Care of a Client with Biliary Disorders

Understanding biliary disorders, nursing management, and prevention of complications.

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The Gallbladder
Introduction

Most disorders of the biliary tract result from gallstones. Gallstones in the gallbladder (Cholelithiasis) are usually asymptomatic. Bile flow may be blocked by gallstones in the bile ducts (choledocholithiasis) triggering biliary colic or causing inflammation of the gallbladder (cholecystitis). Cholecystitis may be acute, developing over hours, or chronic, persisting for a long time. Gallstones can also block the flow of digestive enzymes from the pancreas resulting in inflammation of the pancreas (gallstone pancreatitis).

Burden of gallstone disease

Gallstone disease is one of the most common and costly of all digestive diseases. More than 20 million persons have gallbladder disease in the United States. The direct and indirect cost of gallbladder disease represents a consumption of ~$6.2 billion annually in the U.S., constituting a major health burden that has increased more than 20% over the last 3 decades. With an estimated 1.8 million ambulatory care visits each year, gallstone disease is a leading cause for hospital admissions related to gastrointestinal problems. The mortality rate for gallstones disease is relatively low at 0.6%.

Learning objectives

- Identify the common causes of cholecystitis and cholelithiasis (gallbladder disease).
- Differentiate the symptoms of acute cholecystitis from chronic cholecystitis.
- Discuss the management of acute cholecystitis.
- Develop a postoperative plan of care for clients undergoing cholecystectomy.

Structure and Functions of the biliary tract

The biliary tract consists of small tubes (ducts) that carry bile from the liver to the gallbladder and then to the small intestine. The gallbladder is a small, pear-shaped sac located beneath the liver.

Bile has two main functions: aiding in digestion and eliminating certain waste products (mainly hemoglobin and excess cholesterol) from the body. Bile salts aid in digestion by making cholesterol, fats, and fat-soluble vitamins easier to absorb from the intestine. The main pigment in bile, bilirubin, is a waste product that is formed from hemoglobin (the protein that carries oxygen in the blood) and is excreted in bile. Hemoglobin is released when old or damaged red blood cells are destroyed.

Bile flows out of the liver through the left and right hepatic ducts, which come together to form the common hepatic duct. This duct then joins with a duct connected to the gallbladder, called the cystic duct, to form the common bile
duodenum. The common bile duct enters the small intestine at the sphincter of Oddi (a ring-shaped muscle), located a few inches below the stomach. About half the bile secreted between meals flows directly through the common bile duct into the small intestine. The rest of the bile is diverted through the cystic duct into the gallbladder to be stored. In the gallbladder, up to 90% of the water in bile is absorbed into the bloodstream, making the remaining bile very concentrated.

Eating releases gut hormones and stimulates cholinergic nerves, causing the gallbladder to contract and the sphincter of Oddi to relax. Bile then flows from the gallbladder into the small intestine to mix with food contents and perform its digestive functions. About 90% of bile salts are reabsorbed into the bloodstream through the wall of the lower small intestine, the rest are broken down by bacteria in the large intestine. Some are reabsorbed in the large intestine and the rest excreted in stool. Bile flow can be blocked or slowed (cholestasis) by tumors. Cholestasis can also lead to inflammation, fibrosis, and strictures of the bile ducts (sclerosing cholangitis).

**Gallstones (Cholelithiasis)**

Cholelithiasis is the presence of one or more calculi (gallstones) in the gallbladder. Gallstones are collections of cholesterol, bile pigment or a combination of the two, which can form in the gallbladder or within the bile ducts of the liver. In the United States, the most common type of gallstones are made of cholesterol.

**Risk factors for Gallstones**

Female gender, older age, family history, obesity, high blood cholesterol levels, drugs such as estrogen containing medications, ceftriaxone, and thiazide diuretics, rapid weight loss, total parenteral nutrition or fasting, sedentary lifestyle, gallbladder diabetes and pregnancy are all risk factors for
developing cholesterol gallstones. Disorders that lead to the destruction of red blood cells such as sickle cell anemia are associated with the development of pigmented or bilirubin stones. The occurrence of gallstones varies widely among different ethnic groups.

**Symptoms Gallstones**

Gallstones in the gallbladder are usually asymptomatic and requires no treatment. The most common symptom is biliary colic. Symptoms arise when a gallstone blocks the flow of bile out of the gallbladder or through the bile ducts. Choledocholithiasis (gallstone in the common bile duct) may cause intermittent or constant discomfort.

- Pain localized in the upper abdomen, which may radiate to the right shoulder, may last from 30 minutes to hours.
- May be associated with sweating, nausea, vomiting.
- Gallstone attacks can produce chest pain that may feel like a heart attack.
- An inflamed gallbladder (cholecystitis), infected material trapped within the common bile duct (cholangitis), or gallstone pancreatitis can result in fever, chills, severe abdominal pain or jaundice.

