Care of Patients After Esophagectomy

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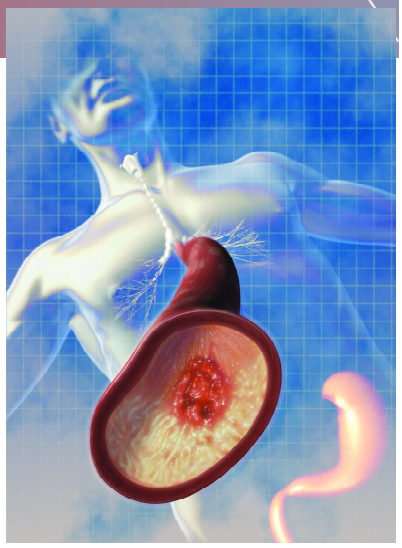

With approximately 12 000 new cases diagnosed each year in the United States and a nearly equivalent number of deaths, esophageal cancer remains one of the most lethal of all malignant diseases.[1,2] The tumor occurs more often in men than in women and more often in African Americans than in whites. The incidence of esophageal cancer increases with age.[3,4]

Squamous cell and adenocarcinoma are the 2 most common histopathologic forms of esophageal cancer. Squamous cell carcinoma occurs more often in African Americans and Asians than in other groups, and the incidence is higher in China, Japan, and Iran than in other countries.[3] Squamous cell carcinoma mainly occurs in the upper and middle parts of the esophagus. Adenocarcinoma arises mainly in the distal part of the esophagus and at the gastroesophageal junction. Esophageal cancer may spread to other parts of the body via the blood or lymphatic system. Distant metastases most often occur in the liver and lungs.[3,5,6]

CE This article has been designated for CE credit. A closed-book, multiple-choice examination follows this article, which tests your knowledge of the following objectives:

1. Identify the clinical findings associated with esophageal cancer
2. Describe the postoperative complications of esophagectomy
3. Discuss important aspects of nursing care of patients after esophagectomy

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Etiology

The precise etiology of esophageal cancer is not known. However, several risk factors are associated with its occurrence. Heavy alcohol use in conjunction with cigarette smoking or chewing tobacco is a major risk factor for squamous cell cancer. In areas of the world where esophageal cancer is endemic (eg, Iran, Russia, Puerto Rico, Singapore, China, Japan, and parts of Africa), dietary factors are associated with increased risk of esophageal cancer. In these countries, diets are high in nitrosamines, pickled and fermented foods, and hot teas. Researchers speculate that the chronic mucosal inflammation caused by drinking hot liquids and created by repeated exposure to toxins increases the likelihood of malignant transformation within cells of the esophageal mucosa.[3,5]

Another possible etiologic factor involved in the development of esophageal cancer is chronic irritation of the esophageal mucosa related to gastroesophageal acid reflux. Barrett esophagus develops in the distal part of the esophagus in a subset of patients with chronic reflux.[7] In this condition, the esophageal epithelial surface is altered to become more like the stomach lining. This alteration, which is described as columnar metaplasia, is associated with a markedly increased risk of progression to adenocarcinoma. To detect changes within the esophagus before they progress to cancer, patients with known Barrett esophagus should undergo regular endoscopic examinations and esophageal biopsies.

Recently, a genetic component of esophageal cancer has been investigated. Overexpression and mutation of the gene that encodes the tumor suppressor protein p53 have been found in esophageal cancer. This genetic link is one of the most commonly studied links associated with cancer development.[3] Other tumor suppressor genes may also be associated with esophageal cancer.[8]

Clinical Findings

Early-stage esophageal cancer is rarely associated with notable signs and symptoms; therefore, early detection is difficult.[8] Dysphagia is the most common initial symptom but usually occurs in late-stage esophageal cancer.[3] The esophagus is very pliable; therefore, tumors are usually quite advanced before a person perceives difficulty with swallowing. By the time patients go to a physician, they often have had dysphagia for several months. It may have started with the inability to swallow solid foods and then progressed eventually to liquids. They may have experienced significant weight loss, malnutrition, and weakness.[3] In addition to dysphagia, patients with esophageal tumors may have pain with swallowing (odynophagia). Other late clinical manifestations of esophageal cancer are substernal pain, hiccups, respiratory difficulty, heartburn, halitosis, hoarseness, coughing, sialorrhea (excessive salivation), and nocturnal aspiration.[5,6,8,9]

Early-stage esophageal cancer is rarely associated with significant symptoms and therefore early detection is difficult

Prognosis

The overall prognosis for patients with locally advanced esophageal cancer is poor. The age of the patient, the stage of cancer at diagnosis, and the location of the tumor are all predictors of survival.[10] For patients with disease extending through the wall of the esophagus and or involvement of regional lymph nodes, 5-year survival is less than 15%.[1]

Surgical Management

Surgical resection is the mainstay of treatment for patients with localized esophageal cancer. However, in an effort to improve cure rates, chemotherapy and radiation therapy are often used in conjunction with surgery.[11-14] We address the nursing care of patients who have surgical resection of esophageal neoplasms and patients who have prophylactic surgery for treatment of Barrett esophagus with high-grade dysplasia.

