Guidelines for the Pre-Operative Assessment and Management of Patients with Obstructive Sleep Apnoea

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Summary and Key Recommendations

• Obstructive Sleep Apnoea (OSA) is common and preoperative assessment should include a risk assessment such as the STOP-BANG screening tool to facilitate diagnosis and treatment.

• A high index of suspicion for OSA should exist in all morbidly obese patients, as the prevalence is substantially higher in this patient group.

• Untreated OSA is associated with more than doubling the risk of perioperative complications and increased hospital length of stay.

• If OSA is strongly suspected on clinical grounds, or a screening tool, patients should be referred for Sleep Medicine assessment where surgery is non-urgent.

• If OSA is strongly suspected on clinical grounds, or screening tool, and either sleep studies are not readily available or surgery is urgent, then patients should be treated as if they have a positive diagnosis, and managed accordingly.

• It is recommended that agreed, expedited referral pathways should be established between preoperative assessment clinics and local Sleep Medicine services to minimise delays where significant OSA is suspected.

• If OSA has been diagnosed or is strongly suspected, the postoperative care provided should include the ability to institute CPAP except in selected minor day-case surgery.

• Patients who have their own treatment devices e.g. CPAP machines, should bring them into hospital on admission.

• OSA should not preclude patients from day case surgery, however, detailed perioperative management & discharge planning should be put into place in advance and central neuraxial techniques or loco-regional anaesthesia used wherever possible.

• A co-ordinated perioperative management plan should be agreed through the preoperative assessment process.
The following review article is aimed at providing preoperative assessment staff with an evidence-based overview to diagnose and manage adult patients with Obstructive Sleep Apnoea in the perioperative setting. The following areas are covered:

- General review of Obstructive Sleep Apnoea
- Screening, diagnosis and management of Obstructive Sleep Apnoea perioperatively
- Appended algorithms providing pathways of care for staff to follow in the clinical setting

1. OBSTRUCTIVE SLEEP APNOEA

1.1 Introduction

Obstructive Sleep Apnoea (OSA) is a common disorder in the developed world. When accompanied by excessive daytime sleepiness OSA is termed OSA syndrome (OSAS). The prevalence of OSA in adults in the general population depends on the patient cohort studied, with evidence suggesting that it is higher than previously estimated. A 2013 publication from North America has demonstrated rates for moderate to severe OSA of 3 – 17% in the general population, with males and older people at highest risk [1]. A subsequent population-based study from Switzerland demonstrated a prevalence of moderate to severe OSA of 23.4% and 49.7% in women and men respectively, in a non-obese population cohort (mean body mass index [BMI] of 25.6 kg/m²) [2].

Over upcoming decades, this problem is likely to increase due to an ageing and increasingly obese population; with rising obesity levels fuelling an increase in awareness of OSA [3]. OSA is closely linked to obesity with a 10% increase in body weight conferring a 6-fold increase in the risk of developing moderate to severe OSA [4]. In patients presenting for surgery the prevalence of moderate to severe OSA has been estimated at 7 – 10%, however this can be as high as 70% in high-risk populations e.g. bariatric surgery [5, 6].

1.2 Pathophysiology

The balance of upper airway patency during inspiration is controlled by forces promoting dilatation (oropharyngeal dilator and abductor muscles), and collapse (negative intrathoracic and intra-airway pressure produced by the action of the diaphragm and intercostal muscles). During sleep, the reduction in dilatation forces causes a predisposition towards upper airway narrowing and snoring. Further forces promoting upper airway collapse, such as increased airway adipose tissue can disturb this balance further, leading to complete or partial collapse of the airway and subsequent apnoea. OSA is characterised by periodic partial (hypopnoea) or complete (apnoea) obstruction of the upper airway during sleep, leading to repetitive arousal from sleep to restore airway patency. Resumption of breathing occurs with arousals secondary to an increase in oropharyngeal dilator muscle tone.

