

Anesthetic Drugs

Key Terms

<i>analgesia</i>	<i>local infiltration</i>
<i>anesthesia</i>	<i>anesthesia</i>
<i>anesthesiologist</i>	<i>neuroleptanalgesia</i>
<i>anesthetist</i>	<i>preanesthetic drug</i>
<i>brachial plexus block</i>	<i>regional anesthesia</i>
<i>conduction block</i>	<i>spinal anesthesia</i>
<i>epidural block</i>	<i>transsacral block</i>
<i>general anesthesia</i>	<i>volatile liquid</i>
<i>local anesthesia</i>	

Chapter Objectives

On completion of this chapter, the student will:

- State the uses of local anesthesia, methods of administration, and nursing responsibilities when administering a local anesthetic.
- Describe the purpose of a preanesthetic drug and the nursing responsibilities associated with the administration of a preanesthetic drug.
- List several drugs used in local and general anesthesia.
- List and briefly describe the four stages of general anesthesia.
- Discuss important nursing responsibilities associated with caring for a patient receiving a preanesthesia drug and during the postanesthesia recovery room period.

Anesthesia is a loss of feeling or sensation. Anesthesia may be induced by various drugs that are able to bring about partial or complete loss of sensation. There are two types of anesthesia: local anesthesia and general anesthesia. **Local anesthesia**, as the term implies, is the provision of a pain-free state in a specific area (or region). With a local anesthetic, the patient is fully awake but does not feel pain in the area that has been anesthetized. However, some procedures done under local anesthesia may require the patient to be sedated. Although not fully awake, sedated patients may still hear what is going on around them. **General anesthesia** is the provision of a pain-free state for the entire body. When a general anesthetic is given, the patient loses consciousness and feels no pain. Reflexes, such as the swallowing and gag reflexes, are lost during deep general anesthesia (Fig. 35-1). An **anesthesiologist** is a physician with special training in administering anesthesia. A nurse **anesthetist** is a nurse with special training who is qualified to administer anesthetics.

LOCAL ANESTHESIA

The various methods of administering a local anesthetic include topical application, local infiltration, or regional anesthesia.

Topical Anesthesia

Topical anesthesia involves the application of the anesthetic to the surface of the skin, open area, or mucous membrane. The anesthetic may be applied with a cotton swab or sprayed on the area. This type of anesthesia may be used to desensitize the skin or mucous membrane to the injection of a deeper local anesthetic. In some instances, topical anesthetics may be applied by the nurse.

Local Infiltration Anesthesia

Local infiltration anesthesia is the injection of a local anesthetic drug into tissues. This type of anesthesia may be used for dental procedures, the suturing of small wounds, or making an incision into a small area, such as that required for removing a superficial piece of tissue for biopsy.

Regional Anesthesia

Regional anesthesia is the injection of a local anesthetic around nerves so that the area supplied by these nerves will not send pain signals to the brain. The anesthetized area is usually larger than the area affected by

