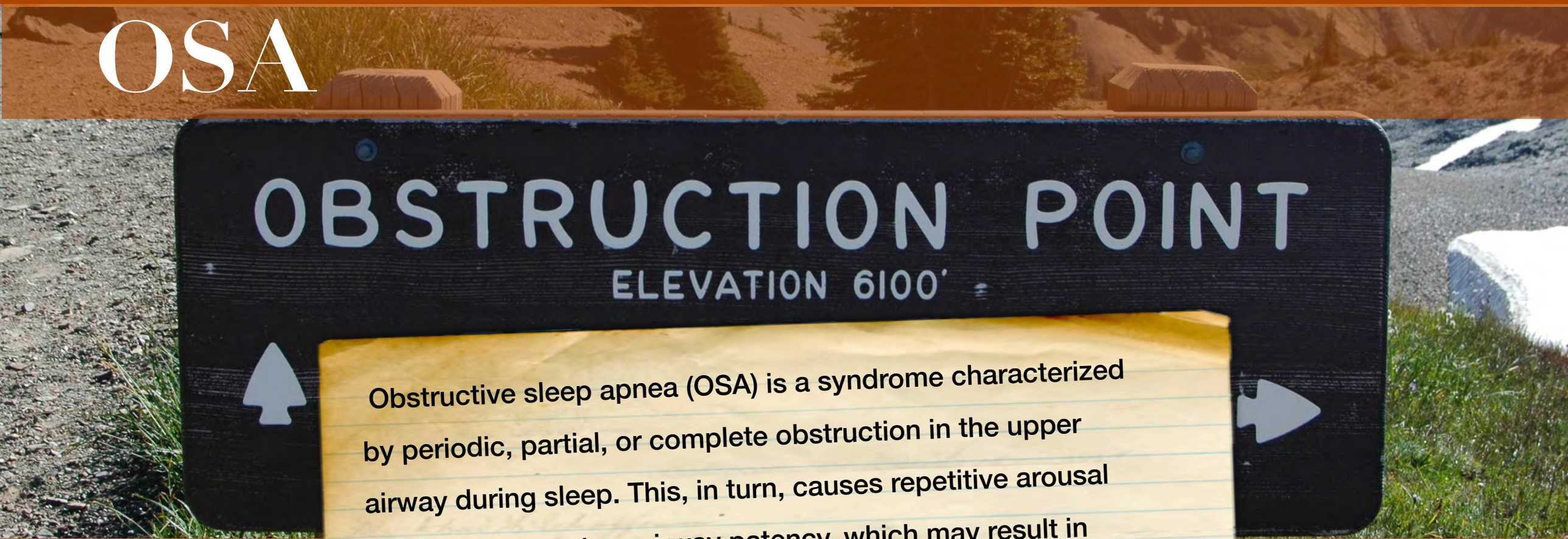
OSA

A PRETTY BIG DEAL

Definition

OSA



Obstructive sleep apnea (OSA) is a syndrome characterized by periodic, partial, or complete obstruction in the upper airway during sleep. This, in turn, causes repetitive arousal from sleep to restore airway patency, which may result in daytime hypersomnolence or other daytime manifestations of disrupted sleep such as aggressive or distractible behavior in children. The airway obstruction may also cause episodic sleep-associated oxygen desaturation, episodic hypercarbia, and cardiovascular dysfunction. In the perioperative period, both pediatric and adult patients with OSA, even if asymptomatic, present special challenges that must be addressed to minimize the risk of perioperative morbidity or mortality.

OSA is a disorder characterized by repetitive upper airway collapse during sleep. Obstructive sleep apnea (OSA) affects approximately 20% of US adults. Up to 80% of people with obstructive sleep apnea (OSA) are and with obesity at epidemic proportions worldwide, OSA remains a major contributing factor to perioperative complications and airway management difficulties. Numerous studies have reported major respiratory complications, including brain damage and death, in surgical patients with OSA. More than 75% of patients with OSA are undiagnosed or untreated.

obese,

Airflow ceases for more than 10 seconds, five or more times per hour, despite continuing ventilatory effort. It usually is associated with a decrease in arterial oxygen saturation (SaO2) of more than 4%.

