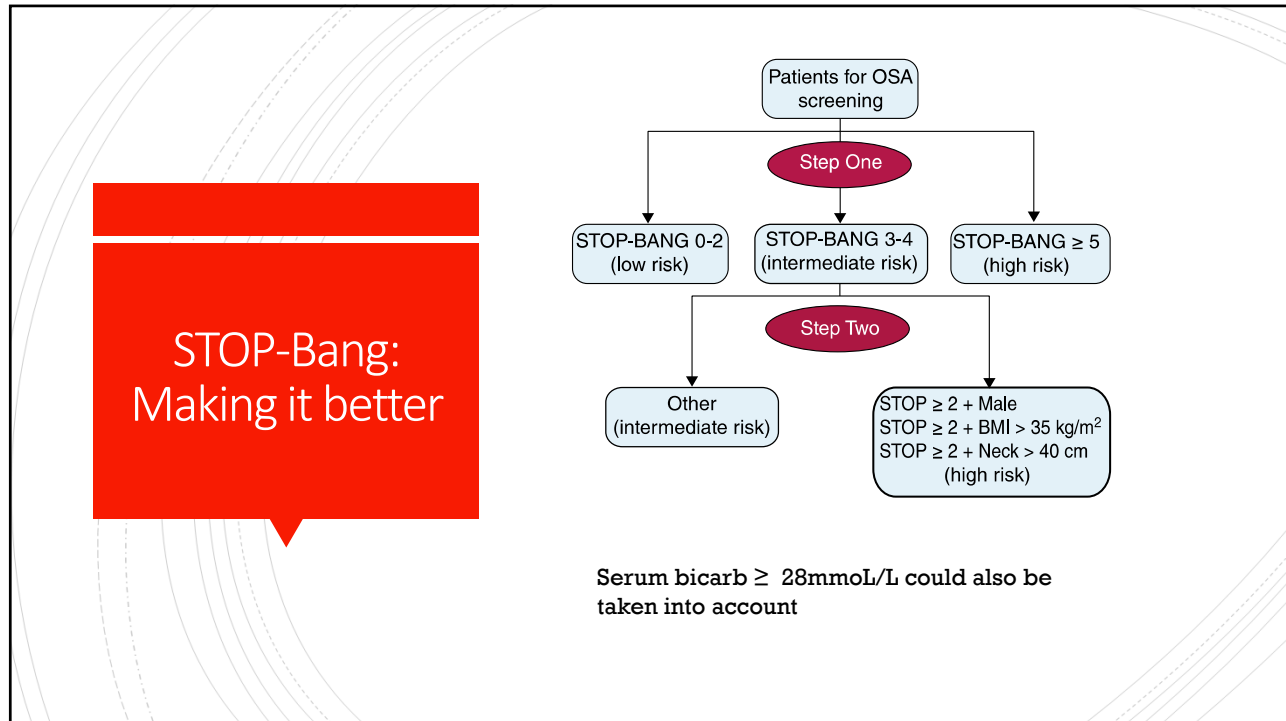
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STOP-BANG