**Diagnosis**

- Gallstones is suspected when symptoms of right upper quadrant abdominal pain, nausea or vomiting occur.
- The location, duration and “character” (stabbing, gnawing, cramping) of the pain help to determine the likelihood of gallstone disease.
- Abdominal tenderness and abnormally high liver function blood tests may be present.
- Calculated gallstones are easily visualized on abdominal x-ray examination.
- Endoscopic retrograde cholangiopancreatography (ERCP).

**Treatment**

**Nonsurgical Management.**

- Asymptomatic stones are usually managed conservatively with no medical or surgical intervention.
- Acute pain occurs when the gallstones partially or totally obstruct the cystic or common bile duct.

There are no laboratory tests specific for gallbladder disease. Elevated serum levels of alkaline phosphatase, aspartate aminotransferase (AST), and lactate dehydrogenase (LDH) indicates abnormalities in liver.
• Measures aimed at resting the inflamed gallbladder are the same as those discussed for cholecystitis below.

• Diet Therapy
  o The client must adhere to a low-fat diet to prevent further pain of biliary colic.
  o Replacement of fat-soluble vitamins (such as vitamins A, D, E, and K) and the administration of bile salts to facilitate digestion and vitamin absorption may be ordered if gallstone is causing obstruction of bile flow.
  o NPO for nausea and vomiting.

Endoscopic retrograde cholangiopancreatography (ERCP) or surgery is used for the treatment of choledocholithiasis.

Pain management:
• Meperidine hydrochloride (Demerol) IV is usually given for biliary colic.
• Antispasmodic or anticholinergic drugs, such as dicyclomine hydrochloride (Bentyl), may be given to relax smooth muscles and decrease ductal tone and spasm.
• Antiemetics to control nausea and vomiting.
• Bile acid therapy dissolving gallstones, depending on the type of stones.

• This treatment is generally reserved for older adults who have mild or asymptomatic gallstone disease and those who are poor surgical risks. May take up to 2 years to dissolve gallstones. Adherence to therapy may be a problem for patients.

• Severe pruritus due to jaundice may be treated with Cholestyramine resin (Questran) binds with bile acids in the intestine, forming an insoluble compound that is excreted in the feces.
  o Instruct client to mix the powder form of the drug with fruit juices or milk. It should be taken before meals and at bedtime.

Extracorporeal Shock Wave Lithotripsy.

Extracorporeal shock wave lithotripsy is a noninvasive procedure that is used for ambulatory treatment of clients with gallstones in some settings. A machine—a lithotriptor—generates powerful shock waves to shatter the gallstones.

IV conscious sedation with fentanyl citrate (Alfenta, Sublimaze) or midazolam hydrochloride (Versed) may be used to minimize pain and help the client tolerate the procedure better.

Older clients should not be given Demerol, since it can cause acute confusion and nausea.
Percutaneous Transhepatic Biliary Catheter Insertion

May be done under fluoroscopic guidance. This procedure decompresses obstructed extrahepatic ducts so that bile can flow.

Surgical management

Cholecystectomy: Symptomatic clients require treatment, and laparoscopic cholecystectomy is the accepted first-line therapy (discussed below).

Cholecystitis

Inflammation of the gallbladder wall. May be acute or chronic.

Etiology

The exact etiology of cholecystitis is unknown. In addition to the formation of gallbladder calculi, causes of acute cholecystitis include severe acute illness and tumor.

Risk factors include:

- Being female
- Pregnancy
- Hormone therapy
- Older age
- Obesity
- Rapid weight loss or gain
- Diabetes

Acute Cholecystitis

Acute cholecystitis is inflammation of the gallbladder that develops over hours, usually due to obstruction of the cystic duct by a gallstone. Acute cholecystitis is the most common complication of cholelithiasis.

Pathophysiology of Acute cholecystitis

When a gallstone becomes impacted in the cystic duct and persistently obstructs it, acute inflammation results. Bile stasis triggers release of inflammatory enzymes. The damaged mucosa secretes more fluid into the gallbladder lumen than it absorbs. The resulting distention further releases inflammatory mediators (e.g., prostaglandins), worsening mucosal damage and causing ischemia, all of which perpetuate inflammation. Bacterial infection can supervene. The vicious circle of fluid secretion and inflammation, when unchecked, leads to necrosis and perforation. If acute inflammation resolves then continues to recur, the gallbladder becomes fibrotic and contracted and does not concentrate bile or empty normally—features of chronic cholecystitis.

In the elderly, symptoms of cholecystitis may be nonspecific (e.g., anorexia, vomiting, malaise, weakness), and fever may be absent.

Acute acalculous cholecystitis is cholecystitis without stones. It accounts for 5 to 10% of all cholecystitis. Commonly seen in critically ill patients or long term TPN therapy. Symptoms are similar to those of acute cholecystitis.
Symptoms include; right upper quadrant pain and tenderness, (Pain may radiate to the right shoulder or back) sometimes accompanied by fever, chills, nausea, and vomiting. With right subcostal palpation, pain increases with deep inspiration (Murphy’s sign). Pain triggered by high fat or high volume meal.

In chronic cholecystitis, clients may have insidious symptoms and may not seek medical treatment until late symptoms such as jaundice, clay-colored stools, and dark urine result from an obstructive process.

