

# Gastrointestinal Interventions

## LEARNING OBJECTIVES

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**Upon completion of this chapter, the reader will be able to:**

1. Explain the indications for GI procedures.
2. Describe the complications associated with a GI procedure.
3. Develop a plan of care for the patient undergoing a GI procedure.
4. Demonstrate appropriate patient teaching prior to a patient undergoing a GI procedure.
5. List optimal outcomes that may be achieved through evidence-based management of patients undergoing GI interventions.

Admissions to the intensive care unit (ICU) with gastrointestinal (GI) problems are most often attributed to bleeding (see Chapter 34). The most common sources are ulcer erosions and/or perforations, Mallory-Weiss syndrome, and varices. Although treatment options for these patients vary, most will require a diagnostic test and/or procedure. This chapter describes specific diagnostic and therapeutic GI procedures that may take place in the ICU or in the treatment of critically ill adults.

## GASTRIC LAVAGE

Gastric lavage is the procedure of instilling large volumes of tap water or normal saline into the abdomen by inserting a large-bore tube (e.g., Ewald®, Levine®, Argyl®, or nasogastric tube) through the nose or mouth, down the esophagus, and into the stomach. A topical anesthetic may be sprayed into the back of the throat or placed on the tube before its insertion so as to minimize irritation and gagging as the tube is being placed. Once the fluid is instilled into the abdominal cavity, it is then drained back out by suction or gravity drainage, depending on institutional procedures. This procedure may be intermittent or continuous, depending on the patient's condition.

Frequently, the purpose is to localize the site of upper GI bleeding; evaluate the severity of bleeding; cleanse the stomach of clots; prevent aspiration of clots; or prevent nitrogenous load absorption (from red blood cell death). Less frequently, gastric lavage can be used to remove drugs ingested by overdose. Recently, however, gastric emptying has fallen out of favor in the case of overdose because of complications and the lack of evidence for clinical benefit. Position statements have stated that gastric lavage should be used in restricted settings (Eddleston, Juszczak, & Buckley, 2003). According to one poison control center specialist, gastric lavage is indicated for life-threatening overdose or poisoning. When the ingestion occurred less than one hour previously, lavage is beneficial. Gastric lavage is also used with drugs having a delayed absorption, such as with enteric-coated, long-acting, or sustained-release drugs. Gastric lavage may be beneficial when “handfuls” of drugs have been ingested, when bowel sounds are absent or hypoactive, or when liquid medications or poisons in toxic amounts have been ingested. Data suggest that lavage is only 10% to 60% effective (Blazys, 2000).

Regardless of the purpose of the gastric lavage, extreme caution must be taken if used for patients with esophageal varices or history of recent GI surgeries (Thomas, 2001). Lavage should not be used with patients who have central nervous system depression. Other contraindications include patients at risk for hemorrhage or GI perforation, and patients who have ingested hydrocarbons or corrosive substances.

Complications identified with gastric lavage include esophageal or gastric perforation, endotracheal intubation with lavage tube, aspiration, and hypothermia. The latter complication is more common in elderly patients. In the case of overdose, a common complication of gastric lavage is that substances are forced beyond the pyloric sphincter into the small bowel (Eddleston et al., 2003). Oral, nasal, or pharyngeal injuries may occur during lavage tube insertion. As a consequence, the patient's airway should always be protected during the procedure. Vagal stimulation can cause bradycardia. The use of warm water for lavage decreases the risk of hypothermia (Blazys, 2000).

Patient preparation for gastric lavage will include patient/family education. The patient will be placed on cardiac monitor, automatic blood pressure cuff, oxygen by nasal cannula or mask, and pulse oximeter. An intravenous (IV) line will be started, oral airway inserted, and suction set up; the patient will also be positioned in left lateral or in high Fowler's position. If the patient does not have an intact gag reflex, endotracheal intubation may be necessary. Emergency equipment (e.g., bag-valve-mask, emergency cart, suction equipment) must be at the bedside during the procedure.