Preoperative Evaluation

Patients may undergo multiple diagnostic tests in preparation for esophageal surgery[4] (Table 1). The definitive diagnostic study for patients suspected of having an esophageal tumor is flexible fiberoptic esophagoscopy with biopsy. As well as indicating the presence of disease, a biopsy also can provide information about cell differentiation.

In addition to a biopsy, many patients undergo computed tomography, positron emission tomography, and endoscopic ultrasound to determine local stage and invasiveness of the tumor and to survey for

Table 1 Preoperative diagnostic studies for esophageal surgery

Blood and urine tests
Chemistry panel
Complete blood cell count
Serum albumin level
Liver function tests
Urinalysis
Radiological studies
Chest radiography
Barium swallow
Computed tomography of the abdomen
Computed tomography of the mediastinum
Bone scan
Esophageal ultrasound for depth of invasion
Positron emission tomography
Cardiac and pulmonary studies
Pulmonary function tests
Electrocardiography
Tissue typing and tumor identification
Cytology of tumor brushings or biopsy specimens
Cervical lymph node biopsy
Endoscopy with biopsy or brushings
Bronchoscopy and laryngoscopy for cervical or thoracic esophageal lesions

Table 2 TNM staging system for esophageal carcinoma[15]

Primary tumor (T)

T_X	Primary tumor cannot be assessed
T_0	No evidence of primary tumor (eg, after treatment with radiation and chemotherapy)
T_{is}	Carcinoma in situ
T_1	Tumor invades lamina propria or submucosa but not beyond it
T_2	Tumor invades muscularis propria
T_3	Tumor invades adventitia
T_4	Tumor invades adjacent structures (eg, aorta, tracheo-bronchial tree, vertebral bodies, pericardium

Regional lymph nodes (N)

N_X	Regional lymph nodes cannot be assessed
N_0	No regional lymph node metastasis
N_1	Regional node metastasis

Distant metastasis (M)

M_X	Presence of distant metastasis cannot be assessed
M_0	No distant metastasis
M_1	Distant metastasis

Stage grouping

Stage 0	Tis	No	Mo
Stage 1	T1	No	Mo
Stage IIA	T2	No	Mo
Stage IIB	T1	N1	Mo
	T2	N1	Mo
Stage III	T3	N1	Mo
	T4	Any N	Mo
Stage IV	Any T	Any N	M1

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any local lymph node metastasis.[3] Regional lymph nodes include lymph nodes in the mediastinum and nodes a round the gastric cardia and along the left gastric artery. Distant lymph nodes include lymph nodes around the celiac axis and retroperitoneum and in the cervical (neck) chains. Involvement of these distant nodes is considered distant metastatic disease (stage IV), and aggressive surg ical treatment is generally not considered in patients with nodal involvement in these areas. Distant metastases may also involve the liver, lungs, peritoneum, or adrenal glands. For patients with distant metastatic disease, palliative chemotherapy, radiation therapy, or both are the primarytreatments.[2] Once esophageal cancer is detected, it may be staged by using the TNM (tumor-node-metastasis) classification system (Table 2). In this system, tumors are classified according to size, lymph node involvement, and the presence of metastases. The course of treatment and the prognosis of the disease depend on the stage at diagnosis. Surgery for esophageal cancer may be performed with either a curative or palliative intent.[16] See Table 3 for factors that increase surgical risk.

Table 3 Factors that increase surgical risk in esophageal cancer[17,18]

Age >60 years
Chronic or recent illness, especially pneumonia
Obesity, smoking
Poor nutritional status
Excessive alcohol consumption
Use of drugs such as antihypertensives, muscle relaxants, tranquilizers, sleep inducers, insulin, sedatives, narcotics, β-adrenergic blockers, or cortisone

Surgical Techniques

Surgical resection of the esophagus for cancer is a technically demanding procedure. It usually involves removing part or all of the esophagus, part of the stomach, lymph nodes in the surrounding a rea, and occasionally the spleen (if it is injured or bleeding). Most commonly, the stomach is used to reconst ruct the gastrointestinal tract. If the entire esophagus and stomach must be removed, part of the bowel is used to create a tube to maintain gastrointestinal continuity. The most common surgical procedures for esophageal cancer are transhiatal

esophagectomy and transthoracic esophagectomy.

Transhiatal esophagectomy involves both an abdominal incision and a cervical (neck) incision. The thoracic cavity is not opened. The abdominal component of the procedure involves complete mobilization of the stomach. Lymph nodes around the distal part of the esophagus, the gastric cardia, and the left gastric artery are resected in continuity with the specimen. The intrathoracic part of the esophagus is then dissected away from adjacent thoracic structures by using a blunt technique. To perform this maneuver, the surgeon opens the diaphragmatic hiatus and mobilizes the esophagus by careful manual dissection up into the thoracic cavity.[19]

The cervical component of the operation involves opening the neck and retracting the sternocleidomastoid muscle laterally. The part of the esophagus in the neck is encircled and dissected away from the adjacent trachea. The esophagus is then divided in the neck and passed down through the chest. The upper part of the stomach is then divided, and the specimen, which includes the esophagus and the upper part of the stomach, is sent to the pathology laboratory for examination. Gastrointestinal continuity is reestablished by constructing a tube out of the remaining part of the stomach and passing the tube up through the chest and anastomosing the cervical part of the esophagus to the stomach tube[20,21] (Figure 1).

