Thyroid and Antithyroid Drugs

Key Terms

euthyroid goiter hyperthyroidism hypothyroidism iodine iodism myxedema thyroid gland thyroid storm thyrotoxicosis thyroxine triiodothyronine

Chapter Objectives

On completion of this chapter, the student will:

- Identify the hormones produced by the thyroid gland.
- Discuss the uses, general drug actions, adverse reactions, contraindications, precautions, and interactions of thyroid and antithyroid drugs.
- Discuss important preadministration and ongoing assessment activities the nurse should perform on the patient taking thyroid and antithyroid drugs.
- List the signs and symptoms of iodism and iodine allergy.
- Discuss ways to promote an optimal response to therapy, how to manage adverse reactions, and important points to keep in mind when educating patients about the use of thyroid and antithyroid drugs.

The **thyroid gland** is located in the neck in front of the trachea. This highly vascular gland manufactures and secretes two hormones: **thyroxine** (T_4) and **tri-iodothyronine** (T_3) . **Iodine** is an essential element for the manufacture of both of these hormones. The activity of the thyroid gland is regulated by thyroid-stimulating hormone, produced by the anterior pituitary gland (see Fig. 50-1). When the level of circulating thyroid hormones decreases, the anterior pituitary secretes thyroid-stimulating hormone, which then activates the cells of the thyroid to release stored thyroid hormones. This is an example of the feedback mechanism (see Chap. 50).

Two diseases are related to the hormone-producing activity of the thyroid gland:

- **Hypothyroidism**—a decrease in the amount of thyroid hormones manufactured and secreted.
- Hyperthyroidism—an increase in the amount of thyroid hormones manufactured and secreted.

The symptoms of hypothyroidism and hyperthyroidism are given in Table 51-1. A severe form of hyperthyroidism, called **thyrotoxicosis** or thyroid storm, is characterized by high fever, extreme tachycardia, and altered mental status. Thyroid hormones are used to treat hypothyroidism and antithyroid

drugs and radioactive iodine are used to treat hyperthyroidism.

THYROID HORMONES

Thyroid hormones used in medicine include both the natural and synthetic hormones. The synthetic hormones are generally preferred because they are more uniform in potency than are the natural hormones obtained from animals. Thyroid hormones are listed in the Summary Drug Table: Thyroid and Antithyroid Drugs.

ACTIONS

The thyroid hormones influence every organ and tissue of the body. These hormones are principally concerned with increasing the metabolic rate of tissues, which results in increases in the heart and respiratory rate, body temperature, cardiac output, oxygen consumption, and the metabolism of fats, proteins, and carbohydrates. The exact mechanisms by which the thyroid hormones exert their influence on body organs and tissues are not well understood.

USES

Thyroid hormones are used as replacement therapy when the patient is hypothyroid. By supplementing the decreased endogenous thyroid production and secretion with exogenous thyroid hormones, an attempt is made to create a **euthyroid** (normal thyroid) state. Levothyroxine (Synthroid) is the drug of choice for hypothyroidism because it is relatively inexpensive, requires once-a-day dosages, and has a more uniform potency than do other thyroid hormone replacement drugs.

Myxedema is a severe hypothyroidism manifested by lethargy, apathy, memory impairment, emotional changes, slow speech, deep coarse voice, thick dry skin, cold intolerance, slow pulse, constipation, weight gain, and absence of menses.

Thyroid hormones are also used in the treatment or prevention of various types of euthyroid **goiters** (enlargement of the thyroid gland), including thyroid nodules, subacute or chronic lymphocytic thyroiditis (Hashimoto's), and multinodular goiter and in the management of thyroid cancer. The hormone may be used with the antithyroid drugs to treat thyrotoxicosis. Thyroid hormones also may be used as a diagnostic measure to differentiate suspected hyperthyroidism from euthyroidism.

ADVERSE REACTIONS

During initial therapy, the most common adverse reactions seen are signs of overdose and hyperthyroidism (see Table 51-1). Adverse reactions other than symptoms of hyperthyroidism are rare.

