Preoperative assessment in patients presenting for elective surgery

Carol E Gray
Julie Baruah-Young
Christopher J Payne

Abstract

Preoperative assessment of patients undergoing elective surgery is vital to ensure patients have underlying co-morbidities identified, appropriate investigations performed and are optimized prior to the day-of-surgery. Anaesthetic pre-assessment is usually initiated at a pre-assessment clinic. A thorough assessment should include a careful history and examination as well as assessment of both the airway and functional capacity. This article provides a systematic approach to the assessment process.

Keywords Airway assessment; cardiac risk assessment; investigations; pre-operative assessment

Royal College of Anaesthetists CPD Matrix: 1A02, 1C01, 1E05, 2A03

Learning objectives

After reading this article you should be able to:

- perform a thorough assessment of patients presenting for elective procedures
- identify patients who require further investigations prior to surgery
- identify patients who may be at higher risk of perioperative complications
- formulate a plan for the management of patients with medical co-morbidities

Pre-assessment

Preoperative anaesthetic assessment is essential in patients attending for elective surgery. Ideally, this process should begin prior to admission for surgery in an outpatient setting. Pre-assessment clinics (PAC) allow for a protocol-led review and assessment of such patients. PACs are usually run by nurses trained in pre-assessment who work closely with anaesthetists with an interest in pre-assessment. Although this will normally be a consultant anaesthetist, PAC provide an invaluable opportunity for foundation and speciality doctors to gain experience in the pre-assessment setting.

The pre-assessment process has a number of objectives, including:

- identifying latent pathology requiring treatment
- optimizing pre-existing medical conditions
- ensuring appropriate preoperative investigations are arranged
- promoting lifestyle modifications, including smoking cessation, weight loss, alcohol reduction
- streamlining day-of-surgery admission
- reducing day-of-surgery cancellations
- highlighting high-risk or challenging patients to the appropriate anaesthetic team
- discussion of anaesthetic techniques prior to admission.

The ultimate responsibility for anaesthetic technique and decisions lies with the anaesthetic team on the day of surgery. Also, if a patient is admitted on the day of surgery, assessment should not be performed in the anaesthetic room, even if the patient has been seen in the PAC.

History

Assessment of all elective surgical patients should begin with a thorough history. This should be focussed, with the aim of identifying medical co-morbidities and the functional effect of the conditions. A previous anaesthetic history should be taken and ideally previous anaesthetic records should be examined to identify any problems related to anaesthesia or airway management. A family history of any significant problems with anaesthesia should be sought, including malignant hyperthermia and suxamethonium apnoea. Risk factors for gastro-oesophageal reflux should be identified; these include hiatus hernia, a history of reflux and medical conditions which may delay gastric emptying. Appropriate plans for airway management can then be formulated and antacid prophylaxis prescribed. A review of all regular medications should be undertaken and the patient should be instructed as to which drugs to continue or withhold in the peri-operative period. Most hospitals have their own guidelines to facilitate this within the pre-assessment clinic.

A general physical examination should reveal any abnormalities such as obesity, scoliosis and flexor contractions which may have implications for positioning while under anaesthesia. A cardiovascular and respiratory examination should be performed to confirm the presence of cardiac murmurs, dysrhythmias and lung pathologies.

Airway assessment

Assessment of the airway is a core component of preoperative assessment to attempt to predict patients where bag mask ventilation (BMV) or endotracheal intubation may be problematic. There is no single test or assessment in isolation that can predict whether an airway will be difficult to manage. However a thorough airway assessment allows planning of strategies for airway management. Information from previous anaesthetic documentation regarding grade of laryngoscopy can be extremely useful but the process of performing a thorough

Carol E Gray *FRCA is a Consultant Anaesthetist at Ninewells Hospital, Dundee, UK. Conflicts of interest: none declared.*

Julie Baruah-Young *MBChB is a Core Anaesthetic Trainee in the East of Scotland Deanery, UK. Conflicts of interest: none declared.*

Christopher J Payne *MD FRCS is a Consultant Surgeon at Ninewells Hospital, Dundee, UK. Conflicts of interest: none declared.*

airway assessment should not be omitted as ease of intubation may have changed due to a multitude of factors.

