Pre-operative assessment of elective surgical patients


Abstract
Patients due to undergo elective surgery who are not considered to be medically fit, may have their operation postponed or even cancelled. Not only will this result in significant anxiety for the person, but it will also have financial implications for the hospital, in terms of lost theatre time. In an attempt to prevent postponing or cancelling scheduled surgery, pre-operative assessment is essential to ensure that the patient is physically and emotionally prepared. This article examines the main components of pre-operative assessment and how addressing any problems before surgery can help to improve post-operative outcomes for patients.

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Introduction
The main aims of pre-operative assessment are to reduce the incidence of cancellations on the day of surgery by ensuring that the patient is medically fit to undergo the procedure, and to rationalise the number of tests and investigations required, therefore reducing any unnecessary testing and related costs. Pre-operative assessment aims to reduce patient anxiety as well as improve patient outcomes in the post-operative period. The value of pre-operative assessment has been highlighted. Pollard and Olson (1999) suggested that early outpatient pre-operative assessment might reduce surgery cancellation rates. Fischer (1996) agreed with this, stating that early pre-operative assessment should be used to reduce the number of surgical cancellations in hospital.

Aims and intended learning outcomes
This article provides an overview of the main components of pre-operative assessment, including rationale for its use, aims in relation to minimising delays or cancellations of planned surgery and optimising patient outcomes. After reading this article and completing the time out activities you should be able to:
- Describe the pre-operative assessment process.
- Identify the role of pre-operative assessment in preventing delays or cancellations to scheduled elective surgery.
- Understand the rationale for tests required as part of pre-operative assessment.
- Recognise the importance of preparing patients physically and emotionally for surgery.

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The National Institute for Clinical Excellence (NICE) (2003) produced guidelines on the use of routine pre-operative tests for elective surgical patients. Although these guidelines are about nine years old, they are still relevant to practice. Tests carried out as part of pre-operative assessment should be based on NICE (2003) recommendations and local policy.

Aims of pre-operative assessment should include (Association of Anaesthetists of Great Britain and Ireland 2010):

- Identifying potential health concerns that might affect any planned surgery. This may include existing medical conditions, weight concerns or any allergies.
- Detecting and treating any new conditions identified during pre-operative assessment such as cardiac arrhythmias, cardiac murmur or blood disorders.
- Identifying any temporary infections, such as respiratory, urinary or skin infections, which might affect post-operative recovery.
- Providing an opportunity for patients to ask questions about the procedure and post-operative care as well as to talk about any fears or concerns they may have.

Following pre-operative assessment and pending any results from tests (for example, blood and urine, and meticillin-resistant Staphylococcus aureus (MRSA) swabs), a decision should be made about whether or not the patient is medically fit to undergo surgery.

**Complete time out activity 1**

**Pre-operative assessment**

Initial assessment should include gathering information about the patient using hospital admission forms. This will include the patient’s name, age, address, and details of next of kin. This information is vital to ensure the patient can be identified and that details such as contact numbers are available in the event of an emergency. This is particularly important for day surgery patients as it is generally not recommended that they are discharged after a general anaesthetic without having made arrangements for someone to accompany them home. If no one is available to accompany the patient, local trust guidelines may state that the person will be required to undergo the procedure as an inpatient.

Assessment should also include details of the patient’s height, weight, pulse and blood pressure. Urine is tested and sent to the laboratory for culture and sensitivity. This is carried out for all surgical procedures, but it is particularly important for orthopaedic procedures such as hip or knee replacements where infection could endanger the patient’s new joint. To assess the patient’s risk of infection, swabs will be taken from the groin and nose as part of the hospital’s MRSA prevention policy.

The patient should be asked a series of questions in conjunction with NICE (2003) guidelines and local policy. These questions form the basis on which the nurse will request certain tests or investigations, for example an electrocardiogram (ECG) for patients who have angina, recent or regular chest pain or known hypertension. One of the key questions asked is if the patient has an allergy to latex. Theatre staff will need to be informed if this is the case so that they can arrange the theatre list in such a way that the operation is carried out in a latex-free environment (Association of Perioperative Registered Nurses 2004).