Obesity

Obesity is a degree of excess weight associated with adverse health consequences. It is defined as a body mass index (BMI, or weight in kg divided by height in m2) greater than 29, and overweight is defined as a BMI of 25 to 29.9.9 A BMI of 40 or greater is classified as morbid obesity, and a BMI of 50 or greater designates super-obesity. Morbid obesity is associated with an increased risk of comorbidities, which may influence perioperative morbidity and mortality. With the U.S. population aging and becoming obese, the prevalence of OSA is expected to increase significantly. Among the surgical population, patients with morbid obesity and OSA tend to be overrepresented due to the higher rates of obesity and OSA-related complications requiring surgical therapy.

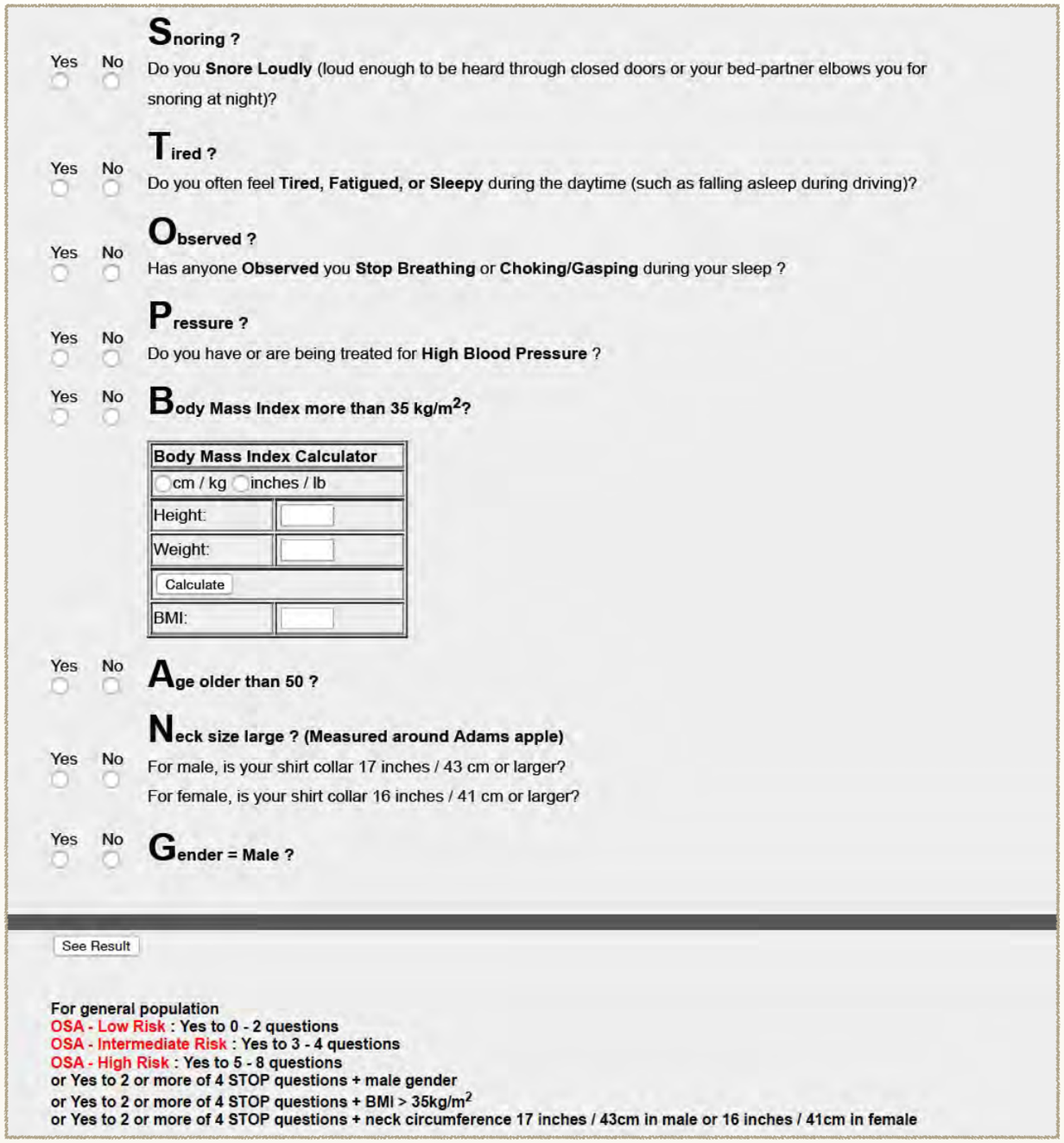
Obesity

SYNONYMS fatness, corpulence, stoutness, portliness, plumpness, chubbiness, rotundity, flabbiness, grossness. ANTONYMS thinness, emaciation.