Predictors of difficulty with BMV include:

- obesity (neck circumference >60 cm)
- beard
- edentulous
- snoring
- anatomical facial abnormality.

Predictors of difficult laryngoscopy include:

- Inter-incisor gap
  - Mouth opening is vital for most airway interventions. The ability to open less than 3 cm is regarded sign of potential difficulty.
- Mallampati scoring system
  - This assesses the view of the oropharynx. Sit in front of the patient and ask them to open their mouth maximally and protrude their tongue whilst observing the view (Table 1). Class 3 and 4 can be associated with difficult laryngoscopy.
- Thyromental distance
  - This is the distance from the upper border of the thyroid cartilage to the tip of the jaw and is measured with the head extended. A distance of less than 6.5 cm can be associated with difficult view at laryngoscopy. This has been traditionally been measured with finger breadths, with a distance of less than three finger widths being associated with a poor view at laryngoscopy. However, it is recommended that it is measured accurately with a ruler to avoid subjective results.
- Jaw protrusion
  - This assesses temporomandibular joint movement. Patients can be asked to protrude their lower jaw or to 'bite your upper lip'. Inability to protrude the lower jaw can be associated with a poor view at laryngoscopy.
- Neck movement
  - This examines the patient's ability to achieve the optimal position for airway management, both for intubation and mask ventilation. The 'sniffing position' is achieved by cervical flexion and atlanto-axial extension. With the neck fully flexed, the patient should be able to lift their head more than 15°, which demonstrates normal occipito-axial movement).
- Dentition
  - Particularly the presence of any loose teeth, prominent teeth including single maxillary incisors, dentures and any loose dental work.

Mallampati scoring system

Class	Structures visible
1	Faucal pillars, soft palate and uvula
2	Uvula tip masked by base of tongue
3	Visualization of base of uvula only
4	Soft palate not visible

Table 1

Any airway test in isolation is of limited value. However, utilising multiple tests can increase their usefulness. A number of scoring systems have been produced including the Wilson Score,[1] which assesses multiple components of airway assessment:

- obesity
- restricted head and neck movements
- restricted mandibular movements
- receding mandible
- prominent upper incisors.

These risk factors are assigned a score of 0, 1 or 2, with a score of greater than 2 predicting more than 75% of difficult intubations. Such scoring systems have an increased positive predictive value when compared with single tests. However there is also a high incidence of false-positives.

Every anaesthetist should have an airway plan before performing a general anaesthetic, particularly if predictors suggest a potentially difficult intubation. A number of strategies for predicted difficult intubations are possible including using video laryngoscopes and fibreoptic techniques. All anaesthetists should be familiar with these techniques and should seek appropriate help if deemed necessary.

Airway assessment is not only important for intubation but also for extubation. The Difficult Airway Society extubation guideline provides a framework for assessing extubation risk and is helpful in planning extubation strategies.[2]

Medical co-morbidities

Hypertension

Patients with hypertension are at increased risk of an exaggerated fall in systolic blood pressure on induction of anaesthesia (especially in uncontrolled hypertension) and an exaggerated sympathetic response to stresses such as laryngoscopy and pain. This can potentially precipitate myocardial ischaemia and cerebrovascular accidents. Patients may have evidence of end organ damage, for example left ventricular hypertrophy on ECG and renal impairment as evidenced by deranged renal function, and this should be investigated. Hypertension is also associated with a number of other conditions including coronary artery disease, cerebrovascular disease and diabetes mellitus and a history of these should be sought. The presence of end organ damage or co-existing disease may significantly elevate the patient's risk and may need to be investigated further.

Treatment of hypertension returns vascular reactivity towards normal levels and so should improve cardiovascular stability in the peri-operative period. The evidence for treatment of pre-operative hypertension is lacking. However it is accepted that patients with severe hypertension (diastolic BP >110 mmHg) require control prior to elective surgery. It is important to clarify whether hypertension is primary or secondary (i.e. neuroendocrine tumours) as this may necessitate additional investigations and treatment preoperatively. Antihypertensive medication should be continued until the point of anaesthesia, although some units recommend withholding angiotensin-converting enzyme inhibitors on the morning of surgery to reduce the risk of intraoperative hypotension.

Coronary artery disease (CAD)

CAD may range from stable angina to previous myocardial infarction with evidence of heart failure. A thorough history is