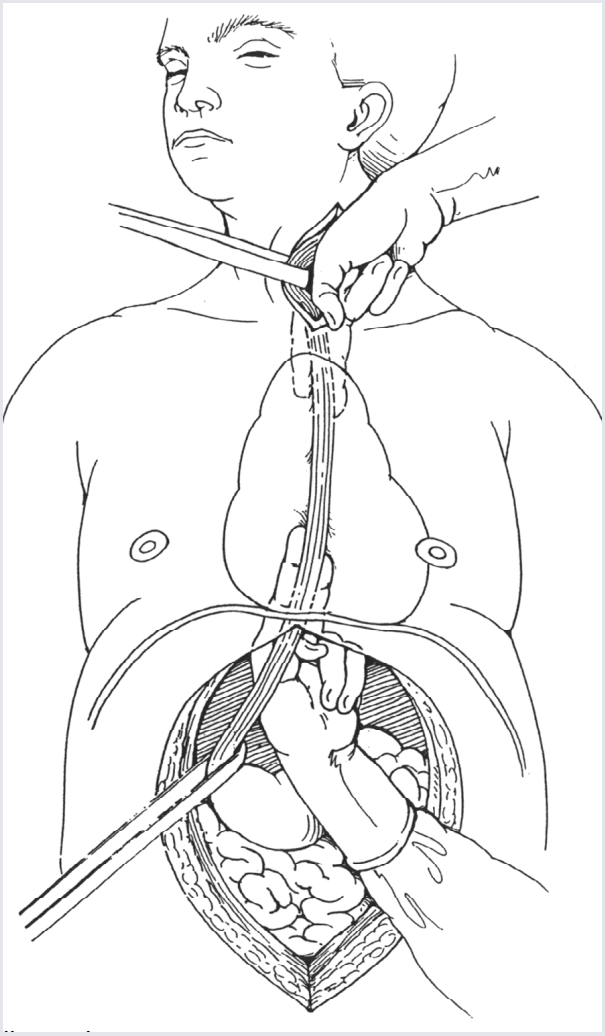
Transthoracic esophagectomy involves an abdominal incision and a thoracotomy. The mid and lower parts of the esophagus are removed along with the upper part of the stomach. The abdominal component of the procedure involves complete mobilization of the stomach. The lymph nodes associated with the distal part of the esophagus, the gastric cardia, and the left gastric artery are resected in continuity with the specimen. When the stomach and the distal part of the esophagus are completely dissected, the abdominal incision is closed and the patient is repositioned for a right thoracotomy.[22] Once the chest is opened, the intrathoracic part of the esophagus is dissected, and specimens of lymph nodes associated with the paraesophageal space and the subcarinal area are obtained for pathological examination. The esophagus is divided in the chest. The upper part of the stomach is also divided, and the specimen, which includes the esophagus and the upper part of the stomach, is sent for pathological examination. In order to restore the gastrointestinal tract, the stomach is reconfigured, and a gastric tube is created and passed into the chest. The stomach is anastomosed to the esophagus in the chest cavity. Patients who have transthoracic esophagectomy have no neck incision and have one or more chest tubes postoperatively[21] (Figure 2).

The choice of operation depends on the location of the tumor, the patient's pulmonary function, and the surgeon's experience and preference.

Several investigators have studied the preoperative factors that can be used to predict postoperative pulmonary complications. One of the most consistent predictors of pulmonary complications is compromised preoperative lung function as indicated by spirometry.[23] Patients who have a forced expiratory volume in 1 second of less than 65% are at greatest risk for postoperative pulmonary failure.[17] Additional risk factors for pulmonary complications include the patient's age and performance status.[23] For patients with poor preoperative lung function, a period of preoperative cardiopulmonary rehabilitation should be considered.[23]

If the surgery is done to treat cancer, nearby lymph nodes also are removed. Each operative approach has strengths and weaknesses. The transhiatal esophagectomy spares patients a thoracotomy incision, thus diminishing postoperative pain and pulmonary complications.[16] In addition, the transhiatal esophagectomy places the esophageal anastomosis high in the neck. If the anastomosis leaks in this position, the leak is easily managed by opening the neck incision for drainage. Doing so rarely results in systemic sepsis or mortality. The transhiatal approach, however, does not allow complete dissection of intrathoracic lymph nodes and thus may limit the surgeon's ability to remove all disease-bearing lymph nodes.