**Diagnosis**

- There are no laboratory tests specific for gallbladder disease. Acute cholecystitis is suspected based on symptoms and signs.
- Abdominal ultrasonography detects the gallstone and sometimes the associated inflammation. It is safe, accurate, and painless.
- Abdominal CT identifies complications such as gallbladder perforation or pancreatitis.
- Elevated lipase suggest bile duct obstruction.
- Elevated WBC indicate inflammation.
- Direct (conjugated) and indirect (unconjugated) serum bilirubin levels are elevated if an obstructive process is present.
- Serum and urine amylase levels are elevated if there is pancreatic involvement

**Treatment and Interventions**

Nonsurgical treatment measures prescribed during the acute phase of cholecystitis are directed at resting the inflamed gall-bladder in an effort to reduce the inflammatory process and relieve the pain. Acute cholecystitis is generally managed surgically because of the risk of sepsis and perforation. Acute cholecystitis begins to subside in 2 to 3 days and resolves within 1 wk. in 85% of patients even without treatment.

- Withholding food and fluids or modifying the diet by avoiding high-fat or high-volume meals. These dietary measures decrease stimulation of the gallbladder and help prevent pain, nausea, and vomiting.
- A nasogastric tube is inserted to empty the stomach contents in patients with severe nausea and vomiting.
- Antiemetics such as trimethobenzamide hydrochloride (Tigan), to relieve nausea and vomiting.
- IV fluids, antibiotics, and analgesics;
- Cholecystectomy is done when patients are stable.

Morphine is generally not given in the management of cholecystitis pain, because it can cause spasms of the sphincter of Oddi and increase pain.
• Pain management: severe pain opioid analgesics, such as meperidine hydrochloride (Demerol), to relieve abdominal pain and spasm.

• Antispasmodic agents, such as anticholinergics (e.g., dicyclomine hydrochloride [Bentyl, Lomine^]), may be used to relax the smooth muscles, preventing biliary contraction.

**Cholecystectomy:** The usual surgical treatment of clients with acute and chronic cholecystitis is cholecystectomy, the removal of the gallbladder.

**Complications**

• Perforation and peritonitis: Increasing abdominal pain, high fever, and rigors with rebound tenderness or ileus suggest empyema (pus) in the gallbladder, gangrene, or perforation.

• Acute cholecystitis accompanied by jaundice or cholestasis, is usually due to partial common duct obstruction.

• Gallstone pancreatitis due to biliary tract obstruction.

• Cholecystoenteric fistula

**Gallstone Pancreatitis**

Gallstone pancreatitis is inflammation of the pancreas that results from blockage of the pancreas duct by a gallstone. This occurs at the level of the sphincter of Oddi. If a stone from the gallbladder travels down the common bile duct and gets stuck at the sphincter, it blocks outflow of all material from the liver and pancreas. This results in inflammation of the pancreas that can be quite severe. Gallstone pancreatitis can be a life-threatening and evaluation by a physician urgently is needed if someone with gallstones suddenly develops severe abdominal pain.

**Risk factors and causes Gallstone Pancreatitis**

Risk factors for gallstone pancreatitis are similar to those described for gallstone disease.

**Symptoms Gallstone Pancreatitis**

Symptoms are similar to those discussed in gallstones but may be much severe. Pain may be felt in the left upper abdomen or in the back. It is usually sudden in onset, quite severe, frequently sharp or squeezing in character, and often associated with nausea and vomiting.

**Diagnosis Gallstone Pancreatitis**

![Abdominal CT scans: Reveals Inflammation of the pancreas and]
severity of the pancreatic inflammation.

- Abdominal ultrasound: to small gallstones not seen with CT scan.

**Treatment Gallstone Pancreatitis**

*(Will be discussed in more details under pancreatitis)*

- NPO until the inflammation subsides.
- Intravenous fluids is required if the inflammation is modest and symptoms resolve in a few days.
- Persistent pain or fevers suggest severe pancreatitis and ongoing inflammation.
- If oral intake cannot be resumed within approximately 5-7 days intravenous delivery of nutrients (TPN or PPN) should be started.
- Nasogastric tube should be inserted to relieve the stomach of fluid in severe nausea and vomiting.

Antiemetics may be given to relieve nausea and vomiting.

Pain management: IV until oral intake is resumed.

**Diagnosis and Tests**

Abdominal Ultrasound: initial diagnostic procedure. Biliary ultrasound reveals calculi, with gallbladder and/or bile duct distension.

MRCP (Magnetic resonance cholangiography)

ERCP (Endoscopic Retrograde Cholangiopancreatography): direct Visualization of the biliary tree by cannulation of the common bile duct through the duodenum.

Percutaneous transhepatic cholangiography (PTC): Fluoroscopic imaging distinguishes between gallbladder disease and cancer of the pancreas (when jaundice is present); supports the diagnosis of obstructive jaundice and reveals calculi in ducts.