The post-procedure assessment by the ICU nurse will include measurement of blood volume loss, vital signs, lab values as ordered, fluid status, cardiac rhythm, and head-to-toe physical assessment. If the purpose of the lavage was to lower toxic levels of an ingested drug, the nurse must also monitor the patient's neurological status. The ICU nurse should monitor for complications such as aspiration, displacement of the tube, and a clogged tube, which may require reinsertion (Thomas, 2001).

## ENDOSCOPIC PROCEDURES

### Upper GI Endoscopy

An esophagogastroduodenoscopy (EGD) is a procedure performed to evaluate the lining of the esophagus, the stomach, and the upper portion of the duodenum. A thin, flexible, lighted tube with a camera is inserted into the mouth and then advanced into the esophagus. A small instrument may be passed through this scope to take a sample of tissue for biopsy. The primary indication for an upper endoscopy is to view the inner lining of the esophagus, the entire stomach, and approx-

imately five inches of the upper small bowel to identify ulcers and abnormalities (Zuckerman & Lotsoff, 2003). EGD is the diagnostic procedure of choice for all cases of upper GI bleeding (Manning-Dimmitt, Dimmitt, & Wilson, 2005) and is preferred to diagnose stomach cancer (Layke & Lopez, 2004). This procedure is also the best way to evaluate suspected complications of gastroesophageal reflux disease (Szarka, DeVault, & Murray, 2001).

Complications of an upper endoscopy are rare but may include esophageal perforation and bleeding. In one study of patients who underwent GI procedures, a small percentage (4.2%) developed a bacteremia after EGD (Nelson, 2003).

Patient preparation for an upper endoscopy entails taking nothing by mouth (NPO) for six hours prior to procedure to decrease the risk for aspiration. An IV catheter will be inserted so that IV sedation can be administered during the procedure (Zuckerman & Lotsoff, 2003). Patients undergoing procedures such as EGD or colonoscopy (discussed later in this chapter) are often anxious. High levels of anxiety may result in more difficult and painful procedures. In one study, patients who listened to music reduced their anxiety score statistically more than patients who did not. Music is a noninvasive nursing intervention that can decrease anxiety before GI procedures (Hayes, Buffum, Lanier, Rodahl, & Sasso, 2003). More information on the use of music therapy can be found in Chapters 3 and 9.

Post procedure, the ICU nurse should monitor vital signs, oxygen saturation, and for return of the gag reflex. Assessment for signs and symptoms of bleeding and respiratory distress should be performed as well. The patient should be positioned with the head of the bed elevated for aspiration precautions until fully awake (Zuckerman & Lotsoff, 2003).

### Flexible Sigmoidoscopy

A flexible sigmoidoscopy is an examination of the lining of the rectum and sigmoid colon, and may include evaluation of part of the descending colon (American Medical Association [AMA], 2002). In this procedure, a thin, short, flexible, lighted tube (sigmoidoscope) is inserted into the rectum. This scope transmits an image via a tiny camera to a screen that allows the physician to carefully examine the lining of the large intestines from the rectum to the sigmoid (descending) colon. This tube may also instill air to distend the bowel for better visualization. If a polyp or inflamed tissue is visualized, the physician can insert a tiny instrument into the tube to remove the polyp or take a piece of tissue for biopsy (Kuric, 2004).

Indications for a flexible sigmoidoscopy may include diarrhea, abdominal pain, and constipation. Identification of bleeding and inflammation as well as visualization of abnormal growths and ulcers in the descending colon and rectum are

other indications. Diagnosis of irritable bowel syndrome in patients older than age 50 may require flexible sigmoidoscopy or colonoscopy (Hyams, 2001). This test may also detect early signs of cancer. Flexible sigmoidoscopy procedures do not visualize the transverse or ascending colon, however. In extreme cases, flexible sigmoidoscopy can provide an immediate diagnosis of patients with diarrhea who are suspected of having *Clostridium difficile* infection (Schroeder, 2005). Potential complications include bleeding and puncture of the colon.

