Introduction

This chapter will provide information for nurses who are caring for patients on a surgical ward that specializes in upper gastrointestinal surgery. It will focus on surgical interventions that are carried out when all other methods of treatment have been ineffective, or are indeed inappropriate. This chapter will also include endoscopic practice, and both diagnostic and therapeutic procedures will be outlined.

It must also be remembered that there are many different techniques and practices in the field of gastroenterology. Therefore, surgical procedures may have slightly different names, according to their origin. It is important to use this book in conjunction with current evidence-based practice and research.

Each organ will be addressed in distinct sections of this chapter, and the associated anatomy and physiology will be discussed, followed by details of specific nursing assessment. However, the specific investigations will be addressed together at the beginning of the chapter in order to avoid repetition.

Nursing assessment refers to the collecting of data, reviewing or analysing the data, and identifying problems. It is essential that a comprehensive history is taken from the patient or their family to serve as a baseline for assessment. Assessment can be completed through interviewing, i.e. asking questions related to the patient’s condition, observation for
any non-verbal indications of discomfort or distress, and measuring through use of tools of assessment, e.g. pain assessment chart. It is a continuous process and needs to be frequently reviewed. For the purpose of this chapter the framework is based on the Roper, Logan and Tierney model of nursing, as described in Holland et al (2004) and Holloway’s (1993) care planning, as this remains best practice in the ward environment. The generalized pre- and postoperative management remains the same as for any patient undergoing upper abdominal surgery, and only specific problems will be highlighted following the discussion of the disease or organ dysfunction.

Overview of the anatomy and physiology of the digestive system

The digestive system refers to the organs, structures and complementary glands of the digestive canal that together are involved in the breaking down of food constituents into smaller components for absorption and final utilization by the cells. The digestive system, therefore, consists of the gastrointestinal tract, which is a continuous musculo-membranous tube lined with mucous membrane, which is approximately 9 m long. This tube extends continuously through the body cavity from the mouth to the anus, and includes the mouth, pharynx, oesophagus, stomach, small intestine, large intestine, rectum and anus.

There are four basic activities that take place in the digestive system:
* ingestion – taking the food into the body (eating)
* peristalsis – movement of the food along the gastrointestinal tract
* absorption of nutrients into the cells for use
* defecation – the elimination of waste products.

Two methods of digestion are employed: chemical and mechanical digestion. Chemical digestion is where large carbohydrates, proteins and lipid substances are broken down by chemical reactions. Ancillary organs which produce and store digestive enzymes are involved in this process. These include the salivary glands, liver, gall bladder and pancreas, and are external to the digestive tract. Mechanical digestion is where the food is physically moved – e.g. chewing, and mixing or churning the contents in the stomach with the digestive enzymes.

In investigations

There are many investigative procedures that a patient may undergo in order to diagnose the disorder and enable the surgical team to plan the relevant course of action or surgical intervention (Table 16.1). It is often a process of elimination by considering differential diagnoses.

The patient requires a full explanation of the proposed investigation, in order to make an informed decision about whether to go ahead with the test or not. Patients will be required to give verbal and, often, written consent. Informed consent will involve a discussion with the patient, outlining what the test will look at specifically, the risks involved, and the potential outcomes of the test and, indeed, not having the test at all. The Department of Health have an initiative called Good Practice in Consent which outlines the issues (DoH, 2001). The most common investigations are briefly described below.

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Abdominal X-rays
Under normal circumstances, dense material may be penetrated by X-rays, which give an outline of the organs or bones under investigation. When investigating the soft tissue and organs of the abdominal cavity, it is often necessary to use a contrast medium such as barium sulphate to highlight the spaces and cavities in the gastrointestinal tract. X-rays use ionizing radiation and therefore carry a degree of risk, particularly during rapid cell division.

Nursing issues
The most at-risk patients are therefore female patients of reproductive capacity, as there is an increased possibility of affecting a fetus through pelvic X-rays. Consequently, any abdominal radiography should be carefully monitored and only carried out if absolutely essential. A 10-day rule applies to all radiological examinations for female patients of reproductive age. This rule requires the examination to be carried out within 10 days following the first day of the last menstrual period. There may be some exceptions to this rule for those women who have been sterilized, are not menstruating or are not sexually active. Abdominal X-rays are useful in detecting gallstones (approximately 10% of gallstones are radio-opaque) and abdominal fluid levels.

CAT (computerized axial tomography) scan/CT scan
This provides a computerized picture of a part of the body, which is achieved by combining fine X-rays, often with a contrast medium. ‘Slices’ of the abdomen are produced and are useful for detecting irregular anatomy, including tumours.

Barium studies
A radio-opaque contrast medium called barium sulphate is used for radiological studies of the gastrointestinal tract. It is a fine, milky contrast medium that is taken orally, to allow detection of small alterations in the stomach.

Barium swallow and barium meal
This test is usually undertaken to highlight the oesophagus, stomach and upper intestinal tract, therefore assisting in detecting any exacerbation of oesophagitis, dysphagia, gastric or duodenal ulcers, or the presence of abnormalities such as hiatus hernia, strictures, obstruction or fistulae.

Nursing issues
It is advisable for the patient not to have anything to eat or drink for a period of 6–8 hours prior to the investigation, as the examination is more successful if the stomach is empty.

Cholecystogram
A cholecystogram is an X-ray showing the gall bladder following the introduction of a radio-opaque contrast medium containing iodine. This may be introduced by ingestion or injection, and the technique is usually undertaken to detect gallstones or biliary obstruction, or to assess the ability of the gall bladder to fill and empty. It has now been largely superseded by ultrasonography and other investigations.

Cholangiogram or cholangiography
The radio-opaque contrast medium is injected directly into the biliary tract or intravenously. The procedure is carried out during biliary surgery to detect any abnormalities or blockages, as it allows the bile ducts to be viewed on X-ray film. A cholangiogram can also be performed postoperatively in order to check the patency of the common bile duct following exploratory surgery and removal of any residual gallstones (sometimes the common bile duct can become oedematous and inflamed). The contrast medium is introduced through the indwelling T-tube inserted during the surgical procedure.

Nursing issues
The postoperative cholangiogram should be carried out and results reviewed by the surgical team prior to the removal of the T-tube. The nursing role will be discussed later in this chapter.

Endoscopy
The cavities or interior of the gastrointestinal tract can be investigated through the use of an endoscope, which is a luminous fibreoptic instrument that can be inserted through a natural orifice for viewing cavities and internal organs, then relaying them to a television screen. The fibreoptic endoscope is often used to reach areas previously inaccessible with other instruments, as it has greater flexibility. Instruments can also be passed through the special tube of the endoscope to obtain biopsies or perform other procedures such as polypectomy.

Oesophagogastroduodenoscopy
For examination of the upper gastrointestinal tract, it is necessary to wait for the stomach to be empty, for visualization and prevention of aspiration.
Oesophagastroduodenoscopy (OGD) is usually performed to detect and diagnose ulcers and tumours. It is also used to establish the cause of upper gastrointestinal bleeding and to obtain biopsy samples. It may also be referred to in the chapter as gastroscopy.

**Nursing issues**
It is necessary for the patient to have nothing orally for approximately 6 hours prior to these procedures, in order to ensure that the stomach is empty. During the procedure, an anaesthetic spray is often used to anaesthetize the throat. Therefore, following the procedure, it is usual to wait for throat sensation to return to normal prior to drinking. This takes approximately 1 hour, after which the patient may eat or drink normally. Sometimes, fluids are withheld following an oesophageal dilatation until X-rays have been taken, in order to rule out any damage or trauma caused by the procedure.