Hepatobiliary (HIDA) scan (Cholescintigraphy): May be done to confirm diagnosis of cholecystitis, especially when barium studies are contraindicated.

Endoscopic Ultrasonography

Chest x-ray: Rule out respiratory causes of referred pain.

CBC: Moderate leukocytosis (acute).

**Nursing management**

Patient must be NPO at least 6 to 8 hours prior to ERCP.

Driving is not permitted for 12 to 24 hours after ERCP to allow the sedatives time to completely wear off.

**Post-op care after cholecystectomy**

- Relieve post-op pain
- Assess respiratory status
- Wound care
- Drain care.

**T-Tube care**
T-tube placement is a simple procedure that is used to control biliary drainage by placing a tube shaped like a T into the common bile duct after a cholecystectomy. This tube is inserted with the intention of preventing the build-up of bile in the common bile duct due to temporary swelling after the surgery. The build-up of bile along with the swelling can potentially prevent the healing of the bile duct resulting in a leakage of bile from the common bile duct into the abdominal cavity, which can be potentially life-threatening if not recognized and treated appropriately.

- Ensure that the T-tube is properly connected to a sterile container; keep the tube below the level of the surgical wound. This position promotes the flow of bile and prevents backflow or seepage of caustic bile onto the skin.
- Monitor drainage from the T-tube for color and consistency; record as output. Normally, the tube may drain up to 500 mL in the first 24 hours after surgery; drainage decreases to less than 200 mL in 2 to 3 days, and is minimal thereafter. Drainage may be blood tinged initially, changing to green-brown. Report excessive drainage immediately (after 48 hours, drainage greater than 500 mL is considered excessive). Stones or edema and inflammation can obstruct ducts below the tube, requiring treatment.
  - Place in Fowler’s position. This promotes gravity drainage of bile.
  - Assess skin for bile leakage during dressing changes. Bile irritates the skin; it may be necessary to apply skin protection. Observe the incision and tube insertion site for s/s of infection.
  - Note and report any right upper abdominal quadrat pain, nausea and vomiting, bile drainage around the tube and any changes in vital signs.
  - Teach client how to manage the tube when turning, ambulating, and performing activities of daily living. Direct pulling or traction on the tube must be avoided.
  - If indicated, teach care of the T-tube, how to clamp it, and signs of infection.
  - Never irrigate, clamp or aspirate the T-tube without a physician’s order.
  - When client is allowed to eat, clamp the t-tube for 1 to 2 hours before and after meal as prescribed by the physician. (This allows bile to be delivered into the duodenum to aid in digestion).
  - Clients may be discharged home with the tube in place. Reporting early signs of infection facilitates prompt treatment.
After T-tube removal patients must be monitored closely for s/s of bile leakage (Bile peritonitis). The symptoms of bile leakage include; Severe abdominal pain, nausea; vomiting, fever, and jaundice. This can lead to organ failure and death.

**Nutrition after cholecystectomy**

After cholecystectomy some people develop frequent loose, watery stools that lasts from a few weeks to a few months. After cholecystectomy bile is less concentrated and drains more continuously into the intestines, where it can have a laxative effect. To help mitigate this effect the nurse should advise client to;

- Eat smaller amounts of fat at a time easier to digest. Large amounts of fat can remain undigested and cause gas, bloating and diarrhea.
- Avoid high-fat foods, fried and greasy foods, and fatty sauces and gravies for at least a week after surgery.
- Choose fat-free or low-fat foods.
- Increase the intake of soluble fiber in diet.
- Eat smaller, more-frequent well balanced meals (lean protein, such as poultry, fish or fat-free dairy, along with vegetables, fruits and whole grains).
- Limit intake of foods that tend to worsen diarrhea, such as Caffeine, Dairy products, Greasy foods, Very sweet foods.

If the diarrhea does not improve Anti-diarrheal loperamide (Imodium A-D), or cholestyramine (Prevalite) that decrease the laxative effect of bile, may be ordered by the HCP.

**Patient education**

In postoperative teaching and discharge planning, the nurse should include a supportive spouse, family member, or significant other to provide reinforcement of information and to assist the client in adhering to the treatment plan. With a cholecystectomy, discharge teaching for the client and the family may include the following;

- Pain management
- Diet therapy
- Wound, drain, and incision care
- Activity restrictions
- Recognition of complication
- Health care follow-up
Table 1: Acute vs Chronic Cholecystitis