CONTRAINDICATIONS

These drugs are contraindicated in patients with known hypersensitivity to the drug or to any constituents of the drug, after a recent myocardial infarction (heart attack), or in patients with thyrotoxicosis. When hypothyroidism is a cause or contributing factor to a myocardial infarction or heart disease, the physician may prescribe small doses of thyroid hormone.

PRECAUTIONS

These drugs are used cautiously in patients with Addison's disease and during lactation. The thyroid hormones are classified as Pregnancy Category A and are considered safe to use during pregnancy.

INTERACTIONS

When administered with cholestyramine or colestipol there is a decreased absorption of the oral thyroid preparations. These drugs should not be administered within 4 of 6 hours of the thyroid hormones. When administered with the oral anticoagulants there is an increased risk of bleeding. It may be advantageous to decrease the dosage of the anticoagulant when a thyroid preparation is prescribed. There is a decreased effectiveness of the digitalis preparation if taken with a thyroid preparation.



SUMMARY DRUG TABLE THYROID AND ANTITHYROID DRUGS

GENERIC NAME	TRADE NAME*	USES	ADVERSE REACTIONS	DOSAGE RANGES
Thyroid Hormones				
levothyroxine sodium (T ₄) lee-voe-thye- rox'-een	Eltroxin, Levo-T Levothroid, Levoxyl, Synthroid, <i>generic</i>	Hypothyroidism, thyrotoxicosis	Palpitations, tachycardia, headache, nervousness, insomnia, diarrhea, vomiting, weight loss, sweating, heat intolerance	0.025–0.3 mg/d PO; 0.05–0.1 mg IV; 0.05 mg initially, increase by 0.025 mg PO & 2–3wk; maintenance dose, 0.2 mg/d, may subsitute IV IM
liothyronine sodium (T ₃) lye'-oh-thye'- roe-neen	Cytomel, <i>generic</i> Trio stat	Hypothyroidism, thyrotoxicosis	Same as levothyroxine	5–75 mcg/d PO, 25–50 μg IV q4–12h
liotrix (T ₂ , T ₄) <i>lye'-oh-trix</i>	Thyrolar	Hypothyroidism, thyrotoxicosis	Same as levothyroxine	15-120 mg/d PO
thyroid desiccated thye'-roid	Armour Thyroid, <i>generic</i>	Hypothyroidism, thyrotoxicosis	Same as levothyroxine	65–195 mg/d PO
Antithyroid Preparations				
methimazole meth-im-a-zole	Tapazole, generic	Hyperthyroidism	Agranulocytosis, headache, exfoliative dermatitis, granulocytopenia, thrombocytopenia, hepatitis, hypoprothrombinemia, jaundice, loss of hair, nausea, vomiting	15-60 mg/d
propylthiouracil (PTU) proe-pill-thye- oh-yoor'-a-sill	PTU generic	Same as methimazole	Same as methimazole	300–900 mg/d PO, usually in divided doses at about 8-h intervals
Iodine Products				
strong iodine solution eye'-oh-dine	Lugol's Solution, Thyro-Block, generic	To prepare hyperthyroid patients for thyroid surgery, thyrotoxic crisis, thyroid blocking in radiation therapy	Rash, swelling of salivary glands, 'iodism" (metallic taste, burning mouth and throat, sore teeth and gums, symptoms of a head cold, diarrhea, nausea), allergic reactions (fever, joint pains, swelling of parts of face and body)	2–6 drops PO TID for 10 d before surgery; 130 mg/d PO
Sodium iodine (¹³¹ I) so'-de-um, eye'-oh-dide	lodotope, <i>generic</i>	Thyrotoxicosis, selected cases of thyroid cancer	Bone marrow depression, anemia, blood dyscrasias, nausea, vomiting, tachycardia, itching, rash, hives, tenderness and swelling of the neck, sore throat, and cough	Measured by a radioactivity calibration system before administering PO 4–10 mCi; thyroid cancer: 50–150 mCi

The Patient Receiving a Thyroid Hormone

ASSESSMENT

Preadministration Assessment

After a patient receives a diagnosis of hypothyroidism and before therapy starts, the nurse takes vital signs and weighs the patient. A history of the patient's signs and symptoms is obtained. The nurse performs a general physical assessment to determine outward signs of hypothyroidism.