The assessment may last 15-30 minutes and should aim to identify, and subsequently manage, any risks or problems before the patient is admitted to hospital to undergo surgery. However, Holt et al (2007) suggested that pre-anaesthesia assessment may not affect the final decision to operate on the day, which remains within the remit of the anaesthetist. If the nurse has any anaesthetic-related concerns during pre-operative assessment, it is important to raise these with the anaesthetist at the earliest opportunity.

**Complete time out activity 2**

**Obesity**

The patient’s height and weight is used to calculate body mass index (BMI). Hospitals will usually have an ideal range with regard to a patient’s BMI. Day surgery patients usually have a cut-off point of a BMI of around 35 (with regard to safe limits in which to operate). However, there may be some flexibility in this, for example if the patient’s BMI is high because he or she is very muscular, or if surgery is classed as a minor procedure, therefore lowering the risks associated with surgery. Patients with a BMI over 35 will need to be referred to an anaesthetist for advice. The anaesthetist will consider whether or not the patient will be able to undergo surgery at the hospital or if the operation will need to be postponed until the individual loses weight.

Patients who are obese may be at increased risk of complications during surgery. An obese patient lying flat may have difficulty expanding...
the lungs, leading to inadequate oxygenation. This might cause the individual to become hypoxic, as well as resulting in possible chest infection and/or lung collapse. Excess weight may place added strain on the person’s heart, which in turn could lead to a cardiac event. Being overweight may increase the individual’s risk of post-operative complications (Box 1). Patients may find it difficult to mobilise and this could result in the development of deep vein thrombosis (DVT), pressure ulcers or chest infection. Hospitals tend to carry out risk assessments so that special heavy-duty electric beds and chairs, for example, can be ordered in advance.

**Cardiovascular system**

Patients with known coronary artery disease should have a baseline cardiac assessment, which involves an ECG (NICE 2003). Fleisher et al (2007) suggested that the most important component of pre-operative assessment, with regard to the cardiovascular system, is history taking. The cardiac history will reveal any angina, recent or past heart attacks, significant arrhythmias and/or comorbidities (Poldermans et al 2009). Other significant cardiac history, such as the presence of a pacemaker or implantable defibrillator, is also important as it could affect where patients have their operation, for example in hospitals which have specialist coronary or intensive care units.

Physical examination of the patient should also be carried out. This is more common in inpatients, however day-surgery patients can also have a physical examination if results from the cardiac assessment reveal any recent chest pain or history of cardiac murmurs. The main function of physical examination is to assess the patient’s heart and lung function to ensure that he or she is medically fit to undergo surgery (Longmore et al 2001). The clinical significance of cardiac murmurs needs to be established as they can pose increased risks for patients undergoing non-cardiac surgery. These risks include potential heart attack, heart failure or undiagnosed arrhythmias displacing a clot, which could cause the patient to have a stroke.

Where surgery is not indicated for cancer or life-threatening conditions, the patient’s cardiac function should be thoroughly examined before surgery. Other potentially undiagnosed conditions such as hypertension also need to be managed before the patient undergoes surgery. If surgery is postponed or cancelled, it is important that the patient understands why this has happened. GP referral for treatment and instructions to contact the hospital once the patient’s present condition, such as hypertension, is adequately managed may be necessary. Most pre-operative assessment units have guidelines on undiagnosed or poorly controlled hypertension and cardiac murmurs, particularly relating to whether an echocardiogram is required and/or advice from a cardiology specialist is needed before surgery. **Complete time out activity 3**

Patients undergoing surgery should have a detailed and accurate record of any medications being taken. This should include any herbal remedies or nutritional supplements, and whether the patient uses alcohol, tobacco and especially any over-the-counter or illicit drugs. Particular medications can affect the outcome of surgery. Drugs such as warfarin increase the risk of bleeding post-operatively, methotrexate interacts with anaesthetic agents and birth control medication may increase the risk of DVT. These medications may have to be stopped before the patient undergoes surgery (Longmore et al 2001).

The decision to stop medication should be based on the desired outcome of surgery or the requirement of the anaesthetist.

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**Box 1**

**Peri-operative and post-operative complications for obese patients**

- Respiratory system: obese patients tend to have reduced functional residual capacity. This could lead to airway closure and desaturation in the supine position, as well as more rapid desaturation if difficulty is encountered intubating the trachea. Morbidly obese patients with co-existing conditions such as asthma or chronic obstructive pulmonary disease are at increased risk of peri-operative respiratory complications.
- Cardiovascular disease: obese patients are more likely to experience hypertension, hyperlipidaemia, ischaemic heart disease and heart failure.
- Metabolic disease: morbidly obese patients have a high incidence of diabetes. They should be assessed for adequate glucose control and for complications of diabetes, especially cardiac disease, renal disease and autonomic dysfunction.
- Thromboprophylaxis: obese patients are at increased risk of venous and pulmonary thromboembolism.