**Endoscopic retrograde cholangiopancreatography**
Endoscopic retrograde cholangiopancreatography (ERCP) views the biliary tree endoscopically. It can be purely diagnostic or also used for therapeutic purposes. The endoscope with a fine catheter is passed via the oesophagus, stomach and duodenum to the duodenal papilla. There, the pancreatic and common bile ducts are injected with the contrast medium introduced through the ampulla of Vater. Any irregularities will be viewed on the screen, and biopsies and cytology specimens may be taken. The investigation is usually performed to aid diagnosis of obstructive jaundice, chronic pancreatitis or pancreatic carcinoma, or biliary colic, and can also facilitate the removal of gallstones.

**Nursing issues**
The patient should be nil by mouth for at least 6 hours prior to the procedure. An anaesthetic throat spray may be used, as may sedation. Following the procedure, the patient is usually unable to eat or drink for a few hours. Observations should include blood pressure and pulse for indications of bleeding or perforation. This procedure may be contraindicated in patients with cardiac and respiratory disorders (Hibberts and Barnes, 2003).

**Percutaneous transhepatic cholangiography**
In percutaneous transhepatic cholangiography (PTC), heavily concentrated contrast medium dye is injected straight into the biliary tree, enabling all parts of the biliary system to be viewed. This is done through a needle and catheter introduced transcutaneously under ultrasound guidance. It is particularly useful for investigating persistent symptoms related to the biliary system of those patients who have already undergone a cholecystectomy or gastrectomy and cannot have an ERCP.

**Nursing issues**
As in ERCP.

**Ultrasound**
High-frequency sound waves are transmitted by the ultrasound probe and echoes are received from various organs, outlining them. It is safe, as it is non-invasive, and does not use ionizing radiation. It is used in gastroenterology to investigate and detect abnormalities of the biliary system, pancreas, liver and spleen.

**Nursing issues**
If the ultrasound is carried out for investigation of the gall bladder or pancreas, it may be necessary for the patient to stop eating for up to 12 hours, and drink clear fluids only, prior to the procedure. This will ensure that the gall bladder will be fully enlarged due to the retention of bile.

**Upper gastrointestinal disorders**

**Mouth**

**Anatomy and physiology**
This chapter will not discuss disorders of the mouth but will highlight the importance of a healthy mouth in the role of digestion. The mouth contains structures that are involved in the preparation of food for passage through the gastrointestinal tract. These structures are the tongue, teeth, hard and soft palates, and salivary glands. The act of biting and chewing requires the ability of the extrinsic muscles of the tongue to move the food from side to side, and the intrinsic muscles of the tongue to alter the shape of the food for swallowing. This act of chewing is also variable according to the dental pattern and shape of the mouth of the individual and the type of food ingested.

The formation and assisted passage of the bolus requires the secretion of saliva from the parotid, submandibular and sublingual salivary glands, which
secret mucus and amylase. The flow of saliva is dependent on the stimulus initiated from taste and pressure in the mouth. Saliva is also responsible for keeping the mouth clean and removing food particles through keeping it moistened (Rutishauser, 1994).

It is therefore important that individuals have moistened, clean mouths and regular dental check-ups to assist and facilitate the function of chewing, forming and swallowing the bolus of food.

**Oesophagus**

**Anatomy and physiology**

The oesophagus, sometimes called the gullet, is approximately 24 cm long, and is a muscular canal which is collapsible. It runs from the base of the pharynx, behind the trachea, through the opening between the thoracic cavity and abdominal cavity, terminating at the lower oesophageal sphincter of the stomach. It comprises four layers:

- The tunica adventitia (outer layer).
- The muscularis – longitudinal and circular muscles that aid propulsion of food via the action of peristalsis. These muscles graduate from voluntary or striated muscles at the upper, pharyngo-oesophageal sphincter to involuntary or smooth muscles at the cardiac sphincter.
- The submucosal layer, containing blood vessels and tissue.
- The mucosal layer, which aids passage of the food bolus along the oesophagus through the secretion of mucus from special glands.

The function of the oesophagus is to transport the food bolus along the canal by the involuntary action of peristalsis (contractions and waves). The whole process takes 1–8 seconds, depending on the consistency of the food bolus. The pharyngo-oesophageal and gastro-oesophageal sphincters control the flow of the bolus by relaxing, so as to allow the passage of the food through, and contracting, to prevent backflow of contents.

**Oesophageal dysfunction**

Dysfunction refers to any condition that disrupts or affects the normal function of the oesophagus, resulting in uncomfortable symptoms. Symptoms may include acute pain (odynophagia) and difficulty in swallowing (dysphagia), obstruction of food, and feeling the passage of liquids when swallowing, and often the patient will be able to point to the locality of the problem. Some of the conditions, causes and interventions are shown in Table 16.2 and are described below.

**Oesophageal diverticulum**

Oesophageal diverticulum refers to a weakness in the muscle wall of the oesophagus where a pouch of mucosa and submucosa can slip through, causing a protrusion. Diagnosis is through barium swallow and X-rays. Gastroscopy or passing of a nasogastric tube is not undertaken, as there is an increased risk of perforation.

**Intervention**

Intervention is by removal of the pouch surgically. Because of its position, care must be taken to avoid damaging the adjacent vessels, and often a myotomy (a cut in the muscle) is performed to reduce the risk of spasticity to the muscle.

**Oesophageal trauma and/or perforation**

External trauma can be caused by stab, bullet or crush wounds. Internal trauma can be caused by swallowing foreign bodies, puncture from sharp objects or following an investigative procedure. Examples of these are metallic objects, dentures, fish bones and medical instruments. Other trauma effects can be through the ingestion of poisonous substances, or continuous unrelieved strain caused by

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vomiting, resulting in mucosal trauma (Mallory–Weiss tear) or full-thickness rupture of the oesophagus.

**Intervention**
Oesophagoscopy is commonly undertaken with removal of the foreign body or dilatation. In severely traumatized cases, a gastrostomy is created for the insertion of a feeding tube to allow the traumatized area of the oesophagus and oedema to subside. Antibiotics may be prescribed following a perforated oesophagus, as there is an increased risk of infection.

**Oesophageal achalasia**
Oesophageal achalasia is a neuromuscular change that causes benign spasm of the lower oesophageal sphincter, sometimes with marked dilatation of the oesophagus. The lower oesophageal sphincter fails to respond and relax in order to facilitate swallowing. This results in the patient feeling that food is stuck in the gullet. Food is often regurgitated, and oesophageal distension occurs. There is a danger of spillover of food from the oesophagus into the trachea, causing respiratory aspiration. Diagnosis is through OGD and barium swallow.

**Intervention**
The aim would be to dilate the lower oesophageal sphincter using a balloon under pressure, inserted under X-ray or endoscopic guidance. There is a risk of perforation in a small percentage of the procedures. A surgical oesophagomyotomy, i.e. division of the muscle wall, may be performed if dilatation fails.

**Oesophageal varices**
Oesophageal varices are enlarged, swollen, engorged vessels at the base of the oesophagus that are at risk of rupturing, causing a torrential haemorrhage, which can be life threatening.

**Intervention**
The aim of treatment is to stop the haemorrhage. This is done endoscopically by injecting the varices with adrenaline (epinephrine), or by placing a band around the bleeding vessel. In an emergency situation a Sengstaken–Blakemore tube is inserted to block the gastro-oesophageal junction to stop bleeding.

**Oesophageal stricture**
Oesophageal stricture may be caused by intensive and prolonged radiotherapy; through external pressure on the oesophagus by an enlarged adjacent organ or tumour; cancer of the oesophagus; or ingestion of caustic substances. The commonest cause of oesophageal stricture, however, is an inflammatory stricture caused by acid reflux (see below). Diagnosis involves a specific comprehensive history of any recent changes in swallowing, and investigations include endoscopy and biopsy.

**Intervention**
Intervention is by treatment of the underlying cause and may include dilatation of the lumen of the oesophagus and possibly the insertion of a stent.

**Oesophagitis**
The mucosal lining of the oesophagus becomes inflamed following an acute or chronic episode of infection, e.g. fungal; irritation, which includes malignancy, chemical ingestion or prolonged use of a nasogastric tube; complications following gastric/duodenal surgery; or trauma, caused by repeated vomiting, reflux, bending, coughing, stooping or straining. Investigations include a specific history, oesophagoscopy and/or biopsy (Day, 2003).