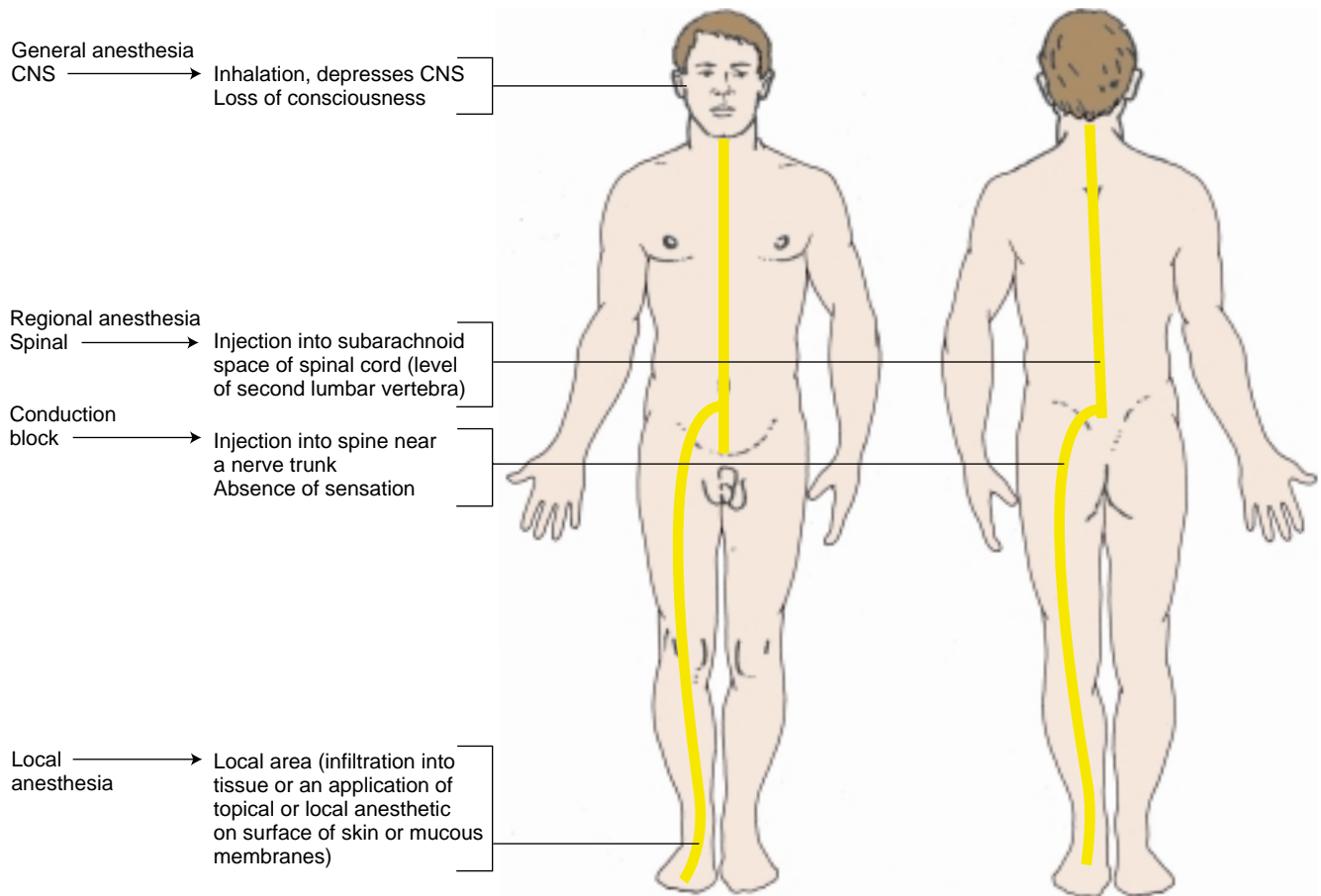


FIGURE 35-1. Sites and mechanisms of action of drugs used for anesthesia.

local infiltration anesthesia. Spinal anesthesia and conduction blocks are two types of regional anesthesia.

Spinal Anesthesia

Spinal anesthesia is a type of regional anesthesia that involves the injection of a local anesthetic drug into the subarachnoid space of the spinal cord, usually at the level of the second lumbar vertebra. There is a loss of feeling (anesthesia) and movement in the lower extremities, lower abdomen, and perineum.

Conduction Blocks

A **conduction block** is a type of regional anesthesia produced by injection of a local anesthetic drug into or near a nerve trunk. Examples of a conduction block include an **epidural block** (injection of a local anesthetic into the space surrounding the dura of the spinal cord); a **transsacral (caudal) block** (injection of a local anesthetic into the epidural space at the level of the sacrococcygeal notch); and **brachial plexus block** (injection of a local anesthetic into the brachial plexus). Epidural, especially, and transsacral blocks are often used in obstetrics. A brachial plexus block may be used for surgery of the arm or hand.

Preparing the Patient for Local Anesthesia

Depending on the procedure performed, preparing the patient for local anesthesia may or may not be similar to preparing the patient for general anesthesia. For example, administering a local anesthetic for dental surgery or for suturing a small wound may require that the nurse explain to the patient how the anesthetic will be administered, take a patient's allergy history, and when applicable, prepare the area to be anesthetized, which may involve cleaning the area with an antiseptic or shaving the area. Other local anesthetic procedures may require the patient to be in a fasting state because a sedative may also be administered. The nurse may administer an intravenous sedative such as the antianxiety drug diazepam (Valium) (see Chap. 30) during some local anesthetic procedures, such as cataract surgery or surgery performed under spinal anesthesia.

