Assessing and Managing the Acutely Ill
Adult Surgical Patient

Edited by

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Blackwell
Publishing
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The aim of this book is to provide a source of information for adult nursing and operating department practitioner (ODP) students and newly qualified nurses working in acute surgical environments. The focus is on major surgical conditions and interventions that are commonly encountered in district general hospitals. Increasingly, patients being nursed in acute wards have complex health care needs and require intensive observation and monitoring. Reasons for this include the fact that technological developments have led to an increase in the number of procedures that are carried out on a day surgical or outpatient basis and a shorter length of stay for patients undergoing inpatient procedures. Thus, patients cared for in acute surgical wards are often older, undergoing major surgical procedures, or are acutely ill (McArthur-Rouse, 2001). Additionally, advancements in anaesthetic and critical care techniques have enabled higher risk patients to undergo major surgical procedures that previously would have been inappropriate. The net effect of these occurrences is an increase in the acuity and dependency of patients being cared for in acute general wards (Coad & Haines, 1999; DoH, 2005).

Traditionally nurses have not been well equipped to assess and manage these patients, missing early warning signs of deterioration, leading to the phenomenon that has become known as ‘sub-optimal care’. McQuillan et al. (1998) describe sub-optimal care as avoidable components that contribute to physiological deterioration, with major consequences on morbidity, mortality, requirement for intensive care and cost. Several strategies for reducing the occurrence of sub-optimal care have been implemented including the Critical Care Outreach Initiative (DoH, 2000, 2005) and the use of early warning scoring systems. Additionally, courses have been developed to enable qualified nurses to recognise the early warning signs of critical illness and caring for highly dependent patients in the ward environment and such topics are now addressed in the pre-registration nursing curriculum. This book aims to complement these initiatives with the focus on surgical care. It does not seek to address every surgical intervention; rather it focuses on the common major surgical conditions that could potentially require intensive monitoring and intervention. It seeks to support the use of early warning scoring systems by emphasising the importance of thorough assessment and interpretation of clinical data, thus providing underpinning knowledge to help nurses make sense of their findings and articulate them effectively to the appropriate personnel.

The book is divided into two sections. Part One deals with the principles of surgical care such as pre-operative assessment and preparation, the peri-operative period and post-operative recovery. Additionally the principles of post-operative pain management are considered, as are the psychosocial
aspects of surgery. This section deals with the general aspects of surgical care as they apply to all patients undergoing surgery and provides underpinning knowledge and rationale for practice.

Part Two considers specific surgical conditions and interventions and the application of the principles to particular client groups. The chapters in Part Two are set out according to surgical specialties and each considers the pathophysiology, investigation and diagnosis, assessment, monitoring and management of common acute surgical conditions cross-referenced to Part One.

Nursing and ODP students should find this book useful to consolidate what they learn in lectures and as a guide whilst on surgical placements. Qualified nurses may also benefit from the book to enhance their knowledge and understanding of the rationale for care.

Fiona J McArthur-Rouse and Sylvia Prosser

References

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This book has been the result of collaboration between the authors who would also like to acknowledge with thanks the additional contributions of:

The Operating Theatre Department, William Harvey Hospital, East Kent Hospitals NHS Trust for departmental photographs

Karen E Lumsden, Lecturer Practitioner (Emergency Care), Department of Adult Nursing Studies, Canterbury Christ Church University, for specialist subject advice

Rhonda Barnes, Breast Care Nurse Specialist, William Harvey Hospital, East Kent Hospitals NHS Trust for specialist subject advice

Angela Harman, Ward Manager, Gynaecology, Queen Elizabeth the Queen Mother Hospital, East Kent Hospitals NHS Trust for specialist subject advice

Yvonne Hill, formerly Head of Department, Adult Nursing Studies, Canterbury Christ Church University for her continued support for this project
Chapter 1  Pre-operative Assessment and Preparation
Chapter 2  The Peri-operative Phase
Chapter 3  Post-operative Recovery
Chapter 4  Post-operative Pain Management
Chapter 5  Psychosocial Aspects of Surgery
Introduction

This chapter will address the important aspects of assessing and managing a patient before surgery. It will be divided into pre-operative assessment and pre-operative preparation. Box 1.1 identifies the aims of this chapter.

Pre-operative assessment occurs to screen a patient for fitness to undergo anaesthetic and surgery. Formerly, this was conducted by those with medical qualifications. However, with the aim of reducing junior doctors’ working hours, other appropriately trained health professionals, mainly nurses, have undertaken some tasks that had been part of the doctors’ remit. The screening and assessment process is increasingly carried out prior to admission by a specifically trained pre-assessment team working to agreed protocols.

A multicentred trial found that appropriately trained nurses performed pre-assessment of surgical patients comparably with medical staff. Three essential components were suggested for preparation of nurses taking on these roles:

- Masters level modules in anatomy, physical examination and test ordering
- The provision of a clinical mentor (senior doctor)
- A requirement to maintain a learning log-book as evidence of developing skills (Kinley et al., 2001)

Although nurses and operating department practitioners (ODPs) are not qualified to decide whether a patient is fit for anaesthetic or surgery, they can identify patients who may be at risk by using agreed questionnaires (Association of Anaesthetists of Great Britain and Ireland (AAGBI), 2001).