In contrast, transthoracic esophagectomy involves a thoracotomy incision and requires placement of the anastomosis in the chest. If the anastomosis leaks in the chest, mediastinitis, which may be life threatening, often develops. The clear advantage of the transthoracic procedure is that the surgeon can dissect the intrathoracic part of the esophagus and the regional mediastinal nodes under direct vision via the thoracotomy incision. Doing so provides a theoretical advantage in disease control. Results of a recent clinical trial suggest that the transthoracic procedure may have a small adva-



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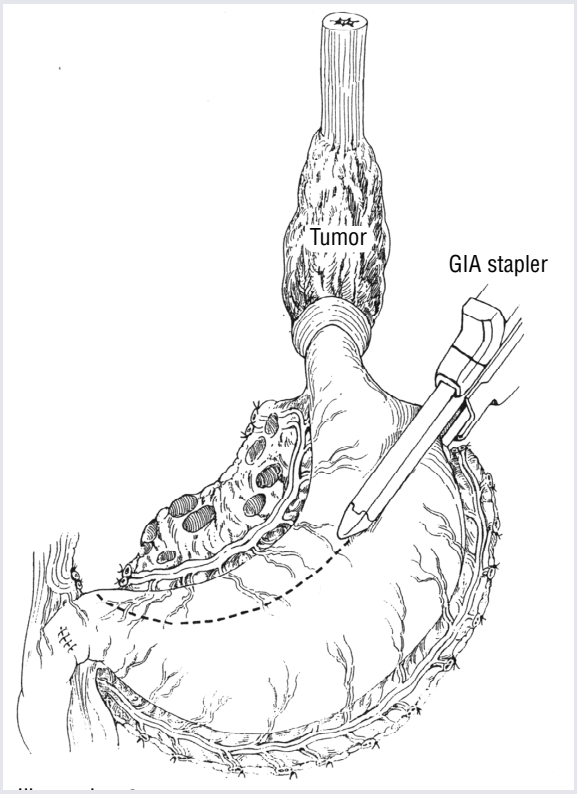

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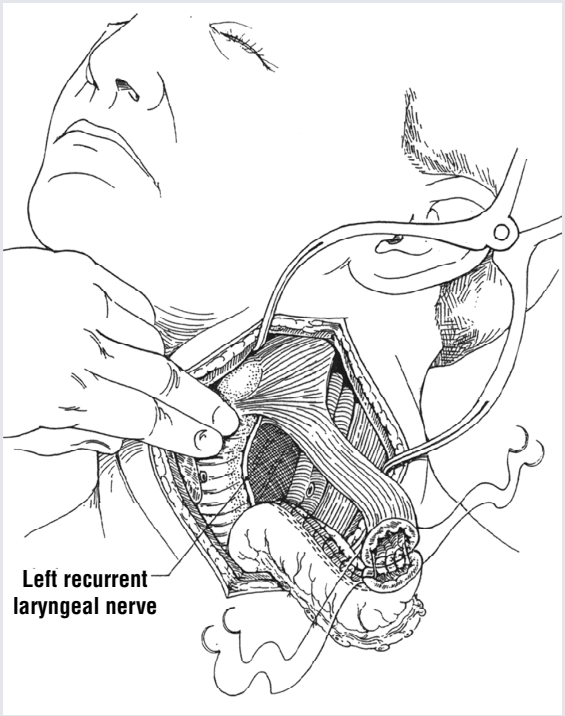

C

Figure 1 Transhiatal esophagectomy. A, Transhiatal mobilization of esophagus. B, Construction of gastric tube by using gastrointestinal anastomosing stapler. C, Formation of esophagogastric anastomosis.

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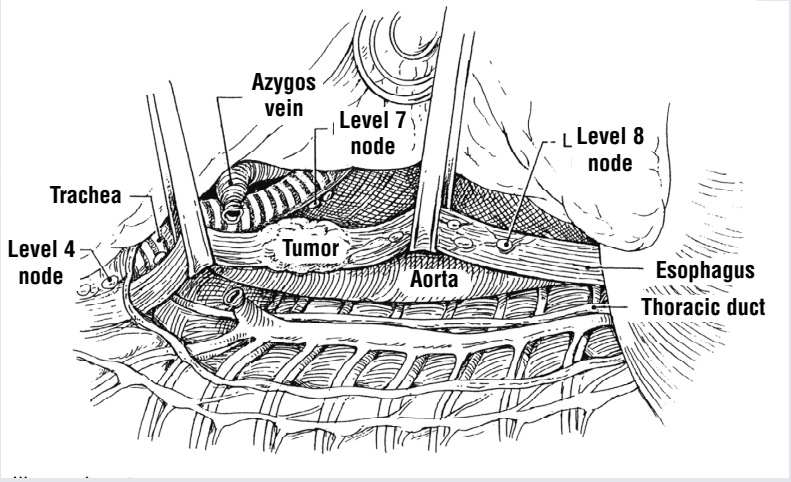

Figure 2 Transthoracic esophagectomy.

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tage for disease control, although this advantage was not statistically significant in the analysis of overall survival rates.[24]

Enhanced nursing care that includes multisystem interventions such as aggressive pulmonary toilet; aggressive pain control; careful, skilled monitoring for potential complications; preoperative and postoperative teaching; and an interdisciplinary, collaborative approach has helped lower the mortality rate of esophagectomy patients. Gregoire and Fitzpatrick[25] refer to this "more comprehensive" nursing care and credit it as a factor in enhancing survival rates. Therefore, nurses play a key role in improving outcomes for these patients.

