The effective management and administration of premedication

**AUTHOR** Sue Saunders, BSc, RN, is staff nurse, the Royal Bournemouth Hospital.


Nurses play an essential role in preparing patients for surgical procedures, whether the operation is planned or an emergency. Part of this preparation may include administration of premedication. Government initiatives such as *The NHS Plan* (Department of Health, 2000) and *Essence of Care* (DoH, 2001) emphasise the need to get the fundamental aspects of nursing care right, and nurses have a professional responsibility to deliver evidence-based care (NMC, 2002). Additionally, the publication of *Building a Safer NHS for Patients: Improving Medication Safety* (DoH, 2004) aims to improve patient safety by reducing the incidence of drug errors. This article looks at why pharmacological intervention is no longer a routine preoperative preparation. It will discuss drugs that are used to aid anaesthesia and those used as prophylaxis to aid postoperative recovery, consider the ways in which premedication can now include psychological interventions, and look at the nurse’s role.

In the days when anaesthesia was induced by inhalation of a gas, some of the agents used, such as diethyl ether, could cause outpourings of secretions such as saliva that made it difficult to get the patient to deeper planes of anaesthesia. As a result, the experience could be a long and frightening one. The original aim of premedication was to reduce salivation and other secretions, produce euphoria and raise the threshold of pain. The introduction of intravenous induction agents, short-acting opioids and muscle relaxants has made anaesthesia a much safer and less traumatic experience, and so the purpose of premedication changed (Simpson and Popat, 2002; Cuschieri et al, 2001). Also, with the increase in the number of operations carried out on a day-surgery basis, drugs likely to have any long-lasting effects that might delay discharge are avoided where possible.

Weller (2000) defines premedication as ‘drugs given preoperatively in order to reduce fear and anxiety and to facilitate the induction and maintenance of, and recovery from, anaesthesia’. Aitkenhead et al (2001) describe premedication as being administered in the 1–2 hour period before the induction of anaesthesia. Simpson and Popat (2002) explain that the term is now accepted as also referring to other pharmacological agents that may need to be administered several hours earlier in order to attain specific responses. In addition, psychological preparation of the patient is considered to be of equal importance.

The objectives of administering premedication to patients (Aitkenhead et al, 2001; Stone, 2003) are to:

- Enhance hypnotic effect of general anaesthetic agents;
- Reduce postoperative nausea and vomiting;
- Allay anxiety and fear;
- Reduce secretions;
- Produce analgesia;
- Produce amnesia;
- Prevent bronchospasm;
- Reduce volume and increase the pH of gastric volume;
- Prevent and/or minimise aspiration;
- Weaken vagal reflexes;
- Maintain haemodynamic stability.

**Reduction of anxiety**

Most patients presenting for surgery will experience a degree of anxiety, and there is a significant inverse relationship between anxiety and the smoothness of anaesthesia (Aitkenhead et al, 2001). There is now a consensus that the most important factor in reducing patient anxiety is the preoperative visit by the anaesthetist, which provides the opportunity not only to assess the patient’s pharmacological needs, but to provide reassurance and information about the perioperative procedures. In turn, the patient has the opportunity to ask questions and express fears (Simpson and Popat, 2002; Aitkenhead et al, 2001; Cuschieri et al, 2001; Dawson, 2000).

These measures may be insufficient to relieve anxiety, so anxiolytic (relief of anxiety) medication, ideally benzodiazepines, should be considered for these patients (Box 1). The terms ‘sedation’ and ‘anxiolysis’ are sometimes used synonymously, but in fact some drugs, such as barbiturates, provide sedation but have no anxiolytic properties. It is unwise to administer sedative medication if the patient is in a critical condition, particularly if respiratory function is at risk of compromise (Aitkenhead et al, 2001). Benzodiazepines possess useful properties for premedication including relief of anxiety, sedation and amnesia. Short-acting benzodiazepines taken orally are the most common premedications, and these can be administered at low doses so as not to induce excessive and prolonged sedation. In addition, the amnesic properties can help to alleviate unpleasant memories of the procedure. A further advantage of this drug group is that oral administration gives better results, eliminating the need for an uncomfortable intramuscular injection.