**Intervention**
Intervention is by treatment of the underlying cause and may involve medical treatment or dilatation, oesophagastrotomy, fundoplication, vagotomy and pyloroplasty.

**Oesophageal cancer**
This is the ninth most common type of cancer in the UK, with nearly 7200 new cases each year. Approximately 5% of the total cancer deaths in the UK are caused by oesophageal cancer (Cancer Research UK, 2008a). It is more common in people over the age of 60, and is twice as common in men as in women. The 5-year survival rate is 7% in men and 8% in women.

There are two main types of oesophageal carcinoma.

* Squamous cell carcinoma accounts for half of the diagnosed cases, and develops in the squamous cells which form the lining of the oesophagus.
* Adenocarcinoma begins in the gland cells that make the mucus in the lining of the oesophagus, and is usually found in the lower third of the oesophagus. It may infiltrate adjacent structures up and down the oesophagus, is insidious in its onset and does not cause symptoms in the early stages. Symptoms may include involvement of the vocal cords, i.e. hoarseness, dysphagia leading to total blockage in some cases, anorexia with
weight loss, pain, regurgitation of undigested food, persistent cough or clearing of the throat, halitosis or foul-smelling breath and haemoptysis. The tumour may eventually invade other adjacent structures, such as the bronchi, trachea, pericardium and great blood vessels, with metastases in the lymph nodes and liver. A patient with Barrett’s oesophagus, a condition where the lower oesophagus has ulcerative benign lesions in the columnar epithelium, is 50 times more likely to get this type of cancer. It is therefore important that the individual undergoes regular gastroscopy surveillance.

Oesophageal carcinomas are thought to be associated with an increased consumption of alcohol, tobacco, hiatus hernia and Plummer–Vinson syndrome (i.e. cricoid webs causing dysphagia and achalasia). There may be a decreased incidence if an adequate intake of vitamins A and C and the mineral zinc are included in the diet.

**Investigations**
Investigations include a specific history as outlined in assessment, barium swallow, OGD, biopsy, endoscopic ultrasound and CAT scan. A bronchoscopy may also be performed to rule out any tracheal involvement.

**Endoscopic ultrasound.** Endoscopic ultrasound has revolutionized the staging of oesophageal cancers. The patient undergoes a gastroscopy, but a fibreoptic tube with an ultrasound crystal is inserted, instead of the camera. The tumour can then be sized, its relation to adjacent structures established and involvement of lymph nodes assessed.

**Intervention**
Surgical intervention is undertaken if the tumour is considered curative, i.e. partial or total oesophagectomy, or palliative intervention may include the insertion of a self-expanding metallic stent. Treatment may also involve chemotherapy, or laser treatment (photodynamic therapy or PDT). Radiotherapy may be effective with an early-stage carcinoma, or as a palliative measure in the advanced stages. If the patient is severely dysphagic, a feeding jejunostomy may be created to meet nutritional needs.

**Insertion of a stent.** When the carcinoma is severely advanced or involves adjacent organs and tissues, palliative intervention may be the option of choice. An expanding stent is passed to ensure that the oesophagus remains patent (Fig. 16.1), thus allowing a soft diet to be taken enterally by the patient (Bailey, 2004).

**Surgical intervention.** Surgical intervention is by an oesophagectomy, where part or all of the oesophagus is removed. The surgical approach may be through the thorax and abdomen, abdomen alone or thorax alone, leaving the stomach positioned in the thoracic cavity. Radiotherapy and chemotherapy can also be used in conjunction with an oesophagectomy, either prior to or following surgical intervention.

**Oesophageal surgery – specific preoperative assessment**
Eating and drinking is clearly one of the problems for a patient undergoing an oesophagectomy, and should be discussed in detail as part of the specific preoperative assessment. Questions should be asked and documented in relation to the specific history, to identify changes in appetite, increasing dysphagia, substernal pain, regurgitation, vomiting, severe weight loss, increased anxiety, metastatic gland enlargement in the neck, haematemesis and, finally, melaena or anaemia. Examples of questions are: ‘How long have you had difficulty in swallowing?’ ‘Does it affect all foods or just fluids?’ ‘Do you regurgitate the food?’ ‘How long does it take you to swallow the food?’ ‘Where does the food
stick? ‘Does it cause pain?’ ‘If so, whereabouts?’ ‘Is it getting worse or better?’ As a result of the appropriate questions being asked, specific problems are identified, as shown in Box 16.1.

### Specific issues related to eating and drinking

- **Nutritional deficit** – due to alteration in appetite as a result of nausea, anorexia, regurgitation, dysphagia or pain on ingesting food.
- **Increased weight loss** – following alteration in appetite/pathology.
- **Potential risk of malnutrition** – following decrease in nutritional status/pathology.

**Specific objective** will be to ensure that adequate nutritional levels are maintained and that the patient is well nourished prior to surgical intervention. Any associated pain and discomfort is relieved or removed.

### Nursing intervention and rationale

- **Assess the ability of the patient to retain food and fluids.** Document food, calorie and fluid intake on the appropriate charts along with weight charts. This will help to monitor nutritional intake and any weight fluctuation, and identify need for further intervention.
- **Facilitate passage of food by offering drinks along with food intake; sometimes, soda water will help to clear the blockage and dislodge any food that is trapped.** Small, frequent, light meals should be offered that are easy to swallow. All meals should be offered in a conducive environment.
- **It may be necessary to give liquidized nutritional intake with vitamin supplements and high-protein fluid drinks, or totally replace enteral nutritional intake with parenteral feeding in order to provide the nutritional requirements.**
- **It is advisable to involve the dietitian and/or the nutritional specialist nurse to provide additional educational input, thus preventing further complications or problems following the introduction of special diets.**
- **Initialize appropriate referral to dietitian and possibly gastroenterologists.**
- **Maintain food chart/nutritional documentation to monitor patients’ requirements.**

### Eating and drinking

It is important that postoperative nutritional and fluid needs are met by a regimen of fluid replacement and volume expanders intravenously, including total parenteral nutritional (TPN) replacement and/or supplements. Often, a jejunostomy tube is inserted at operation for postoperative feeding, before the patient is allowed to ingest food some days later when the anastomosis has healed.

### Personal cleansing and dressing

There is a high risk of wound infection. Therefore, careful monitoring of the wound for signs of clinical infection, i.e. redness, swelling, heat, pain and exudate, should be undertaken. Comfort needs include assistance with hygiene and creating a safe environment.

### Elimination

Monitor for urinary retention, which is related to the neuroendocrine response to stress, anaesthesia and recumbent position.

### Additional specific potential complications

These complications include anastomotic leakage, malnutrition, pneumothorax, aspiration pneumonia, wound infection, blocked stent, fistula development,
poor prognosis and associated high levels of anxiety.

**Stomach**

**Anatomy and physiology**

The anatomy of the stomach is consistent with the rest of the digestive system tract, but it has the specific function of accommodating and digesting the food following ingestion. This is achieved by its shape and modification to receive food and become a reservoir when full. The contraction and churning of the stomach contents is aided by the muscular lining of smooth oblique, circular and longitudinal muscles. The upper part of the stomach wall is thought to be thinner, with little contractile ability; the pylorus is thicker, with an increased contractile function. The passage of food from the oesophagus, stomach and duodenum is controlled by neuromuscular control and sphincter activity.

The mucosa has the ability to secrete enzymes through gastric glands that are present in the columnar epithelium in the mucosa. These cells are known as zymogenic and secrete pepsinogen; parietal cells secrete hydrochloric acid; and mucous cells are responsible for secreting mucus and the intrinsic factor.