Patient preparation ideally would include a thorough cleansing of the bowel with enemas and/or laxatives and a clear liquid diet for 12 to 24 hours before the procedure. However, in the ICU, this is not always appropriate.

One study compared three forms of bowel preparation for flexible sigmoidoscopy. In this study, patients were given one of three colon preparations: two Fleet® enemas; magnesium citrate orally the evening before, clear liquid diet, and two bisacodyl (Dulcolax®) suppositories the day of the exam; or magnesium citrate orally the evening before, clear liquid the day of the exam, and two Fleet® enemas one hour before the procedure. Results showed that the magnesium citrate and Fleet® enema preparation were well tolerated and acceptable for 70% of patients (Herman, Shaw, & Loewen, 2001). The use of these preps is based on the evaluation of the ICU patient's condition.

To perform the procedure, the patient is placed on the left side. An IV line is started, oxygen is applied, and baseline vital signs are obtained.

Following the procedure, the patient will be monitored for signs and symptoms of bleeding and possible perforation. Other complications of a flexible sigmoidoscopy that have been reported include pain, infection, vasovagal response, and abdominal distention (AMA, 2002). Nelson (2003) reported a post-flexible sigmoidoscopy bacteremia rate of 0.5%. Vital signs are to be obtained, and oxygen saturations are to be monitored as per institutional protocol (Kuric, 2004).

## Colonoscopy

In a colonoscopy, a long, flexible, lighted tube is inserted into the rectum and slowly guided into the colon to permit visualization of the entire colon from the rectum to the lower end of the small intestines. The scope bends to allow the physician to move it around the curves in the bowel. A biopsy can be taken through a tiny instrument passed through the scope. The physician may also pass a laser, heater probe, or electrical probe or inject medication through the scope to stop bleeding. Indications for a colonoscopy include detection of early signs of cancer and diagnosis of the cause of unexplained changes in bowel habits, inflammation, growths, ulcers, and sources of bleeding. Colonoscopy is the diagnostic procedure of choice for

acute lower GI bleeding (Manning-Dimmitt et al., 2005). Again, diagnosis of irritable bowel syndrome in patients older than age 50 may require colonoscopy or sigmoidoscopy (Hyams, 2001).

Computerized tomographic (CT) colonography, also called virtual colonoscopy, is an evolving technology being evaluated for colorectal cancer screening. According to the findings of a meta-analysis, its performance has varied widely across studies. The reasons for the variability in findings are poorly defined. Because a CT colonography does not accurately detect polyps smaller than 10 mm, it may not be preferred over colonoscopy. These issues must be resolved before CT colonography can be advocated for generalized screening for colorectal cancer (Mulhall, Veerappan, & Jackson, 2005; Zakowski, Seibert, & VanEyck, 2004). At present, CT colonography may be useful in patients with obstructing tumors and in patients in whom colonoscopy is incomplete for other reasons (Cotton et al., 2004).

Preparation for a colonoscopy usually involves three days of a clear liquid diet and a laxative the night before the procedure. The patient is positioned on the left side. An IV line is started, oxygen is applied, and baseline vital signs are obtained.

As with patients who undergo EGD, patients who undergo colonoscopy may have high levels of anxiety. In one study, although conducted on patients having colonoscopy as an ambulatory procedure, listening to music during the procedure decreased the level of anxiety without other anxiolytic methods (Andrada et al., 2004).

Post-procedure assessment includes monitoring for signs and symptoms of bleeding/hemorrhage and possible perforation. Vital signs are obtained, and oxygen saturation is monitored as per institutional protocol (Gastroenterology Consultants Ltd, 2005). A 2.2% bacteremia rate was reported in one study of patients who underwent colonoscopy (Nelson, 2003). Aspiration should be observed for, because 43% of patients in one recent study who received sedation or topical anesthesia developed respiratory complications (Livett, 2005).