Pre-operative assessment

The aim of pre-operative assessment

Pre-operative assessment is a screening process that aims to ensure that patients are in the optimum state before their operation. In addition to evaluating the
medical history of the individual and performing an appropriate physical assessment, there is an opportunity to enquire about social circumstances, provide information and allow interventions (such as referral, counselling, ordering and performing investigations) if necessary.

Pre-operative assessment commences when the decision to perform surgery is taken and may take place in a variety of settings and time spans. In addition to the patient’s health status, the nature of surgery will dictate whether it could be accomplished in day surgery or whether the patient needs to be admitted as an inpatient. Pre-operative assessment is often conducted at a specified clinic, but screening may begin at the surgical outpatient department by patients completing a questionnaire, or via telephone interview (AAGBI, 2001). These preliminary questionnaires are not a substitute to formal pre-operative assessment, but enable a reduction in the time spent asking the basic questions (Garcia-Miguel et al., 2003).

The ideal situation is to have clinics where pre-operative assessment occurs in a centralised location near departments where investigations take place and with access to anaesthetic opinion (Janke et al., 2002). The timing of a comprehensive pre-operative assessment is influenced by the combination of surgical invasiveness and severity of any existing disease. It needs to be well in advance of the anticipated day of procedure for all elective patients (American Society of Anesthesiologists (ASA), 2002) and the optimum time frame is suggested to be approximately three to four weeks before surgery (Bramhall, 2002). This permits appropriate adjustment and allocation of staffing and resources. Additionally, it avoids surgical delay or cancellation and allows an opportunity for the consolidation of information given to the patient (Ziolkowski & Strzyzewski, 2001).

A pre-operative evaluation includes an interview with the patient (ideally with accessible medical records), a directed examination, investigations when indicated, and other consultations when appropriate (ASA, 2002).

Risk assessment

The risk of surgery to the patient depends on the type of procedure (either minor or major) and the patient’s health status, physical fitness and the presence of any co-existing disease. Avidan et al. (2003) suggest that when assessing a patient for surgery and anaesthetic, consideration about the potential benefits of the proposed surgery should be balanced against the risk to the patient. An evaluation of these components will establish whether there is negligible, low, intermediate or high risk to the patient (see Figure 1.1). Those in the low-risk category and those having low-risk surgery may not need further evaluation but for those considered to be of intermediate or higher risk, further testing may be beneficial (Avidan et al., 2003).

Patients’ health status can be determined by a simple classification scale produced by the American Society of Anesthesiologists (ASA) describing fitness to undergo an anaesthetic. It is separated into six levels, which are outlined in Table 1.1. They range from a normal healthy patient (ASA grade 1) to a declared brain-dead patient whose organs may be donated (ASA grade 6).

Surgical evaluation

History taking

The initial information collected at pre-operative assessment includes patient demographics, contact
Pre-operative Assessment and Preparation

**Box 1.2** Specific information collected at pre-operative assessment.

- Current and past medical history
- Surgical history with a focus on anaesthetic risk factors
- Medication and allergies
- Appropriate family history
- Social issues (home transportation and environment, designated caretakers, alcohol intake and smoking habits)

Details, details of the procedure and relevant medical practitioners involved in the patient’s care. Box 1.2 identifies further specific information that is collected.

For pre-operative evaluation, the focus of the history and physical examination is on risk factors for pulmonary, cardiac and anaesthetic complications (Ziolkowski & Strzyzewski, 2001). If the patient has any risks that can be adjusted, then elective surgery can be deferred until his or her health has been optimised. Other areas such as specific endocrine diseases (diabetes and thyroid problems) and neurological conditions (e.g. stroke, muscle disease, epilepsy) are also queried.

**Pulmonary risk**

Respiratory complications constitute a large proportion of overall morbidity and mortality post-operatively and are more common than cardiac complications. They include:

- Atelectasis (partial or complete collapse of a lung due to obstruction)
- Infection (such as bronchitis and pneumonia)
- Prolonged mechanical ventilation
- Respiratory failure
- Bronchospasm
- Exacerbation of underlying chronic lung disease (Garcia-Miguel *et al.*, 2003)

The most important risk factor for respiratory complications is chronic lung disease, which is more prevalent in smokers. In addition to increased airway irritability and the risk of developing post-operative pneumonia, smoking has a negative effect on cardiac function (Ziolkowski & Strzyzewski, 2001).

Patients with a cold have an increased risk of bronchospasm and laryngospasm following instrumentation of the larynx and pharynx, and this may be life-threatening. Additionally, any post-operative coughing may place strain on sutures. Therefore, it is important to ascertain whether a patient has a cold and it is wise to consider delay to surgery until they have recovered (Avidan *et al.*, 2003).