Diazepam was the first of this group to be used commonly, but now temazepam is often preferred because of its more rapid onset and shorter duration of action. The sedative and anxiolytic effects only last about 90 minutes, even though there may be residual drowsiness.
Lorazepam produces a greater degree of amnesia than other drugs in this group, and more prolonged sedation than temazepam. It can be administered the night before major surgery, although a further, smaller dose may be required if surgery is delayed. Midazolam is often used in preference to diazepam because recovery is faster, though it is associated with excessive sedation when high doses are given intravenously or when it is used with certain other drugs.

Benzodiazepines may occasionally cause respiratory depression. Flumazenil is antagonistic to benzodiazepines and should be available to reverse excessive sedation, though because it has a shorter half-life (the time taken for half of a substance to be metabolised) than benzodiazepines the patient could become re-sedated (Aitkenhead et al, 2001; Mehta, 2004).

Reducing secretions

Excessive secretion is a problem that rarely occurs with modern anaesthetic agents, and therefore anticholinergic premedication is no longer used routinely to dry up salivary secretions (Simpson & Popat, 2002; Aitkenhead et al, 2001). However, for patients in whom an ‘awake’ intubation is planned, administration of an anticholinergic is useful because a dry mouth promotes the penetration of local anaesthetic drugs in the upper airway.

If needed as a premedication, hyoscine hydrobromide is the drug of choice as it is efficient at drying salivary secretion while providing a degree of amnesia, sedation and antiemesis. It should be used cautiously in patients with cardiovascular disease and avoided in the elderly. It can cause blurred vision.

Prevention of pain

As a rule, analgesia will be given preoperatively for patients whose condition is painful, or for those who need a painful procedure to be performed before the induction of anaesthesia, such as internal jugular puncture before major cardiovascular surgery (Stone, 2003). In addition to the physiological effects, it is thought that the administration of analgesia can provide psychological benefits in reducing pain. For example, a recent study of the anticipation and experience of pain, that used magnetic resonance imaging to study neural responses in brain regions that were pain-sensitive, supported the researchers’ hypothesis that even though placebo were used, the pain experience was altered by the expectation of pain relief (Wager, 2004).

In the past, opioid drugs were used commonly for premedication, but now they are used less routinely because of their side-effects, and thought to only be necessary, as explained, when the patient is in pain preoperatively (Simpson & Popat, 2002). Opioids are more likely to be used on induction of anaesthesia, and include pethidine, morphine and papavertum although shorter acting, more potent opioids such as alfentanil, fentanyl and remifentanil are now preferred. Inappropriate use of opioids is discouraged because of their serious side-effects (Table 1, p42).

Naloxone hydrochloride can be used to reverse opioid-induced respiratory depression, and antiemetics should always be prescribed concurrently in case of nausea and vomiting (Aitkenhead et al, 2001; Mehta, 2004).

Postoperative antiemesis

Postoperative nausea and vomiting (PONV) are distressing and very common after anaesthesia but it remains difficult to predict which patients will experience these. The vomiting centre might be stimulated by signals from the digestive tract, the part of the inner ear that controls balance, or by the chemoreceptor zone in the brain, which responds to harmful substances in the blood (Henry, 2002).

Patients considered to be at high risk include those with a history of PONV or motion sickness and those undergoing certain types of surgery, such as procedures involving the ear or gastrointestinal tract and major gynaecological procedures. If severe, PONV may lead to dehydration and electrolyte imbalance (Cox, 2002). Sometimes antiemetics will be given as premedication but often they are more effective if administered intravenously during anaesthesia (Cox, 2002; Aitkenhead et al, 2001).

There are several commonly prescribed antiemetics that can be used individually or in combination as they have different modes of action. These include:

- Cyclizine, an antihistamine that reduces the sensitivity of the vomiting centre. It also has sedative properties. Other common side-effects are blurred vision, dry mouth and tachycardia;

- Metoclopramide, a dopamine antagonist, that stimulates the myenteric plexus. It also has sedative properties.

- Prochlorperazine, an antihistamine and dopamine antagonist.