## Scleral Endoscopic Therapy

Sclerotherapy entails the direct injection of a sclerosing agent into a visible vein. The solution irritates, dehydrates, changes surface tension, or destroys the endothelial cells to produce initially a small thrombosis and then permanent fibrosis of the vein (Marting, 2000). A fiber-optic endoscope is passed through the esophagus, through the stomach, and into the duodenum. A sclerosing agent may then be injected through a special port on the scope into the vessel that is bleeding. This procedure should be done using moderate sedation. Indications for this procedure are to locate the source of bleeding

and to control or prevent bleeding from varices, gastric ulcers, or duodenal ulcers (Vlavianos & Westaby, 2001).

Emergency sclerotherapy is widely used as a first-line therapy for variceal bleeding in cirrhosis, although pharmacological treatment with vasopressors may stop bleeding in the majority of patients. Agents used in one extensive literature review included vasopressin (Pitressin®), terlipressin (Novapressin®), somatostatin (Aminopan®), and octreotide (Sandostatin®) (D'Amico, Pagliaro, Pietrosi, & Tarantino, 2005). Results from one study suggested that prophylactic sclerotherapy for esophageal varices might be more effective in prolonging long-term survival of patients with liver cirrhosis in the absence of hepatocellular carcinoma, compared with emergency sclerotherapy (Ogusu et al., 2003).

Possible complications with scleral endoscopic therapy include aspiration, perforation of esophagus, atelectasis, bradycardia, respiratory depression (due to sedation), and sepsis. The bacteremia rate found in one study of patients who underwent scleral endoscopic therapy was 15.4% (Nelson, 2003).

To prepare the patient for scleral endoscopy, the ICU nurse will apply oxygen, pulse oximetry, and a blood pressure cuff and connect the patient to a cardiac monitor. Baseline vital signs and IV access will be obtained. Suction will be set up. Atropine is kept at the bedside in the event of vagal stimulation.

Post-procedure assessment will include vital signs, evaluation of airway and respiratory status, and return of the gag reflex. The ICU nurse will monitor for dysrhythmias and interpret coagulation lab study results. The patient is positioned on the left side with the head elevated until the cough, gag, and swallow reflexes return (Vlavianos & Westaby, 2001).

### Variceal Banding

Variceal banding is an endoscopic procedure during which small elastic “O” rings are placed around varices to cause strangulation and sloughing of tissue. This tissue is then replaced by fibrous tissue (Zuckerman & Lotsoff, 2003). Variceal banding is the treatment of choice for bleeding varices. A 50% reduction in rebleeding has been reported with this procedure (Lin, Bilir, & Powis, 2000; Vlavianos & Westaby, 2001). Pre- and post-procedure patient care is the same as for patients who receive scleral endoscopic therapy.

### Endoscopic Retrograde Cholangiopancreatography

Endoscopic retrograde cholangiopancreatography (ERCP) combines the use of a scope and radiographs to visualize the pancreatic and bile ducts. The endoscope is passed into the stomach and duodenum (as with the EGD) to visualize the lining of these organs. The scope is passed until it reaches the area of the duodenum where the biliary tree and pancreas open into the duo-

denum. A small tube is placed through the scope, and dye is injected to the bile duct. X-rays are taken immediately to identify obstructions by gallstones or narrowing of the bile ducts. An instrument can be inserted into the scope to remove obstructions and take tissue for a biopsy (Andriulli et al., 2003).

The primary indications for ERCP are to diagnose chronic pancreatitis and conditions affecting the gallbladder and bile ducts; other conditions of the liver and pancreas may be detected as well. ERCP is the gold standard for treatment of obstructive jaundice, placement of biliary stents, and drainage of pseudocysts. However, a relatively new technique—therapeutic ultrasonography—has proven effective in cases where ERCP has been unsuccessful (Cipolletta, Bianco, Rotondano, & Marmo, 2000; Giovannini, 2004).