💥 Gerontologic Alert

The symptoms of hypothyroidism may be confused with symptoms associated with aging, such as depression, cold intolerance, weight gain, confusion, or unsteady gait. The presence of these symptoms should be thoroughly evaluated and documented in the preadministration assessment and periodically throughout therapy.

Ongoing Assessment

The full effects of thyroid hormone replacement therapy may not be apparent for several weeks or more, but early effects may be apparent in as little as 48 hours. During the ongoing assessment, the nurse monitors the vital signs daily or as ordered and observes the patient for signs of hyperthyroidism, which is a sign of excessive drug dosage. Signs of a therapeutic response include weight loss, mild diuresis, a sense of well-being, increased appetite, an increased pulse rate, an increase in mental activity, and decreased puffiness of the face, hands, and feet.

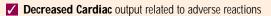
NURSING DIAGNOSES

Drug-specific nursing diagnoses are highlighted in the Nursing Diagnoses Checklist. Other nursing diagnoses applicable to these drugs are discussed in depth in Chapter 4.

PLANNING

The expected outcomes of the patient may include an optimal response to therapy, identification of adverse reactions, and an understanding of and compliance with the prescribed therapeutic regimen.

Nursing Diagnoses Checklist



Anxiety related to symptoms, adverse reactions, treatment regimen, other (specify)

IMPLEMENTATION

Promoting an Optimal Response to Therapy

Thyroid hormones are administered once a day, early in the morning and preferably before breakfast. An empty stomach increases the absorption of the oral preparation. Levothyroxine (Synthroid) also can be given intravenously and is prepared for administration immediately before use.

The dosage is individualized to the needs of the patient. The dose of thyroid hormones must be carefully adjusted according to the patient's hormone requirements. At times, several upward or downward dosage adjustments must be made until the optimal therapeutic dosage is reached and the patient becomes euthyroid.

Some patients may exhibit anxiety related to the symptoms of their disorder, as well as concern about relief of their symptoms. The patient should be reassured that although relief may not be immediate, symptoms should begin to decrease or even disappear in a few weeks.

Monitoring and Managing Adverse Reactions

The nurse monitors the patient for any adverse reactions, especially during the initial stages of dosage adjustment. The nurse notifies the primary health care provider if the patient experiences these or any adverse drug reactions. If the dosage is inadequate the patient will continue to experience signs of hypothyroidism (see Table 51-1). If the dosage is excessive, the patient will exhibit signs of hyperthyroidism.

Nursing Alert

If signs of hyperthyroidism (eg, nervousness, anxiety, increased appetite, elevated body temperature, tachycardia, moderate hypertension or flushed, warm, moist skin) are apparent, the nurse reports these to the primary health care provider before the next dose is due because it may be necessary to decrease the daily dosage.

Thyroid hormone replacement therapy in patients with diabetes may increase the intensity of the symptoms or the diabetes. The nurse closely monitors the patient with diabetes during thyroid hormone replacement therapy for signs of hyperglycemia (see Chap. 49) and notifies the primary health care provider if this problem occurs.

The nurse carefully observes patients with cardiovascular disease taking the thyroid hormones. The development of chest pain or worsening of cardiovascular disease should be reported to the primary health care provider immediately because the patient may require a reduction in the dosage of the thyroid hormone.