In addition to specific respiratory conditions (such as asthma, emphysema, chronic bronchitis, tuberculosis or obstructive sleep apnoea) it is useful to evaluate the severity of any breathlessness. Table 1.2 outlines the further questions that relate to exercise tolerance, coughs, sputum production and the use of supplemental oxygen therapy.

**Cardiac risk**

Anaesthesia causes strain on the heart that should not affect a healthy person but if a heart is compromised by ischaemia, it may not be able to withstand the increased demand placed on it by hypoxia, hypotension, hypertension or dysrhythmia (Ziolkowski & Strzyzewski, 2001). Therefore, the patient’s current and past cardiac history is confirmed. They are asked several questions to ascertain any history of chest pain, arrhythmias and conditions such as myocardial infarction or hypertension (see Table 1.2).

**Anaesthetic risk**

Patients are asked if they have previously had an anaesthetic and whether they or any family member has had problems with anaesthetics. Loose teeth, caps, crowns and dentures are noted and

<table>
<thead>
<tr>
<th>ASA</th>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>A</td>
<td>A normal healthy patient</td>
</tr>
<tr>
<td>P2</td>
<td>A</td>
<td>A patient with mild systemic disease</td>
</tr>
<tr>
<td>P3</td>
<td>A</td>
<td>A patient with severe systemic disease</td>
</tr>
<tr>
<td>P4</td>
<td>A</td>
<td>A patient with incapacitating systemic disease that is a constant threat to life</td>
</tr>
<tr>
<td>P5</td>
<td>A</td>
<td>A moribund patient who is not expected to survive without the operation</td>
</tr>
<tr>
<td>P6</td>
<td>A</td>
<td>A declared brain-dead patient whose organs are being removed for donor purposes</td>
</tr>
</tbody>
</table>


---

**Table 1.1** Patient physical status (ASA classification) (2005).

ASA Grade | Description |
----------|-------------|
P1 | A normal healthy patient |
P2 | A patient with mild systemic disease |
P3 | A patient with severe systemic disease |
P4 | A patient with incapacitating systemic disease that is a constant threat to life |
P5 | A moribund patient who is not expected to survive without the operation |
P6 | A declared brain-dead patient whose organs are being removed for donor purposes |
patients are informed about the potential risk of chipping to teeth during laryngoscopy (Avidan et al., 2003). Conditions affecting airway management, such as restriction of jaw or neck movements, and states that may impact on the patient’s experience, such as depression and anxiety, are also identified.

**Medication and allergies**

Medication that patients are taking needs to be ascertained and should include prescribed, over the counter and herbal medications as they may adversely affect the outcome of the surgery. For example, warfarin will prolong bleeding time so it needs to be discontinued before surgery commences, especially if blood loss is expected. Patients often regard herbal medications as being safe, but some will have an impact on the surgical procedure or anaesthesia. For example, bleeding time is prolonged by garlic, feverfew, ginger and ginkgo biloba and the sedative effects of anaesthesia are prolonged by valerian and St John’s Wort (Flanagan, 2001). It is important to ask specifically about the contraceptive pill, as the patient may not consider this to be medication although it may impact upon treatment. It is often useful if patients attend the clinic with their medications or a list of their drugs with the times they are taken. Allergies to any medications or other substances such as plasters, latex and foods are discussed.

Patients should understand the need to withhold or change some medications before the operation. Often medications can be continued but this should be discussed with the appropriate medical practitioner. Details of some drugs that need to be discontinued or continued are shown in Table 1.3. Patients may benefit from additional medication before surgery. These are termed ‘pre-medication’ and include anti-emetics, drugs for pain relief or to reduce anxiety.

**Physical examination**

A general examination of the patient can be conducted during the history taking. This enables the health professional to note the patient’s apparent state of health, their posture and gait, their skin colour, any obvious lesions and any signs of distress either from anxiety, breathlessness or pain (Bickley & Szilaygi, 2003). Box 1.3 identifies some minimum evaluations suggested by the ASA (2002).

---

### Table 1.2 Pulmonary and cardiovascular risks.

Patients are asked screening questions about the following topics that relate to the relevant system:

<table>
<thead>
<tr>
<th>Respiratory system</th>
<th>Cardiovascular system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma, chronic obstructive pulmonary disease (emphysema, chronic bronchitis) or tuberculosis (TB)</td>
<td>Hypertension</td>
</tr>
<tr>
<td>Obstructive sleep apnoea</td>
<td>Chest pain, angina, myocardial infarction</td>
</tr>
<tr>
<td>General breathlessness (dyspnoea), orthopnoea (breathlessness when lying down), paroxysmal nocturnal dyspnoea (wakening in the middle of the night with breathlessness)</td>
<td>Palpitations, arrhythmias, other cardiac conduction abnormalities</td>
</tr>
<tr>
<td>Details of cough and sputum production</td>
<td>Heart murmurs, rheumatic fever, valvular dysfunction</td>
</tr>
<tr>
<td>Exercise tolerance</td>
<td>Insertion of a pacemaker</td>
</tr>
<tr>
<td>Use of supplemental oxygen therapy</td>
<td></td>
</tr>
<tr>
<td>Details of any respiratory attacks</td>
<td></td>
</tr>
</tbody>
</table>

(NHS Modernisation Agency, 2003; Ziolkowski & Strzyzewski, 2001)

---

### Box 1.3 Minimum pre-operative evaluations suggested by the ASA (2002).

- **Baseline observations:**
  - Height
  - Weight
  - Body mass index (BMI)
  - Temperature
  - Blood pressure
  - Pulse rate
  - Respiratory rate
  - Oxygen saturation (SpO₂)
- An airway assessment
- Examination of both the cardiovascular and respiratory systems
Table 1.3  Details of some medications that should be continued or discontinued prior to surgery.