Pancreatitis is the most frequent complication of ERCP. The incidence of clinically significant pancreatitis following an ERCP ranges from 1% to 13.5% (Pande & Thuluvath, 2003). Administration of pharmacological agents to prevent or limit this complication has been the topic of several recent studies. Other, less frequent complications include infection, bleeding, and perforation of the duodenum (Andriulli et al., 2003; Demols & Deviere, 2003; Testoni, 2004). The bacteremia rate in one study of patients who underwent ERCP was 11% (Nelson, 2003).

In a study of 45 patients, with a mean age of 58 years, who underwent ERCP, preoperative education and explanation of how to communicate during the procedure enhanced patient cooperation and patient satisfaction (Ratanalert, Soontrapornchai, & Ovarlarnporn, 2003). The nurse should expect the patient to exhibit irritability, hyperexcitability, and poor cooperation during an ERCP. Educating the patient before the procedure takes place can help to keep the patient relaxed and self-confident during the ERCP. Information giving should focus on details of the procedure and feelings such as discomfort or pain that might occur during the procedure (Ratanalert et al., 2003).

## SURGICAL PROCEDURES

### Percutaneous Transjugular Intrahepatic Portosystemic Shunt

Percutaneous transjugular intrahepatic portosystemic shunt (TIPS) is the procedure of choice when surgery is indicated for varices. This interventional treatment results in decompression of the portal system (Ochs, 2005). The purpose of a TIPS is to decompress the portal venous system and therefore prevent rebleeding from varices or stop or reduce the formation of ascites (Boyer & Haskal, 2005). It is also useful in the treatment of complications of portal hypertension, bleeding varices, and ascites. TIPS is an accepted procedure indicated for

patients who do not respond to sclerotherapy, variceal banding, or pharmacologic intervention, or who have problematic ascites (Brigham, 1998). The procedure involves placement of a metal stent to create an opening in the intrahepatic tract. Pre-procedure laboratory tests should include serum electrolytes, blood count, coagulation profile, liver function, and renal function (Boyer & Haskal, 2005).

Potential complications include puncture of the hepatic artery or biliary tree, rupture of the portal vein or liver capsule, or stent thrombosis or migration (Maciel et al., 2003). Other reported disadvantages of TIPS include the induction of hepatic encephalopathy, infection, renal failure, migration into the portal vein or right atrium, and shunt dysfunction (Siewert, Salzman, Purucker, Schurmann, & Matern, 2005). Complications of TIPS that have been reported include thrombosis, occlusion/stenosis, transcapsular puncture, intraperitoneal bleed, hepatic infarction, fistulae, sepsis, infection, hemolysis, encephalopathy, and stent migration or placement in the inferior vena cava (Boyer & Haskal, 2005).

Ten percent of patients with cirrhosis develop refractory ascites, which has significant morbidity and a one-year survival of less than 50%. Patients with refractory ascites may benefit from TIPS. An extensive literature review was conducted to compare TIPS and paracentesis in these patients with regard to overall short- and long-term survival, effectiveness, and complications. Results suggested that TIPS removed ascites more effectively than did paracentesis (discussed later in this chapter). After one year, the beneficial effects of TIPS on ascites were still evident. Mortality, GI bleeding, septicemia/infection, acute renal failure, and disseminated intravascular coagulation did not differ significantly between the two groups. However, hepatic encephalopathy occurred significantly more often in the TIPS group (Saab, Nieto, Ly, & Runyon, 2005).

A portal caval shunt, although rarely done, may be considered for some patients. This surgical procedure involves connecting the portal vein to the inferior vena cava in an attempt to decrease portal pressure. Recipients for liver transplant often have portal caval shunts for portal hypertension (Nosaka et al., 2003). Potential complications of this procedure include encephalopathy and formation of peptic ulcers. Postoperatively, the nurse must assess carefully for signs and symptoms of encephalopathy, septic shock, renal failure, bleeding, and intravascular hemolysis (Bernard, Hagihara, Burke, & Kugelmas, 2001).

### Other Procedures

Esophagogastric tamponade tubes may be inserted to provide direct pressure as a temporary means of controlling active

bleeding from gastric or esophageal varices (Day, 2001). The most common types of esophagogastric tubes are listed in **Table 32-1**.