Secretion of gastric juices and hydrochloric acid is stimulated by the hormone gastrin from the pyloric mucosa. Gastrin is stimulated by protein foods in the stomach and is released into the bloodstream to reach the gastric glands. Water and glucose are absorbed by the stomach wall along with some drugs and alcohol. The normal pH of the stomach is 2, and is maintained by the secretion of hydrochloric acid (Smith, 2003).

**Pathology**

**Hiatus hernia**

There is a herniation of the stomach through an opening in the diaphragm into the thoracic cavity. In patients who are symptomatic, gastro-oesophageal reflux is displayed, in which the acid contents backflow into the oesophagus, causing inflammation. It is thought to affect 40% of the population. It is more common in females, and the risk increases with age. Muscular weakness and diaphragmatic abnormalities cause the herniation to occur, and these may result from increased intra-abdominal pressure, e.g. because of pregnancy, obesity, malignancy, trauma or persistent coughing/sneezing.

**Sliding hiatus hernia**

Sliding hiatus hernia accounts for 90% of cases. The upper stomach and gastro-oesophageal junction are moved upwards and slide in and out of the thorax. Diagnosis is through radiological studies and fluoroscopy. Clinical manifestations are classically heartburn, regurgitation and dysphagia. The modern surgical management, if the patient is symptomatic, is a laparoscopic Nissen fundoplication, although open procedures are still practised by some surgeons.

**Para-oesophageal hiatus hernia**

All or part of the stomach pushes through the diaphragm opening next to the gastro-oesophageal junction. Investigations are the same as for a sliding hiatus hernia. Clinical manifestations often present with fullness after eating, or chest discomfort, haemorrhage, obstruction, and pain as a result of strangulation of the hernia, which is aggravated when lying flat. Reflux does not usually occur, and it is thought that 10% of the patients who have this type of hiatus hernia are asymptomatic.

**Surgical intervention**

Anterior gastropexy can be performed, where the weak portion of the stomach is placed in its normal position and anchored to the abdominal wall.

**Gastric dysfunction**

Reduced absorption occurs, leading to an accumulation of fluid; reversed peristalsis, causing vomiting; and failure of the mucus to act as a barrier.

**Peptic ulceration**

Peptic ulceration refers to erosion and ulceration of the mucosa of the stomach or duodenum. It is thought that most of these ulcers are due to infection caused by *Helicobacter pylori*, but, clearly, increased acid secretion is also required. These ulcers, which can be gastric, duodenal or stress ulcers, are diagnosed by gastroscopy, barium studies and a breath test for *H. pylori*.

**Gastric ulceration**

Peptic ulceration occurs in the pre-pyloric area of the stomach and accounts for approximately 20% of all peptic ulcers. The age range most affected is 45–70 years old; however, gastric ulceration particularly affects women over the age of 65. It is particularly associated with a familial tendency, stress, alcohol consumption, smoking and ulcerogenic drugs.
Aspirin, phenylbutazone and other non-steroidal anti-inflammatory drugs (NSAIDs) predispose to gastric ulcers because they inhibit prostaglandin synthesis. Prostaglandins contribute to the protective effect whereby the mucosa resists damage from gastric juices and hydrochloric acid. Steroids and chemotherapy drugs have similar effects. Other factors that have an influence on the mucosal layer, causing damage, are intestinal reflux, and hypersecretion of hydrochloric acid, which produces gastritis.

Clinical manifestations are mainly associated with burning pain in the epigastric region that occurs approximately 45–90 minutes following a meal, and this is often relieved by vomiting. Food does not help and may increase the pain. Other manifestations can include persistent belching, haematemesis, and the patient may appear malnourished. Gastric ulcers have the added complication of a higher mortality associated with complications of bleeding. Very few of these ulcers are malignant, and most malignant gastric ulcers occur in the antrum body.

**Intervention.** Treatment is by blocking acid secretion using proton pump inhibitors, as well as eradication of *H. pylori* using combination antibiotics. The vast majority of patients never require surgery, which until 20 years ago was the only treatment available. Surgery is now only required for complications such as bleeding and perforation (Table 16.3).

**Duodenal ulcer**

A duodenal ulcer is located in the first 1–2 cm of the duodenum and is the result of excessive gastric acid release and *H. pylori*. It is often seen in the age group around 50 years old, is more common in males (3:1) and is four times more common than gastric ulcers. There is a high association with blood group O (35% are more susceptible), and it is more common in adults with responsible decision-making jobs. The patient generally appears well nourished.

Clinical manifestations are again associated with pain, which presents in the mid-epigastric region 2–3 hours following the intake of food and often during the early hours of the morning between 1 and 2 a.m. It is often described as back pain, or heartburn. This pain may be relieved by the intake of food, particularly milk or antacids. Duodenal ulcers are rarely malignant, but have for many years been associated with the ingestion of caffeine, stress, alcohol abuse, cirrhosis, chronic pancreatitis, chronic renal failure and smoking. Investigation and diagnosis is by gastroscopy, blood tests in order to correct any anaemia, and a general physical examination. Gastric function tests, to detect the presence or absence of hydrochloric acid and hypersecretion, are occasionally undertaken.

**Intervention.** Treatment is again by the use of proton pump inhibitors such as omeprazole and lansoprazole and other new preparations, which are extremely potent suppressors of acid secretion, as well as combination antibiotics, e.g. amoxicillin, metronidazole or clarithromycin, to eradicate *H. pylori*. Surgery is reserved for acute complications such as bleeding and perforation, as previously discussed. On very rare occasions when medical treatment fails and there is recurrent symptomatic ulceration despite maximum medical treatment, then elective surgery can be considered (see Table 16.3).

**Stress ulcer**

Stress ulcer may result following infection, shock, burns or severe trauma, and can occur either in the stomach or duodenum. It is thought to be associated with increased pepsin, acid and ischaemia of the stomach wall. Its onset is rapid, initially within the first 48 hours, and it may be very extensive by the fifth to sixth day. As long as the stressful circumstances remain, the ulcers will spread. The patient is generally treated symptomatically with antacids.

**Acute complications**

*Haemorrhage* is a common complication of peptic ulceration and occurs most commonly in the distal stomach and proximal duodenum. Haemorrhage is characterized by melaena but is also often life threatening. It must be corrected by replacing lost fluids, giving blood or blood derivatives, e.g. plasma.
Adrenaline (epinephrine) or fibrin/thrombin can be injected at endoscopy to stop the bleeding. Surgical intervention may be necessary for bleeding that is not responsive to endoscopic treatment or for heavy bleeding.

* Perforation and subsequent peritonitis has a sudden onset, sometimes without prior warning. It is a surgical emergency, and surgery should be performed as soon as the patient’s condition allows it. Upper abdominal pain is experienced, which may be referred to the right shoulder. The abdomen is distended and rigid. The patient may rapidly become shocked. Surgical intervention is by oversewing of the perforation, with intravenous antibiotic therapy to treat bacterial peritonitis.

* Obstruction results when scarring and stenosis occur in the pyloric sphincter. The patient feels full and becomes nauseated and vomits. Decompression is initially required and can be achieved by removing the stomach contents via nasogastric tube aspiration. Surgical intervention: gastroenterostomy is a palliative operation for pyloric obstruction (Fig. 16.2). Vagotomy and antrectomy involve severing the vagus nerve and removing the antrum of the stomach. This will help to reduce hypersecretion of hydrochloric acid if treatment with proton pump inhibitors fails. These patients may require TPN if severe weight loss has occurred.

Gastric cancer

In the UK, gastric or stomach cancer is the sixth most common cancer in men, and the ninth in women, with over 8200 new cases diagnosed each year. It is twice as common in men than in women, and more common in the 50–70-year-old age bracket. Gastric cancer constitutes 3% of cancer deaths and has a mean five year survival of 14% (Cancer Research UK, 2008b).

Predisposing factors include the following:

* Dietary: eating a lot of salted, cured and smoked foods is suggested to increase an individual’s risk.

* Infection: H. pylori is a common bacterial infection of the stomach. It is diagnosed on gastroscopy and biopsy, and a simple course of antibiotics often eradicates it. If left untreated, it increases the individual’s risk of developing gastric cancer by up to five times.