Administering Local Anesthesia

The physician or dentist administers a local injectable anesthetic. Table 35-1 lists the more commonly used local anesthetics.

TABLE 35-1 EXAMPLES OF LOCAL ANESTHETICS

GENERIC NAME	TRADE NAME*
articaine HCl	Septocaine
bupivacaine HCl	Marcaine HCl, <i>generic</i>
chloroprocaine HCl	Nesacaine, Nescaine-MPF
lidocaine HCl	Dilocaine, Xylocaine, <i>generic</i>
mepivacaine HCl	Carbocaine, Isocaine HCl
prilocaine HCl	Citanest HCl
procaine HCl, injectable	Novocain, <i>generic</i>
ropivacaine	Naropin
tetracaine HCl	Pontocaine HCl

*The term *generic* indicates the drug is available in generic form.

Nursing Responsibilities When Caring for a Patient Receiving Local Anesthesia

When applicable, the nurse may be responsible for applying a dressing to the area. Depending on the reason for using local anesthesia, the nurse also may be responsible for observing the area for bleeding, oozing, or other problems after the administration of the anesthetic.

PREANESTHETIC DRUGS

A **preanesthetic drug** is one given before the administration of anesthesia. The nurse usually gives a preanesthetic drug before the administration of general anesthesia but on occasion may give it before injection of the local anesthetic to sedate the patient. The preanesthetic may consist of one drug or a combination of drugs.

Purpose of Preanesthetic Drugs

The general purpose of the preanesthetic drug is to prepare the patient for anesthesia. The more specific purposes of these drugs include the following:

- Narcotic or antianxiety drug—to decrease anxiety and apprehension immediately before surgery. The patient who is calm and relaxed can be anesthetized more quickly, usually requires a smaller dose of an induction drug, may require less anesthesia during surgery, and may have a smoother anesthesia recovery period (awakening from anesthesia).
- Cholinergic blocking drug—to decrease secretions of the upper respiratory tract. Some anesthetic gases and volatile liquids are irritating to the lining of the respiratory tract and thereby increase mucous secretions. The cough and swallowing reflexes are lost during general anesthesia, and excessive secretions can pool in the lungs, resulting in pneumonia or atelectasis during the postoperative period. The

administration of a cholinergic blocking drug, such as glycopyrrolate (Robinul) dries up secretions of the upper respiratory tract and lessens the possibility of excessive mucous production.

- Antiemetic—to lessen the incidence of nausea and vomiting during the immediate postoperative recovery period.



Gerontologic Alert

Preanesthetic drugs may be omitted in those 60 years or older because many of the medical disorders for which these drugs are contraindicated are seen in older individuals. For example, atropine and glycopyrrolate, drugs that can be used to decrease secretions of the upper respiratory tract, are contraindicated in certain medical disorders, such as prostatic hypertrophy, glaucoma, and myocardial ischemia. Other preanesthetic drugs that depress the central nervous system (CNS), such as narcotics, barbiturates, and antianxiety drugs with or without antiemetic properties, may be contraindicated in the older individual.

Selection of Preanesthetic Drugs

The preanesthetic drug is usually selected by the anesthesiologist and may consist of one or more drugs (Table 35-2). A narcotic (see Chap. 19), antianxiety drug (see Chap. 30), or barbiturate (see Chap. 26) may be given to

TABLE 35-2 EXAMPLES OF PREANESTHETIC DRUGS

GENERIC NAME	TRADE NAME*
Narcotics	
droperidol	Inapsine
fentanyl	Sublimaze, <i>generic</i>
meperidine hydrochloride	Demerol, <i>generic</i>
morphine sulfate	Duramorph, <i>generic</i>
Barbiturates	
pentobarbital	Nembutal Sodium, <i>generic</i>
secobarbital	<i>generic</i>
Cholinergic-Blocking Drugs	
atropine sulfate	<i>generic</i>
glycopyrrolate	Robinul, <i>generic</i>
scopolamine	<i>generic</i>
Antianxiety Drugs With Antiemetic Properties	
hydroxyzine	Atarax, Vistaril, <i>generic</i>
Antianxiety Drugs	
chlordiazepoxide	Librium, <i>generic</i>
diazepam	Valium, <i>generic</i>
midazolam	Versed

*The term *generic* indicates the drug is available in generic form.

relax or sedate the patient. Barbiturates are used only occasionally; narcotics are usually preferred for sedation. A cholinergic blocking drug (see Chap. 25) is given to dry secretions in the upper respiratory tract. Scopolamine and glycopyrrolate also have mild sedative properties, and atropine may or may not produce some sedation. Antianxiety drugs have sedative action; when combined with a narcotic, they allow for a lowering of the narcotic dosage because they also have the ability to potentiate the sedative action of the narcotic. Diazepam (Valium), an antianxiety drug, is one of the more commonly used drugs for preoperative sedation.