Emergency equipment listed in **Table 32-2** must be available at the bedside of any patient being treated with an esophagogastric tamponade tube. Maximum time of therapy is 36 hours for the esophageal balloon and 72 hours for the gastric balloon (Day, 2001).

Patient care entails positioning the patient in high Fowler's position (if alert) or on the left side (if unconscious). Provision of oral care every two hours and frequent oral suctioning are important. Nares care should be provided if the patient is nasally intubated. Monitoring for airway patency and signs of distress (e.g., tachypnea, stridor, cough) is essential. Gastric and esophageal output should be monitored and measured. Institutional policy should be followed for specific care of each port on the tube.

Tamponade for treatment of esophageal varices may be accompanied by several complications, some of which may be life-threatening. Therefore, extreme caution should be used when performing the insertion of an esophagogastric tamponade tube. While hemostasis is not achievable by tamponade in 8% to 50% of patients, and 50% of the patients experience re-bleeding, use of tamponade may achieve stabilization of a patient so that sclerotherapy or surgery becomes a treatment option (Greenwald, 2004).

## LIVER BIOPSY

A liver biopsy is a procedure that extracts liver tissue to be sent for analysis by a pathologist. Liver biopsy, while formerly used only for diagnostic purposes, has additional purposes such as assessment of disease progression, response to therapy, and diagnosis of transplant rejection (Looi, 2005). Several methods are used to perform a liver biopsy:

**TABLE 32-1** Common Esophagogastric Tubes

Tube	Port
Minnesota (four lumen)	Esophageal and gastric balloon
	Esophageal and gastric lavage/suction
Sengstaken-Blakemore tube (three lumen)	Gastric and esophageal balloon
	Gastric suction/lavage

Source: Day, 2001.

**TABLE 32-2** Required Equipment at Patient Bedside for Esophagogastric Tamponade Tube

Equipment	Rationale
Sphygmomanometer	To measure balloon pressures
Four rubber-tipped clamps	For clamping balloon ports
Adhesive tape	For securing tubes
Two suction setups	One for esophageal, one for gastric
Nasogastric tubes	One for Minnesota, two for Sengstaken-Blakemore
Normal saline	For irrigation
Emergency intubation equipment	To manage airway during emergency
Bite block	To prevent biting on tube
Atropine	To manage Vagal bradycardias
Scissors	To cut tubes in emergency for airway management

Source: Day, 2001.

- *Percutaneous liver biopsy.* The skin is numbed with a local anesthetic where a small incision may or may not be made, depending on type of needle used. A special needle is then passed through the skin into the liver, at an intercostal space anterior to the mid-axillary line. The liver is located by percussion and tapping by the physician.
- *Percutaneous image-guided liver biopsy.* The needle insertion is guided by CT scan or ultrasound images.
- *Laparoscopic liver biopsy.* A small incision is made into the abdomen and a laparoscope is inserted. A laparoscope is a telescope that magnifies the objects it sees and sends images to a monitor. The physician watches the monitor and uses instruments to remove the sample. Ultrasound may be used in conjunction with the laparoscope.
- *Transvenous biopsy.* A catheter is inserted into the right internal jugular vein, through the right atrium, and into the superior vena cava and hepatic vein; it is then guided into the liver. A biopsy needle is inserted into the catheter and into the liver. This procedure may be used when the patient has clotting problems or ascites (Maciel et al., 2003; National Digestive Disease Information Clearinghouse [NDDIC], 2005).
- *Open surgical liver biopsy.* This method is rarely used except as a part of another surgical procedure. An aspirating needle or a wedge section will be done. Indications for this procedure include diagnosing and staging disease of the liver (Spycher, Zimmerman, & Reichen, 2001).

In preparation for a liver biopsy, the patient may not take aspirin, aspirin-containing products, ibuprofen, or anticoagulants. The patient should be NPO for eight hours. IV fluids, sedative drugs, pain medication, antibiotics, antiemetics, and supplemental oxygen will be provided. The patient must be instructed to lie completely still and maintain expiration during the procedure.