Nursing Care of Patients After Esophagectomy

After esophagectomy, patients go to an intensive care unit for 24 to 48 hours. They are usually intubated and have multiple drains and tubes. These patients require intensive cardiopulmonary monitoring in the immediate postoperative period.[4] Critical care nursing skills are vital in the systematic assessment of these patients.

Neurological Status

Assess neurological status every shift and more often if any changes from baseline occur. Even subtle changes in neurological status may indicate a postoperative complication. Decreased responsiveness, pupillary changes, inability to move or unilateral weakness, agitation, inability to control pain, or any neurological change should be carefully watched and promptly reported to a physician if it persists.[26]

Pain Management

Management of pain is key in these patients, and adequate pain control reduces the mortality and morbidity of patients after esophagectomy.[27] In 1996, Tsui et al[27] found that adequate pain control contributed to decreased cardiopulmonary complications, shorter hospital stay, and decreased mortality in patients undergoing transthoracic esophagectomy. Initial pain management may consist of morphine or bupivacaine given epidurally, patient-controlled analgesia with morphine, or a combination of both, at the physician's discretion. Pain should be reassessed as often as necessary to ensure that it is under control. Because these patients receive nothing by mouth for 5 to 7 days, intravenous or epidural pain medications are used. Oral pain medications are started once an anastomotic leak is ruled out on the fifth or seventh postoperative day and once the patient is tolerating an oral diet. The main classes of medication used for pain control include opioids, nonsteroidal anti-inflammatory drugs, and local anesthetics. Nonpharmacological interventions include heat/cold, massage, distraction, relaxation, and positioning.[28] Nurses should contact the pain service if they cannot relieve a patient's pain adequately.

Pulmonary Care

The risk of pulmonary complications is substantial after all esophageal surgical procedures.[29-31] Aggressive pulmonary toilet should be initiated immediately postoperatively to prevent atelectasis and pneumonia, major complications of esophagectomy.[3] As addressed earlier, pain control is paramount in ensuring good pulmonary toilet. Patients are usually intubated after surgery and may or may not be extubated the evening of surgery. Atelectasis or noncardiogenic pulmonary edema may develop quickly after surgery. During the immediate postoperative period, monitor oxygenation closely and maintain vigilance for develop-

ments that may be associated with a sudden decrease in oxygenation. Patients may require suctioning, chest physiotherapy, and nebulizers to improve pulmonary status. Once a patient is extubated, initiate coughing, deep breathing exercises, and use of the incentive spirometer. Avoid nasotracheal suctioning because of the risk of passing a catheter through the new anastomosis.[8,25] Teach patients to splint their incision with a pillow. Early mobilization will assist in reducing the pulmonary risk of atelectasis, a precursor to pneumonia.[32] Monitor patients closely for fever.

Depending on the type of surgery, a chest tube may be in place. For patients with chest tubes, assess the drainage every shift. The drainage should become serosanguineous within a few hours. Expect no more than 100 to 200 mL/h on the first day. Drainage should decrease gradually. A sudden change in the color of chest tube drainage may indicate an anastomotic leak and should be called to the attention of a physician.[25] Check the chest tube site for drainage, and keep the chest tube dressing clean, dry, and intact. Keep the chest tube free of any kinks or dependent loops,[33] and palpate the surrounding area for subcutaneous emphysema.[9]

If subcutaneous emphysema does develop, it is a harbinger of potentially significant complications, and the medical staff should be notified. Subcutaneous emphysema may be due to an air leak from a pleural injury sustained during the operation. Such an air leak is not necessarily of grave significance, but additional suction may be needed or placement of a new chest tube may be required. Of greater concern, however, new-onset subcutaneous emphysema may indicate a leak of the esophageal anastomosis. In such instances, air from the gastrointestinal tract dissects upward through the mediastinum and manifests as subcutaneous emphysema in the chest and neck. Fever, tachycardia, and hypoxemia also may develop in patients with this complication. Medical staff should be notified immediately. Esophageal leak can be confirmed by a swallowing study with water-soluble contrast material.[34] Postoperative chest radiographs should be checked for pneumothorax and for placement of any chest tube.

Acute respiratory distress syndrome can develop as soon as the evening of surgery. Patients are particularly prone to acute respiratory distress syndrome after transhiatal esophagectomy because the mediastinal lymphatics, which drain pulmonary interstitial fluid, are extensively disrupted during the surgery. Although the mechanisms that lead to the postoperative development of the syndrome are not fully understood, the vigorous systemic inflammatory response that accompanies the operation may play an important role. This extensive mediastinal dissection may also initiate a generalized systemic inflammatory response.[35] Unfortunately, the complication of acute respiratory distress syndrome remains difficult to predict, but all patients should be monitored for abrupt changes in oxygenation in the perioperative period.