<table>
<thead>
<tr>
<th></th>
<th>Discontinue</th>
<th>Continue or initiate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiovascular</strong></td>
<td>• ACE inhibitors and potassium-sparing diuretics (morning of surgery)</td>
<td>• Other antihypertensive</td>
</tr>
<tr>
<td><strong>Respiratory</strong></td>
<td>• Long-acting oral hypoglycaemic drugs – convert to insulin sliding scale</td>
<td>• Beta blockers and anti-anginals</td>
</tr>
<tr>
<td><strong>Endocrine</strong></td>
<td>• Monoamine oxidase inhibitors (2 weeks)</td>
<td>• Oxygen</td>
</tr>
<tr>
<td><strong>Neurological and psychiatric</strong></td>
<td>• Warfarin – convert to heparin or low-molecular weight heparin for major surgery</td>
<td>• Thyroid replacement</td>
</tr>
<tr>
<td><strong>Drugs affecting coagulation</strong></td>
<td>• Oral contraceptive pill and hormone replacement therapy – stop for several weeks</td>
<td>• Steroids – additional cover may be required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Insulin – convert to sliding scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other psychiatric medications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Anti-epileptics – add benzodiazepine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Continue with all anticoagulants where the bleeding risk is low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provide post-operative thrombosis prophylaxis</td>
</tr>
</tbody>
</table>

(Reprinted from *Perioperative Care, Anaesthesia, Pain Management and Intensive Care*, Avidan et al., p. 9, © 2003 with permission from Elsevier)

**Box 1.4**  Simple tests are used to evaluate the airway.

- Thyromental distance: the distance between the thyroid notch to the top of the jaw with the head extended should be 6.5 cm or more.
- The patient should be able to insert their middle three fingers vertically into their mouth.
- The Mallampati test: the patient is asked to open their mouth as wide as possible and protrude their tongue out as far as possible. The extent to which the faucial pillars, soft palate and uvula are visualised is then graded from 1 (all visualised) to 4 (not visualised) and is outlined in Figure 1.2. Clinically, grade 1 usually predicts an easy intubation and grade 3 or 4 suggest a difficult intubation.

**Figure 1.2**  Mallampati test to evaluate the airway.

The patient is asked to open their mouth as wide as possible and protrude their tongue out as far as possible. The extent to which the faucial pillars, soft palate and uvula are visualised is then classified from 1 (all visualised) to 4 (not visualised). Class I usually predicts an easy intubation and Class III or IV suggest a difficult intubation.


Airway evaluation

Occasionally, there is difficulty in ventilating and intubating patients, particularly obstetric and obese patients. Certain physical characteristics may increase the risk of problems with airway management. These include protruding upper teeth, limited mouth opening, a large tongue, tracheal deviation and immobility of the head, neck and jaw. The patient’s teeth are assessed and any caps, crowns, bridges or dentures are noted (Avidan et al., 2003). Box 1.4 identifies some simple tests that are used to evaluate the airway and Figure 1.2 illustrates the various grades of the Mallampati test (Mallampati et al., 1985).

Respiratory examination

The baseline investigations for the respiratory system include the respiratory rate and the peripheral haemoglobin oxygen saturation ($SpO_2$) while breathing room air. The shape of the spine and chest and any use of accessory muscles are noted.
and then the chest is more closely evaluated. Movement of the chest with each breath is observed for equality of symmetry and expansion. The patient is asked to cough up sputum that may otherwise be heard on auscultation, then asked to breathe through their mouth moderately deeply. The stethoscope is used to listen at the front and the back of the chest over the lung area. Any added sounds such as wheezes or crackles are recorded. Other techniques include palpation and percussion. The trachea is palpated to check if it is central, and placing hands around the chest wall enables assessment of whether expansion is equal on both sides. Percussion is a technique where the clinician’s fingers are used to tap the chest wall in order to produce an audible vibration to assess the density within the lungs (Cross & Rimmer, 2002). Any abnormality is noted and the surgeon or anaesthetist may need to be informed.

**Cardiovascular examination**

The patient’s blood pressure and pulse rate need to be documented. The radial pulse is used to evaluate the rate and rhythm (regular or irregular). If the patient has a history of stroke or transient ischaemic attack (TIA) then they may have narrowed carotid arteries, so a stethoscope is used to listen for a bruit (a swishing sound that indicates increased turbulence) and if one is noted, the surgeon or anaesthetist should be notified (Janke et al., 2002).