The repeated airway obstruction leads to sleep-associated oxygen desaturation, episodic hypercarbia and cardiovascular dysfunction. The repetitive arousal leads to disruptive sleep, which manifests in daytime somnolence, poor concentration, and morning headache [7]. In contrast to the obesity hypoventilation syndrome (OHS, see below) daytime hypercapnia does not occur.
Table 1. Predisposing factors for OSA

- Obesity (BMI ≥35)
- Male gender
- Neck circumference >40 cm in males, or >39 cm in females
- Family history of OSA
- Enlarged tonsils
- Anatomical nasal obstruction
- Smoking
- Advancing age
- Craniofacial abnormalities e.g. Down’s Syndrome, Micrognathia, Acromegaly

1.2 Symptoms

The triple ‘S’ represents a useful way to capture the main symptoms from which affected patients may suffer:
- Snoring when asleep
- Stopping breathing when asleep (Struggling to breathe)
- Sleepy when awake

In addition, patients may complain of:
- Nocturnal choking episodes
- Frequent nocturnal arousals
- Morning headaches
- Poor memory and concentration during the daytime

1.3 Clinical associations

Morbid obesity creates its own challenges perioperatively, which are beyond the scope of this article. Compounding this issue, patients with OSA are at increased risk for significant comorbid disease that may carry significant impact in the perioperative setting. Strongest associations are with the following conditions [8, 9, 10]:
- Increased background risk of cardiovascular disease i.e. myocardial infarction, hypertension, bi-ventricular dysfunction, stroke and atrial fibrillation.
- Increased risk of Diabetes Mellitus (type 2) and Metabolic syndrome
- Cognitive dysfunction and memory problems
- Increase in all-cause mortality risk compared to general population

1.4 Definitions

- Apnoea – complete cessation of airflow for > 10 seconds during sleep
- Hypopnoea – airflow reduction of > 50% for > 10 seconds during sleep
- Apnoea hypopnoea index (AHI) – average number of apnoeas/hypopnoeas occurring per hour during sleep

Table 2. OSA Classification*

<table>
<thead>
<tr>
<th>AHI</th>
<th>Severity of OSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>Normal</td>
</tr>
<tr>
<td>5-14</td>
<td>Mild</td>
</tr>
<tr>
<td>15-30</td>
<td>Moderate</td>
</tr>
<tr>
<td>&gt; 30</td>
<td>Severe</td>
</tr>
</tbody>
</table>

* See reference [11]
1.5 Diagnosis

Formal diagnosis of OSA is through Sleep medicine evaluation. Diagnosis is usually based on:
- History of presenting symptoms (above)
- Evidence of daytime sleepiness – this is usually assessed by completing an Epworth Sleepiness Score (see Appendix 1). A score of > 12 is strongly suggestive of increased daytime somnolence
- Diagnostic sleep studies – a range of studies can be used to aid diagnosis. Complexity of studies ranges from simple overnight pulse oximetry to in-patient polysomnography and may depend on local expertise and availability

1.6 General clinical management

- **Mild OSA** – lifestyle advice including weight loss is first line, with mandibular advancement devices also having been shown to be effective. Consideration of Continuous Positive Airways Pressure (CPAP) if unresponsive to above or if symptoms are impacting on quality of life.
- **Moderate/Severe OSA** – mainstays are weight loss and CPAP. Mandibular advancement devices can be used but are generally less effective than CPAP.

The above management applies to all patient groups diagnosed with OSA and is not only applicable to patients presenting for elective surgery. Above treatment recommendations are based on National Institute for Health and Clinical Excellence (NICE) guidance [12].

1.7 General perioperative considerations

Greater numbers of elderly and morbidly obese patients are now presenting for surgery. This has been compounded over recent years with the development of government initiatives to treat morbid obesity through surgical intervention (bariatric surgery). In bariatric patients, OSA screening and treatment should be a routine part of preassessment [13].

Untreated OSA is associated with a range of co-morbidities (see above), which increases risk to patients in the perioperative period. A cohort study of 1,058,710 hospitalised adult patients undergoing elective surgeries has highlighted significant adverse postoperative outcomes associated with OSA [5] – Table 3.

Table 3. Postoperative risk of complications in patients with OSA compared to non-OSA patients [5]. RR – relative risk. Risks of pneumonia and tracheostomy were not increased in OSA vs. no OSA group.
One limitation highlighted in this study, was a lack of information regarding patient use of CPAP therapy at home, which the Nationwide Inpatient Sample database did not specify. However, it is clear that a diagnosis of OSA (with or without home CPAP treatment) is associated with a range of highly significant perioperative complications. Abdominal surgery appears to convey the highest absolute risk.

