International Surgical Sleep Society COVID-19 Adult and Pediatric Practice Guidelines

International Surgical Sleep Society COVID-19 Ad Hoc Task Force Members

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Overview

As of March 2020, Coronavirus Disease 2019 (COVID-19) has caused unprecedented, worldwide disruption in patient care, including the management of obstructive sleep apnea (OSA). Members of the International Surgical Sleep Society (ISSS) represent a unique group of OSA specialists providing surgical treatment of adult and pediatric OSA. Preventative measures of the COVID-19 outbreak have resulted in either partial or complete arrest of non-urgent surgical procedures. Thus, the health of patients requiring surgical therapy for OSA are being negatively affected by unexpected treatment delay.

This document herein aims to provide guidelines for the community of both adult and pediatric OSA treatment providers in the COVID-19 crisis. The objectives of this taskforce:

(1) to develop criteria for high-priority sleep surgery patients
(2) to identify temporizing management strategies for patients awaiting sleep surgery
(3) to assess relative safety and resource consumption for various surgical classes

While these objectives cannot provide specific timelines for resumption of sleep surgeries, they are meant to provide a framework which can be applied to evolving and locale-specific COVID-19 threat levels.

Objective 1: To develop criteria for high-priority sleep surgery patients

- Need
    - Sleep surgery is traditionally deemed “elective surgery”
    - Surgical restrictions are likely to be lifted in a measured, incremental fashion
    - Upon removal of restrictions, there will be limited operating room availability given coincident demand across surgical specialties
    - The different phenotypes of OSA manifest with different levels of severity, both clinically and objectively (1)

- Considerations
    - Resource limitations
        - Non-essential procedures should be delayed to preserve personal protective equipment, beds and ventilators during the COVID-19 outbreak.
        - Perioperative risk assessment is key to determine required level of postoperative care (2, 3)
            - Greater baseline severity of OSA is associated with higher levels of postoperative monitoring (2, 3)
            - Patients requiring post-operative positive airway pressure (PAP) usage generate concerns for “field aerosolization” of viral particles (14)
            - Prolonged postoperative monitoring is recommended following invasive lower pharyngeal airway procedures or maxillomandibular advancement (3) (see Objective 3 for more information)
    - Patient factors
        - More severe sleep apnea (longer desaturations, lowest oxygen level) are associated with greater health risks (4, 5)
        - Impact on quality of life, public health risk (6)
        - Degree of PAP intolerance (7, 8)
    - Surgical goals
        - Optimize PAP adherence
        - Achieve success/cure with surgery alone

- Recommendations
    - Cases should be reviewed on a case by case basis to determine if an urgent procedure is warranted
    - Surgery should only be considered when sufficient postoperative monitoring capacity is available
    - Competing factors should be carefully balanced
        - OSA severity: greater health risk of untreated disease versus greater risk of prolonged postoperative monitoring including need for inpatient PAP usage
        - Co-morbidities: greater health risk of untreated OSA versus susceptibility of COVID-19 morbidity/mortality (9, 10)
    - Priority cases
        - Patients with complete PAP intolerance
        - Surgeries aimed at optimizing PAP usage
        - Patients with severe daytime sleepiness limiting activities of daily living

        - Patients with idealized surgical candidacy (3, 11)
            - Palatine tonsil hypertrophy (grade 3 or 4) with low-lying tongue
            - Lingual tonsil hypertrophy (grade 3 or 4)
            - Body-mass index (BMI) < 32 kg/m^2
            - Absence of concomitant neuromuscular, neurological or respiratory conditions
    - Alternative Therapies
        - While waiting for surgical intervention, bridging sleep apnea therapy should be strongly promoted, including but not limited to, continuous positive airway therapy and positional therapy
        - Post-operative head of bed elevation should be encouraged to minimize need for post-operative PAP (3, 12)

- Specific Pediatric Recommendations
    - Severe laryngomalacia patients with failure to thrive may warrant urgent supraglottoplasty when not responding to medical management and/or oxygen support
    - Urgent sleep surgery may be considered in very severe OSA patients with hypoxemia not responding to positive pressure ventilation
    - Surgery should only be considered when sufficient postoperative monitoring capacity is available for higher risk pediatric surgical patients including severe OSA patients with genetic predisposition to hypotonia or neuromuscular disorder, comorbidities, bleeding disorders, congenital cardiac anomalies or pulmonary hypertension (13)

Objective 2: To identify temporizing management strategies for patients awaiting sleep surgery

- Need
  - With indefinite delay in surgical treatment of OSA, adverse health effects are likely

- Considerations
  - Health risks associated with OSA are greater in patients with more severe sleep apnea, longer desaturations, low oxygen levels and comorbidities
  - The majority of sleep labs are also impacted by COVID-19 restrictions and are limiting polysomnograms
  - Depending on geographic viral impact with isolation mandates, durable medical equipment (DME) companies supplying CPAP/BIPAP/APAP may have limited resources to deliver devices (14)
  - Geographic viral burden is impacting availability of over the counter medications

- Recommendations:
  - Encourage use of PAP, particularly if patient already possesses one
    - Reframing CPAP as temporizing measure may increase patient compliance
    - DME capacity to deliver new equipment may be limited
  - Encourage use of mandibular reposition appliance, particularly if patient already possesses one
    - Custom fabrication of mandibular reposition appliance by dental or medical professional currently presents COVID-19 transmission concerns
    - Over-the-counter / online devices demonstrate inferior efficacy and patient comfort profiles (15)
  - Positional therapy
    - Encourage head of bed elevation (3, 12)
    - Use positional data form sleep study to determine individual's potential therapeutic benefit of non-supine sleep
  - Emphasize behavioral modifications (weight loss if appropriate, avoidance of sedatives, alcohol and large meals before bedtime) (16)
  - Maximize medical management for nasal obstruction (intranasal corticosteroid spray, new generation antihistamines) (17)

