Pre-operative Screening for Obstructive Sleep Apnoea

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Key Amendment

Date	Amendment	Approved by
21st January 2019	Inclusion of advice for edoxaban. Additional information for the management of medicines for diabetes	Medicines Safety Committee
25th June 2020	Document extended for 6 months during COVID-19 period.	QGC
4th January 2021	Pre-operative assessment Key Documents approved for 3 years	Pre-op Directorate Governance Meeting
27th December 2023	Extended document for 6 months whilst under review. Updated owner details.	Dr Harsha Mistry
12th November 2024	Document extended for 12 months whilst awaiting National Guidelines to inform if changes are required	Dr Harsha Mistry

Introduction

Obstructive sleep apnoea (OSA) is a sleep-related breathing disorder characterised by periodic, partial or complete airway obstruction during sleep. This airway obstruction may cause episodic sleep-associated oxygen desaturation, hypercapnia and cardiovascular dysfunction.

The prevalence of OSA in the general population has been estimated to be between 5 and 9%.It is likely to be higher in the surgical population (up to 23%) and particularly among certain patient groups such as those undergoing bariatric surgery (up to 70%).

Chronic untreated OSA leads to multi-systemic adverse consequences and is an independent risk factor for increased mortality in the general population. The inherent collapsibility of the airway and the systemic effects of the disease also place surgical OSA patients at increased risk of serious perioperative complications.

It has been shown that many patients with OSA remain un-diagnosed despite both surgical and anaesthetic preoperative review. Studies have consistently shown that the incidence of postoperative oxygen desaturation, respiratory failure, cardiac events, length of hospital stay and unplanned intensive care unit transfer are all higher in subjects with OSA.

Patients who should be screened pre-operatively by a questionnaire

- Patients with a BMI over 35

Screening questionnaire for Obstructive Sleep Apnoea

The STOP-BANG Questionnaire has a high sensitivity at around 75% (i.e. it is effective at detecting possible OSA) but a lower specificity at around 50% (i.e. it is not effective at detecting those who do not have OSA).

Snoring Do you snore loudly? (Louder than talking or can be heard through walls)	**Yes/No**
Tired Do you often feel tired, fatigued or sleepy during daytime?	**Yes/No**
Observed Has anyone observed you stop breathing during your sleep?	**Yes/No**
Pressure Do you suffer from, or are being treated for, high blood pressure?	**Yes/No**
BMI BMI more than 35kg/m^2?	**Yes/No**
Age Age over 50 yrs old?	**Yes/No**
Neck circumference Neck circumference greater than 40cm/16 inches?	**Yes/No**
Gender Male gender?	**Yes/No**

- **Score 0-2** – Low risk of OSA
  - Surgery can proceed without further investigation
  - Low probability of moderate/severe OSA being present (probability around 18%)
- **Score 3-4** – Intermediate risk of OSA
  - Surgery can proceed without further investigation
  - There is a chance patient could have OSA not detected by STOP BANG screening
- **Score 5-8** – High risk of OSA
  - Please refer to consultant anaesthetist using Work-list
  - There is greater than 50% probability of moderate/severe OSA being present
  - Decision of whether to proceed with surgery will be on a case by case basis
  - If CPAP is deemed necessary preoperatively then it is recommended that the patient has CPAP for at least one week and ideally 6 weeks pre-operatively

Outcomes following identification of STOP-BANG score of 5-8

The result of the STOP-BANG test should be taken in context and the pre-operative action will depend on other patient factors and surgical factors. The majority of patients with sleep apnoea will be able to proceed for surgery, but there are some risk factors (detailed below) which influence the decision of whether to proceed or defer surgery.

Table. Factors which influence decision about whether to continue with surgery or defer and investigate potential OSA

Less concerning, may support continuing with surgery	**More concerning and may require OSA investigation**
Minor surgery with minimal opioid requirement	Major invasive surgery with high opioid requirements
Non airway surgery	Upper airway surgery with postoperative upper airway swelling likely

	Surgery requiring prolonged head down position
Surgery is urgent and deferring could be detrimental to patients health	Surgery is reasonably non-urgent and could be safely deferred
Patient is otherwise well with no cardiovascular disease	Patient has cardiovascular disease (hypertension, ischaemic heart disease, symptomatic heart failure)
Patient has a good exercise tolerance	Patient is breathless on exertion and has a limited exercise tolerance due to breathlessness
Normal SpO2 (i.e. above 94% on room air)	Resting low SpO2 (i.e. below 94%)
No pulmonary hypertension	Pulmonary hypertension has been suspected in the past (i.e. on previous echo or CT)
BMI is below 40	BMI is above 40

Continue with Surgery

- If the surgery is urgent (i.e. surgery for cancer) or a low-risk surgery which will require minimal opioid analgesia, it may be appropriate to continue with surgery, remembering the points in the section 'Perioperative Management of Patients with OSA' below.
- If there are other risk factors and there is likely to be significant post-operative opioid analgesia requirements then these patients should be directed for surgery at Worcester Royal Hospital or Alexandra Hospital (rather than Kidderminster) where there is on site HDU and 24 hour resuscitation services.
- Where surgery is high risk for exacerbating OSA (i.e. major Surgery, upper airway surgery) then a postoperative HDU bed or continuous overnight oximetry is recommended. This decision will be made on a case by case basis.

Organise Overnight Oximetry.