Nursing Responsibilities When Caring for a Patient Receiving a Preanesthetic Drug

The nurse evaluates the patient's physical status and gives an explanation of the anesthesia. In some hospitals, the anesthesiologist examines the patient the day or evening before surgery, although this may not be possible in emergency situations. Some hospitals use members of the operating room or postanesthesia recovery room staff to visit the patient the night before or the morning of surgery to explain certain facts, such as the time of surgery, the effects of the preanesthetic drug, preparations for surgery, and the postanesthesia recovery room. Proper explanation of anesthesia, the surgery itself, and the events that may occur in preparation for surgery, as well as care after surgery, require a team approach. The nurse's responsibilities include the following:

- The nurse describes or explains the preparations for surgery ordered by the physician. Examples of preoperative preparations include fasting from midnight (or the time specified by the physician), enemas, shaving of the operative site, use of a hypnotic for sleep the night before, and the preoperative injection about 30 minutes before going to surgery.
- The nurse describes or explains immediate postoperative care, such as the postanesthesia recovery room or a special postoperative surgical unit and the activities of the physicians and nurses during this period. The nurse tells the patient that his or her vital signs will be monitored frequently and that other equipment, such as intravenous fluids and monitors, may be used.
- The nurse describes, explains, and demonstrates postoperative patient activities, such as deep breathing, coughing, and leg exercises.
- The nurse tailors the preoperative explanations to fit the type of surgery scheduled. Not all of these teaching points may be included in every explanation.

GENERAL ANESTHESIA

The administration of general anesthesia requires the use of one or more drugs. The choice of anesthetic drug depends on many factors, including:

- The general physical condition of the patient
- The area, organ, or system being operated on
- The anticipated length of the surgical procedure

The anesthesiologist selects the anesthetic drugs that will produce safe anesthesia, **analgesia** (absence of pain), and in some surgeries, effective skeletal muscle relaxation. General anesthesia is most commonly achieved when the anesthetic vapors are inhaled or administered intravenously (IV). Volatile liquid anesthetics produce anesthesia when their vapors are inhaled. **Volatile liquids** are liquids that evaporate on exposure to air. Examples of volatile liquids include halothane, desflurane, and enflurane. Gas anesthetics are combined with oxygen and administered by inhalation. Examples of gas anesthetics are nitrous oxide and cyclopropane.

Drugs Used for General Anesthesia

Methohexital and Thiopental

Methohexital (Brevital) and thiopental (Pentothal), which are ultrashort-acting barbiturates, are used for:

- Induction of anesthesia
- Short surgical procedures with minimal painful stimuli
- In conjunction with or as a supplement to other anesthetics
- Control of convulsive states (thiopental)

These drugs have a rapid onset and a short duration of action. They depress the central nervous system (CNS) to produce hypnosis and anesthesia but do not produce analgesia. Recovery after a small dose is rapid.

Etomidate

Etomidate (Amidate), a nonbarbiturate, is used for induction of anesthesia. Etomidate also may be used to supplement other anesthetics, such as nitrous oxide, for short surgical procedures. It is a hypnotic without analgesic activity.

Propofol

Propofol (Diprivan) is used for induction and maintenance of anesthesia. It also may be used for sedation during diagnostic procedures and procedures that use a local anesthetic. This drug also is used for continuous sedation of intubated or respiratory-controlled patients in intensive care units.

Midazolam

Midazolam (Versed), a short-acting benzodiazepine CNS depressant, is used as a preanesthetic drug to relieve anxiety; for induction of anesthesia; for conscious sedation before minor procedures, such as endoscopic procedures; and to supplement nitrous oxide and oxygen for short surgical procedures. When the drug is used for induction anesthesia, the patient gradually loses consciousness during a period of 1 to 2 minutes.