Gerontologic Alert

Older adults are more sensitive to thyroid hormone replacement therapy and are more likely to experience adverse reactions when taking the thyroid hormones. In addition, the elderly are at increased risk for adverse cardiovascular reactions when taking thyroid drugs. The initial dosage is smaller for an older adult, and increases, if necessary, are made in smaller increments during a period of about 8 weeks. Periodic thyroid function tests are necessary to monitor drug therapy. Dosage may need to be reduced with age. If the pulse rate is 100 bpm or more, the nurse notifies the primary health care provider before the drug is administered.

Educating the Patient and Family

Thyroid hormones are usually given on an outpatient basis. The nurse emphasizes the importance of taking the drug exactly as directed and not stopping the drug even though symptoms have improved. The nurse provides the following information to the patient and family when thyroid hormone replacement therapy is prescribed:

- Replacement therapy is for life, with the exception of transient hypothyroidism seen in those with thy-
- Do not increase, decrease, or skip a dose unless advised to do so by the primary health care provider.
- Take this drug in the morning, preferably before breakfast, unless advised by the primary health care provider to take it at a different time of day.
- Notify the primary health care provider if any of the following occur: headache, nervousness, palpitations, diarrhea, excessive sweating, heat intolerance, chest pain, increased pulse rate, or any unusual physical change or event.
- The dosage of this drug may require periodic adjustments; this is normal. Dosage changes are based on a response to therapy and thyroid function tests.
- Therapy needs to be evaluated at periodic intervals, which may vary from every 2 weeks during the beginning of therapy to every 6 to 12 months once symptoms are controlled. Periodic thyroid function tests will be needed.
- Weigh yourself weekly and report any significant weight gain or loss to the primary health care
- Do not change from one brand of this drug to another without consulting the primary health care provider.

EVALUATION

- The therapeutic effect is achieved.
- Adverse reactions are identified and reported to the primary health care provider.
- The patient verbalizes the importance of complying with the prescribed treatment regimen.

- The patient verbalizes an understanding of the treatment modalities and importance of continued follow-up care.
- The patient and family demonstrate an understanding of the drug regimen.

ANTITHYROID DRUGS

Antithyroid drugs or thyroid antagonists are used to treat hyperthyroidism. In addition to the antithyroid drugs, hyperthyroidism may be treated by the administration of strong iodine solutions, use of radioactive iodine (131I), or by surgical removal of some or almost all of the thyroid gland (subtotal thyroidectomy).

ACTIONS

Antithyroid drugs inhibit the manufacture of thyroid hormones. They do not affect existing thyroid hormones that are circulating in the blood or stored in the thyroid gland. For this reason, therapeutic effects of the antithyroid drugs may not be observed for 3 to 4 weeks. Antithyroid drugs are listed in the Summary Drug Table: Thyroid and Antithyroid Drugs.

Strong iodide solutions act by decreasing the vascularity of the thyroid gland by rapidly inhibiting the release of the thyroid hormones. Radioactive iodine is distributed within the cellular fluid and excreted. The radioactive isotope accumulates in the cells of the thyroid gland, where destruction of thyroid cells occurs without damaging other cells throughout the body.

USES

Methimazole (Tapazole) and propylthiouracil (PTU) are used for the medical management of hyperthyroidism. Not all patients respond adequately to antithyroid drugs; therefore, a thyroidectomy may be necessary. Antithyroid drugs may be administered before surgery to temporarily return the patient to a euthyroid state. When used for this reason, the vascularity of the thyroid gland is reduced and the tendency to bleed excessively during and immediately after surgery is decreased.

Strong iodine solution, also known as Lugol's solution, may be given orally with methimazole or propylthiouracil to prepare for thyroid surgery. Iodine solutions are also used for rapid treatment of hyperthyroidism because they can decrease symptoms in 2 to 7 days. Radioactive iodine (131I) may be used for treatment of hyperthyroidism and selected cases of cancer of the thyroid. The drug is given orally either as a solution or in a gelatin capsule.