<table>
<thead>
<tr>
<th>Acute Cholecystitis</th>
<th>Chronic Cholecystitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute cholecystitis is the sudden inflammation of the galbladder that causes marked abdominal pain, often with nausea, vomiting, and fever.</td>
<td>Chronic cholecystitis is a lower intensity inflammation of the gallbladder that lasts a long time. It may be caused by repeat attacks of acute cholecystitis.</td>
</tr>
<tr>
<td>An attack subsides in 2 to 3 days and completely resolves in a week.</td>
<td>People with chronic cholecystitis have recurring attacks of pain.</td>
</tr>
<tr>
<td>Fever occurs in about one third of people with acute cholecystitis.</td>
<td>Fever rarely occurs in people with chronic cholecystitis.</td>
</tr>
<tr>
<td>Right upper abdominal pain associated with nausea and vomiting</td>
<td>Pain is less severe than the pain of acute cholecystitis and does not last as long.</td>
</tr>
<tr>
<td>Acute pain lasts more than 6 hours and often more than 12 hours.</td>
<td>Jaundice, clay colored stool, and dark urine steatorrhea is common</td>
</tr>
<tr>
<td>The pain peaks after 15 to 60 minutes and remains constant.</td>
<td>Inflammation is followed by fibrosis</td>
</tr>
<tr>
<td>Pain often extends to the lower part of the right shoulder blade or to the back.</td>
<td>Chronic cholecystitis requires the removal of the gallbladder surgically.</td>
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</tbody>
</table>

Figure 2: Endoscopic retrograde cholangiopancreatography (ERCP)
### Table 2: Surgical management of Biliary disorders

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Description</th>
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<tbody>
<tr>
<td>Preoperative ERCP</td>
<td>ERCP is a procedure in which an endoscope is passed through the stomach and into the small intestine and bile duct to check for stones or blockages. Stones in the common bile duct is removed during the procedure. Care same as those of patient undergoing endoscopic procedures.</td>
</tr>
<tr>
<td>Cholecystotomy</td>
<td>An opening into the gallbladder) may be an emergency procedure to remove gallstones.</td>
</tr>
<tr>
<td>Choledocholithotomy</td>
<td>An incision into the common bile duct to remove stones</td>
</tr>
<tr>
<td>Open cholecystectomy</td>
<td>Removal of GB through right subcostal incision</td>
</tr>
<tr>
<td>Preoperative Care.</td>
<td>- Usual preoperative care for abdominal surgeries.</td>
</tr>
<tr>
<td></td>
<td>- General preoperative care for the client undergoing anesthesia.</td>
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<tr>
<td></td>
<td>- Reinforce teaching of aggressive measures to prevent respiratory complications.</td>
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<tr>
<td></td>
<td>- Demonstrate splinting methods using a pillow or folded blanket to minimize incision site strain.</td>
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<tr>
<td></td>
<td>- Emphasize the importance of early mobilization in preventing complications</td>
</tr>
</tbody>
</table>

**Intraoperative**
- A T-tube drain is inserted into the common bile duct to ensure patency of the duct. A drainage tube, such as a Jackson-Pratt (JP) drain may also be inserted in the gallbladder bed to prevent fluid accumulation.

**Postoperative Care.**
- Postoperative incisional pain management using a patient-controlled analgesia (PCA) pump.
- Client is usually NPO for about 8 to 24 hours postoperatively. In some cases a nasogastric (NG) tube provides stomach decompression during this period.
- Remove the NG tube as ordered when peristalsis returns.
- Gradually advance the diet from clear liquids to solid foods as patient can tolerate.
- Coughing and deep breathing exercises
- Antiemetics for clients with episodes of postoperative nausea and vomiting.
- Incision site, the surgical drain, and the T-tube care.
<table>
<thead>
<tr>
<th>Laparoscopic Cholecystectomy</th>
<th>The laparoscopic procedure is commonly done on an ambulatory care basis in a same-day surgery suite.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal of the gallbladder using a laparoscope inserted through several small incisions in the upper abdomen</td>
<td>Preoperative care.</td>
</tr>
<tr>
<td></td>
<td>No special preparation. Surgeon explains the procedure; the nurse answers questions and reinforces the physician's instructions.</td>
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<tr>
<td></td>
<td>General preoperative care for the client undergoing anesthesia.</td>
</tr>
<tr>
<td></td>
<td>NPO status before the surgery.</td>
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<tr>
<td></td>
<td>Intraoperative: the surgeon removed the gallbladder through small midline puncture at the umbilicus.</td>
</tr>
<tr>
<td></td>
<td>Postoperative Care.</td>
</tr>
<tr>
<td></td>
<td>Decreased risk of wound complication</td>
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<tr>
<td></td>
<td>Early ambulation to promote absorption of the carbon dioxide and minimize &quot;free air pain&quot; and bloating.</td>
</tr>
<tr>
<td></td>
<td>Administer analgesics as prescribed for pain and discomfort.</td>
</tr>
<tr>
<td></td>
<td>Client is usually discharged from the hospital or surgery center within 1 day.</td>
</tr>
<tr>
<td></td>
<td>Following laparoscopic cholecystectomy the client can return to usual activities, including work within 1 to 3 weeks.</td>
</tr>
<tr>
<td></td>
<td>The following discharge instructions are taught to the patient and caregiver after a laparoscopic cholecystectomy.</td>
</tr>
<tr>
<td></td>
<td>Remove the bandages on the puncture site the day after surgery and shower.</td>
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<tr>
<td></td>
<td>Notify the surgeon if any of the following signs and symptoms occur: redness, swelling, bile-colored drainage or pus from any incision; and severe abdominal pain, nausea, vomiting, fever, or chills.</td>
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<tr>
<td></td>
<td>Gradually resume normal activities.</td>
</tr>
<tr>
<td></td>
<td>Return to work within 1 week of surgery.</td>
</tr>
<tr>
<td></td>
<td>Resume a usual diet, but a low-fat diet is usually better tolerated for several weeks after surgery.</td>
</tr>
</tbody>
</table>