The risk of major cardiac complications (including cardiac death, myocardial injury, heart failure, thromboembolism, stroke and atrial fibrillation) within 30 days of non-cardiac surgery has been shown to increase significantly in undiagnosed, severe OSA [14].

The impact of CPAP treatment on perioperative complications is discussed in further detail in section 2.4.

Other perioperative challenges in patients with OSA include:
- 8-fold increase in the incidence of difficult intubation [8]
- Increased sensitivity to use of perioperative opioids and sedation
- Complications associated specifically with obesity – refer to further reading
- Increased length of hospital stay

1.8 Obesity Hypoventilation Syndrome (OHS)

Obesity is also associated with the ‘obesity hypoventilation syndrome’. Along with the characteristics seen in OSA, there is chronic awake hypercapnia, but a diminished ventilatory drive despite an elevated PaCO₂ (diagnosis requires arterial blood gas analysis during wakefulness). Individuals tend to have lower daytime oxygen saturations, lower quality of life, increased daytime somnolence, and at the extreme, pulmonary hypertension and right heart failure. These patients are clinically very similar to patients with OSA, but with potentially more severe cardio-pulmonary co-morbidities, and mandate a high index of suspicion to identify them pre-operatively. Low daytime oxygen saturations and raised plasma bicarbonate levels are clues to the presence of OHS. OHS usually requires treatment with non-invasive ventilation (NIV) rather than CPAP. See recommendations for further reading for a comprehensive overview of OHS.

2. SCREENING, DIAGNOSIS AND PERIOPERATIVE MANAGEMENT OF OSA

Given the reported prevalence of OSA in patients presenting to the preoperative assessment clinic, and increased incidence of postoperative complications, it is essential to employ strategies to identify and diagnose patients at highest risk. Successful diagnosis allows treatment and optimisation of OSA in the preoperative period thereby allowing appropriate perioperative planning and minimisation of associated complications.

2.1 Preoperative Screening

 Appropriately targeted preoperative assessment prior to elective surgery provides an ideal opportunity to identify and refer patients identified as being ‘at risk’ of suffering from OSA. This should be underpinned by:

History and symptoms – ‘triple S’ symptoms (above) are a quick and simple way of achieving this. A positive response to these symptoms should raise a high index of suspicion that OSA may be present and prompt a more in depth assessment. A formal Epworth Sleepiness Score (ESS) represents an ideal way to assess daytime somnolence with a score > 12 abnormal (Appendix 1). As part of delivery of the ESS, it is critical to ask patients to demarcate true ‘sleepiness’ from fatigue when answering questions.
Physical examination – baseline measurements of height, weight, body mass index, neck circumference and blood pressure should be performed to facilitate diagnosis. In addition a formal airway examination is recommended. Patients identified as Mallampatti 3 and 4 are at increased risk of suffering from OSA. There is a close relationship between OSA and difficult endotracheal intubation.

Gait speed – it has been highlighted that a 1.5-fold increased risk for OSA in patients with a reduced gait speed (<0.89 m/s) when compared to faster walkers (≥0.89 m/s). This simple test may in future add utility to other screening tools recommended below but requires further validation [15].

Screening tools – use of a validated screening tool provides a useful adjunct in bringing history and examination findings together in identifying ‘at risk’ individuals. An effective screening tool should have high diagnostic accuracy, thereby allowing diagnosis of individuals at high risk of suffering from OSA whilst eliminating those at low risk.

The **STOP-BANG 8-item questionnaire** is best validated in the perioperative setting [16]. A positive answer to any of the responses registers a 1-point score, with all responses being equally weighted.

S **do you Snore loudly, enough to be heard through closed door?**

T* **do you feel Tired or fatigued during the daytime almost every day?**

O **has anyone Observed that you stop breathing during sleep?**

P **do you have a history of high blood Pressure, with or without treatment?**

B **Body mass index >35kg/m2**

A **Age >50 years**

N **Neck circumference >40cm**

G **male Gender**

* Although not externally validated, replacing the ‘T’ question with a formal ESS of >12 may in the authors’ opinion offer greater diagnostic accuracy.