Hemodynamics

Patients are given intravenous maintenance fluid (isotonic sodium chloride solution or lactated Ringer solution) at a rate of 100 to 200 mL/h for the first 12 to 16 hours after surgery. These fluids help maintain adequate circulating blood volume to protect vital organs and ensure adequate blood supply to the newly created anastomosis. Major fluid shifts occur in the first few days after surgery, and hypovolemia may be a problem.[8] Patients may require fluid boluses in the immediate postoperative period. Crystalloids or blood products may be used to restore circulating volume, but overloading with fluids must be avoided. The lungs are already compromised because lymph clearance has been diminished by the surgical removal of the mediastinal lymphatics and nodes.[25] Reduced clearance of lymph predisposes these patients to interstitial pulmonary edema. Malnutrition and low protein levels can further complicate the situation.

These patients require a delicate balance between adequate fluid replacement and fluid overload.[8] The extent and duration of the surgical procedure in esophagectomy inevitably results in transudation of fluid into the interstitium. Therefore, patients need volume support and rehydration. However, because they

These patients require a delicate balance between adequate fluid replacement and fluid overload

are also susceptible to pulmonary edema, hydration should not be excessive. In most instances, maintenance of 30 mL/h of urine output is evidence of adequate postoperative fluid resuscitation.

Determination of body weight and careful documentation of fluid intake and output should be done daily. Patients usually have an arterial catheter in place. If their hemodynamic status is unstable, they may have a pulmonary artery catheter. Postoperative edema may be significant, depending on the amount of fluid required to maintain hemodynamic stability, so meticulous skin care is necessary. Fluid in the tissues will seek out dependent areas and cause the skin in those areas to be at greater risk for breakdown. When hemodynamic status is stable, patients should be turned at least every 2 hours to assist in maintaining skin integrity. Patients who cannot tolerate frequent turning or who are difficult to mobilize will need a pressure-relieving surface.[36]

Nasogastric Tubes

In general, all patients have a nasogastric tube after esophagectomy. Do not move, manipulate, or irrigate the nasogastric tube. If the tube comes out for any reason, do not attempt to replace it. The nasogastric tube goes through the anastomosis and is not sutured in place.[9,19,22] Attempting to replace the nasogastric tube may result in damage to the anastomosis. Be sure to notify a physician immediately if the tube becomes dislodged or does not appear to be functioning properly.[25] Monitor the tube for patency and assess the drainage for color and amount.

Gastrointestinal Care

After esophagectomy, patients are restricted from taking anything by mouth for 5 to 7 days to prevent an anastomotic leak or fistula formation.[25] Patients have nasogastric tubes with low-level continuous or intermittent suction. Oral medications, if ordered, are crushed and put down the nasogastric tube; they are never swallowed. Diligent mouth care improves patients' comfort and reduces the risk for infection and should be maintained while patients are intubated and throughout the period when they cannot take anything by mouth.

A jejunostomy feeding tube is often placed during surgery and is left clamped until used.[37] Flush the tube with 10 to 20 mL of isotonic sodium chloride solution every shift. Jejunostomy site care should be performed on a daily basis. Wash the surrounding skin with a gentle soap, and assess the skin for any signs of irritation or breakdown. Apply a non–petroleum-based protective ointment, and make sure that the tube is well secured. Patients may or may not be started on tube feedings 2 to 3 days after surgery, depending on the surgeon's preference.[38,39] Preoperatively, patients may have been receiving total parenteral nutrition or some other high-energy liquid supplement. If so, total parenteral nutrition may be resumed after surgery.

At 5 to 7 days after surgery, a fluoroscopic swallowing examination with water-soluble contrast material is done to check the anastomosis for leaks before oral intake of anything is allowed.[25] If a leak is suspected, an alternative form of nutrition should be started. The physician may choose to start tube feedings via the jejunostomy tube or to start patients on total parenteral nutrition. If no leak is detected, patients are started on a clear liquid diet and advanced to soft foods as tolerated.[3]

Patients should be instructed to eat 6 to 8 small frequent meals each day, because large meals may not be well tolerated.[3] Also, instruct patients to avoid very hot or cold beverages and spicy foods. Protein supplements, high-energy foods, or a soft dysphagia diet may be indicated. A dietician is usually involved in patients' care, and laboratory results from a weekly nutritional panel can guide nutritional decision making. Having patients sit upright, chew slowly, and eat more than 3 hours before bedtime assists in reducing reflux.

Having patients drink fluids between meals rather than with meals assists in controlling signs and symptoms of the dumping syndrome, which may arise in patients who have had their vagus nerves divided. This common adverse effect after vagotomy is related to unregulated gastric emptying and rapid delivery of carbohydrates and partially digested food products into the small intestine. Minimizing liquids with meals and the consumption of frequent, small, low-carbohydrate meals also assists in controlling these signs and symptoms.[3]

Patients whose oral intake is not adequate by the time of discharge may be discharged with plans for supplemental tube feeding. Such feeding requires that patients or caregivers be taught how to administer tube feedings, and the correct supplies must be ordered and given to the patients before discharge.

Genitourinary Care

Patients have Foley catheters draining to gravity after esophagectomy. Monitor fluid intake and output hourly during the initial postoperative period. Call a physician if urine output is less than 30 mL/h for 2 consecutive hours. Discontinue the catheter as soon as possible to avoid urinary tract infections.