ADVERSE REACTIONS

Methimazole and Propylthiouracil

The most serious adverse reaction associated with these drugs is agranulocytosis (decrease in the number of white blood cells [eg, neutrophils, basophils, and eosinophils]). Reactions observed with agranulocytosis include hay fever, sore throat, skin rash, fever, or headache. Other major reactions include exfoliative dermatitis, granulocytopenia, aplastic anemia, hypoprothrombinemia, and hepatitis. Minor reactions, such as nausea, vomiting, and paresthesias, also may be seen.

Strong Iodine Solutions

Reactions that may be seen with strong iodine solution include symptoms of **iodism** (excessive amounts of iodine in the body), which are a metallic taste in the mouth, swelling and soreness of the parotid glands, burning of the mouth and throat, sore teeth and gums, symptoms of a head cold, and occasionally gastrointestinal upset. Allergy to iodine may also be seen and can be serious. Symptoms of iodine allergy include swelling of parts of the face and body, fever, joint pains, and sometimes difficulty in breathing. Difficulty breathing requires immediate medical attention.

Radioactive Iodine (131 I)

Reactions after administration of ¹³¹I include sore throat, swelling in the neck, nausea, vomiting, cough, and pain on swallowing. Other reactions include bone marrow depression, anemia, leukopenia, thrombocytopenia, and tachycardia.

CONTRAINDICATIONS

The antithyroid drugs are contraindicated in patients with hypersensitivity to the drug or any constituent of the drug. Methimazole and propylthiouracil are contraindicated during pregnancy and lactation. Radioactive iodine is contraindicated during pregnancy (Pregnancy Category X) and lactation.

PRECAUTIONS

Methimazole and propylthiouracil are used with extreme caution during pregnancy (Pregnancy Category D) because they can cause hypothyroidism in the fetus. However, if an antithyroid drug is necessary during pregnancy or lactation, propylthiouracil is the drug most often prescribed. In many pregnant women thyroid dysfunction

diminishes as the pregnancy proceeds, making a dosage reduction possible. Methimazole and propylthiouracil are used cautiously in patients older than 40 years because there is an increased risk of agranulocytosis and in patients with a decrease in bone marrow reserve (eg, after radiation therapy for cancer). Strong iodine preparations (except ¹³¹I) are classified as Pregnancy Category D and are used cautiously during pregnancy.

INTERACTIONS

There is an additive bone marrow depression when methimazole or propylthiouracil is administered with other bone marrow depressants, such as the antineoplastic drugs, or with radiation therapy. When methimazole is administered with digitalis, there is an increased effectiveness of the digitalis and increased risk of toxicity. There is an additive effect of propylthiouracil when the drug is administered with lithium, potassium iodide, or sodium iodide. When iodine products are administered with lithium products, synergistic hypothyroid activity is likely to occur.

NURSING PROCESS

The Patient Receiving an Antithyroid Drug

ASSESSMENT

Preadministration Assessment

Before a patient starts therapy with an antithyroid drug, the nurse obtains a history of the symptoms of hyperthyroidism. It is important to include vital signs, weight, and a notation regarding the outward symptoms of the hyperthyroidism (see Table 51-1) in the physical assessment. If the patient is prescribed an iodine solution, it is essential that the nurse take a careful allergy history, particularly to iodine or seafood (which contains iodine).

Ongoing Assessment

During the ongoing assessment, the nurse observes the patient for adverse drug effects. During short-term therapy before surgery, adverse drug reactions are usually minimal. Long-term therapy is usually on an outpatient basis. The nurse questions the patient regarding relief of symptoms, as well as signs or symptoms indicating an adverse reaction related to the blood cells, such as fever, sore throat, easy bruising or bleeding, fever, cough, or any other signs of infection. As the patient becomes euthyroid, signs and symptoms of hyperthyroidism become less obvious. The nurse observes the patient for signs of **thyroid storm** (high fever, extreme tachycardia, and altered mental status), which can occur in patients whose hyperthyroidism is inadequately treated.