A jugular venous pressure (JVP) is measured if the patient has a history of heart failure or if they are breathless. With the patient at 45 degrees, the highest point of the oscillation in the internal jugular vein is noted from the sternal angle. The JVP is useful, as the pressure in the jugular vein reflects right atrial pressure and provides a clinical indicator of cardiac function (Bickley & Szilaygi, 2003).

The chest is then examined for any deformities, surgical scars, visible pulsations or evidence to indicate a pacemaker or cardiac defibrillator (a rectangle under the skin). The heart is auscultated by listening in various regions on the chest wall using the diaphragm (for high-pitched noises) and the bell (for low-pitched noises). The first (S1, ‘lub’) and the second (S2, ‘dub’) heart sounds and any additional sounds, such as murmurs, are recorded. Finally, any evidence of peripheral oedema and its extent should be described.

### Pre-operative tests and investigations

At pre-operative assessment, patients at high risk are identified for appropriate testing and interventions to reduce their surgical risk. The ASA (2002) states that pre-operative tests are useful only if they affect peri-operative anaesthetic care, and any testing should be informed by the history and examination (Avidan et al., 2003). Investigations in a healthy patient having minor surgery are unnecessary and routine tests are not advised. The argument that they may be useful to discover a disease or disorder in an asymptomatic patient does not make an important contribution to pre-operative assessment (AAGBI, 2001). Specific pre-operative investigations for particular types of surgery are discussed in the relevant chapters in Part Two of this book.

The UK National Institute for Clinical Excellence (NICE) published a comprehensive review of evidence on pre-operative testing for elective surgery (NICE, 2003). The tests relate to the complexity of the operation and to the ASA grades and are highlighted in a visual manner as a series of traffic lights (if red, the test is not recommended; if yellow, the test can be considered; and if green, the test is recommended). Their guidance suggests that, for healthy patients aged 16–80-plus undergoing minor surgery, the only recommended test is an electrocardiogram (ECG) for those over 80 years old. Some tests are to be considered across some of the age-spans (urinalysis, full blood count, renal function) but generally, tests were not considered necessary in this group of people.

Appropriate selection of pre-operative investigations is promoted if departments have policies on which investigations should be performed to reflect the age, co-morbidity and complexity of the surgery (AAGBI, 2001). For example, some tests are useful in certain circumstances and Avidan et al. (2003) outline the following:

- Haemoglobin measurement – before surgery where major blood loss is anticipated; may be justified in older people and in menstruating women or if anaemia is suspected
- Platelet count and coagulation (clotting) studies – if the history raises concerns about abnormal clotting
- Urea, creatinine and electrolytes – if the patient is dehydrated, has renal dysfunction or if electrolyte abnormalities are suspected
The AAGBI (2001) suggests that an ECG is not indicated for asymptomatic males under 40 or asymptomatic females under 50 but is valuable in all patients with a cardiac history. Interestingly, Kinley et al. (2002) found that house officers ordered almost twice as many unnecessary tests as nurses. This was possibly due to the fact that nurses adhered to protocol more than the house officers.

**Blood transfusions**

Patients who are likely to require a blood transfusion post-operatively will have blood taken for grouping or cross matching. Although rare, risks of blood transfusions include the possible transmission of hepatitis, HIV/AIDS virus and variant Creutzfeldt–Jakob disease (vCJD), as well as transfusion reactions. Patients should be counselled about the possible need and any objections to receiving blood products should be documented. Autologous transfusion reduces the need for donated blood transfusion and is sometimes used in elective surgery. Box 1.5 identifies the main techniques of autologous blood transfusion.

**MRSA screening**

Most hospitals have policies for screening patients for methicillin-resistant *Staphylococcus aureus* (MRSA) because whilst colonisation on the individual’s skin may be harmless, should the bacteria be transferred into the patient’s wound, severe infection may occur. Also, debilitated patients are more at risk of contracting an infection. This is particularly relevant for patients undergoing orthopaedic surgery (see Chapter 12). Swabs are usually taken from the patient’s nose and groin and, if positive, decontamination is recommended according to local policy.

**Pressure sore risk assessment**

Surgical patients are at increased risk of developing pressure sores because of the increased time that they are immobile during and immediately after their operation. The Waterlow Risk Assessment Scale (Waterlow, 1988) is frequently used to assess the patient’s level of risk and enables staff to implement appropriate plans of care and allocate the necessary pressure-relieving devices. In older patients and those at increased risk of developing pressure sores it is important to inspect, assess and document the status of the pressure areas on admission.

**Nutritional screening and assessment**

In an important study undertaken in the early 1990s, McWhirter and Pennington (1994) highlighted that many patients are admitted to acute hospitals in a nutritionally compromised state. Additionally, during hospitalisation, further deterioration in their nutritional status can occur. Surgical patients are at particular risk of developing malnutrition, due in part to the nature of the surgery and any pre-existing disease, and also to factors such as prolonged fasting pre-operatively and restriction of oral intake post-operatively.