Incision Care

Keep all dressings clean, dry, and intact. The surgical dressing is removed by a surgeon on postoperative day 2. Patients may have a neck incision, which can be opened by a surgeon at the bedside if an anastomotic leak is suspected. Neck incisions that are opened up require wet to dry dressing changes 2 to 3 times a day for several weeks, unless otherwise specified by the physician. In instances in which the anastomosis has separated, patients often have saliva leaking out through the cervical incision. Such leakage is often low in volume and can be managed by simple dressing changes to the neck wound. However, if a patient is leaking saliva in large volumes (>250 mL every 8 hours), application of a wound drainage bag to the lower part of the neck incision may be required. The leak is allowed to seal on its own, but sealing could take several weeks.

Drains

Patients may have a Jackson-Pratt drain to bulb suction coming out of one of the incisions. Monitor the amount and color of drainage each shift. If the bulb drain will not hold suction, notify the medical team. A Penrose drain also may be in the neck incision. Change the dressing for the Penrose drain as often as necessary to protect and maintain skin integrity around the drain.

Infection Risk

Patients who have esophagectomy have many potential sites of infection. They often have compromised nutritional status, they have invasive catheters in the early postoperative period, and they have the usual risk of infection at the surgical sites. Meticulous wound and skin care, hand washing, avoidance of cross-contamination with organisms from other patients, and changing of invasive catheters per the facility's protocol assist in reducing the chance of infection. Judicious use of antibiotics and adequate nutrition also help avoid infection.

Prophylaxis of Deep Vein Thrombosis

Heparin shots are given subcutaneously twice a day and compression stockings are applied to both lower extremities to prevent deep vein thrombosis. Until patients are ambulating independently, they should keep the stockings on when in bed. Encourage early ambulation as well as leg and ankle exercises. Early mobilization of patients includes getting them out of bed to a chair the first postoperative day and 3 times each day thereafter.

Psychosocial Aspects

Diagnosis of esophageal cancer can be a devastating event in a person's life. Patients may struggle with depression, mortality, and fear preoperatively, and most likely they will experience some fear and anxiety after surgery. Patients need support and reassurance postoperatively. They may fear mortality, have concerns about body image, or have feelings of guilt that their lifestyle habits (eg, smoking and drinking) may have contributed to the development of their disease.[4] Encourage them to find a counselor with whom they can work through these issues. In addition, some patients may drool; causing embarrassment and adding to their feelings of isolation. These patients need assistance in learning methods to manage their secretions, such as using a portable suction device, discreet use of tissues, and proper disposal of potentially infectious material.[4]

Offer explanations and support to patients' family members and friends to promote healthy interactions with the patients. Encourage patients to express their feelings and fears in a safe environment. Consider your own filters or issues with their disease and possible causative factors. Help patients focus on the future and set goals for a healthier diet and lifestyle. Offer community resources when available (see list in "Discharge Instructions").

Other Considerations

A high proportion of patients who have esophageal surgery have a history of heavy smoking and alcohol use. Be aware of possible delirium tremens on postoperative day 3 or 72 hours after the patient's last drink. Early identification (preoperative) of patients at risk for signs and symptoms of withdrawal is the best prevention, and early treatment is safest for both patients and staff members. Benzodiazepines (most commonly lorazepam) are ordered to manage alcohol withdrawal. For patients experiencing

nicotine withdrawal, consider a nicotine patch.

Postoperative Complications

Esophageal resection is an involved operation with multiple potential complications, of which the nursing staff and the physicians should be aware. The postoperative mortality rate associated with esophagectomy procedures ranges from 5% to 13%. The most common causes of morbidity and mortality are cardiopulmonary complications. Table 4 lists possible postoperative complications of esophagectomy, their signs and symptoms, and management techniques. Prevention and early detection are the keys to successful management of postoperative complications.