Post-procedure care entails keeping the patient on the right side for 1 to 2 hours (or as directed by the physician), bedrest for 8 to 12 hours, assessment and treatment of pain and any complications, and monitoring

of vital signs, urinary output, intake and output, and hemoglobin and hematocrit. In a study of positioning of patients following liver biopsy, it was found that right-sided and supine positioning were best tolerated (Hyun & Beutel, 2005).

Potential complications of liver biopsy include infection, fever, pain, swelling, drainage, redness at the insertion site, shortness of breath, pneumothorax, puncture of gallbladder, bleeding, abdominal swelling or bloating, worsening abdominal pain, and nausea or vomiting. Pain may be referred to the shoulder. Bleeding may occur up to 15 days post-procedure (NDDIC, 2005).

## PARACENTESIS

During a paracentesis, a needle is inserted through the abdominal wall and into the peritoneum to remove fluid for diagnostic or therapeutic purposes. Indications include evaluation of an abdominal injury; removal of ascites, which is causing difficulty breathing, pain, or affecting the function of the kidneys or bowel; prevention of peritoneal rupture; and diagnosis of infections in the peritoneal fluid or certain types of cancer (Huether, 2002).

Complications of paracentesis include bowel perforation, bladder perforation, bleeding, intravascular volume loss, infection at the insertion site, hypotension, and needle puncture of the abdominal blood vessels (Rushing, 2005).

Patient preparation for a paracentesis includes obtaining baseline assessment of fluid and electrolyte status. A urinary catheter is inserted if patients are unable to empty their bladder. Abdominal girth is measured. The patient is positioned supine or may tilt toward the side of the procedure. Prior to the

procedure, the patient should be assessed for any bleeding or problems with clotting. A patent IV is needed. During and following the procedure, the ICU nurse should observe for signs and symptoms that may indicate hypovolemia, such as pallor, diaphoresis, hypotension, and tachycardia (Rushing, 2005).

Post-procedure care entails measurement of abdominal girth so that a pre-post measurement is documented. Girth measurement is best performed by the same person to ensure consistency. The amount of fluid removed is documented, as well as color and clarity of the fluid. Intake and output are monitored. The insertion site is assessed for drainage or signs of infection. The patient is assessed for hematuria, hypotension, fever, severe abdominal pain, bleeding from the needle insertion site, change in bowel sounds, and tachycardia (Huether, 2002; Rushing, 2005).

### PATIENT OUTCOMES

Nurses can help ensure attainment of optimal patient outcomes such as those listed in **Box 32-1** for patients undergoing GI interventions.

### SUMMARY

The GI tract is the largest endocrine system of the body and has a complex relationship with the accessory organs (pancreas, liver,

and gallbladder) of the body. Each component both affects and depends on the others. ICU nurses must be familiar with the physiology of this system so that they can understand the multitude of GI problems the critically ill patient faces. Included in this knowledge are the many diagnostic and therapeutic exams the critically ill patient may undergo. The nurse is required to understand and support the patient through these procedures to ensure the best possible outcome for each patient.

#### Box 32-1

### Optimal Patient Outcomes

1. Airway remains patent
2. Physical comfort in expected range
3. Hemoglobin and hematocrit in expected range
4. Restoration of gag reflex (post-procedure)
5. Knowledge of follow-up care
6. Return of vital signs to pre-procedure level

## CASE STUDY

S.G. is a 57-year-old patient with a history of alcoholism, mild cirrhosis, and hypertension. He was admitted to the ICU from the Emergency Department with mental status changes, abdominal distention, and abdominal pain.

His wife reports that he has been more sleepy than usual over the past few days and his “beer belly” has been getting bigger. She reported that the patient said he had been “putting on a few pounds” and was going to cut down to only two six-packs per day. Today, the patient was barely arousable, so she called for an ambulance to bring him to the hospital.