Box 1. An Inconsolable Patient

Amanda Smith (not her real name) was third on the morning list for an incisional hernia repair. As her nurse was preparing Ms Smith for theatre, she noticed that Ms Smith appeared very anxious and upset. The nurse asked what was worrying her and at this point Ms Smith broke down completely, saying that she did not want to be a nuisance, but she was terrified due to a previous operation during which several complications had developed. The nurse reassured her that she was not a nuisance and her anxiety was normal and understandable. She rang the anaesthetist and asked him to talk to Ms Smith as soon as possible to explain the anaesthetic and operation procedure carefully to her in the hope that this would offer her some degree of comfort. Even after the anaesthetist had done this, however, Ms Smith remained inconsolable. He thought she might benefit from 20mg of temazepam but he did not want it to be given for another 90 minutes.

The nurse wondered how else she could help, and remembered that on admission Ms Smith had explained that, although not a regular churchgoer, she was a spiritual lady and on her last admission the hospital chaplain had been of great comfort to her. The nurse contacted the chaplain, who cheerfully agreed to come and sit with Ms Smith for the next 90 minutes, which had a tremendously calming effect.

Keywords: Theatre, Premedication, Surgery
Aspiration

Aspiration is the inhalation of foreign matter, blood or gastric contents, and can cause a serious airway emergency. It may occur during induction, in the operating room, in recovery or during transfer. Postoperatively, it is caused by regurgitating gastric contents into the tracheobronchial system. Unlike vomiting it is passive and often silent.

Aspiration can also cause bronchospasm, where the increase in bronchial smooth muscle tone results in the closure of the small airways (Field, 2000).

The risk of aspiration and subsequent lung damage (which appears as a mottled appearance on an X-ray known as ‘Mendelson’s syndrome’) is reduced if drugs are given to reduce the contents and acidity of the stomach. Ideally patients will have a period where they are ‘nil by mouth’ before their operation, but in the case of trauma or other emergencies this is not always possible.

Other predisposing factors for aspiration include obesity, pregnancy, gastric and oesophageal disorders, as well as the presence of a tracheostomy, neuromuscular disease or a nasogastric tube (Simpson and Popat, 2002).

Common drugs used to combat aspiration are:

- Cimetidine and ranitidine, which are H2 receptor blockers. This action prevents histamine from producing acid in the stomach. Side-effects include dizziness, malaise, headache, rash, gastrointestinal disturbances and sometimes tachycardia;
- Lansoprazole and omeprazole, which are proton pump inhibitors. They block the enzyme system that is responsible for the transport of hydrogen ions (in effect the secretion of acid) across the cell membrane of specialised cells into the stomach (Henry, 2002). The side-effects are similar to those above plus dry mouth, and joint and muscle pain.

Prophylactic measures

Prophylaxis uses drugs to prevent disease. Although not technically premedication, certain drugs are given preoperatively for conditions or procedures that predispose to certain complications. The important ones are for:

- Prevention of surgical infections. Antibiotics are no substitute for good surgical practice and strict aseptic technique, but they are indicated when the risk of infection is high and there is proven benefit. Antibiotic regimens that provide suitable chemoprophylaxis against surgical infections are detailed in Table 2;
- Prevention of deep vein thrombosis. It is recommended that prophylaxis against DVT and pulmonary embolism be given in all surgical specialties according to the degree of risk, with the exception of orthopaedics, where there is a difference of opinion among surgeons. Subcutaneous low-dose heparin is used to reduce thrombin formation without full anticoagulation, which would cause potentially fatal preoperative bleeding;
- Prevention of renal failure. Prophylaxis is based on the maintenance of adequate renal perfusion and oxygenation. Careful administration of intravenous crystalloids (sodium-containing solutions), five per cent dextrose (glucose added to water) and diuretics are used in high-risk groups (Cuschieri et al, 2001);
- Prevention of cardiac complications. If patients are taking regular medication for heart conditions, in general they are advised to continue these as usual on the day of surgery (but not warfarin) to prevent cardiac complications. Atrial fibrillation (AF) occurs in up to 50 per cent of cardiac patients and represents the most common postoperative arrhythmic complication. It may result in inappropriate tachycardia, hypotension and heart failure. The results of a recent study suggested that oral prophylaxis with sotalol or amiodarone plus metoprolol with a short preoperative treatment is highly effective at reducing AF in patients undergoing cardiac surgery (Auer et al, 2004). Antihypertensive medication is believed to be of particular benefit during anaesthesia to prevent wild swings of blood pressure, particularly high pressure occurring at laryngoscopy and intubation (Simpson and Popat, 2002);
- Management of diabetes mellitus. Patients with both type 1 and type 2 diabetes whose condition is well-controlled and who are having only minor surgery may simply omit their morning dose of short-acting insulin and their breakfast, knowing they may eat again later in the day. Blood glucose measurements should be taken before and after surgery. In major surgery on patients with type 1 diabetes or poorly controlled type 2 diabetes, however, preoperative management should include the regular monitoring of a sliding-scale regimen of soluble insulin and usually a five per cent dextrose infusion. Ideally patients with diabetes should be placed first on the theatre list.
Administration of drugs