Nursing Diagnoses Checklist

- **Risk for Infection** related to adverse drug reactions
- Risk for Impaired Skin Integrity related to adverse reactions

NURSING DIAGNOSES

Drug-specific nursing diagnoses are highlighted in the Nursing Diagnoses Checklist. Other nursing diagnoses applicable to these drugs are discussed in depth in Chapter 4.

PLANNING

The expected outcomes of the patient may include an optimal response to therapy, identification and management of adverse reactions, and an understanding of and compliance with the prescribed drug regimen.

IMPLEMENTATION

Promoting an Optimal Response to Therapy

The patient with an enlarged thyroid gland may have difficulty swallowing the tablet. If this occurs, the nurse discusses the problem with the primary health care provider. Strong iodine solution is measured in drops, which are added to water or fruit juice. This drug has a strong, salty taste. The patient is allowed to experiment with various types of fruit juices to determine which one best disguises the taste of the drug. Iodine solutions should be drunk through a straw because they may cause tooth discoloration.

Radioactive iodine is given by the primary health care provider, orally as a single dose. The effects of iodides are evident within 24 hours, with maximum effects attained after 10 to 15 days of continuous therapy. If the patient is hospitalized, radiation safety precautions identified by the hospital's department of nuclear medicine are followed.

Once a euthyroid state is achieved, the primary health care provider may add a thyroid hormone to the therapeutic regimen to prevent or treat hypothyroidism, which may develop slowly during long-term antithyroid drug therapy or after administration of ¹³¹I.

The patient with hyperthyroidism is likely to have cardiac symptoms such as tachycardia or palpitations. Propranolol, a adrenergic blocking drug (see Chap. 21), may be prescribed by the primary health care provider as adjunctive treatment for several weeks until the therapeutic effects of the antithyroid drug are obtained.

The patient with hyperthyroidism may be concerned with the results of medical treatment and with the problem of taking the drug at regular intervals around the clock (usually every 8 hours). Whereas some patients may be awake early in the morning and retire late at night, others may experience difficulty in an 8-hour

dosage schedule. Another concern may be a tendency to forget the first dose early in the morning, thus causing a problem with the two following doses.

If the patient expresses a concern about the dosage schedule, the nurse may be able to offer suggestions. For example, the nurse suggests the following 8-hour interval schedule: 7 AM, 3 PM, and 11 PM. The nurse may also suggest posting a notice on a bathroom mirror to remind the individual that the first dose is due immediately after rising. After a week or more of therapy, most patients remember to take their morning dose on time. If the first or last dose interferes with sleep, the nurse should suggest the patient discuss this with the primary health care provider.

Monitoring and Managing Adverse Drug Reactions

The nurse monitors the patient throughout therapy for adverse drug reactions. The nurse monitors the patient frequently for signs of agranulocytosis. It is important that the patient be protected from individuals with infectious disease because if agranulocytosis is present, the patient is at increased risk of contracting any infection, particularly an upper respiratory infection. The nurse monitors for signs of infection, particularly upper respiratory infection in visitors and other health care personnel.



Agranulocytosis is potentially the most serious adverse reaction to methimazole and propylthiouracil. The nurse notifies the primary health care provider if fever, sore throat, rash, headache, hay fever, yellow discoloration of the skin, or vomiting occurs.

If the patient experiences a rash while taking methimazole or propylthiouracil, the nurse carefully documents the affected areas, noting size, texture, and extent of the rash, and reports the occurrence of the rash to the primary health care provider. Soothing creams or lubricants may be applied, and soap is used sparingly, if at all, until the rash subsides.

When iodine solutions are administered, the nurse observes the patient closely for symptoms of iodism and iodine allergy (see Adverse Reactions). If these occur, the nurse withholds the drug and immediately notifies the primary health care provider. This is especially important if swelling around or in the mouth or difficulty in breathing occurs.

Educating the Patient and Family

The nurse reviews with the patient and family the dosage and times the drug is to be taken. The following additional teaching points are included in a teaching plan.