Airway

OSA is undiagnosed in up to 80% of patients and failure to recognize OSA preoperatively is a major causes of perioperative complications, all patients must be screened for OSA. A clinical diagnosis of OSA may be made from an observation of components that make up the classic triad of sleep disordered breathing (i.e. apnea or snoring with hypopnea during sleep), arousal from sleep (i.e., extremity movement, turning, vocalization, or snorting), and daytime sleepiness (i.e., easily falling asleep during quiet times of the day) or fatigue.

There are many screening tools used to diagnose OSA clinically. Common methods are the Berlin questionnaire and the American Society of Anesthesiologists (ASA) checklist, however the most commonly used is the is the STOP-BANG screening test. This questionnaire has a sensitivity of 93% and specificity of 43% to detect severe OSA.



Yes No **Snoring ?**
Do you **Snore Loudly** (loud enough to be heard through closed doors or your bed-partner elbows you for snoring at night)?

Yes No **Tired ?**
Do you often feel **Tired, Fatigued, or Sleepy** during the daytime (such as falling asleep during driving)?

Yes No **Observed ?**
Has anyone **Observed** you **Stop Breathing** or **Choking/Gasping** during your sleep ?

Yes No **Pressure ?**
Do you have or are being treated for **High Blood Pressure** ?

Yes No **Body Mass Index more than 35 kg/m^2?**

Body Mass Index Calculator	
cm / kg inches / lb	
Height:	
Weight:	
Calculate	
BMI:	

Yes No **Age older than 50 ?**

Yes No **Neck size large ? (Measured around Adams apple)**
For male, is your shirt collar 17 inches / 43 cm or larger?
For female, is your shirt collar 16 inches / 41 cm or larger?

Yes No **Gender = Male ?**

See Result

For general population
OSA - Low Risk : Yes to 0 - 2 questions
OSA - Intermediate Risk : Yes to 3 - 4 questions
OSA - High Risk : Yes to 5 - 8 questions
or Yes to 2 or more of 4 STOP questions + male gender
or Yes to 2 or more of 4 STOP questions + BMI > 35kg/m^2
or Yes to 2 or more of 4 STOP questions + neck circumference 17 inches / 43cm in male or 16 inches / 41cm in female

Polysomnography is the gold standard in the diagnosis of OSA. Polysomnography consists of monitoring the electroencephalogram (EEG), electrooculogram (EOG), and submental electromyogram (EMG) for staging sleep. Oral and nasal airflow, respiratory efforts (i.e., inductance or impedance pneumography to monitor thoracoabdominal motion or the diaphragmatic EMG), oximetry, and capnography are also monitored. The results of a sleep study are reported as events and indices. Events include apnea (no airflow ≥ 10 seconds), hypopnea (tidal volume [VT] ≤ 50% of the control awake value ≥ 10 seconds), desaturation (> 4% decrease in SaO2), and arousal, which may be detected clinically (i.e., vocalization, turning, or extremity movement) or by an electroencephalographic burst. 12 Indices are measured as events per hour, which include the Apnea-Hypopnea Index or AHI (i.e., number of times a patient was apneic or hypopneic per hour), oxygen desaturation index (i.e., number of times a patient had a more than 4% decrease in SaO2 per hour), and arousal index (i.e., number of times a patient was aroused per hour). If the patient has OSA, the entire sleep study is repeated with CPAP titration to determine the level of CPAP that causes a significant decrease in the AHI.The severity of OSA is expressed in terms of the Apnea Hypopnea Index; an AHI of 6 to 20 is considered mild, an AHI of 21 to 40 is moderate, and an AHI greater than 40 is severe OSA. (See below)The main issue for us perioperative physicians is the fact that we have to also have to take into consideration the issue of invasiveness of the procedure the patient will undergo, the requirement and choice of analgesics and the disposition of the patient (Inpatient vs. Outpatient procedures), also monitoring and airway management.