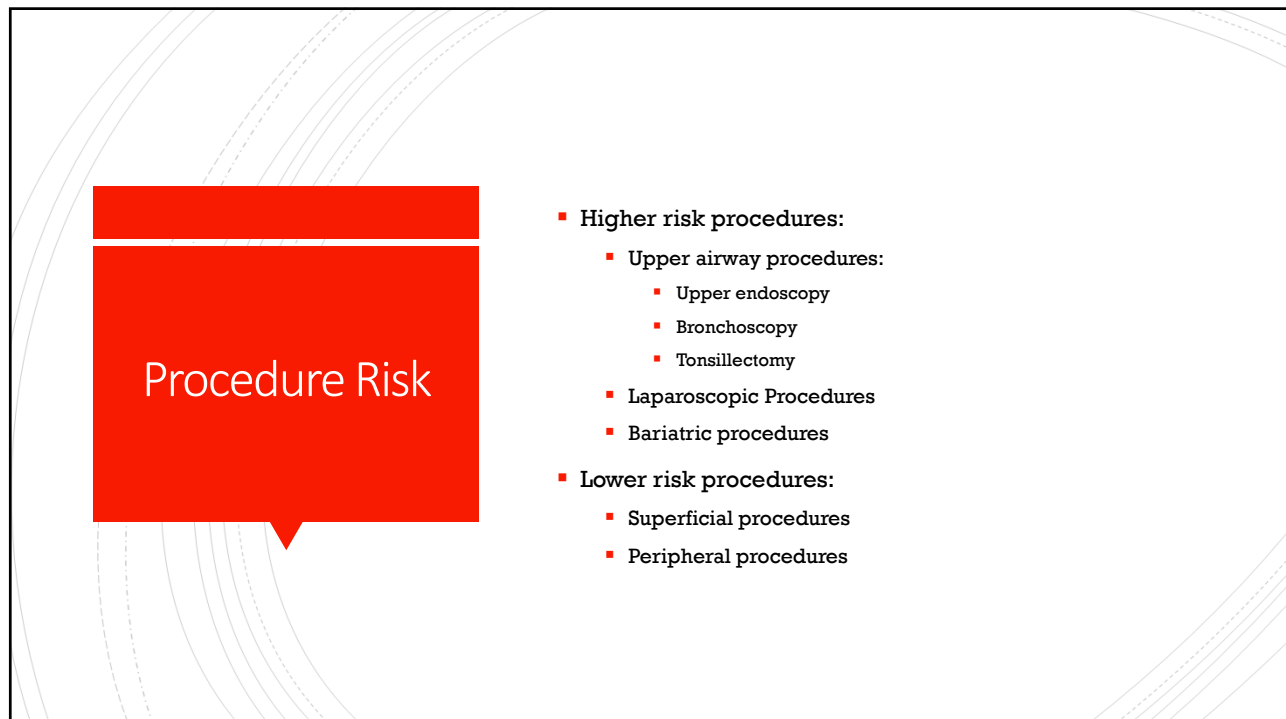
		Yes	No
S	Do you <i>snore</i> loudly (loud enough to be heard through closed doors)?	<input type="checkbox"/>	<input type="checkbox"/>
T	Do you often feel <i>tired</i> , fatigued, or sleepy during daytime?	<input type="checkbox"/>	<input type="checkbox"/>
O	Has anyone <i>observed</i> you stop breathing during your sleep?	<input type="checkbox"/>	<input type="checkbox"/>
P	Do you have or are you being treated for high blood <i>pressure</i> ?	<input type="checkbox"/>	<input type="checkbox"/>
B	<i>BMI</i> > 35 kg/m ² ?	<input type="checkbox"/>	<input type="checkbox"/>
A	<i>Age</i> > 50 years old?	<input type="checkbox"/>	<input type="checkbox"/>
N	<i>Neck</i> circumference > 40 cm?	<input type="checkbox"/>	<input type="checkbox"/>
G	Male <i>gender</i> ?	<input type="checkbox"/>	<input type="checkbox"/>

- STOP-Bang ≤ 2 – very unlikely to have OSA (approaches 100% confidence for ruling out mod-sev OSA)
- STOP-Bang ≥ 5 – OSA is very likely
- STOP-Bang 3-4 – less certainty

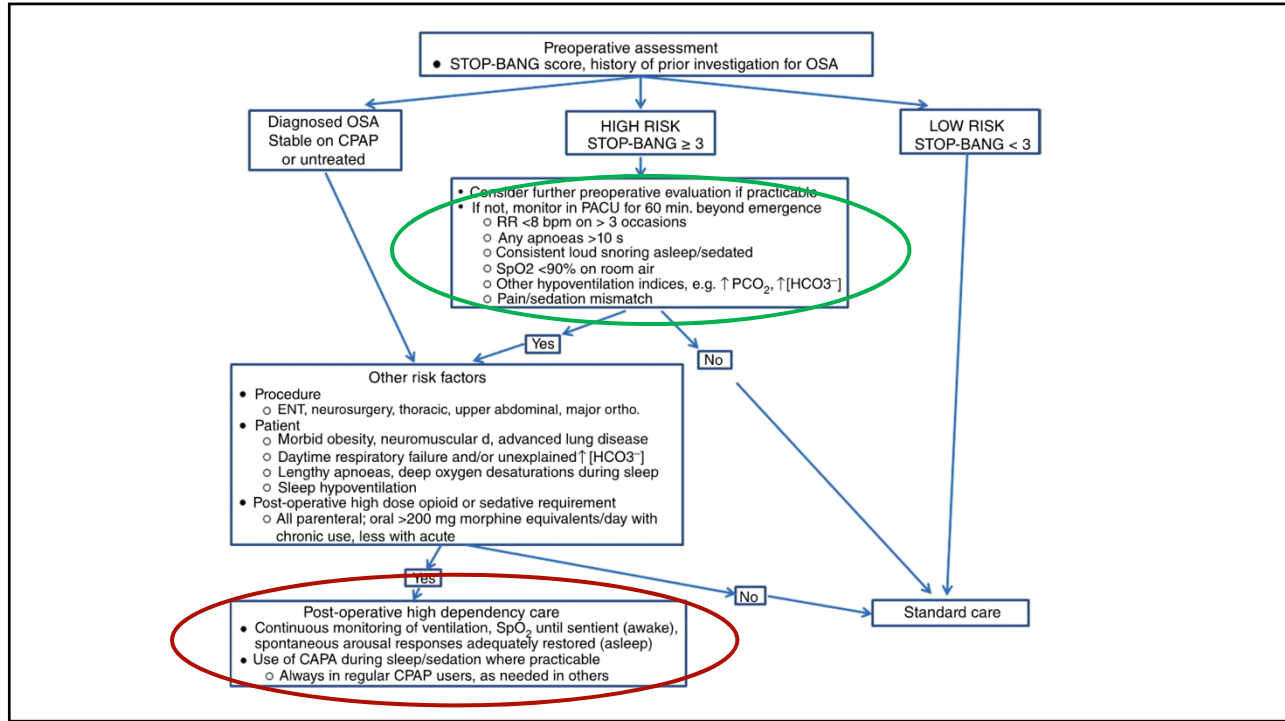
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Management of OSA