* Previous stomach surgery is suggested to increase the risk of stomach cancer, due to reduced acid production.

* Pernicious anaemia is also a predisposing factor, in that the stomach does not produce enough gastric enzymes to take up vitamin B_{12}. However, vitamin B_{12} levels can be topped up with regular 3-monthly injections of hydroxocobalamin.

Prognosis is poor, as many tumours are asymptomatic and therefore present late, often with metastases. Those situated in the lesser curvature do not cause gastric function disorder, while some tumours that occur in the cardiac or pyloric orifice display symptoms caused by disturbed gastric motility. Up to 80% of cases on presentation are too advanced for curative surgical intervention (Cancer Research UK, 2008c). Because of the asymptomatic nature of the disease in its early stage, there has been speculation as to the advantage of a screening programme for all patients over 40 years old who present with dyspepsia. However, dyspepsia is a very common disorder and affects a large proportion of the general population, whereas gastric cancer is relatively uncommon.

Clinical presentation includes dyspepsia over 4 weeks, anorexia, nausea, vomiting or haematemesis, hoarseness, epigastric discomfort, abdominal distension, pain, weight loss, blood in stool and iron deficiency anaemia.

Diagnosis can be made through investigating occult bloods, while OGD/gastroscopy is the gold standard investigation which allows biopsies and histological confirmation. CT scan and laparoscopy
are carried out to stage the disease and determine resectability.

**Intervention**

A partial or total gastrectomy may be performed (Figs 16.3 and 16.4). Total gastrectomy is often associated with a high morbidity and mortality. It is often ineffective, although it may improve palliation, and long-term trials are being undertaken to address this (Cancer Research UK, 2008c).

**Pre- and postoperative care of patients with gastric cancer**

**Specific preoperative assessment**

Patients with gastric cancer may have many problems that require nursing intervention. Anxiety related to the impending surgical procedure is common in most surgical patients, but is made more threatening by the possible diagnosis of cancer and...
poor prognosis. Other specific problems associated with gastric cancer are nutritional deficiency related to anorexia; subsequent weight loss; and pain. The management of pain pre- and postoperatively in gastric cancer surgery is paramount, and questions should be focused on the nature of the pain, location, pattern, duration, intensity and reaction to the pain, in order to plan nursing care effectively (Box 16.2).

### Specific issues related to pain

- Pain related to abnormal presence of epithelial cells in tumour formation, sometimes causing pressure on nerves and other organs.
- Pain related to presence of metastases or ascites.

**Specific objective** will be to ensure that pain is relieved and aim for the optimum state of being pain-free.

### Nursing intervention and rationale

- Use a pain assessment chart to monitor for the possible indicators of pain: e.g. restlessness, irritability, verbalization and withdrawal. Verbal reports may not always be accurate, because of the effects of the disease process and medication.
- Analyse the information on the assessment chart to indicate pain characteristics. This will aid in the differential diagnosis of pain, therefore ensuring that the appropriate intervention is implemented.
- Discuss with the patient the purpose of pain control and that the aim is to strive for a pain-free state. This will ensure that patients understand why they should report any increase in pain sensation before the pain becomes severe.
- Use a variety of non-pharmacological strategies to relieve the pain: positioning, cutaneous stimulation and massage with oils. Due to the multiple factors that cause and exacerbate pain, a combination of methods of relieving pain may be more effective than a single approach.
- Behavioural pain-relieving strategies may include distraction, relaxation and imagery. These strategies enable patients to divert their attention from the pain and may stimulate endorphin release through having a sense of control and relaxed muscles.
- Liaise with the medical staff to discuss and determine an effective method and dose of analgesics. These may include opioids, non-opioids and adjunctives.
- Discuss impending surgery and the method of controlling pain postoperatively. Ensure that patients have time to ask questions related to the surgery and postoperative management. This will provide patients with as much information as they require, to ensure that they understand what is expected of them.
- Initiate appropriate referral to the specialist pain service/nurse specialist for monitoring and advice.

### Specific postoperative nursing interventions

#### Maintaining a safe environment

**Immediately postoperatively,** the patient should be placed in the semirecumbent position for comfort and to help with breathing.

#### Breathing and communicating

To avoid pulmonary complications, analgesics should be given which will encourage deep breathing and productive coughing. This will result in increased oxygen and carbon dioxide interchange, therefore providing adequate oxygen content for circulation. Adequate analgesics will prevent shallow breathing and allow for physiotherapy.

### Eating and drinking

A nasogastric or nasojejunal tube may be in situ. Irritation or bleeding from the position of the nasogastric tube on the mucosa should be avoided, by observing and checking the position of the tube and giving nasal and mouth care. Drainage contents should also be monitored. Oral fluids are often withheld, in order to protect the anastomosis. There may be a risk of dehydration; therefore, fluid intake will need to be monitored and replaced by an intravenous infusion. This will compensate for loss in drainage and vomit, as well as maintaining normal hydration needs. Accurate recording is required, and the nasogastric tube is removed once it is felt that the anastomosis has healed. Often a contrast X-ray is performed prior to removal of the nasogastric or nasojejunal tube. Oral fluids are gradually increased as tolerated, but, again, strict observation should be made for signs of abdominal distension and pain.

There is also an increased risk of malnutrition and/or starvation. Once eating is re-established, dietary needs should be met by offering small bland and frequent meals and drinks. It may also be necessary to replace vitamin B$_{12}$, and give...
vitamin supplements, since following resection of the stomach it is possible that the absorption of vitamins will be affected, including the production of intrinsic factor, which is important for the absorption of cyanocobalamin (vitamin B\textsubscript{12}). The patient should be observed for any evidence of regurgitation, which may be caused by eating too much, eating too fast or as a result of oedema along the anastomosis.

Occasionally, when there is prolonged ileus or complications, it may be necessary to commence parenteral feeding support for 5–6 days postoperatively, commencing normal eating when bowel function returns and the patient feels hungry.

**Mobilizing**

The patient may have limited mobility because of the disease process, the surgery, pain on movement and the effects of anaesthesia. Mobility should be encouraged by giving sufficient analgesics, and monitoring for the side-effects of low blood pressure and dizziness. The goal is to increase mobility daily as the individual is able.

**Personal cleansing and dressing**

There may be a risk of wound infection, so it is important to observe for signs of such. The amount and type of wound drainage should be monitored. The dressing should be changed as necessary. The dressing may be removed and the wound left exposed around the third day. Sutures/staples are removed after approximately 7–10 days.

**Additional specific complications**

These may include shock, haemorrhage, pulmonary complications and the following.

**Steatorrhoea**

Unabsorbed fat in the stools results from rapid gastric emptying, where the pancreatic and biliary secretions have not had the opportunity to break down and digest the gastric contents.

**Dumping syndrome**

Dumping syndrome is where vasomotor and gastric symptoms occur after meals, usually after about 10–90 minutes. If the stomach has been anastomosed to the jejunum, the contents may pass through too quickly; therefore, full absorption may not occur. This has implications for the absorption of carbohydrates and electrolytes, as they need to be diluted before absorption can occur. If fluids are taken at meal times, this will also encourage the stomach to empty too quickly, giving rise to the symptoms of dizziness, faintness, weakness, sweating, pain and fullness. These symptoms occur as a result of rapid distension of the jejunal loop anastomosed to the stomach, caused by the hypertonic solution of intestinal contents drawing the extracellular fluid into the intestinal contents for dilution.

**Gastritis**

Because of the removal of the pylorus, its function as a barrier to reflux of duodenal contents is impaired; likewise for the oesophagus when the cardiac sphincter is involved. Vitamin B\textsubscript{12} deficiency, leading to anaemia, can occur on occasions.