Older people in particular may have pre-existing poor general physical and mental health causing a loss of appetite. Chronic ill health and acute episodes of illness are often associated with an impaired appetite, as are depression and drug treatments such as chemotherapy. Patients who have difficulty swallowing or who are fasting for surgery or other tests may miss meals. If an operation is cancelled, the fasting period may be prolonged if pre-operative nutritional support is not instigated.

During nutritional screening, patients at risk of malnutrition who may require a more comprehensive nutritional assessment are identified.

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**Box 1.5** Types of autologous blood transfusion.

**Pre-operative donation** – patients who are otherwise fit for surgery may donate their own blood, which can be stored for up to 35–42 days. Contraindications to autologous transfusion include sepsis and severe myocardial infarction.

**Isovolaemic haemodilution** – up to 1.5 litres of blood may be withdrawn before the induction of anaesthesia and replaced by intravenous saline infusion. This results in haemodilution and a reduction in the red blood cells lost during surgery. The withdrawn blood can be reinfused either intra- or post-operatively.

**Cell salvage** – blood is collected from the patient either by suction directly from the operation site or via collection devices attached to surgical drains (see Chapter 12). The blood is reinfused either intra- or post-operatively, with or without washing.

(Green & McClelland, 2004)
Nutritional screening involves taking a dietary and clinical history from the patient (see Box 1.6). If nutritional screening highlights a deficit, further assessment may be undertaken, usually by a dietitian. This will include more intense measurements, such as anthropometric indices and biochemical indicators (see Edwards (2000) for further discussion of these). If a nutritional deficit is identified, it is important to instigate pre-operative nutritional support in order to optimise the patient’s condition pre-operatively. This may take the form of dietary supplements, enteral or parenteral feeds. (See Chapter 3 for a further discussion of the nutritional demands of surgery.)

**Box 1.6  Nutritional screening – observations and questions that may be asked when taking a dietary history.**

- Age – older patients are at increased risk of malnutrition
- History of recent unintentional weight loss – how much weight has been lost? How quickly? Do the patient’s clothes appear to be loose? Body mass index.
- Appetite – does the patient finish meals or leave all or part of each meal? Are meals skipped?
- Physical ability to prepare meals and eat – does the patient require assistance with the preparation of meals and/or with eating? Is a particular diet required? What is the condition of the patient’s mouth and teeth?
- Gastrointestinal function – does the patient suffer from constipation or diarrhoea, indigestion, heartburn, or nausea and vomiting?
- Social factors – does the patient eat alone or with family? Who shops and which products are bought? How much exercise does the patient have?
- Medical factors – does the patient have any pre-existing diseases that may influence nutritional intake and demand (e.g. diabetes, thyroid disease, malignancy, food allergies)? Is the patient taking any medication that may influence appetite?
- Psychological factors – does the patient appear depressed? Has he or she suffered a recent bereavement?
- General appearance – the following should be observed:
  - Skin – tone, texture, colour, signs of bruising
  - Nails – white patches, dry, brittle
  - Eyes – colour and condition, sunken
  - Mouth – moist, pink mucosa or discoloured
  - Lips – are they dry and cracked?
  - Tongue – is it dry or moist, clean or furred?
    - Does the breath smell?
  - Gums – do they bleed for no reason? Do they recede?
  - Dentures – do they fit?
  - Cheek bones – are they overly prominent?
  - Clothes and rings – are they loose?

Pre-operative preparation

Preparing patients for surgery involves both psychosocial and physical dimensions. Psychosocial preparation includes assessing and managing anxiety and stress, patient education and informed consent, whilst physical preparation is concerned with the prevention of peri- and post-operative complications.

Assessment of home circumstances

In order to prevent delays in discharging the patient post-operatively, an assessment of the individual’s home circumstances and support mechanisms should take place pre-operatively, preferably as part of the pre-admission assessment. This includes providing the patient with an anticipated date of discharge and, if long-term convalescence is likely to be required, commencing the necessary arrangements, including any specialist referrals (e.g. social work, occupational therapist). Any changes that need to be made to existing care packages should also be noted.

Psychosocial preparation

This aspect of pre-operative preparation often commences when the patient visits the pre-assessment clinic. Sometimes they have the opportunity to visit the ward or intensive care unit and meet the staff who will be caring for them. Alternatively, theatre staff may come to the ward once the patient has been admitted, to introduce themselves and answer any questions the patient may have. Chapter 5
Informed consent

Before undergoing any surgical procedure, the patient must give consent that is based on a realistic understanding of the procedure and potential complications. The surgeon explains the operation to the patient, who is given the opportunity to ask questions prior to signing the consent form. It is important that language is used that the patient understands and that the use of medical terminology is avoided. The patient must receive sufficient information to make an informed choice. Cable et al. (2003) identify three areas of consideration when obtaining consent: legal, professional and ethical. These include issues such as age/adulthood, mental capacity and professional duty of care. Some patients, however, lack the capacity to consent and Plant (2004) identifies these as:

- Minors
- Those with transient or irreversible cognitive impairment
- Those with mental illness
- Those who are receiving undue coercion to consent

In the acutely ill adult surgical patient, transient cognitive impairment may arise due to the effects of illness or its treatment and in such situations it may be necessary to administer treatment in the patient’s best interests (Plant, 2004). In situations such as these it may be necessary to seek legal advice. (See Plant (2004) for further discussion of this issue.)