*(Association of Anaesthetists of Great Britain and Ireland 2007)*

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**TIME OUT**

3 A 65-year-old woman due to have hip replacement surgery presents for pre-operative assessment. Her medical history includes arthritis in the hip and knee joints, previous myocardial infarction, hypertension and asthma. She has been prescribed salbutamol, but rarely uses it. The patient smoked up until five years ago, drinks less than ten units of alcohol a week and has no drug allergies. Her BMI is 35 and her vital signs and ECG are all within acceptable limits. She is taking the following medications: atenolol, co-codamol, bendrofluamide and Senna. She has recently started taking garlic and ginseng and has been taking evening primrose oil for ten years. What advice might you need to give to this patient about the medication and herbal supplements that she is taking in relation to post-operative outcomes? You may need to speak to your pharmacist as well as consult the British National Formulary to check for any potential drug interactions.
Learning zone surgical nursing

Beta-adrenoceptor drugs, such as metoprolol, atenolol or propranolol, should generally be continued to prevent withdrawal and haemodynamic instability; sudden withdrawal can lead to tachycardia, anxiety, headache and nausea (Smith et al 1996, Nicholls and Wilson 2000). Instructions to stop medication may extend to the use of herbal drugs such as St John’s Wort, which can affect pharmacokinetics of digoxin (Johne et al 1999). Ginseng may inhibit platelet aggregation and can also affect glucose management in patients with type 2 diabetes who are fasting before surgery (Kimura et al 1988, Vuksan et al 2000). Garlic may also inhibit platelet aggregation (Apitz-Castro et al 1986, Srivastava 1986). As with conventional drugs, herbal medication may also need to be stopped at least a week before the patient is admitted for surgery (Tsen et al 2000, Ang-Lee et al 2001, Broughton et al 2007).

Pulmonary system
Pulmonary assessment should include a detailed history of the patient’s lung function as well as any family history of malignant hyperthermia (Pritchard 2003). Malignant hyperthermia is a rare, but potentially life-threatening complication of anaesthesia, characterised by a rapid rise in temperature, muscle rigidity, tachycardia and acidosis. Patients with poor lung function may not be suitable for a general anaesthetic, because their lungs cannot cope with the requirements of undergoing anaesthesia. However, patients may still be able to have the operation under a spinal or local anaesthetic, if appropriate. The operation may only be carried out where there are facilities such as an intensive care unit or a high dependency unit to meet the needs of patients experiencing serious complications.

Pulmonary conditions may include asthma or chronic obstructive pulmonary disease (COPD). Smoking is an important factor that needs to be addressed, particularly in relation to how much tobacco is smoked and for how long. Respiratory problems that require attention may be related to occupational circumstances such as exposure to asbestos, which could limit the patient’s respiratory function; presence of lung cancer; or removal of a lung for any reason. Another important factor, particularly in older people, is presentation of symptoms, as symptoms associated with COPD and late-onset asthma can be similar. Table 1 provides information on the key features of asthma and COPD to enable healthcare professionals to differentiate between the two.

Presence of sleep apnoea may be significant, particularly if the patient requires a continuous positive airway pressure (CPAP) mask. The risk of undergoing general anaesthesia must be balanced against the benefits of surgery. Patients may be asked to bring in their CPAP mask before the operation. Another factor that may affect a patient’s response to the anaesthetic is if the person requires domiciliary oxygen, for example because he or she has severe COPD. Although this may mean that the patient cannot have surgery under a general anaesthetic, the person could still undergo the operation under a local, regional or spinal anaesthetic. A further test that can be requested for patients with asthma or COPD is spirometry, which measures the patient’s lung volume and airflow. The results from this test can be broadly categorised as normal, restricted, obstructed or severely obstructed.

NICE (2003) guidelines recommend that for routine operations a chest X-ray is not required, however local guidelines may state that a pre-operative chest X-ray is necessary for breast cancer or lung-related surgery. Generally, NICE (2003) recommends that X-rays are only required for adults with cardiovascular disease undergoing major surgery. A patient undergoing cardiovascular surgery will also require a chest X-ray (NICE 2003).