- Surgical dressing and drain within 24 to 48 hours after surgery. The T-tube remains in place up to 6 weeks. (see care of T-tube drain and patient discharge instruction)
**Table 3: Care of a client for ERCP**

| Before the test | NPO six to eight hours before the test.  
| Client may be instructed to stop blood thinner prior to the procedure.  
| Client should be accompanied by a friend or family member to escort them home after the examination.  
| Reinforce what will happen during the procedure to make sure the client understand.  
| Informed consent required prior to the procedure.  
| Remove eyeglasses or contact lenses, and dentures for safety. |

| During the test | Intravenous (IV) line (by inserting a needle into a vein in the hand or arm) to administer medications.  
| Conscious sedation: a combination of a sedative to induce relaxation, and a medication to prevent discomfort.  
| Local anesthetic is used to suppress gag reflex |

| After the test | Monitor patient’s V/S closely while the sedative medications wear off.  
| Advice patient not to drive or make important decisions at least 24 hours after the procedure.  
| Patient may experience mild sore throat.  
| NPO until gag reflex is established.  
| Monitor client and report the following to the physician immediately; Severe abdominal pain (not just gas cramps), Severe unusual chest pain, A firm, distended abdomen; Vomiting; Fever or chills; Difficulty in swallowing or a severe sore throat, Passing black stools |

Complications are rare, however, they can occur. Pancreatitis due to irritation of the pancreatic duct by the X-ray contrast material or cannula is the most common complication. If ERCP included a therapeutic procedure such as removal of stones or placement of a stent (drain), there are additional small risks of bleeding or perforation.
Table 4: Discharge instruction for a client going home with a T-tube

- The T-tube will be left in place for up to several weeks.
- An X-ray is performed to ensure duct has healed and that there are no stones present before the t-tube is removed.
- Don’t sleep on the same side as the tube.
- To prevent the tube from being pulled out, secure the tube and bag inside your clothing.
- Avoid heavy lifting and strenuous activity.
- Very good hand hygiene is very important to prevent infection. Wash your hand thoroughly before caring for your tube.
- Change the dressing around the t-tube every day.
- Inspect the wound for signs of infection every day.
- Empty the bag attached to the drain at least twice a day (more if needed). To empty the bag:
  - Wash your hands
  - Remove the closure at the bottom of the bag.
  - Drain the fluid into a measuring cup.
  - Record the amount of fluid each time you empty the bag. You will share this information with your doctor on your next visit.
  - Replace the closure on the bottom of the bag.
- If you have no drainage bag attached to the tube flush them once or twice daily with 10 mL sterile saline, using sterile techniques.
- Call your HCP if
  - pain, swelling, or fluid around tube
  - redness or warmth around the incision
  - nausea and vomiting
  - chills and fever
  - fluid from the incision
  - stitches holding the tube becoming infected/loose
  - a tube that falls out
  - fluid that has a bad smell
  - drainage that changes color from light pink to bright red
References


NCLEX Style Questions

1. A client is scheduled for ultrasound of the gallbladder the following morning. What will the nurse do in preparation for this diagnostic study?
   a. Administer the contrast agent orally 6 to 8 hours before the study.
   b. Administer the radioactive agent intravenously the evening before the study.
   c. Initiate no fluid and fluid intake after midnight for the client.
   d. Encourage the intake of 64 ounces of water 8 hours before the study.

2. The dietician has recommended low fat diet for a client with cholelithiasis. What is the rationale for this dietary recommendation?
   a. Prevents further pain of biliary colic when the gallbladder contracts.
   b. Fatty food causes bloating and flatulence.
   c. Increased abdominal pain due to fat indigestion.
   d. To expedite weight loss which increases the risk of cholelithiasis.

3. The nurse is caring for a client after cholecystectomy who has a T-tube in place. Which of these actions by the client requires immediate intervention by the nurse?
   a. The client is lying in a semi Fowler’s position
   b. The client places the drainage bag on the chest while resting in bed.
   c. The tube is connected to the inside of the patient’s gown with a safety pin.
   d. The client places the drainage bag in a bathrobe pocket while ambulating.

4. The nurse is taking care of a client who is 56 hours post cholecystectomy. Which of these assessment findings should the nurse report immediately to the physician?
   a. Thin greenish-brow drainage from the drainage tube.
   b. Drainage of 620ml greenish from the t-tube.
   c. Dry pink skin around the tube insertion site.
   d. Client has diminished lung sounds at both lung bases.
5. The nurse determines that a client requires further teaching requiring home management of T-tube when the client stated. (select all that apply)

   a. “Redness and warmth should be expected at the incision site the first week after surgery.”
   b. “I will empty your drain 2 to three times a day and as needed.
   c. “I will wash my hand before and after caring for the incision and emptying the bag.”
   d. “I can drain the bag directly into the sink or toilet when I get home.”
   e. “I will call the health care provider if the fluid draining smells bad.”