Accuracy of the documentation is vital in order to avoid a catastrophe and numerous checks are carried out to ensure that patient safety is maintained. Often the patient’s skin will be marked with an indelible pen at the site of operation to ensure that the correct procedure is carried out.

Physical pre-operative preparation

The main aims of pre-operative preparation are to prevent peri- and post-operative complications such as wound infection, deep vein thrombosis and chest infection. This section considers measures to help prevent such complications from occurring.

Pre-operative fasting

Patients are often fasted for elective procedures and they may be referred to as being ‘nil-by-mouth’ (NBM). This is to reduce the potentially fatal complication of aspiration of the gastric contents into the lungs (causing aspiration pneumonia). Webb (2003) states that a patient is at higher risk of reflux during surgery for two main reasons:

- Increased pressure in the abdominal cavity, especially during bowel or stomach surgery
- Muscle relaxation caused by drugs used in anaesthesia

Patients were often fasted from midnight for a procedure the following day. However, a comprehensive report produced by the ASA (1999) made recommendations that are supported by the AAGBI (2001). They state that the minimum fasting periods are:

- Six hours for solid food or milk
- Two hours for clear non-particulate and non-carbonated fluids

Avidan et al. (2003) state that, despite precautions, some patients remain at high risk of aspiration due to impaired gastric emptying. These include trauma patients; those who have underlying gastrointestinal pathology or autonomic dysfunction; patients who are on opioid medications and patients who are pregnant or obese.

If the above fasting times are adhered to, fluid and nutritional supplementation is usually not required. However, it is valuable to note that there are some patients who may need intravenous fluid support due to their vulnerability to dehydration. These include older people, those who have had bowel preparation, sick patients, children and breast-feeding mothers (AAGBI, 2001).

Benefits of implementing the above evidence-based pre-operative fasting times include reduced anxiety, thirst and post-operative nausea and vomiting (Osodi, 2004, Figure 1.3).

Skin preparation

The aim of pre-operative skin cleansing is to reduce the bacterial skin flora, particularly *Staphylococcus aureus* (Simmons, 1998), which is a common cause of wound infection. Patients admitted on the day of surgery may undertake their own skin preparation...
prior to admission. They are usually advised to have a bath or shower to remove dirt and microbes from the skin and to wash their hair because this can act as a reservoir for bacteria (Simmons, 1998). Patients admitted a day or more before surgery will need to have their bath or shower using the ward facilities and will be provided with clean linen. Following the bath or shower, the patient will be given a clean theatre gown to wear and will be asked to remove his or her own clothing (depending on the type of operation). Controversy exists regarding the effectiveness of soap versus whole-body disinfection in patients showering pre-operatively, with few recent studies effectively examining this issue. In a review of the literature Simmons (1998) argues that:

‘... although chlorhexidine 4% appears to reduce the incidence of skin flora, its impact on the incidence of wound infection is not conclusive...’

(Simmons, 1998, p. 447)

Another controversial aspect of skin preparation is the removal of body hair from the surgical site. Numerous studies have been undertaken to evaluate the effectiveness of this in reducing the incidence of wound infection with little by way of definitive conclusions (Dawson, 2000). Box 1.7 identifies the arguments for and against this practice.

**Box 1.7 Arguments for and against the removal of body hair in pre-operative skin preparation.**

- The argument for hair removal suggests that leaving body hair in place encourages the bacteria around the hair follicles to be introduced to the wound because of their proximity to the operation site.
- The argument against suggests that removing body hair increases the potential for infection because:
  - The process of removing body hair (shaving and use of depilatory creams) destroys the body’s natural defence mechanism by destroying the natural flora that occur on the skin.
  - Depilatory creams, being chemical agents, destroy the natural barrier of the skin.
  - Shaving causes nicks in the skin that offer bacteria an ideal environment to reproduce.
- If hair is to be removed, clipping or trimming may be preferred.

(adapted from Dawson, 2000)

**Anticoagulant therapy and antiembolic stockings**

To prevent the complication of deep vein thrombosis (DVT), patients are encouraged to mobilise pre-operatively and may be taught limb exercises by the physiotherapist to promote venous return. Antiembolic stockings are frequently used, and the patient must be given the correct size as badly fitting stockings can cause excessive pressure and heel necrosis. Anticoagulant therapy is sometimes prescribed pre-operatively or commences in the immediate post-operative period. See Chapter 3 for further discussion of the prevention of DVT.