The patient has no significant surgical history. His wife denies use of tobacco or recreational drugs.

S.G. was admitted to the ICU. Upon admission physical exam, the following observations were noted: stuporous, but responsive to painful stimuli; makes purposeful movements; PERL; sclera non-icteric. The patient was intubated for airway control and placed on a T-piece with 40% oxygen. The abdominal exam suggested the presence of ascites.

Vital signs: B/P 92/60; T 37.2°C; HR 106; RR 28

General: slightly jaundiced

HEENT: sclera non-icteric

Neurological: stuporous, but responsive to painful stimuli, made purposeful movements, PERL and 3 mm dilated

Heart: NSR on cardiac monitor with no ectopy; no murmurs, rubs, or gallops

Lungs: coarse breath sounds, diminished at bases, decreased chest excursion

Abdomen: distended with ascites; liver and spleen were not palpable

Laboratory Data upon ICU Admission

Na 137 mEq/L

K 5.3 mEq/L

Cl 97 mEq/L  
CO<sub>2</sub> 11 mEq/L  
Glucose 198 mg/dL  
BUN 31 mg/dL  
Creatinine 2.1 mg/dL  
pH 7.32  
PaCO<sub>2</sub> 18 mm Hg  
pO<sub>2</sub> 81 mm Hg  
SaO<sub>2</sub> 91%  
HCO<sub>3</sub> 16 mEq/L  
Serum lactate 9.4 mg/dL  
AST 522 IU/L  
ALT 178 IU/L  
Total bilirubin 9.8 mg/dL  
PT 29.8 sec  
PTT 92.3 sec  
INR 5.8  
Total protein 4.5 g/dL  
Albumin 1.9 g/dL  
Ammonia 147 μmol/L  
WBC 12.8/mm<sup>3</sup>  
Hgb 9.7 g/dL  
Hct 28.9%  
Platelets 177 × 10<sup>3</sup>

S.G. was started on lactulose (Cephulac®) via nasogastric tube. A paracentesis was performed, and 500 mL of fluid were removed. Fluid removal was stopped at that point because S.G.'s chest expansion increased and SpO<sub>2</sub> increased to 95%.

### CRITICAL THINKING QUESTIONS

1. What is the most likely cause of this patient's ascites and liver dysfunction?
2. Why were only 500 mL of ascitic fluid removed?
3. What complications should the ICU nurse assess for after paracentesis?
4. What signs and symptoms would you anticipate assessing if the patient sustained a bowel perforation from the paracentesis?
5. Which disciplines should be consulted to work with this client?
6. What type of issues may require you to act as an advocate or moral agent for this patient?
7. How will you implement your role as a facilitator of learning for this patient?
8. Use the form to write up a plan of care for one client requiring a GI procedure in the clinical setting. Rate the patient as a level 1, 3, or 5 on each characteristic. Identify the level of nurse characteristics needed in the care of this patient.
9. Take one patient outcome and list evidence-based interventions for this patient.

## Using the Synergy Model to Develop a Plan of Care

SYNERGY MODEL	Patient Characteristics	Level (1, 3, 5)	Subjective and Objective Data	Evidence-based Interventions	Outcomes
	Resiliency				
	Vulnerability				
	Stability				
	Complexity				
	Resource availability				
	Participation in care				
	Participation in decision making				
	Predictability				

## Online Resources

**The Atlas of Gastrointestinal Endoscopy:** [www.endoatlas.com](http://www.endoatlas.com)

**Practice guideline for the creation of a transjugular intrahepatic portosystemic shunt:**

[www.acr.org/s\\_acr/bin.asp?CID=1076&DID=12295&DOC=FILE.PDF](http://www.acr.org/s_acr/bin.asp?CID=1076&DID=12295&DOC=FILE.PDF)

**National Digestive Disease Information Clearinghouse:** <http://digestive.niddk.nih.gov/diseases/pubs/liverbiopsy>

**Society of Gastroenterology Nurses and Associates:** [www.sgna.org](http://www.sgna.org)

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