**Education and discharge planning**

For the patient who is undergoing surgery for an upper gastrointestinal disorder, it is important that the condition is fully addressed and that the patient is fully informed of all procedures and investigations that they are expected to undergo. The procedures and results should be explained in appropriate language that facilitates the asking of questions. The adjustment period is very important for the patient, who is required to alter their lifestyle as a result of surgical intervention or palliative management. A multidisciplinary approach that involves health professionals, the patient, and close family and friends will assist in the planning of aftercare and rehabilitation. If the disorder has not been cured, it may be necessary for the patient to have nutritional advice on how to adjust their diet to meet altered nutritional needs; information so as to identify any complications; appropriate contact numbers for specialist support; advice on how to control and manage their pain; and how to manage specialized equipment, i.e. gastrostomy tube or parenteral feeding. In advanced disease, early referral to the palliative care team is a prerequisite before the patient is discharged back into the community. This ensures that adequate care and support is in place, which can help prevent and/or anticipate some of the distressing symptoms produced by advanced gastric cancer.

**Gall bladder**

**Anatomy and physiology**

The gall bladder, a small muscular pouch or sac, is tucked underneath the liver, and is attached to the liver by connective tissue and to the common bile duct via the cystic duct. Its inner walls are similar in construction to the mucous membrane of the stomach. Bile is secreted from the liver into the hepatic duct continuously, but the majority of
bile is concentrated and stored in the gall bladder. Bile is then secreted into the duodenum in response to the ingestion of food under neuroendocrine control. Concentrated bile may become saturated with cholesterol and form crystals which mark the beginning of gallstones.

Bile flow is stimulated by vagus nerve activity. When foods are released into the duodenum, the sensory receptors are stimulated, causing reflex activity in the vagus. Acetylcholine is released and the gall bladder muscle contracts. At the same time the duodenal mucosa produces the hormone cholecystokinin, which stimulates the gall bladder to contract and eject the stored bile into the digestive system in order to assist with the emulsification of fats.

Bile consists of water, conjugated bile salts – i.e. sodium glycocholate, sodium glycochenodeoxycholate, sodium taurocholate and sodium taurochenodeoxycholate – derived from cholesterol, bile pigments – i.e. bilirubin and biliverdin – and a number of lipids. It is a dark yellow/green substance that has a bitter taste. It has a pH of 7.6–8.6 and approximately 800–1000 mL is secreted daily. It has the dual function of aiding digestion of fats by emulsifying them, and aids excretion through stimulating peristalsis. When erythrocytes are broken down, iron, globin and bilirubin are released. The iron and globin are recycled, but some of the bilirubin is excreted into the bile ducts. It is eventually broken down in the small intestine, giving colour to the faeces, and assisting in the synthesis of vitamin K.

Incidence of gall bladder disease

Suggested predisposing factors for developing gall bladder disease are female gender, taking the contraceptive pill, age between 40 and 60 years old, and obesity; also, having a high blood cholesterol level may increase the risk (Royal College of Surgeons of Edinburgh, 2004).

Clinical presentation

Many patients have a history of biliary discomfort, colic and intolerance to fatty foods, but have not sought medical advice. Gall bladder disease can induce symptoms ranging from mild discomfort following a fatty meal, to the patient who presents to their doctor with acute nausea, vomiting and severe pain. The pain is situated in the right hypochondrium, often radiating to the right shoulder. It is severe and intense and can be spasmodic, easing when stones have been passed from the gall bladder to the common bile duct. If the pain remains untreated and persistent vomiting occurs, shock can ensue. Pyrexia may be present due to infection. Jaundice can be present as a result of the gallstones obstructing the common bile duct (Box 16.3).

Conservative and symptomatic management

Many patients in this acute stage are admitted to the surgical ward for symptomatic control prior to surgical intervention. Until recently it has been common practice to avoid surgery until the

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**Gall bladder disease**

- **Cholelithiasis** presence of gallstones in the gall bladder or common bile duct.
  - **Intervention:**
    - dissolution of stones, ERCP – with or without sphincterotomy, cholecystectomy, choledocholithotomy, exploration of common bile duct, and percutaneous removal of gallstones
- **Cholecystolithiasis** gallstones in the gall bladder.
  - **Intervention:**
    - open cholecystectomy, or laparoscopic cholecystectomy
- **Choledocholithiasis** gallstones in the common bile duct.
  - **Intervention:**
    - dissolution of stones, ERCP, choledocholithotomy, cholecystectomy with exploration of common bile duct
- **Cholangitis** inflammation of bile ducts.
  - **Intervention:**
  - conservative and symptomatic management
- **Cholecystitis** inflammation of the gall bladder.
  - **Intervention:**
    - conservative and symptomatic management, or surgery
inflammation has subsided, often for a period of up to 6 weeks. However, research is showing that there is an improved outcome with early laparoscopic surgery, carried out within 48 hours of an admission for cholecystitis, due to the prevention of dense inflammatory adhesions forming (Peng et al, 2005).

**Nursing issues**
The patient is given regular analgesics for the severe pain. There is a risk of peritonitis following perforation of the gall bladder; therefore, pain levels and vital signs are monitored and appropriate interventions implemented. Patients are allowed fluids but may be prevented from eating solids, particularly if nauseated and vomiting. A nasogastric tube may be passed for persistent vomiting. Fluids are replaced by intravenous infusion, and fluid and electrolyte balance is carefully monitored. Antibiotic therapy is commenced to reduce the inflammation of the gall bladder associated with the infection.

Investigations include abdominal X-rays, ultrasound examination, and ERCP or endoscopic ultrasound if there is jaundice or cholangitis.

**Laparoscopic cholecystectomy**
A laparoscope is introduced into the abdomen under general anaesthesia. Carbon dioxide is used to inflate the abdomen to give clear vision. Three more small incisions are made to facilitate the manipulation of instruments. The gall bladder is then dissected, and removed via the umbilicus. There are a number of advantages to this procedure. The patient is able to mobilize more fully at an earlier stage in their recovery, thus preventing the possibility of complications. Surgical disfiguration is limited, and any drains are removed within 24 hours. This procedure is less painful; therefore, there is a reduced need for opioid analgesics, although there is some discomfort experienced following the introduction of carbon dioxide. However, in up to 5–10% of cases the procedure is not possible laparoscopically and an open cholecystectomy is performed. Laparoscopic cholecystectomy is the gold standard of care for symptomatic gallstones. However, it is associated with a higher incidence of bile duct injury, a catastrophic complication associated with significant perioperative morbidity and mortality. Studies have shown that this risk is reduced as the surgeon becomes more experienced and routinely undertakes laparoscopic surgery (Connor and Garden, 2006).

**Specific postoperative management**
Nursing management is consistent with normal recovery from a general anaesthetic. Analgesics are required for any discomfort associated with the procedure and inflation with carbon dioxide. Oral fluids can be commenced when the patient has fully recovered from the anaesthetic, and diet taken usually the following day. Normal discharge is within 24 hours, although increasingly the procedure is being carried out as a day case. Sutures will then need to be removed after a week by the practice nurse.

**Surgical interventions**

**Cholecystoduodenostomy**
This is a surgical procedure for obstructive jaundice, arising from a stricture of the bile duct caused by congenital factors, inflammation, previous surgery or inoperable tumours of the pancreas or local lymph nodes. The gall bladder is anastomosed to the duodenum, bypassing the common bile duct, ampulla of Vater and sphincter of Oddi (Fig. 16.5). This allows the bile to flow directly into the duodenum.

**Choledochostomy (exploration of the common bile duct)**
This technique allows the removal of stones from the bile duct, and insertion of a T-tube to allow drainage from the bile duct and a precautionary wound drain to the gall bladder bed (Fig. 16.6).
Cholecystectomy and exploration of the common bile duct

This is the removal of the gall bladder followed by an explorative procedure in the common bile duct, and is usually performed to remove gallstones. A T-tube drain is inserted to ensure the common bile duct remains patent for the safe passage of bile (see Fig. 16.6). This tube is then removed approximately 2 weeks postoperatively, following a postoperative cholangiogram. A precautionary wound drain is often inserted to the gall bladder bed. This procedure can be performed laparoscopically or as an open procedure.