- Specific Pediatric Recommendations
  - If feasible, patients who have completed a split night polysomnogram (PSG) or sleep titration study should initiate CPAP, BIPAP or APAP, depending on findings
    - Note: the risk of aerosolization of virus is extremely high with positive airway pressure (18, 19)
      - Risk applies to both patient and family members
  - Consider CPAP desensitization for patients with history of intolerance
  - Medical management of allergic rhinitis symptoms (20):
    - Antihistamines
    - Intranasal corticosteroid sprays
    - Immunotherapy

        - Montelukast - caution with use for mild disease as first line therapy secondary to new black box warning about mental health side effects (7)

- In patients with coexisting asthma, optimize medical management of asthma (20)
- In patients with coexisting infective rhinitis, medically treat the rhinitis (21)
- Weight loss if appropriate

Objective 3: To assess relative safety & resource consumption for various surgical classes

- Need
    - Surgical treatment of obstructive sleep apnea represents a diverse range of modalities with unique COVID-19 risk profiles
- Considerations
    - Transmission risk from patient to health care workers
        - Imperfect diagnostic testing: lack of data regarding sensitivity and specificity of rRT-PCR diagnostic panel (22)
        - As of 3/31/20, widespread testing for all surgical patients is not available
            - Patients undergoing upper airway surgery present two-sided risks to both anesthesia and surgery teams
        - As of 3/31/20, guidelines do not recommend testing of asymptomatic patients
            - Problematic in pediatric settings where most children will be asymptomatic or have mild disease (23, 24)
        - Intraoperative
            - Nasal, oral and pharyngeal mucosa with highest viral loads (25)
                - Nasal mucosa demonstrate higher viral load of COVID-19 compared to pharyngeal mucosa (26)
            - Risk of particle “aerosolization”
                - Powered instrumentation (including atomizers, debriders) (27)
                - Power drills resulting in bone dust
                - Interventions which promote sneezing and/or coughing
                - Increased thermal plume
        - Post-operative
            - Length of inpatient stay
            - Nasal/oral/tracheal secretions hygiene performed by healthcare workers (i.e. not self-care)
            - Frequency of follow up clinic visits
    - Risk of transmission from health care workers to patient
        - Age (>65 and <1 year) and co-morbidities of patient impact likelihood of COVID-19 complication (10, 28)
        - Surface area of open wounds in nose, mouth
        - Length of inpatient stay
        - Frequency of follow up clinic visits
    - Resource consumption (23)
        - Conserve the limited supply of hospital beds, ICU beds, ventilators, and other critical supplies
        - Minimize use of disposable medical supplies and protective equipment
        - Pediatric settings have to prepare to accommodate older often patients (often up to 29 years old) in the pediatric setting to offset demand at adult hospitals
- Recommendations
    - Attempts should be made to reduce particle distribution radius with surgical field coverage (e.g. draping) and air evacuation (e.g. suction)

- Attempts should be made to minimize in-person post-operative appointments (phone or video appointments)
- Table 1 provides safety and resource consumption profile of each procedure
- Drug-Induced Sleep Endoscopy (DISE)
  - Popular diagnostic tool prior to sleep surgery intervention
  - Avoid the use of sterile, disposable covers for flexible endoscopes.
  - High transmission risk as an aerosol-generating procedure
  - Consider placement of full face mask with bronchoscope adapter to approach “closed system” during procedure (29)
- Nasal Surgery
  - Isolated nasal surgery plays an adjunctive role in the management of OSA to facilitate PAP or oral appliance therapy (3, 30)
  - Minimize powered instrumentation such as debriders and drills
- Pharyngeal Surgery
  - Lower pharyngeal surgery (specifically, tongue base surgery) is associated with greater potential for acute, postoperative care (3, 31)
  - Consider use of technologies with decreased thermal transmission
  - Consider procedure techniques without need for power drills (e.g. transpalatal advancement pharyngoplasty)
  - Reduce power settings to minimum therapeutic levels
- Laryngeal Surgery
  - Supraglottoplasty is primary for infants with laryngomalacia and children with sleep-state dependent laryngomalacia with resolution rates of ~66%
  - Consider using cold instruments and avoiding the microdebrider, laser, or other powered instruments to perform
  - Airway surgery has an extremely higher risk to providers and staff
- Hypoglossal Nerve Stimulation Surgery
  - *Extra*-pharyngeal surgery for moderate-severe OSA
- Skeletal Surgery
  - Maxillomandibular advancement has consistently high surgical success rates (32)
  - Transmission and safety concerns given intraoperative use of powered instrumentation and intense post-operative management
- Tracheostomy
  - Historic gold standard of OSA surgical treatment (33)
  - Transmission (both to and from patient) concerns with creation of tracheostoma
  - Safety concerns given intense post-operative management

Table 1

	Transmission Risk	Resource Consumption
Drug-Induced Sleep Endoscopy (DISE)	Moderate	Moderate
Nasal Surgery	Moderate	Moderate
Upper Pharyngeal Surgery	Moderate	Moderate
Lower Pharyngeal Surgery	Moderate	High
Laryngeal Surgery	High	High
Hypoglossal Nerve Stimulation	Low	Moderate
Skeletal Surgery	High	High
Tracheostomy	High	High

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