- **General management**
 - CPAP
 - Surgery
 - Oral appliance

- **Maintenance of management**
 - Compliance
 - Overnight Oximetry

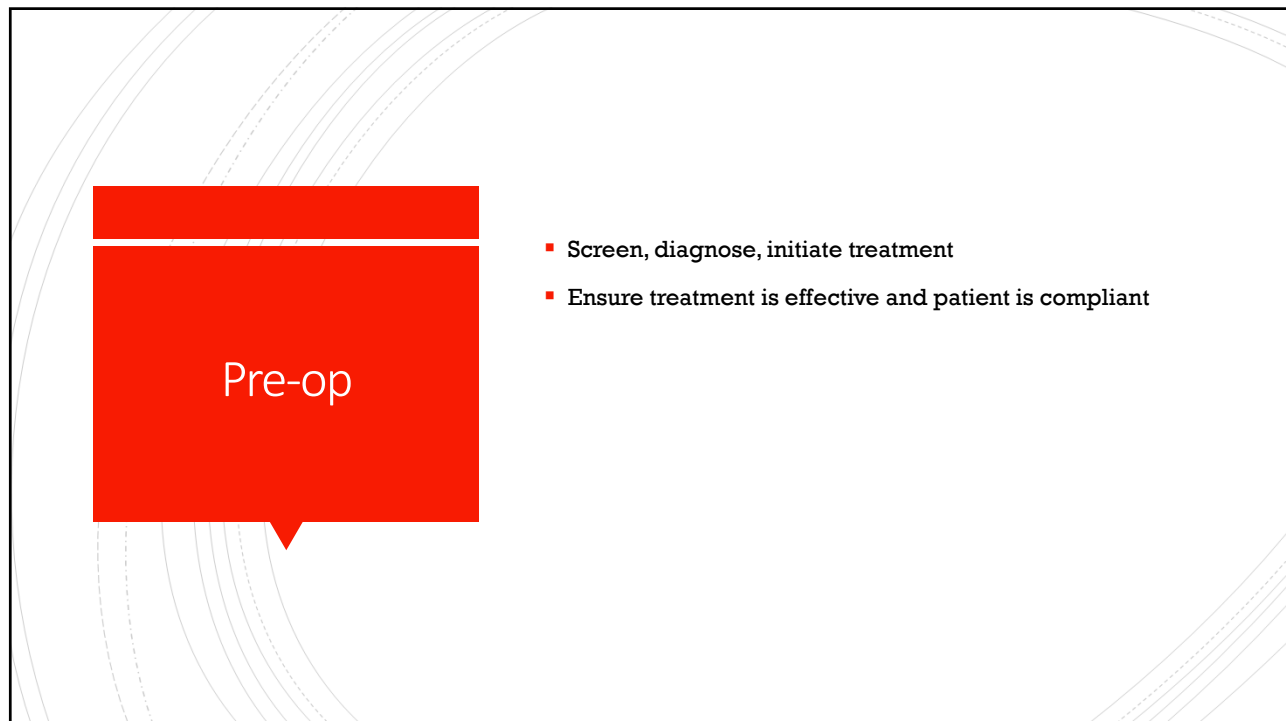
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Perioperative Management