Complete time out activity

Endocrine system
Diabetes can have a significant effect on the patient both pre and post-operatively. Patients

| Key features of asthma and chronic obstructive pulmonary disease (COPD) |
|-----------------------------|----------------|----------------|
| Presenting symptom          | Asthma         | COPD           |
| Onset of symptoms under 35 years | Often         | Rarely        |
| Smoker or ex-smoker with 20+ pack years | Possibly | Nearly always |
| Family or personal history of asthma | Often | Rarely |
| Chronic cough and sputum | Uncommon except during exacerbation | Common |
| Nocturnal disturbance with cough or wheeze | Common | Uncommon |
| Day to day or diurnal variation of symptoms | Common | Uncommon |

(Booker 2007)
with diabetes should have a blood glucose test to ascertain how well their diabetes is being managed (NICE 2003). For patients with well controlled diabetes, being nil by mouth before surgery will most likely not cause any problems. However, if patients require bowel preparation (medication to clear the bowel of faeces) before surgery, there is an increased risk of hypoglycaemia, which increases further if diabetes is less well controlled. All patients with diabetes require careful management and consideration should be given to scheduling their operation for the beginning of the day so that they are not fasting for too long. Fasting times for patients with diabetes should be kept to a minimum, with locally-agreed regimens for blood sugar control and prompt reintroduction of the patients own diabetic medication as soon as possible.

It should be noted that anxiety and stress can have an effect on patients’ ability to control their diabetes. As a consequence, patients may experience episodes of hyperglycaemia or hypoglycaemia, as well as reduced healing, leading to wound infection or breakdown (Mousley 2003).

**Complete time out activity**

### Haematology testing

Patients undergoing surgery do not routinely need to have blood samples taken. Blood tests are indicated in the following circumstances (Longmore et al 2001):

- Operations where there is a potential for significant blood loss such as hip or knee replacement, and abdominal or cardiac surgery.
- Patients with significant medical problems such as hypertension or diabetes, patients on warfarin and those with a high alcohol intake.

Routine blood samples will include urea and electrolytes and full blood count; if a transfusion is a possibility, the patient might require a group and save sample (Longmore et al 2001). There is no need to cross match the patient for a transfusion at this stage. This is because compatibility testing for cross matching can usually be performed within one hour (Hoffbrand and Pettit 1993). This reduces cost and wastage of blood, particularly as red blood cells have a shelf life of only 35 days if kept at 4°C (McCelland 2001). Some surgery, for example knee replacement, can use cell saver techniques: a drain being inserted during

### References


surgery and when the patient returns to the ward the blood collected in the drain is re-infused into the patient (Handel et al 2006, Moonen et al 2007). In this way, the risk of blood incompatibility is avoided and there is no cost to the hospital in terms of cross matching and preparing blood for transfusion.

If patients have any particular blood requirements, for example if they have antibodies that may make it difficult to cross match a unit of blood in an hour, this should be identified and noted in the pre-operative assessment. It is also important to note if patients have any objections to receiving a blood transfusion. These patients need to be informed of options such as cell saver autotransfusion, or undergo pre and post-operative management of their haemoglobin through iron supplementation.

Patients attending pre-operative assessment are given the opportunity to discuss any concerns they may have and ask questions about the surgery. Nurses should discuss the procedure and ensure that patients understand the risks and benefits associated with surgery. Any misconceptions or misunderstandings can be addressed before the patient attends hospital for the operation. The pre-operative assessment nurse may need to make an appointment for the patient to see a consultant to discuss any issues. All results from pre-operative tests should be reviewed and acted on as necessary. If test results highlight any problems or concerns, the GP will be contacted for advice or treatment while the consultant will also be informed as any problems might affect when the patient has surgery.

Conclusion
Pre-operative assessment is a vital part of the patient’s overall management plan. It ensures that the patient is medically fit to undergo any scheduled surgery, and is mentally and emotionally prepared. In this way, any conditions that might affect surgery can be acknowledged and treated in advance to reduce the number of operations being postponed or cancelled on the day of surgery. This will minimise any unnecessary costs, and reduce stress and anxiety for patients.

Guidelines to help you on page 60.

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