Sevoflurane

Sevoflurane (Ultane) is an inhalational analgesic. It is used for induction and maintenance of general anesthesia in adult and pediatric patients for inpatient and outpatient surgical procedures.

Ketamine

Ketamine (Ketalar) is a rapid-acting general anesthetic. It produces an anesthetic state characterized by profound analgesia, cardiovascular and respiratory stimulation, normal or enhanced skeletal muscle tone, and occasionally mild respiratory depression. Ketamine is used for diagnostic and surgical procedures that do not require relaxation of skeletal muscles, for induction of anesthesia before the administration of other anesthetic drugs, and as a supplement to other anesthetic drugs.

Cyclopropane

An anesthetic gas, cyclopropane has a rapid onset of action and may be used for induction and maintenance of anesthesia. Skeletal muscle relaxation is produced with full anesthetic doses. Cyclopropane is supplied in orange cylinders. Disadvantages of cyclopropane are difficulty in detecting the planes of anesthesia, occasional laryngospasm, cardiac arrhythmias, and postanesthesia nausea, vomiting, and headache. Cyclopropane and oxygen mixtures are explosive, which limits the use of this gas anesthetic.

Ethylene

Ethylene is an anesthetic gas with a rapid onset of action and a rapid recovery from its anesthetic effects. It provides adequate analgesia but has poor muscle-relaxant properties. The advantages of ethylene include minimal bronchospasm, laryngospasm, and postanesthesia vomiting. A disadvantage of ethylene is hypoxia. This gas is supplied in red cylinders. Mixtures of ethylene and oxygen are flammable and explosive.

Nitrous Oxide

Nitrous oxide is the most commonly used anesthetic gas. It is a weak anesthetic and is usually used in combination with other anesthetic drugs. It does not cause

skeletal muscle relaxation. The chief danger in the use of nitrous oxide is hypoxemia. Nitrous oxide is nonexplosive and is supplied in blue cylinders.

Enflurane

Enflurane (Ethrane) is a volatile liquid anesthetic that is delivered by inhalation. Induction and recovery from anesthesia are rapid. Muscle relaxation for abdominal surgery is adequate, but greater relaxation may be necessary and may require the use of a skeletal muscle relaxant. Enflurane may produce mild stimulation of respiratory and bronchial secretions when used alone. Hypotension may occur when anesthesia deepens.

Halothane

Halothane (Fluothane) is a volatile liquid given by inhalation for induction and maintenance of anesthesia. Induction and recovery from anesthesia are rapid, and the depth of anesthesia can be rapidly altered. Halothane does not irritate the respiratory tract, and an increase in tracheobronchial secretions usually does not occur. Halothane produces moderate muscle relaxation, but skeletal muscle relaxants may be used in certain types of surgeries. This anesthetic may be given with a mixture of nitrous oxide and oxygen.

Isoflurane

Isoflurane (Forane) is a volatile liquid given by inhalation. It is used for induction and maintenance of anesthesia.

Methoxyflurane

Methoxyflurane (Penthrane), a volatile liquid, provides analgesia and anesthesia. It is usually used in combination with nitrous oxide but may also be used alone. It does not produce good muscle relaxation, and a skeletal muscle relaxant may be required.

Desflurane

Desflurane (Suprane), a volatile liquid, is used for induction and maintenance of anesthesia. A special vaporizer is used to deliver this anesthetic because delivery by mask results in irritation of the respiratory tract.

Fentanyl and Droperidol

The narcotic analgesic fentanyl (Sublimaze) and the neuroleptic (major tranquilizer) droperidol (Inapsine) may be used together as a single drug called Innovar. The combination of these two drugs results in **neuroleptanalgesia**, which is characterized by general quietness, reduced motor activity, and profound analgesia. Complete loss of consciousness may not occur unless

other anesthetic drugs are used. A combination of fentanyl and droperidol may be used for the tranquilizing effect and analgesia for surgical and diagnostic procedures. It may also be used as a preanesthetic for the induction of anesthesia and in the maintenance of general anesthesia.

Droperidol may be used alone as a tranquilizer, as an antiemetic to reduce nausea and vomiting during the immediate postanesthesia period, as an induction drug, and as an adjunct to general anesthesia. Fentanyl may be used alone as a supplement to general or regional anesthesia. It may also be administered alone or with other drugs as a preoperative drug and as an analgesic during the immediate postoperative (recovery room) period.