Principles of a T-tube

During the operation, a cholangiogram is performed to detect gallstones in the common bile duct. If stones are identified, then the surgeon will usually explore the common bile duct and remove the stones or gravel. Following this procedure, the common bile duct is susceptible to leakage, inflammation and oedema; therefore, a T-tube is inserted to maintain the patency of the duct. The function of this T-tube is to allow safe drainage of bile, approximately 300–450 mL during the first day, which gradually decreases as the oedema subsides.

A postoperative cholangiogram is performed approximately 8–10 days following the cholecystectomy. Depending on the surgeon, some T-tubes are clamped prior to the postoperative cholangiogram. Particular attention should be paid to any complaints of pain associated with the clamping of the tube. If this arises, then the clamp should be removed immediately and the surgical team informed.

The results are viewed by the surgeon, and if they indicate that the oedema has subsided and there are no stones present and no leakage of bile, then the T-tube is removed by the nursing staff. It is usual to give the patient analgesics at least 30 minutes prior to the removal of the T-tube. After removal it is important to monitor the patient for a sudden drop in blood pressure, or rise in pulse, and for evidence of pain, as this may indicate that the patient has developed biliary peritonitis caused by seepage of bile into the peritoneal space.

Cholecystojejunostomy

This is a palliative surgical procedure for obstructive jaundice due to a tumour of the pancreas. The gall bladder is anastomosed to the jejunum, bypassing the common bile duct, ampulla of Vater and sphincter of Oddi (Fig. 16.7). A precautionary drain may be inserted to the area of anastomosis.

Pancreatectomy (Whipple’s operation)

This procedure is for carcinoma of the head of pancreas. The duodenum and part of the pancreas are resected, and the common bile duct and pancreatic ducts are joined to the jejunum (Fig. 16.8). There are many variations of this procedure.
Pre- and postoperative care of patients undergoing biliary surgery

Specific preoperative assessment

The patient who requires surgery for biliary dysfunction has many problems that require nursing intervention. The specific problems are associated with the risk of peritonitis due to possible perforation of the gall bladder; haemorrhage associated with reduced vitamin K production and absorption following obstructive jaundice; wound infection following the obstruction or dislodgement of the T-tube; and postoperative chest infection due to the pain associated with the high abdominal incision preventing deep breathing and coughing. However, with the advent of laparoscopic cholecystectomy, more than 90% of these operations are being carried out using minimally invasive techniques, which therefore reduces the need for a subcostal incision. The specific problems associated with breathing are detailed in Box 16.4.

Box 16.4

Specific issues related to breathing

- Inadequate air exchange – due to reduced ventilation of the lungs.
- Reduced ventilation of the lungs – due to frequent, shallow respirations.
- Shallow respirations – due to the risk of associated pain when expanding the lungs.
- Potential risk of chest infection – due to the difficulty in expectorating sputum and limited mobility.
- Difficulty in expectorating sputum – due to the tenacity of the lung secretions and a lack of strength to expectorate.

Specific objective will be to maintain optimal air exchange (lung expansion) and prevent chest infection.

Nursing intervention and rationale

- Accurate recordings and monitoring should be carried out postoperatively to establish the depth and frequency of respirations.
- Deep breathing (diaphragmatic) should be taught to the patient prior to surgery and encouraged postoperatively. This will allow full lung expansion and prevent consolidation of lung secretions. Involve the physiotherapist, especially if the patient has had respiratory problems identified prior to surgery.
- Ensure the patient’s pain is assessed and analgesics are administered prior to intensive deep breathing exercises or physiotherapy and mobilization.
- Instruct the patient in supporting their abdominal wound prior to coughing and expectorating sputum, thereby reducing any stress or pulling on the incision line.
- Encourage a good fluid intake, which will have the effect of reducing the tenacity of the lung secretions and facilitating expectoration of sputum.
- Mobilize as soon as the patient’s condition allows, as this encourages deeper respirations, therefore ensuring that the lungs are adequately ventilated.
- Initiate appropriate referral to physiotherapist, for mobility and check.

Figure 16.8 • Pancreatectomy (Whipple’s operation).
Specific postoperative nursing interventions

Maintaining a safe environment
It is important to monitor vital signs for possible shock; the abdomen for signs of distension; and level of pain, including location and character. These all indicate the possibility of peritonitis, perforation and/or haemorrhage. Early detection will ensure that immediate action can be implemented, i.e. fluid replacement and/or emergency surgery.

Communication
Pain has already been mentioned in detail in the section on gastric surgery and in relation to breathing following biliary surgery. However, the management of pain also has important implications for mobilization and the prevention of deep vein thrombosis.

Eating and drinking
Eating and drinking can usually be commenced immediately postoperatively following a laparoscopic cholecystectomy, and at 24 hours following an open procedure.

Personal cleansing and dressing
Wound management has been discussed in previous nursing interventions, although there is a risk of infection associated with the T-tube drain. Any signs of clinical infection, redness, swelling, heat, pain, purulent drainage or odour should be documented and reported, as this will ensure that systemic antibiotic therapy is introduced if required.

Signs of T-tube obstruction should be observed for, by noting any change in skin colour (jaundice), pale stools, dark yellow urine, nausea and vomiting, and reduced amount of drainage in the bile bag. Any of these signs can indicate that the passage of bile is obstructed, causing pressure within the common bile duct and sometimes the liver and portal system. The skin surrounding the T-tube should be observed for any redness and excoriation, and protected with a small keyhole dressing, as bile contents, when leaking around the tube, can cause skin irritation and pain.

Additional specific complications
It should be remembered that the elderly have an increased risk of morbidity and mortality when undergoing surgery of the biliary tract in an emergency, due to an increased risk of complications associated with the cardiovascular system. It is estimated that 70% of people over 75 years old have long-standing illness and are therefore at greater risk when undergoing surgical intervention (Office of Health Economics, 1992).

Education and discharge planning
As previously stated in this chapter, it is important that the patient who undergoes surgery should be fully educated and aware of the implications of the surgery. The patient who has had a cholecystectomy may have symptoms that are associated with the free passage of bile. The gall bladder is no longer there to be used as a reservoir, so the bile will be continually secreted. This may mean that when fatty foods are eaten the patient may feel nauseated, and may develop post-cholecystectomy diarrhoea. The patient should also be aware of the need to report any further pain, nausea or change in skin colour, as this may indicate further biliary obstruction.

Bariatric surgery
(Nuala Davison)

The rise in obesity within the Western world has led to surgeons developing a number of surgical approaches that achieve significant and durable weight loss (Pratt et al, 2006), and risks associated with bariatric surgery have been reduced with the introduction of laparoscopic surgery. Benefits of surgery include the reduction or resolution of many co-morbidities and associated conditions, including type 2 diabetes, hyperlipidaemia, hypertension and obstructive sleep apnoea (Buchwald, 2007).

The degree of obesity of an individual is calculated using the body mass index (BMI), and people are defined as being obese if they have a BMI equal to or greater than 30 kg/m$^2$.

In the UK, selection for bariatric surgery is guided by criteria set by the National Institute for Clinical Excellence (NICE, 2006). Individuals may be treated with obesity surgery if they meet the following criteria:

- a BMI of 40 kg/m$^2$ or more, or between 35 kg/m$^2$ and 40 kg/m$^2$ associated with other significant disease (e.g. type 2 diabetes or hypertension) that could be improved if they lost weight
- evidence that all appropriate and available non-surgical measures have been adequately tried but have failed to achieve or maintain adequate, clinically beneficial weight loss for at least 6 months
- the person has been receiving or will receive intensive management in a specialist obesity service
• the person is generally fit for anaesthesia and surgery
• commitment to the need for long-term follow-up
• obesity surgery is also recommended as a first-line option (instead of lifestyle interventions or drug treatment) for adults with a BMI of more than 50 kg/m² in whom surgical intervention is considered appropriate.