Thresholds for STOP-BANG implementation offer different diagnostic validity in identifying individuals with possible OSA, and conversely when attempting to rule out the condition. The scheme below represents a pragmatic clinical approach to utilising the STOPBANG score achieved based on best available evidence:

0 – 2 **OSA unlikely.** No referral to Sleep Medicine required

3 – 4 **‘Area of uncertainty’** which should precipitate a high index of suspicion for OSA. Further management depends on magnitude and urgency of surgery

≥ 5 **OSA likely.** Defer surgical procedure (if possible) with formal Sleep Medicine referral recommended

Appendix 2 offers a treatment algorithm to aid in clinical-decision making.

It is worth considering the main limitation of the STOP-BANG questionnaire - despite its high sensitivity it has only moderate specificity for predicting OSA. Recent work has shown an improvement in the specificity of STOPBANG if a stepwise approach to its use is taken [17].

Raised bicarbonate in a patient with a STOPBANG >3 is highly indicative for moderate-severe OSA [17]. Certain combinations of risk factors appear to confer a disproportionate risk for OSA e.g. it has been found that the predictive probability of diagnosing OSA is significantly higher when using 2 positive items of STOP + BMI >35 or male gender [18]. This is particularly pertinent in the group of patients with a STOP-BANG score 3-4 (intermediate risk). This is highlighted in appendix 2 [18].
2.2 Preoperative management following diagnosis

The American Society of Anaesthesiologists (ASA) has published guidelines for the perioperative management of patients with OSA [7], however the optimal clinical pathway for newly diagnosed patients is yet to be determined. At the time of writing expert opinion recommends:

• Patients with newly diagnosed moderate to severe OSA should be commenced on CPAP as per NICE guidance [12] preoperatively (depending on urgency of surgery)
• CPAP treatment should be commenced 8-12 weeks in advance of surgery, with flexibility required (depending on the urgency of surgery)

2.3 Preoperative management of patients with established OSA

Table 4. Unadjusted incidence rates and adjusted odds ratios (OR) of postoperative cardiopulmonary complications for treated and untreated obstructive sleep apnoea patients [19]. (Treatment = CPAP)

Appendix 3 offers a treatment algorithm for this patient group preoperatively

2.4 Benefits of CPAP treatment in the perioperative setting

CPAP treatment has been shown to reduce or reverse the cardiovascular structural changes induced by severe OSA. It also improves AHI scores, oxygen saturation levels and functional status. A large cohort study from 2015 has demonstrated the significant benefits of perioperative CPAP use, versus no CPAP, in patients with OSA undergoing major vascular and general surgical procedures [19]. In this study, patients with OSA but not on CPAP therapy had a risk of postoperative complications 2-3 times higher than the patient cohort on CPAP. Patients treated with CPAP encouragingly had a risk of postoperative complications comparable to the group without OSA. Complication rates are summarised in table 4. This risk has been proven across several other studies, whilst also demonstrating significant reductions in hospital length of stay in patients using CPAP perioperatively [20].

Table 4. Unadjusted incidence rates and adjusted odds ratios (OR) of postoperative cardiopulmonary complications for treated and untreated obstructive sleep apnoea patients [19]. (Treatment = CPAP)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No OSA</th>
<th>OSA Untreated</th>
<th>OSA Treated</th>
<th>Adjusted OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any cardiopulmonary complication</td>
<td>4.9%</td>
<td>6.4%</td>
<td>4.2%</td>
<td>1.8</td>
</tr>
<tr>
<td>Postoperative myocardial infarct</td>
<td>0.6%</td>
<td>1.4%</td>
<td>0.6%</td>
<td>2.6</td>
</tr>
<tr>
<td>Unplanned reintubation</td>
<td>1.8%</td>
<td>2.7%</td>
<td>1.4%</td>
<td>2.5</td>
</tr>
<tr>
<td>Postoperative arrhythmia</td>
<td>1.5%</td>
<td>1.6%</td>
<td>1.4%</td>
<td>1.4</td>
</tr>
<tr>
<td>Postoperative cardiac arrest</td>
<td>0.6%</td>
<td>0.9%</td>
<td>0.4%</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Adjusted OR compares patients with OSA who are treated and untreated.