The same precautions should be exercised when giving premedication as with any other prescribed drug. Nurses are legally accountable under the Medicines Act 1968 and Consumer Protection Act 1987, and professionally accountable to the NMC, whose standards generally follow the principles laid down by law. Nurses are also accountable to patients through the principles of negligence and trespass in civil law, and to their employers through contract law.

The five ‘right’ principles

Safe administration is grounded in the five ‘right’ principles (Turkoski et al, 1999) – the right drug, right dose, right patient, right route and right time:

- **The right drug.** The drug dispensed should be checked carefully against the written prescription, as many drugs have similar names. The prescriber’s handwriting should be legible, and any doubts should be clarified. Also, the nurse must understand why any particular medication is being prescribed and know about common side-effects and adverse reactions. She or he should check whether the patient has known allergies to the drugs;

- **The right dose.** Nurses should be aware of the ‘usual’ or ‘average’ dose for the drug prescribed, and be able to identify any individual characteristics of the patient that may be the reason for any unusual dosing. For example if the patient has impaired renal or liver function;

- **The right patient.** Patients going to theatre should be clearly identified with two name-bands, which should be checked before drug administration;

- **The right route.** This could be oral, intravenous, intra-muscular, subcutaneous or through a feeding tube;

- **The right time.** This is particularly important when administering premedications as they are often prescribed according to the duration of their effectiveness. The precise timespan in which their effect is required may not be compatible with administering the drug at the time of routine ward drug rounds. Also, the order of operation lists often gets changed, so timing of administration should be adjusted appropriately.

Nurses, pharmacists and doctors should work together to ensure accurate and safe drug administration. Each has a role in improving the quality of care involved, and where staff do not feel confident in any aspect of administration they should seek confirmation of accuracy (DoH, 2004).

Nursing considerations

A significant aspect of a nurse’s role is to reduce the risk of postoperative complications that may compromise the person’s recovery (Dawson, 2000). Premedication is a routine consideration for surgery, but in order to provide holistic care, nurses should remember that every patient is an individual who may react differently both physically and psychologically. It is important for nurses to administer premeds accurately and safely, and to be aware of the possible side-effects highlighted, remembering that reactions might be more severe in older people and those with hepatic or renal impairment, for example. Baseline observations will help to identify any deviation from the norm, and any suspected adverse reactions should be reported to the anaesthetist. Traditionally, once the patient had taken the premedication she or he was encouraged to remain on bedrest. But current thinking is that if the drug has no sedative effect, bedrest should not be necessary and in fact might increase the risk of a patient developing pressure ulcers. If the patient is to remain on bedrest a theatre canvas should be in place. Before premed is administered, the patient should be advised to shower or bathe, use the toilet and change into a theatre gown.

Information given preoperatively can reduce patients’ stress, anxiety and pain. Ward nurses will usually be in closest contact with patients in the preoperative period, so are well placed to ensure patients understand what has been said to them and the implications of their proposed surgery. Information leaflets can be used to support one-to-one advice and education (Dawson, 2000).

Conclusion

Although premedication is no longer routine, it is still useful for some people or procedures to ensure safe anaesthesia and as prophylaxis to aid postoperative recovery. Addressing psychological needs is a valuable contribution to holistic care. All multidisciplinary team-members should work together to ensure safe preparation for surgery.