Remifentanyl Hydrochloride

Remifentanyl (Ultiva) is used for induction and maintenance of general anesthesia and for continued analgesia during the immediate postoperative period. This drug is used cautiously in patients with a history of hypersensitivity to fentanyl.

Skeletal Muscle Relaxants

The various skeletal muscle relaxants that may be used during general anesthesia are listed in Table 35-3. These drugs are administered to produce relaxation of the skeletal muscles during certain types of surgeries, such as those involving the chest or abdomen. They may also be used to facilitate the insertion of an endotracheal tube. Their onset of action is usually rapid (45 seconds to a few minutes), and the duration of action is 30 minutes or more.

TABLE 35-3

Examples of Muscle Relaxants Used During General Anesthesia

GENERIC NAME	TRADE NAME*
atracurium besylate	Tracrium
cisatracurium besylate	Nimbex
doxacurium chloride	Nuromax
metocurine iodide	Metubine Iodine, <i>generic</i>
mivacurium chloride	Mivacron
pancuronium bromide	Pavulon, <i>generic</i>
pipecurium bromide	Arduan
rapacurium bromide	Raplon
rocuronium bromide	Zemuron
succinylcholine chloride	Anectine, <i>generic</i>
tubocurarine chloride	<i>generic</i>
vecuronium bromide	Norcuron, <i>generic</i>

*The term *generic* indicates that the drug is available in generic form.

Stages of General Anesthesia

General surgical anesthesia is divided into the following stages:

- Stage I—analgesia
- Stage II—delirium
- Stage III—surgical analgesia
- Stage IV—respiratory paralysis

Display 35-1 describes the stages of general anesthesia more completely.

With newer drugs and techniques, the stages of anesthesia may not be as prominent as those described in Display 35-1. In addition, movement through the first two stages is usually very rapid.

Anesthesia begins with a loss of consciousness. This is part of the induction stage (stage I). The patient is now relaxed and can no longer see or hear what is going on. After consciousness is lost, additional anesthetic drugs are administered. Some of these drugs are also used as part of the induction phase, as well as for deepening anesthesia. Depending on the type of surgery, an endotracheal tube also may be inserted into the trachea to provide an adequate airway and to assist in the administration of oxygen and other anesthetic drugs. The endotracheal tube is removed during the postanesthesia period once the gag and swallowing reflexes have returned. If an intravenous line was not inserted before the patient's

DISPLAY 35-1 • Stages of General Anesthesia

STAGE I

Induction is a part of stage I anesthesia. It begins with the administration of an anesthetic drug and lasts until consciousness is lost. With some induction drugs, such as the short-acting barbiturates, this stage may last only 5 to 10 seconds.

STAGE II

Stage II is the stage of delirium and excitement. This stage is also brief. During this stage, the patient may move about and mumble incoherently. The muscles are somewhat rigid, and the patient is unconscious and cannot feel pain. During this stage, noises are exaggerated and even quiet sounds may seem extremely loud to the patient. If surgery were attempted at this stage, there would be a physical reaction to painful stimuli, yet the patient would not remember sensing pain. During these first two stages of anesthesia, the nurse and other health care professionals avoid any unnecessary noise or motion.

STAGE III

Stage III is the stage of surgical analgesia and is divided into four parts, planes, or substages. The anesthesiologist differentiates these planes by the character of the respirations, eye movements, certain reflexes, pupil size, and other factors. The levels of the planes range from plane 1 (light) to plane 4 (deep). At plane 2 or 3, the patient is usually ready for the surgical procedure.

STAGE IV

Stage IV is the stage of respiratory paralysis and is a rare and dangerous stage of anesthesia. At this stage, respiratory arrest and cessation of all vital signs may occur.

arrival in surgery, it is inserted by the anesthesiologist before the administration of an induction drug.