2.5 Sleep Medicine referrals

It is strongly recommended that formal links be established between preoperative assessment, and local Sleep Medicine services at an early stage. Agreed, expedited pathways of care should be drawn up between relevant clinicians to provide objective referral and re-assessment criteria. This provides the ideal platform to optimise patient care, whilst minimising surgical waiting time.
2.6 Stratification of perioperative risk

In addition to a patient’s risk and severity of OSA, it is important to consider the added risks of the invasiveness of the intended surgical procedure and the postoperative analgesia requirements. The ASA Taskforce [7] recommends the following scoring system:

A. Severity of OSA

<table>
<thead>
<tr>
<th>Severity of OSA</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Mild</td>
<td>1</td>
</tr>
<tr>
<td>Moderate</td>
<td>2</td>
</tr>
<tr>
<td>Severe</td>
<td>3</td>
</tr>
</tbody>
</table>

B. Invasiveness of surgery and anaesthesia:

<table>
<thead>
<tr>
<th>Surgery Type</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial surgery under local anaesthesia or peripheral nerve block without sedation</td>
<td>0</td>
</tr>
<tr>
<td>Superficial surgery with moderate sedation or general anaesthesia</td>
<td>1</td>
</tr>
<tr>
<td>Peripheral surgery with spinal or epidural anaesthesia (with no more than moderate sedation)</td>
<td>1</td>
</tr>
<tr>
<td>Peripheral surgery with general anaesthesia</td>
<td>2</td>
</tr>
<tr>
<td>Airway surgery with moderate sedation</td>
<td>2</td>
</tr>
<tr>
<td>Major surgery with general anaesthesia</td>
<td>3</td>
</tr>
<tr>
<td>Airway surgery with general anaesthesia</td>
<td>3</td>
</tr>
</tbody>
</table>

C. Requirement for post-operative opioids:

<table>
<thead>
<tr>
<th>Opioid Type</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Low dose oral opioids</td>
<td>1</td>
</tr>
<tr>
<td>High dose oral, parenteral, or neuraxial opioids</td>
<td>3</td>
</tr>
</tbody>
</table>

D. Estimation of perioperative risk:

Overall score = score for A (0-3) plus the greater of the score for either B or C (0-6)

4 = increased perioperative risk
> 4 = significantly increased perioperative risk

* One point may be subtracted if a patient has been on CPAP before surgery & will continue to use own appliance consistently during the perioperative period.

** One point should be added if a patient with mild or moderate OSA also has a higher resting PaCO₂ (> 6.5 KPa)

2.7 In-patient vs. day case surgery

There are many factors that influence whether day case surgery is appropriate for patients with OSA. These include:
1. Patients’ OSA status i.e. mild to severe
2. Anatomical & physiological abnormalities
3. Status of co-existing diseases
4. Nature of surgery
5. Type of anaesthesia
6. Need for post-operative opioids
7. Patients’ age
8. Adequacy of post-discharge observations
9. Capabilities of the day case facilities

Owing to insufficient literature to offer recommendations, a rational approach is required when planning for day case surgery suitability. Procedures typically performed as day case surgery in non-OSA patients may also be performed for OSA patients when local or regional (loco-regional) anaesthesia is administered. Opinion is equivocal regarding whether superficial procedures may be safely performed with general anaesthesia on a day case basis. Other factors, listed above, may offer additional reasons for inpatient surgery as opposed to day case surgery. The absolute contraindications to day case surgery for OSA patients would include airway surgery and children < 3 years for tonsillectomy.

Any facility offering day case surgery should be well equipped with emergency difficult airway equipment, ability to offer non-invasive respiratory support (CPAP, NIPPV), radiological (CXR) & laboratory services (ABG, electrolytes), and a robust transfer arrangement to an inpatient facility in place.