6. The home care nurse has just listened to messages left by her clients. Which of these clients should the nurse call first?

   a. A client who has T-tube in place and is having difficulty measuring the drainage,
   b. A client who is experiencing loose stools after cholecystectomy.
   c. A client who has T-tube removed and is experiencing abdominal pain and nausea.
   d. A client who needs a new prescription for narcotic analgesics.

7. A client 48 hours post open cholecystectomy has an order to clamp the t-tube 1 hour before and after each meal. The nurse correctly interprets the reason for this order as;

   a. Allows bile to be delivered into the duodenum to aid in digestion.
   b. Helps prevent pain cause by initiation of oral intake.
   c. Prevents indigestion due to lack of bile in the duodenum.
   d. Decreases nausea and vomiting after eating by aiding digestion.

8. 24 hours after open cholecystectomy a client has an order to resume oral food intake. Which of the following food choices from the menu is appropriate for the client’s first meal?

   a. Cream of mushroom soup and whole wheat toast.
   b. Cranberry juice, a bowl of gelatin, and broth.
   c. Coffee with skim milk, low fat muffins.
   d. 1 cup broth, whole grain bread, and fresh fruits.
9. An elderly client admitted with acute exacerbation of chronic cholecystitis is to receive total parenteral nutrition (TPN) and lipids. Which of these interventions is the priority when caring for this patient?

a. Monitor urine specific gravity every shift
b. Change the administration set every 72 hours
c. Infuse the solution in a large peripheral vein
d. Monitor the patient’s blood glucose per protocol

10. The nurse is teaching a patient who is recovering from acute cholecystitis about health promotion and disease management. Which of the following statement by the client would indicate that the client did not understand the nurse’s instructions.

a. “I may need a surgical consult for removal of my gallbladder."
b. “I will call my physician immediately if I experience symptoms of a gallbladder attack."
c. “I will keep a food diary to track foods that cause abdominal pain.
d. “I will eat bland diet without any fat and spices to prevent worsening of my cholecystitis.”

11. Which of the following should the nurse include in the discharge teaching of a client going home 24 hours after laparoscopic cholecystectomy?

a. Keeping the bandage on the puncture site and change only when visible soiled.
b. Reporting any bile colored drainage or pus from incision.
c. Using over the counter pain meds and antiemetics if N/V occur
d. Emptying and measuring the contents of the bile bag from the T tubes every day

12. The nurse is collecting data on a client with acute cholecystitis, who complains of localized right upper abdominal pain. The nurse will also ask the client if they feel pain in which of this area of the body?

a. Left upper arm
b. Lower abdomen
c. Neck or jaw
d. Right shoulder
13. A patient has a bile duct obstructive cholelithiasis. Which of these will the nurse expect to find when assessing the patient's laboratory studies?
   a. Increased serum bilirubin level in the blood
   b. Decreased cholesterol level
   c. Increased blood urea nitrogen level
   d. Decreased serum alkaline phosphatase level

14. A patient who had surgery for gallbladder disease has just returned to the unit. What assessment finding should the nurse caring for this patient report immediately to the physician?
   a. Decreased breath sounds
   b. Drainage of bile colored fluid onto the abdominal dressing
   c. Acute pain with movement
   d. Rigidity of the abdomen

15. A patient who had a laparoscopic cholecystectomy is now complaining of right shoulder pain. What should the nurse suggest to relieve the pain?
   a. Intramuscular Morphine injection
   b. Application of heat 15 to 20 minutes as ordered
   c. Application of ice pack 30 minutes as ordered
   d. Apply liniment rub to affected area

16. A patient has been prescribed ursodeoxycholic acid (UDCA). The nurse understands that additional teaching is needed regarding this medication when the patient states:
   a. "It is important that I see my physician for scheduled follow-up appointments while taking this medication."
   b. "If I lose weight, the dose of the medication may change."
   c. "This medication will help dissolve small gallstones made of cholesterol."
   d. "I will take this medication for 2 weeks and then gradually stop taking it."
17. The clinical nurse instructor is working with a group of student managing a client admitted with acute cholecystitis. The student will correctly identify the major objectives of medical therapy for cholecystitis as? (Mark all that apply.)

- a. Remove the cause of cholecystitis by pharmacologic therapy, endoscopic procedures, or surgical intervention
- b. Reduce the incidence of acute episodes of gallbladder pain.
- c. Reduce the incidence of acute episodes of cholecystitis by supportive and dietary management
- d. Reduce the number of surgical interventions for cholecystitis
- e. Increase the supportive and dietary management of cholecystitis

18. A patient presents to the emergency department complaining of right upper quadrant pain that is severe in nature. The patient states that his doctor told him he had gallstones. The nurse knows to monitor the client for what possible complication of gallstones?