Bariatric surgery achieves and maintains weight loss through:
• restriction of food intake (gastric banding and sleeve gastrectomy)
• malabsorption – reducing the amount of small intestine where food is absorbed (biliopancreatic diversion and duodenal switch)
• combination of restriction and malabsorption (Roux-en-Y gastric bypass).

Types of surgery

The type of surgery a patient receives can depend on dietary habits, psychological disorders such as binge-eating behaviour, age, type of obesity and the patient’s preference.

Adjustable gastric banding

A silicone band is placed around the stomach, creating a small stomach pouch (Fig. 16.9). As a result, the patient will feel fuller after consuming a smaller amount of food. The feeling of fullness (satiety) will last longer, as the stomach pouch takes longer to empty. The band can be adjusted by injecting fluid through a subcutaneous port if the band is providing not enough restriction or too much restriction. Most foods can be eaten, although some patients find certain foods, such as white bread, hard to swallow.

Sleeve gastrectomy

The left part of the stomach is removed, reducing the size of the stomach to approximately 35% of its original size (Fig. 16.10). It is often used as a first-stage procedure for super-obese patients. Appetite is reduced and patients experience early satiety. If weight loss stops, a second procedure such as gastric bypass or duodenal switch can be performed.

Biliopancreatic diversion and duodenal switch

These procedures involve reducing stomach size and shortening the length of duodenum where absorption occurs (Fig. 16.11). Food passes from the stomach into the enteric limb. In both procedures a length of duodenum (biliopancreatic limb) is anastomosed to the enteric limb to allow transit of bile and pancreatic juice. The two limbs join to form the common limb, where digestion and absorption of nutrients take place (Buchwald, 2007). Shortening the length of duodenum where absorption occurs...
can put the patient at risk of iron, calcium, vitamin and protein malabsorption. The patient therefore needs to take vitamin and mineral supplements for life and have regular blood tests.

**Gastric bypass**

Weight loss is achieved through the creation of a small upper stomach pouch (restricting intake) connected to the lower part of the small intestine (Roux limb) (Fig. 16.12). Pancreatic juices and bile travel from the bypassed portion of the stomach and duodenum and mix via a Y anastomotic connection to the Roux limb. The amount of malabsorption is less than with the biliopancreatic diversion/duodenal switch. However, iron and vitamin B₁₂ deficiencies are a risk and patients will be required to take supplements for life along with regular blood tests. Dumping syndrome can occur in patients following gastric bypass surgery when large amounts of carbohydrates are consumed. Symptoms include a runny nose, nausea, tachycardia, syncope, vomiting and diarrhoea (Kellum et al, 1990, cited by Still, 2007).

**Specific preoperative care**

A multidisciplinary approach is essential to ensure the patient is fully assessed, medically stabilized, and has received education about the lifestyle changes that are required for surgery to be successful (Still, 2007). The team should include representatives from surgery, medicine (endocrinology, cardiology, gastroenterology, respiratory), psychology, dietetics, anaesthetics and nursing. Patients taking hypoglycaemics should be commenced on sliding-scale insulin prior to surgery.

**Specific postoperative care**

Care of patients following bariatric surgery should be carried out in an environment adapted for this speciality, as provision of equipment with adequate safe working loads for the patient population is essential. This should include: seating (outpatient and inpatient areas), scales, beds, examination couches, toilets/commodes, wheelchairs, operating tables, hoists and mobility aids. Appropriately sized gowns should also be provided.

Postoperative vital signs monitoring should be carried out using appropriate equipment, i.e. large-sized blood pressure cuffs. Attention should be paid to signs of sepsis, which can include tachycardia, fever, shoulder pain, abdominal pain, shortness of breath and a respiratory rate of above 22 rpm, as these can be a sign of an anastomotic leak, which will require a return to theatre (Still, 2007).
Diabetic patients require regular blood glucose monitoring postoperatively until nutritious fluids are commenced. Insulin and antihypertensive medication requirements can drop significantly postoperatively and should be reviewed (Still, 2007). Medications should be given in regular release formulas rather than sustained release in those patients who have undergone malabsorptive procedures (Still, 2007).

All patients should be given antiembolic prophylaxis, wear antiembolic stockings, and be encouraged to mobilize as soon as possible, to minimize the risk of deep vein thrombosis and pulmonary embolism.

The introduction of fluids and food depends on the type of surgery performed. Patients should be well educated by the dietitian prior to surgery, with a follow-up visit soon after. Patients having malabsorptive procedures such as gastric bypass will often have a barium swallow prior to the introduction of fluids to check for any anastomotic leaks. Typically, most patients will graduate from sips of fluids, to free smooth fluids, to a puréed diet, to a normal diet, albeit with smaller portions, over a period of 6 weeks. Nausea and vomiting should be managed with antiemetics and intravenous fluids until adequate oral intake is achieved.

Special attention needs to be paid to skin care following surgery. Frequent repositioning and monitoring of pressure areas, use of appropriate pressure-relieving mattresses, and control of moisture between skin folds are essential (Rose and Drake, 2008).

Nurses caring for patients undergoing bariatric surgery need to recognize with sensitivity the specific needs of their client group, as the National Association of Bariatric Nurses (USA) found that bias and prejudice can affect patient care (Camden et al, 2008). A thorough understanding of the causes of obesity and the specific physical and psychological effects it can have on the individual is essential, in order to provide quality nursing care.

### Specific discharge education

The success of bariatric surgery is dependent on the patient making changes to their diet and lifestyle.

Patients also need to be made aware of possible long-term complications that may arise (Table 16.4).

- The dietitian will provide written dietary advice for the patient to follow in the first 6 weeks after surgery and beyond.
- Patients may be discharged with 2 weeks’ supply of antithrombolytic medication and should be supplied with a sharps bin and educated on self-administration.
- Contact numbers for the dietitians and clinical nurse specialist should be supplied.
- The patient will require follow-up appointments. This will usually be at 6 weeks to see the surgeon and dietitian, and then at 6–8 weeks for the first gastric band fill. Progress will be monitored by 3-monthly appointments with the dietitian for the first 1–2 years and then yearly thereafter.

<table>
<thead>
<tr>
<th>Table 16.4 Long-term complications following bariatric surgery</th>
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<tbody>
<tr>
<td>Restrictive procedures</td>
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<tr>
<td>Nausea and vomiting</td>
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<tr>
<td>Band slippage/migration</td>
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<tr>
<td>Band erosion</td>
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<td>Port site complications</td>
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<tr>
<td>Outlet obstruction</td>
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<td>Pouch dilatation</td>
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<tr>
<th>Malabsorptive procedures</th>
<th>Management</th>
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<tbody>
<tr>
<td>Dumping syndrome</td>
<td>Managed in OPD</td>
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<tr>
<td>Vitamin and nutrient deficiencies</td>
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<tr>
<td>Gallstones</td>
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<tr>
<td>Intestinal irritation and ulcers</td>
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<td>Changes in stools</td>
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<td>Abdominal bloating</td>
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<td>Malodorous flatus</td>
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</table>

OPD = outpatients department.
Summary of key points

This chapter has described the pathophysiology of the organs of the upper gastrointestinal tract. Diagrams have been used to facilitate understanding, and the dysfunction of the organs and surgical interventions have also been discussed.

- Aetiology and epidemiological data, where appropriate, have been included, but it must be remembered that, as medical intervention progresses and research is undertaken, these statistics may alter.

Some guidance has been offered to assist the nurse to use a problem-solving approach in assessment, planning care, setting goals and initiating intervention for those patients who undergo surgery for a variety of disorders of the upper gastrointestinal tract.

Finally, patient education and preparation for discharge has been highlighted, suggesting that it is necessary to focus on the importance of health promotion. Patient education plays an important part in preventing complications from arising, and in dealing with the implications of failed surgery that may require further intervention.

References


### Further reading

<table>
<thead>
<tr>
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