**Prophylactic antibiotics**

Because surgery involves a breach in the body’s natural defence mechanisms, there is potential for infection of various types, for example wound infection, chest infection and infection of prostheses. For this reason, prophylactic antibiotics are often prescribed to be administered immediately before the operation (often on induction of anaesthesia) and during the post-operative period. The type of antibiotic varies according to the type of surgery.

**Pre-operative checks**

Before transferring the patient to the operating department, a number of pre-operative checks are undertaken (see Box 1.8). Patients who use a hearing aid or dentures should be able to keep these in
place until they arrive in the operating department. The patient’s notes, including the results of any pre-operative investigations and X-rays are collated in readiness to accompany the patient to theatre. The patient is then transferred, usually on his or her bed, to the operating department, escorted by a member of the ward or theatre staff. Throughout the transfer, it is necessary to maintain close observation of the patient and attempt to put him or her at ease.

Emergency procedures

In pre-operative assessment and preparation the primary objective is to enable the patient to undergo surgery in the best physiological and psychological condition. This remains true for those undergoing emergency surgery, where time is often limited and adequate assessment and pre-operative resuscitation of the patient are key. However, Avidan et al. (2003) note that cardiac complications are between two and five times more likely following emergency procedures. Patients in this category are those who present with trauma or a condition that requires fairly immediate surgery.

Chapter 13 discusses the assessment of acutely unwell patients using the ABCDE system and this is normally undertaken in emergency situations. It is important to optimise the patient’s condition as much as possible before surgery in order to achieve the best possible outcome.

Trauma patients are not often fasted and will have delayed gastric emptying due to a variety of mechanisms (Sarmah et al., 2004) so they often have a gastric tube inserted to empty the stomach (Dowds, 2000). Nasogastric insertion is the most common route except where there is a possibility of a basal skull fracture or facial fractures.

As part of the assessment process, various investigations may be conducted on the patient. When inserting wide bore cannulae, blood specimens should be extracted for cross matching, electrolytes, full blood count, clotting studies and glucose. Arterial blood gases are often measured and if there is a urine specimen, this can also be tested for abnormalities and the presence of pregnancy in women of childbearing age. Further investigations such as an ECG, X-rays or those specific to the patient can be completed as appropriate (Dowds, 2000).

When there is adequate time before an operation, the blood bank can complete a 90–95% cross-match referred to as ‘type specific’ blood but if not, the ordering of six units of O-positive blood (and for women of childbearing age an equal number of O-negative blood) is valuable (Sarmah et al., 2004). The consent form for surgical intervention should be completed, and all necessary information related to the procedure and the possible complications should be explained to the patient if his or her condition allows. Obviously, factors such as being under the influence of alcohol and drugs may impair the patient’s comprehension or ability to comply with this. Children undergoing surgery also need consent from a legal guardian unless their condition is critical (Dowds, 2000). Relatives must be kept well informed both pre-operatively and post-operatively.

Self-test questions

1. Match each statement with the correct ASA grade.
   a. A patient with severe incapacitating disease
   b. A fit, healthy patient
   c. A patient who is not expected to survive more than 24 hours
   d. A patient with mild systemic disease

Box 1.8 Checks undertaken and recorded pre-operatively.

- Baseline observations
- Time of last food and drink
- Pre-medication and prophylactic antibiotics administered (if applicable)
- Skin preparation/hair removal (if applicable)
- Removal of make-up, nail varnish, jewellery, personal clothing, prosthesis (if applicable)
- Presence of dentures, loose or capped teeth is documented
- Identification bracelet with correct details is checked
- Allergies are identified and documented
- Notes, X-rays, blood results, ECG results, etc., are collated
- The consent form is signed with the correct procedure and the patient can explain in his/her own words the procedure to be carried out
2. State if the following are true or false.
   a. All medication can be continued until midnight before the operation day
   b. Surgical patients are at particular risk of developing malnutrition
   c. Once evidence about a surgical intervention has been presented, a competent adult has the right to refuse it
   d. Patients should always have hair removed from the surgical site

3. Which of the following tests should be carried out on all surgical patients? (answer yes or no)?
   a. Blood pressure
   b. ECG
   c. Liver blood tests
   d. Waterlow risk assessment

4. How much more likely are cardiac complications in those following an emergency procedure?
   a. 1–2 times
   b. 4–8 times
   c. 2–5 times
   d. 2–4 times

5. What is the minimum recommended fasting period before surgery? (choose one answer)?
   a. 10 hours for solid food/milk and 2 hours for clear fluid
   b. 6 hours for solid food/milk and 2 hours for clear fluid
   c. 6 hours for solid food/milk and 4 hours for clear fluid
   d. 2 hours for solid food/milk and 6 hours for clear fluid

6. The Waterlow Risk Assessment Scale is used to assess the patient’s:
   a. Nutritional risk
   b. Pressure sore risk
   c. Anaesthetic risk
   d. Cardiac risk

7. Identify three types of autologous blood transfusion.

8. Briefly explain the difference between nutritional screening and nutritional assessment.

9. Briefly explain the purpose of pre-operative skin preparation.

10. List the checks that are carried out before the patient is transferred to the operating department.

References and further reading