1. Pre-op: Continue current therapy
2. Intra-op: Avoid exacerbating anesthetic
3. Post-op:
 1. Continue current therapy
 2. Post-op monitoring


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Pre-op

- Screen, diagnose, initiate treatment
- Ensure treatment is effective and patient is compliant

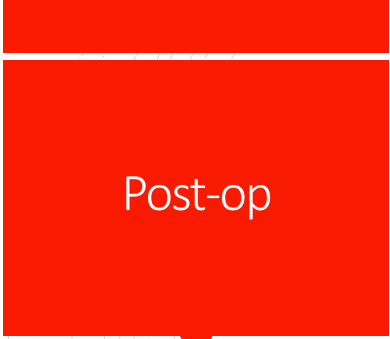
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Intra-op

- **Anesthetic choice**
 - Use local or regional techniques as first-line
 - Neuraxial as second-line (may consider avoiding neuraxial opioids, minimizing dose, or choosing short-over long-acting opioids)
 - Otherwise, general anesthesia
 - Special considerations for sedation
- **General anesthesia**
 - Avoid, minimize opioids
 - Choose short-acting opioids over longer-acting ones
 - Avoid benzodiazepines
 - Avoid NMB
 - If necessary, ensure that full reversal is confirmed before extubation
 - Maintain PEEP, minimize circuit disconnections (during patient transfers, etc.)


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Post-op


- **Continued therapy**
 - Apply CPAP as they normally would use it (for sleeping)
- **Monitoring**
 - Constant bed-side monitoring until fully awake (SpO₂, 1:1 nursing care)
 - Consider extended PACU stay, observing for apneic events while sleeping. Guidelines suggest 90min
 - Even after PACU discharge, may require ongoing continuous SpO₂ monitoring, EtCO₂ monitoring
- **Pain management**
 - Anticipate pain management issues in these patients, mainly pain/sedation mismatch

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- PACU Risk Factors:
 - Bradypnea (RR<8)
 - Apnea (airflow cessation for >10sec per half hour)
 - Desaturaton (SpO2 < 90% on or off nasal O2)
 - Pain/Sedation mis-match (RASS -5 to -3 with pain >5/10)
- Consider a room air challenge:
 - Observe the duration of oxygen desaturations in unstimulated patient
 - Ideally when they are drowsy
 - Can use CPAP during challenge
 - Desaturations below 90% are concerning

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- Oxygenation
 - Provide supplemental oxygen only until patient is able to maintain oxygenation on room air
 - Further supplementation may predispose to apnea
 - Further supplementation may also cause apnea and bradypnea to continue undetected, along with a rising CO2

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Death or near-death in patients with obstructive sleep apnoea: a compendium of case reports of critical complications

Y. Subramani¹, M. Nagappa¹, J. Wong², J. Patra² and F. Chung^{2*}

¹Department of Anaesthesia and Perioperative Medicine, London Health Sciences Centre, St. Joseph Health Care, Western University, 800 Commissioners Rd E, London, Ontario N6A 3W9, Canada and ²Department of Anesthesiology, University Health Network, Toronto Western Hospital, 399 Bathurst Street, M6L 2G5, Toronto, Ontario M5T 2S8, Canada

*Corresponding author. E-mail: f.chung@uhn.ca

Morbidity and Mortality

- 26 deaths, 17 anoxic brain injuries, 12 critical respiratory event and 5 life threatening complications
- 83% diagnosed with OSA, 17% undiagnosed
- 75% received opioids and 81% of those had small doses
- 92% in the first 72 hour (**80% in the first 24 hours** and 67% on surgical wards)

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Summary

- For patients with diagnosed OSA – obtain sleep study results and recommended PAP therapy
- For patients without diagnosed OSA
 - Screen – STOP-Bang. May consider modified STOP-Bang to further decrease the number of “intermediate” scoring patients
 - For patients who screen high and have evidence of associated systemic disease or additional problems with ventilation or gas exchange, consider delaying surgery for testing and treating
- Consider the associated surgical risk, as well as anesthetic options to reduce post-op risk

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- Anesthetic plan may involve:
 - Type of anesthetic
 - Medications used
 - Extended PACU monitoring
- Post-op plan may involve:
 - Resumption of therapy
 - Provision of CPAP/NIPPV therapy
 - Ward monitoring
 - Criteria for discharge