2.8 General perioperative tips for patients requiring CPAP therapy (based on expert opinion)

• Perform surgery under central neuraxial blockade or loco-regional anaesthesia where possible to decrease risk of complications [21]. If sedation is to be used in conjunction, it is advisable to institute the patients’ normal CPAP therapy during surgery.
• In patients undergoing any form of surgery under general anaesthesia it is preferable to provide loco-regional analgesia postoperatively rather than using systemic opioids. It is also advisable to institute normal CPAP therapy immediately postoperatively in the recovery area.
• Organise an inpatient bed prior to surgery for any patient scoring >4 on the ASA Taskforce risk stratification tool (described above) i.e. individuals with a high perioperative risk of complications.
• Consider postoperative Critical Care for particularly high-risk patients or for surgical procedures graded as ‘Complex’ by NICE [22]. This recommendation will require flexible implementation depending on resources available locally at different institutions.
• Where a high index of suspicion exists that significant OSA is likely, but surgical urgency excludes a formal diagnosis, individual patients should be assumed to be suffering from the condition and appropriate provisions made.

3. CONCLUSION

OSA is an increasingly common problem in patients presenting for surgery, with increased risk of adverse outcome where the underlying condition is not optimized. Preoperative assessment clinics provide the ideal environment to facilitate first-line diagnosis and thereby mitigate further associated risk. A coordinated, agreed, perioperative management plan should be set through the preoperative assessment process and cascaded to all relevant clinical teams in advance of surgery.

Evidence-based Guidelines for Preoperative Assessment Units
References

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4. Peppard PE, Young T et al. Longitudinal study of moderate weight change and sleep disordered breathing. JAMA 2000;284: 3015-21
7. American society of Anaesthesiologists: Practice guidelines for the perioperative management of patients with obstructive sleep apnoea. An updated report by the American Society of Anaesthesiologists Task Force on perioperative management of patients with obstructive sleep apnoea; Anaesthesiology 2014; 120 (2): 1-19
19. Abdelsattar ZM, Hendren S; The impact of untreated obstructive sleep apnea on cardiopulmonary complications in general and vascular surgery: a cohort study; Sleep 38 (8) 2015.

Further Reading

APPENDIX 1: Epworth Sleepiness Scale

How likely are you to doze off or fall asleep in the situations described below, in contrast to just feeling tired?

This refers to your usual way of life in recent times.

Even if you haven’t done some of these things recently try to work out how they would affect you.

Use the following scale to choose the **most appropriate number** for each situation:

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>would <strong>never</strong> dose</td>
</tr>
<tr>
<td>1</td>
<td>Slight chance of dozing</td>
</tr>
<tr>
<td>2</td>
<td><strong>Moderate</strong> chance of dozing</td>
</tr>
<tr>
<td>3</td>
<td><strong>High</strong> chance of dozing</td>
</tr>
</tbody>
</table>

**Situation** | **Chance of dozing**
--- | ---
Sitting and reading |  
Watching TV |  
Sitting inactive in a public place |  
As a passenger in a car for an hour without a break |  
Lying down to rest in the afternoon when circumstances permit |  
Sitting and talking to someone |  
Sitting quietly after lunch without alcohol |  
In a car, as the driver, stopped in traffic for a few minutes |  

**Outcomes**

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 10</td>
<td>Normal limits</td>
</tr>
<tr>
<td>11 – 12</td>
<td>Borderline</td>
</tr>
<tr>
<td>13 – 15</td>
<td>Mild daytime sleepiness</td>
</tr>
<tr>
<td>16 – 18</td>
<td><strong>Moderate daytime sleepiness</strong></td>
</tr>
<tr>
<td>19 – 24</td>
<td><strong>Excessive daytime sleepiness</strong></td>
</tr>
</tbody>
</table>
APPENDIX 2: Recommended pathway to manage preoperative patients in conjunction with STOPBANG screening tool

* Certain combinations of risk factors appear to confer an increased risk for OSA. This is particularly pertinent in the ‘area of uncertainty’ with male gender and BMI $\geq 35$ appearing to be particularly pertinent. We therefore recommend a lower threshold for consideration of further assessment where these factors are present in combination with a total score of 3 – 4.

** If surgery is urgent then proceed, but treat as if established OSA diagnosis
APPENDIX 2: Recommended preoperative management of patients with established OSA diagnosis

* If surgery is urgent then proceed, but treat as if established OSA diagnosis
** Recommended that patients use treatment appliance e.g. CPAP in perioperative period

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