When serum bilirubin levels are drawn, the results are usually reported as the total bilirubin, direct bilirubin, and indirect bilirubin levels. Most bilirubin is formed from hemoglobin, as aging or abnormal RBCs are removed from circulation and destroyed. It is then bound to protein and transported to the liver. This protein-bound bilirubin is called indirect or unconjugated bilirubin. Once in the liver, bilirubin is separated from the protein and converted to a soluble form, direct or conjugated bilirubin. Conjugated bilirubin is then excreted in the bile.

- **Total** (serum) bilirubin, the total bilirubin in the blood, includes both indirect and direct forms. In adults, the normal total bilirubin is 0.3 to 1.2 mg/dL or 5 to 21 µmol/L. Total bilirubin levels increase when more is being produced (e.g., RBC hemolysis), or when its metabolism or excretion are impaired (e.g., liver disease or biliary obstruction).
- **Direct** (conjugated) bilirubin levels, normally 0 to 0.2 mg/dL or 1 to 5.1 µmol/L in adults, rise when its excretion is impaired by obstruction within the liver (e.g., in cirrhosis, hepatitis, exposure to hepatotoxins) or in the biliary system.
- **Indirect** (unconjugated) bilirubin levels, normally <1.1 mg/dL or <19 µmol/L in adults, rise in RBC hemolysis (e.g., sickle cell disease or transfusion reaction).

Ursodiol (Actigall) and chenodiol (Chenix) reduce the cholesterol content of gallstones, leading to their gradual dissolution. These drugs are most effective in treating stones with high cholesterol content. They are less effective in treating radiopaque stones with high calcium salt content. Ursodiol is generally well tolerated with few side effects, while chenodiol has a high incidence of diarrhea at therapeutic doses. It also is hepatotoxic, so periodic liver function studies are required during therapy.

The primary disadvantages of pharmacologic treatment for gallstones include its cost, long duration (2 years or more), the high incidence of recurrent stone formation when treatment is discontinued. If infection is suspected, antibiotics may be ordered to cure the infection and reduce associated inflammation and edema. Clients with pruritus (itching) due to severe obstructive jaundice and an accumulation of bile salts on the skin may be given cholestyramine (Questran). This drug binds with bile salts to promote their excretion in the feces. A narcotic analgesic such as morphine may be required for pain relief during an acute attack of cholecystitis.

**Treatments**

**Surgery**

**Laparoscopic cholecystectomy** (removal of the gallbladder) is the treatment of choice for symptomatic cholelithiasis or cholecystitis. This minimally invasive procedure has a low risk of complications and generally requires a hospital stay of less than 24 hours. Not all clients are candidates for laparoscopic cholecystectomy, and there is a risk that a laparoscopic cholecystectomy may be converted to a laparotomy (surgical opening into the abdomen) during the procedure. See the box below for nursing care for a client having laparoscopic cholecystectomy.

When stones are lodged within the ducts, a **cholecystostomy** with common bile duct exploration may be done. A T-tube (Figure 22–2 ■) is inserted to maintain patency of the duct and promote bile passage while the edema decreases. Excess bile is collected in a drainage bag secured below the surgical site. If it is suspected that a stone has been retained following surgery, a postoperative cholangiogram via the T-tube or direct visualization of the duct with an endoscope may be performed. See page 577 for nursing care for a client with a T-tube.

Some clients who are poor surgical risks and for whom laparoscopic cholecystectomy is inappropriate may have either a **cholecystostomy** to drain the gallbladder, or a **choledochostomy** to remove stones and position a T-tube in the common bile duct.

**Dietary Management**

Food intake may be eliminated during an acute attack of cholecystitis, and a nasogastric tube inserted to relieve nausea and vomiting. Dietary fat intake may be limited, especially if the

---

**NURSING CARE FOR THE CLIENT WITH LAPAROSCOPIC CHOLECYSTECTOMY**

**BEFORE SURGERY**

- Provide routine preoperative care as ordered (see Chapter 7).
- Reinforce teaching about the procedure and postoperative expectations, including pain management, deep breathing, and mobilization. Preoperative teaching reduces anxiety and promotes rapid postoperative recovery.

**AFTER SURGERY**

- Provide routine postoperative recovery care as outlined in Chapter 7.
- Assist to chair at bedside as allowed. Early mobilization promotes lung ventilation and circulation, reducing the potential for postoperative complications.
- Advance oral intake from ice chips to regular diet as tolerated. Oral intake can be rapidly resumed due to minimal disruption of the gastrointestinal tract during surgery.
- Provide and reinforce teaching: pain management, incision care, activity level, postoperative follow-up appointments. With early discharge, the client and family assume responsibility for the majority of postoperative care. A clear understanding of this care and expected needs reduces anxiety and the risk of postoperative complications.
- Initiate follow-up contact 24 to 48 hours after discharge to evaluate adequacy of pain control, incision management, and discharge understanding. Contact following discharge provides an opportunity to evaluate care and reinforce teaching.