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PATIENT LABEL

**OBSTRUCTIVE SLEEP APNEA (OSA) POST-OPERATIVE
PHYSICIAN'S PRE-PRINTED ORDERS**

DATE: _____ TIME: _____

All opioid, sedative and CNS depressant medications to be ordered by anesthesiologist ordering OSA monitored bed

Admit to ICU OR

Admit to OSA monitored bed on nursing unit –connected to central monitoring in ICU

Monitoring

Position patient in semi-upright or lateral position

Continuous pulse oximetry

Oxygen therapy to maintain SpO₂ greater than or equal to: _____

Hourly Sedation Score while awake: goal is 0 to 2
(0= awake and alert, 1=slightly drowsy, 2= frequently drowsy, 3= somnolent, drifts off to sleep during conversation, 4=severe sedation, non-responsive to verbal and physical stimulation)

Continuous ETCO₂ and respiratory rate monitoring while patient requiring oxygen therapy

- o ETCO₂ low alarm: _____
- o Respiratory Rate : low alarm limit 8 breaths/minute

Other _____

Notify anesthesiologist if any of the following respiratory events occur in a 30 minute period:

- o Apnea greater than or equal to 10 seconds (1 episode)
- o Respiratory rate less than 8 breaths (3 episodes)
- o Oxygen desaturation less than target above(3 episodes)
- o Significant opioid requirements or pain-sedation mismatch

Positive Airway Pressure Orders

Apply Patient's own CPAP Machine at Patient's usual settings

BIPAP order- see BIPAP Pre-Printed Order

Documentation

Document hourly: Sedation Score, Respiratory rate, Heart rate, Blood Pressure, SpO₂
(Obtain vital sign trends from central monitor in ICU and place in patient's chart)

Document any cardio- respiratory events as listed above and notify anesthesiologist

Anesthesiologist Reassessment

Anesthesiologist will reassess patient for discharge in _____hours

PHYSICIAN'S NAME: _____ PHYSICIAN'S SIGNATURE: _____

Revised: June 11, 2018
 Approved by Anesthesia: June, 2018
 Approved by MAC: June 20, 2018

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St Paul's Hospital Trial Order Set

- → **Patient has known obstructive sleep apnea and had a general anesthetic:**
 - → OSA order set should be completed
 - → Use caution when administering opioid analgesics or sedatives
 - → Maximize nonpharmacologic modalities and non opioids for pain management
 - → Use capnography to identify hypoventilation during entire PACU/HAU stay
 - → Alert the perioperative physician if bradypnea, apnea, desaturation or pain-sedation mismatch occurs
 - → Titrate supplemental oxygen to goal spO₂ and decrease oxygen supplementation to as low as possible while maintaining oxygen saturations
 - → Apply patient's CPAP therapy (if available) during sleep in the PACU
 - → Prior to discharge from PACU; room air for a minimum of one hour and maintenance of oxygen saturations > 90%
 - → If unable to achieve this; alert perioperative physician

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St Paul's Hospital Trial Order Set

- → **Patient with STOP BANG >5 or greater**
 - → Use capnography to identify hypoventilation during entire PACU/HAU stay
 - → Alert the perioperative physician if bradypnea, apnea, desaturation or pain-sedation mismatch occurs
 - → Use caution when administering opioid analgesics or sedatives
 - → Maximize nonpharmacologic modalities and non opioids for pain management
 - → Titrate supplemental oxygen to goal spO₂ and decrease oxygen supplementation to as low as possible while maintaining oxygen saturations
 - → Prior to discharge from PACU; room air for a minimum of one hour and maintenance of oxygen saturations > 90%
 - → If unable to achieve this; alert perioperative physician

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St Paul's Hospital Trial Order Set

- → **Patient with observed apneas (previously undiagnosed):** ¶
 - → Alert perioperative physician ¶
 - → Use capnography to identify hypoventilation during entire PACU/HAU stay ¶
 - → Alert the perioperative physician if bradypnea, apnea, desaturation or pain-sedation mismatch occurs ¶
 - → Titrate supplemental oxygen to goal spO₂ and decrease oxygen supplementation to as low as possible while maintaining oxygen saturations ¶
 - → Prior to discharge from PACU; room air for a minimum of one hour and maintenance of oxygen saturations > 90% ¶
 - → If unable to achieve this; alert perioperative physician ¶