- Take these drugs at regular intervals around the clock (eg, every 8 hours) unless directed otherwise by the primary health care provider.
- Do not take these drugs in larger doses or more frequently than as directed on the prescription container.
- Notify the primary health care provider promptly if any of the following occur: sore throat, fever, cough, easy bleeding or bruising, headache, or a general feeling of malaise.
- Record weight twice a week and notify the primary health care provider if there is any sudden weight gain or loss. (Note: the primary health care provider may also want the patient to monitor pulse rate. If this is recommended, the patient needs instruction in the proper technique and a recommendation to record the pulse rate and bring the record to the primary health care provider's office or clinic.)
- Avoid the use of nonprescription drugs unless the primary health care provider has approved the use of a specific drug.

STRONG IODINE SOLUTION

- Dilute the solution with water or fruit juice. Fruit juice often disguises the taste more than water does.
 Experiment with the types of fruit juice that best reduce the unpleasant taste of this drug.
- Discontinue the use of this drug and notify the primary health care provider if any of the following occur: skin rash, metallic taste in the mouth, swelling and soreness in front of the ears, sore teeth and gums, severe gastrointestinal distress, or symptoms of a head cold.

RADIOACTIVE IODINE

- Follow the directions of the department of nuclear medicine regarding precautions to be taken. (Note: In some instances, the dosage is small and no special precautions may be necessary.)
- Thyroid hormone replacement therapy may be necessary if hypothyroidism develops.
- Follow-up evaluations of the thyroid gland and the effectiveness of treatment with this drug are necessary.

EVALUATION

- The therapeutic effect is achieved.
- Adverse reactions are identified and reported to the primary health care provider.
- Anxiety is reduced.
- The patient verbalizes an understanding of the dosage regimen.
- The patient verbalizes the importance of complying with the prescribed treatment regimen.
- The patient and family demonstrate an understanding of the drug regimen.

Critical Thinking Exercises

- 1. Ms. Hartman, age 47 years, has been prescribed levothyroxine (Synthroid) for hypothyroidism. Develop a teaching plan for Ms. Hartman that would provide her with the knowledge she needs to maintain a therapeutic treatment regimen.
- 2. Mr. Conrad will receive a dose of radioactive iodine from the primary health care provider. Discuss how you would prepare Mr. Conrad before the drug is administered. In preparation for dismissal, analyze the most important points to stress to Mr. Conrad about radioactive iodine.
- 3. Ms. Coker, age 38 years, is prescribed methimazole for hyperthyroidism. Discuss important preadministration assessments for Ms. Coker.

Review Questions

- 1. What adverse reaction is most likely to occur in the early days of therapy in a patient taking a thyroid hormone?
 - A. Congestive heart failure
 - B. Hyperthyroidism
 - C. Hypothyroidism
 - D. Euthyroidism
- 2. The nurse informs the patient that therapy with a thyroid hormone may not produce a therapeutic response for ______.
 - **A**. 24 to 48 days
 - B. 1 to 3 days
 - C. several weeks or more
 - D. 8 to 12 months
- 3. Which of the following symptoms best indicates that serious adverse reactions are developing in a patient receiving methimazole (Tapazole)?
 - **A**. Fever, sore throat, bleeding from an injection site
 - B. Cough, periorbital edema, constipation
 - C. Constipation, anorexia, blurred vision
 - D. Unsteady gait, blurred vision, insomnia
- 4. Which of the following statements made by a patient would indicate to the nurse that the patient is experiencing an adverse reaction to radioactive iodine?
 - A. "I am sleepy most of the day."
 - B. "I am unable to sleep at night."
 - C. "My throat hurts when I swallow."
 - D. "My body aches all over."

Medication Dosage Problems

- 1. Methimazole 60 mg is prescribed. The drug is available in 10-mg tablets. The nurse administers _____.
- 2. Levothyroxine 0.2 mg PO is prescribed. Available are 0.1 mg tablets. The nurse administers _____.