Nursing Responsibilities During the Administration of General Anesthesia

Preanesthesia

Before surgery, the nurse has the following responsibilities:

- Performing the required tasks and procedures as prescribed by the physician and hospital policy the day or evening before or the morning of surgery and recording these tasks on the patient's chart. Examples of these tasks include administration of a hypnotic the night before surgery, shaving the operative area, taking vital signs, seeing that the operative consent is signed, checking to see if all jewelry or metal objects are removed, administering enemas, inserting a catheter, inserting a nasogastric tube, and teaching.
- Checking the chart for any recent, abnormal laboratory tests. If a recent, abnormal laboratory test was attached to the patient's chart shortly before surgery, the nurse must make sure that the surgeon and the anesthesiologist are aware of the abnormality. The nurse can attach a note to the front of the chart and contact the surgeon or anesthesiologist by telephone.
- Placing a list of known or suspected drug allergies or idiosyncrasies on the front of the chart.
- Administering the preanesthetic (preoperative) drug.
- Instructing the patient to remain in bed and placing the side rails up once the preanesthetic drug has been given.
- Positioning the patient to prevent aspiration of vomitus and secretions.
- Checking blood pressure, pulse, intravenous lines, catheters, drainage tubes, surgical dressings, and casts.
- Reviewing the patient's surgical and anesthesia records.
- Monitoring the blood pressure, pulse, and respiratory rate every 5 to 15 minutes until the patient is discharged from the area.
- Checking the patient every 5 to 15 minutes for emergence from anesthesia. Suctioning is provided as needed.
- Exercising caution in administering narcotics. The nurse must check the patient's respiratory rate, blood pressure, and pulse before these drugs are given and 20 to 30 minutes after administration (see Chap. 20). The physician is contacted if the respiratory rate is below 10 before the drug is given or if the respirations fall below 10 after the drug is given.
- Discharging the patient from the area to his or her room or other specified area. The nurse must record all drugs administered and nursing tasks performed before the patient leaves the postanesthesia recovery room.

Nursing Alert

Preanesthetic drugs must be administered on time to produce their intended effects. Failure to give the preanesthetic drug on time may result in events such as increased respiratory secretions caused by the irritating effect of anesthetic gases and the need for an increased dose of the induction drug because the preanesthetic drug has not had time to sedate the patient.

Postanesthesia: Recovery Room

After surgery, the nurse has the following responsibilities, which vary according to where the nurse first sees the postoperative patient:

- Admitting the patient to the unit according to hospital procedure or policy.
- Checking the airway for patency, assessing the respiratory status, and giving oxygen as needed.

Critical Thinking Exercises

1. Mr. Cantu's family asks you why a drug is being given before he goes to surgery for a bowel resection. When checking the chart, you note that Mr. Cantu has an order for meperidine HCl (Demerol) 50 mg IM and glycopyrrolate (Robinul) 0.35 mg IM 30 minutes before surgery. Describe how you would explain to the family the purpose of the preanesthetic drugs that are to be given to Mr. Cantu.
2. A nurse you are working with complains she was reprimanded and asked to fill out an incident report for not giving a preanesthetic drug on time. She states that she feels she is being unfairly accused of an error because the drug was given 10 minutes before the patient was taken to surgery. Justify why this is a potentially serious error.
3. Discuss the most important responsibilities of the nurse in the recovery room after a patient has undergone general anesthesia.

Review Questions

1. When planning preoperative care, the nurse expects that a preanesthetic medication usually is given _____ before the patient is transported to surgery.
 - A. 20 minutes
 - B. 30 minutes
 - C. 40 minutes
 - D. 60 minutes

2. Which of the following drugs is the most commonly used gas for general anesthesia?
 - A. Ethylene
 - B. Eflurane
 - C. Nitrous oxide
 - D. Sevoflurane
3. Neuroleptanalgesia is used to promote general quietness, reduced motor activity, and profound analgesia. Which of the following two drugs are used in combination to accomplish neuroleptanalgesia?
 - A. Fentanyl and droperidol
 - B. Morphine and glycopyrrolate
 - C. Atropine and meperidine
 - D. Fentanyl and midazolam
4. One use of skeletal muscle relaxants as part of general anesthesia is to _____.
 - A. prevent movement during surgery
 - B. facilitate insertion of the endotracheal tube

- C. allow for deeper anesthesia
- D. produce additional anesthesia

● **Medication Dosage Problems**

1. As a preoperative medication for a patient going to surgery, the anesthesiologist prescribes meperidine HCl (Demerol) 50 mg IM. Meperidine is available in solution of 50 mg/mL. The nurse prepares to administer _____.
2. Glycopyrrolate (Robinul) is prescribed for a patient as part of the preoperative preparation for surgery. The drug dose recommendation is 0.002 mg/lb. The patient weighs 150 pounds. The nurse expects the primary care provider to prescribe _____.