- Overnight Oximetry is a described *screening* tool for OSA
- It offers higher sensitivity (up to 85%) and specificity (around 65%) than STOP BANG but it is not the gold standard [8].
- Specificity is still quite low (65%) meaning that even if a result is negative, there is still a chance the patient has significant OSA.
- It is a cheap and readily accessible investigation and can be arranged through the clinical investigation units at WRH, Alexandra Hospital and Kidderminster Treatment Centre.
- The result will be given as 'Oygen Desaturation Index' (ODI) – i.e. the number of desaturations >4% per hour.
- If the ODI is above 15 then this would support a diagnosis of moderate to severe OSA and should prompt CPAP trial treatment or referral to a sleep specialist.
- Referral to a sleep specialist will delay surgery and it might be appropriate to continue with surgery, remembering the points in the section 'Perioperative Management of Patients with OSA' below.
- If the ODI is below 15 it does not mean the patient does not have OSA but may help with perioperative decision making[9]

Referral to the Sleep Service

- In cases of non-urgent surgery it may be appropriate to refer to a sleep specialist service. It should be remembered that the sleep service is heavily subscribed and referral to treatment can take 3-4 months

Respiratory polygraphy

- Considered the gold standard for diagnosing OSA
- Uses oxygen saturation, respiratory movement, EE, EMG and ECG and airflow monitoring to detect apnoea and hypopnoea.
- Requires a specialist report but essentially will provide an Apnoea Hypopnoea Index (AHI) which can be interpreted as:
    - 0-5
    - 5-15 Mild OSA
    - 15-30 indicates moderate OSA and these patients may benefit from treatment pre-operatively although this decision will be individualised
    - 30+ indicates severe OSA and these patients should have the result communicated to the GP and CPAP treatment trialled, ideally for at least 1 week prior to surgery.

Perioperative management of a patient with confirmed OSA

Patients with OSA have an approximately 2 to 4 fold increase in postoperative complications compared to patients without OSA. These complications include:

- Pulmonary complications (prnuomia, post-operative pulmonary oedema, desaturation and worsening OSA.
- Cardiovascular complications (arrhythmia, myocardial infarction, cardiac arrest)

Compared to patients without OSA there is an increased risk of difficult intubation, mask ventilation (around 10 Vs 20%) and the presence of OSA is increases the risks of postoperative MI or pulmonary complications requiring reintubation (OR around 2 in one study). The risks can be mitigated with attention to the following considerations.

List management:

- Patients with known or suspected OSA should be placed early on morning lists (allowing for other considerations, eg, paediatric patients, availability of particular staff, etc).
- Patients with OSA should undergo surgery at Kidderminster under regional or local anaesthesia only.
- Most OSA patients are obese and measures for management of anaesthesia in the obese cohort should be undertaken
- Try to avoid sedative pre-medications.

Considerations at Induction

- OSA is predictive for difficult facemask ventilation and intubation.
- Careful pre-oxygenation, use of the ramped position and back-up airway plans should be utilised.
- Although it is not specifically associated with difficult supraglottic device use, these may not permit adequate ventilation for surgery. They may be useful at induction if mask ventilation is very difficult prior to intubation.
- Use of a readily reversible neuromuscular blocking agent may be considered (i.e. Rocuronium with reversal possible by Suggamadex)
- Consideration of passive nasal oxygenation or THRIVE is worthwhile.
- Videolaryngoscopy is associated with successful intubation in difficult airways, occasionally awake fibreoptic intubation is required.

- Inhalational induction is associated with airway collapse and reduced minute ventilation, relative to healthy patients.

Analgesia

Opioid analgesia post-operatively may increase the risk of ventilation impairment.
Sleep disturbance, periodic hypoxia and systemic inflammation may also influence the effects of opioids.

Consider

- Maximal use of regional anaesthesia (including central neuraxial anaesthesia, regional blocks/catheter techniques).
- Maximal use of non-opioid agents (paracetamol, NSAIDs if not contra-indicated).
- Multimodal analgesia has been shown to be superior to single agent opioids.
- Oral opioids other than morphine (oxycodone may have a less variable pharmacological profile).
- Consider adjuncts including magnesium, ketamine, gabapentin and clonidine.

Intra-operative ventilation

- 6-8ml/kg tidal volume.
- Titrated PEEP – may need to be considerably higher than normal patients.
- Low threshold for arterial line for ABG monitoring.

Post-operative ventilation

- Ensure adequate reversal, with neuromuscular monitoring and reversal.
- Suggamadex is useful in providing reversal following aminosteroid NMBDs.

Consider

- Extubate awake, sat up/on Oxford pillow. Deep extubation may lead to difficult to manage airway
- Extubation onto CPAP/NIV/Nasal High-Flow Device. Postive airway pressure support reduces respiratory failure in this setting.
- Post-operative respiratory support may need acute titration following anaesthesia.
- Reduced respiratory rate may be less indicative of respiratory depression than clinical evidence of sedation.

Post-operatively, these patients should be monitored. In recovery, desaturations below 90%, apnoea 10s or more, respiratory rate of 7 or less and pain-sedation mismatch can be used to identify patients at high risk of postoperative respiratory complications.

ICU should be considered for high risk patients who have confirmed OSA and:

- Have undergone major surgery and have high opioid requirements
- High-risk airway surgery
- Significant concurrent cardiorespiratory disorders
- Hyper-obesity (i.e. BMI over 40)
- Respiratory failure requiring up-titration of CPAP or BiPAP
- Ongoing oxygen requirement combined with CPAP postoperatively is usually best delivered in a high care area

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