Severity of OSA	Adult AHI	Pediatric AHI
None	0–5	0
Mild OSA	6–20	1–5
Moderate OSA	21–40	6–10
Severe OSA	>40	>10

Table 2. Scoring System for Perioperative Risk from OSA: Example*

A. Severity of sleep apnea based on sleep study (or clinical indicators if sleep study is not available)	
Point score: (0–3)†‡	
Severity of OSA (table 1)	Points
None	0
Mild	1
Moderate	2
Severe	3
B. Invasiveness of surgery and anesthesia	
Point score: (0–3)	
Type of surgery and anesthesia	Points
Superficial surgery under local or peripheral nerve block anesthesia without sedation	0
Superficial surgery with moderate sedation or general anesthesia	1
Peripheral surgery with spinal or epidural anesthesia (with no more than moderate sedation)	1
Peripheral surgery with general anesthesia	2
Airway surgery with moderate sedation	2
Major surgery, general anesthesia	3
Airway surgery, general anesthesia	3
C. Requirement for postoperative opioids	
Point score: (0–3)	
Opioid requirement	Points
None	0
Low-dose oral opioids	1
High-dose oral opioids, parenteral or neuraxial opioids	3
D. Estimation of perioperative risk:	
Overall point score: the score for A plus the greater of the score for either B or C: (0–6)§	

Patients with score of 4 may be at increased perioperative risk from OSA; patients with a score of 5 or 6 may be at significantly increased perioperative risk from OSA.One point may be subtracted if a patient has been on CPAP or NIPPV before surgery and will be using his or her appliance consistently during the postoperative period. One point should be added if a patient with mild or moderate OSA also has a resting Paco2 >50 mmHg

Airway

MANAGEMENT

Patients with severe OSA (AHI ≥ 40) have been shown to be at a significantly higher risk for Difficult Mask Ventilation (DMV) and Difficult Intubation (DI). Obese patients with OSA have larger neck circumferences than equally obese patients (i.e., similar BMI) without OSA. This neck "mass loading" (up to 28% increase in neck soft tissue) may be responsible for a more collapsible airway, leading to DMV and DI.

The major concerns during induction of anesthesia or sedation/ analgesia technique in obese and in OSA patients include DMV, DI, and increased risk of regurgitation of gastric contents and potential pulmonary aspiration. General anesthesia with a secure airway is considered preferable to deep sedation without an airway, which is increasingly used in modern anesthesia practice.

A critical decision regarding induction of general anesthesia in the obese patient with OSA is to determine whether awake intubation should be performed. During awake intubation, sedatives and opioids, although desirable, should be minimized or totally avoided if possible, because airway obstruction can occur while the airway is being secured.

If endotracheal intubation is performed after induction of anesthesia, adequate preparation must be made for a difficult airway based on the ASA difficult airway management guidelines. Emergency airway equipment (e.g., video laryngoscopes, supralaryngeal airways, flexible fiberoptic bronchoscopes) and additional help must be immediately available. Video laryngoscopes offer superior viewing of the glottis and reduce the duration of performing endotracheal intubation, thereby preventing significant desaturation in morbidly obese patients. The laryngeal mask airway is an effective rescue device for the difficult airway or failed airway, even in obese patients.

There is a high risk of post-extubation airway obstruction in obese patients with OSA, which is further increased after airway surgery with subsequent nasal packing. Factors to consider when determining whether to leave the patient intubated after surgery include BMI, severity of OSA, associated cardiopulmonary disease, ease of bag-mask ventilation and intubation at induction of anesthesia, type and duration of surgical procedure, and the intraoperative course. Patients with OSA should be extubated in a semirecumbent position after they are fully awake (i.e., rational, oriented, and responding to commands in a quick and unambiguous manner) and after verification of complete reversal of neuromuscular blockade. A nasopharyngeal or oropharyngeal airway may prevent post-extubation airway obstruction. General principles of postoperative care and institution of CPAP is desirable.