- a. Inflammation of the gallbladder with adequate outflow
- b. Bacterial infection of the gallbladder
- c. Viral infection of the gallbladder
- d. Gangrene of the gallbladder
Answers and rationale to NCLEX style questions.

1. Rationale: (C). An ultrasound of the gallbladder is most accurate if the patient fasts overnight, so that the gallbladder is distended. Contrast and radioactive agents are not used when performing ultrasonography of the gallbladder, as an ultrasound is based on reflected sound waves.

2. Rationale: (A). A low Fat Diet is recommended in the treatment of gallbladder disease in which dietary fat may cause painful gallbladder contraction during the secretion of bile.

3. Rationale: (B). Ensure that the T-tube is properly connected to a sterile container; keep the tube below the level of the surgical wound. This position promotes the flow of bile and prevents backflow or seepage of caustic bile onto the skin. The tube itself decreases biliary tree pressure. Place in Fowler’s position. This promotes gravity drainage of bile.

4. Rationale: (B). Monitor drainage from the T-tube for color and consistency; record as output. Normally, the tube may drain up to 500 mL in the first 24 hours after surgery; drainage decreases to less than 200 mL in 2 to 3 days, and is minimal thereafter. Drainage may be blood tinged initially, changing to green-brown. Report excessive drainage immediately (after 48 hours, drainage greater than 500 mL is considered excessive).

5. Rationale: (A, D.). Redness and warmth are signs of infection and should be reported to the HCP. The fluid should be emptied into a measuring cup and the amount recorded.

6. Rationale: (C). After T-tube removal patients must be monitored closely for s/s of bile leakage (Bile peritonitis). The symptoms of bile leakage include; Severe abdominal pain, nausea; vomiting, fever, and jaundice. This can lead to organ failure and death. The client must be assessed immediately and transported to the hospital to rule out bile leak.

7. Rationale: (A). This allows bile to be delivered into the duodenum to aid in digestion.

8. Rationale: (B). The nurse gradually advances the diet from clear liquids to solid foods as tolerated. At the time of discharge client has resumed regular diet with instructions to eat nutritious meals and avoid excessive intake of fat.

9. Rationale: (D). TPN consists of hypertonic glucose, amino acids, and other components such as electrolytes and vitamins. The hypertonicity of the TPN requires administration via a central venous catheter. The high glucose and lipids makes the TPN an excellent medium for bacterial growth so
administration sets should be changed every 24 hours if the TPN contains lipids. TPN may cause hyperglycemia so blood glucose is monitored.

10. Rationale: (D). The client should eat well balanced meal low in fat.

11. Rationale: (B). The client should be instructed to remove the bandages on the puncture site the day after surgery and shower. Notify the surgeon if any of the following signs and symptoms occur: redness, swelling, bile-colored drainage or pus from any incision.

12. Rationale: (D). The patient may have biliary colic with excruciating upper right abdominal pain that radiates to the back or right shoulder. Pain from cholecystitis does not radiate to the left upper arm, the lower abdomen, the neck, or the jaw.

13. Rationale: If the flow of blood is impeded, bilirubin, a pigment derived from the breakdown of red blood cells, does not enter the intestines. As a result bilirubin, levels in the blood increase.

14. Rationale: (D). The location of the subcostal incision will likely cause the patient to take shallow breaths to prevent pain, and this may result in decreased breath sounds. The nurse should remind patients to take deep breaths and cough to expand the lungs fully and prevent atelectasis. Acute pain is an expected assessment finding following surgery and analgesics should be administered for pain relief. Abdominal splinting or application of an abdominal binder may assist in reducing the pain. Bile may continue to drain from the drainage tract after surgery and this will require frequent changes of the abdominal dressing. Increased abdominal tenderness and rigidity should be reported immediately to the physician, as it may indicate bleeding from an inadvertent puncture or nicking of a major blood vessel during the surgical procedure.

15. Rationale: (B). If pain occurs in the right shoulder or scapular area (from migration of the CO2 used to insufflate the abdominal cavity during the procedure), the nurse may recommend use of a heating pad for 15 to 20 minutes hourly, walking, and sitting up when in bed.

16. Rationale: Ursodeoxycholic acid (UDCA) has been used to dissolve small, radiolucent gallstones composed primarily of cholesterol. This drug can reduce the size of existing stones, dissolve small stones, and prevent new stones from forming. Six to 12 months of therapy is required in many patients to dissolve stones, and monitoring of the patient is required during this time. The effective dose of medication depends on body weight.

17. Rationale: (A, B, C.).The major objectives of medical therapy are to reduce the incidence of acute episodes of gallbladder pain and cholecystitis by supportive
and dietary management and, if possible, to remove the cause of cholecystitis by pharmacologic therapy, endoscopic procedures, or surgical intervention. This makes options D and E incorrect.

18. Rationale: (D). In calculous cholecystitis, a gallbladder stone obstructs bile outflow. Bile remaining in the gallbladder initiates a chemical reaction; autolysis and edema occur; and the blood vessels in the gallbladder are compressed, compromising its vascular supply. Gangrene of the gallbladder with perforation may result.