Table 4 Postoperative complications of esophagectomy*

Complications	Signs and symptoms	Prevention strategies	Management
Esophageal anastomotic leak	Fever (≥38.6°C [101°F]) Inflammation, pain Drainage from the neck wound or accumulation of fluid at the wound site Subcutaneous emphysema Unexplained tachycardia or tachypnea Hypoxemia Change in color of chest tube drainage[25]	Use skilled surgical techniques Do not feed the patient too early Maintain strict status of no oral intake Manage pain adequately Avoid nasotracheal suctioning after extubation[14]	Use esophagography with water-soluble contrast material to diagnose the leak Increase tube feedings After several days, dilate the esophagus if needed Open neck wound at bedside Irrigate and pack with wet-to-dry dressing Stop oral intake
Pneumonia, adult respiratory distress syndrome, atelectasis	Tachypnea Diminished breath sounds Increased temperature Hypoxemia Poor pulmonary compliance Interstitial infiltrates evident on chest radiograph Dyspnea/shortness of breath Change in mentation Confusion	Have patient stop smoking before surgery Frequently turn patient, and provide use of incentive spirometry, nebulizers Chest physiotherapy, suctioning Feed early after surgery[38] Have patient ambulate early after surgery	Reintubate patient and provide respiratory support as needed Provide appropriate antibiotic therapy Promote aggressive pulmonary toilet Monitor arterial blood gases
Deep vein thrombosis and/or pulmonary emboli	Difficulty breathing Leg swelling Inflammation of involved leg Tachypnea Arrhythmias Pain in leg	Have patient ambulate early after surgery Have patient do leg exercises Provide antiembolism stockings and sequential compression devices Administer subcutaneous heparin	Infuse heparin Maintain bed rest Use a Greenfield filter Provide pulmonary support
Gastric necrosis	Fever Oliguria Acidosis Tachycardia Hypotension	Use skilled surgical technique	Provide operative management
Cardiac arrhythmias, myocardial infarction	Atrial fibrillation Continuous supraventricular tachycardia Chest pain Shortness of breath Electrocardiographic changes Elevated cardiac enzyme levels	Maintain adequate blood pressure in perioperative period Maintain electrolyte balance Provide adequate pain management Maintain normal body temperature Maintain hemoglobin level at 100 g/L (10 g/dL)or greater[25]	Administer digoxin, diltiazem, □-blockers Use cardioversion Replace electrolytes Use percutaneous transluminal coronary angioplasty Provide oxygen therapy Administer aspirin Administer morphine Administer nitroglycerin

Continued

Table 4 *Continued*

Complications	Signs and symptoms	Prevention strategies	Management
Prolonged ileus	Lack of bowel sounds Increased nasogastric tube drainage Nausea/vomiting No evidence of bowel function for more than 10 days after surgery Decreased appetite	Provide adequate pain management with use of nonnarcotic agents (non-steroidal anti-inflammatory drugs) Administer metoclopramide Have patient increase activity level	Administer metoclopramide Give stool softeners, suppositories, enemas, bowel stimulants Place a nasogastric tube (by physician) to prevent vomiting
Wound infection	Redness at incision Increased pain at incision Foul odor from wound Swelling at incision Discolored drainage from incision Fever	Administer prophylactic antibiotics Use sterile technique at time of surgery Maintain adequate tissue oxygenation during surgery Maximize nutritional status preoperatively Have staff use meticulous hand washing	Open wound and start dressing changes Administer systemic antibiotics if surrounding erythema significant
Sepsis	Change in neurological status Confusion Decreased systemic vascular resistance Hypotension	Administer appropriate and timely antibiotics Administer fluids Maintain strict hand washing procedures Change invasive catheters per the facility's protocol	Treat underlying cause Insert a pulmonary artery catheter Administer vasoactive medications Administer antibiotics Administer fluids
Gastrointestinal bleeding	Bloody drainage from nasogastric tube Tarry stools Decreased hematocrit	Administer H_2-blockers	Give blood transfusions Do endoscopy with coagulation Intervene surgically if needed
Esophageal stenosis or anastomotic stricture	Difficulty swallowing	Use meticulous surgical technique	Dilate the esophagus
Diarrhea	Increased loose stools Fluid and electrolyte imbalances Weakness and fatigue	Choose proper tube feeding Have patient drink liquids between meals not with meals Have staff practice strict hand washing	Treat underlying cause Administer loperamide before meals Monitor for infection with *Clostridium difficile*
Bleeding	Hypotension Decreased hematocrit	Use meticulous surgical technique	Give blood transfusions Administer intravenous fluids Support blood pressure Identify source Correct the cause Intervene surgically if needed
Chylothorax	Milky white drainage from the chest tube	Use meticulous surgical technique	Monitor amount: if chyle output is 400-600 mL per 8 hours continuously for 2-3 days, transthoracic ligation of the thoracic duct will be required[14]

*If any complications are suspected, notify a physician immediately.

Esophageal anastomotic leakage is the most serious postoperative complication and may occur 2 to 10 days after surgery.[3]

Discharge Instructions

Discharge instructions for patients and their families or caregivers should include the following:

• Take a few minutes each day to inspect the surgical incision for any signs or symptoms of infection or other complications (increased pain, swelling, inflammation, fever, drainage, saliva leaking at incision site). Report any problems to your doctor immediately. See your doctor right away if you experience any difficulty swallowing.

• Avoid smoking. You may find it helpful to join a stop smoking support group.

• Bathe and shower as usual. Wash the incision gently with a mild unscented soap.

• Avoid strenuous activity for 12 weeks after surgery. You may resume your daily activities, work, and sexual relations as soon as you feel able to do so. However, avoid driving for the first 3 weeks after returning home.

• Avoid coffee, tea, cocoa, cola drinks, alcoholic beverages, and any food or spices that cause indigestion. Try to eat 6 to 8 small meals a day. Avoid drinking liquids with meals to avoid rapid transit of food through your bowel. Drink fluids between meals instead. Eating more than 3 hours before bedtime will reduce reflux.

• Weigh yourself several times a week. Report any significant weight changes to your doctor (>4.5 kg [10 lb] in 2 weeks).

• Try not to take pain relievers longer than 4 to 7 days. Talk with your doctor if you continue to have pain that requires pain medication after a few days. To prevent constipation, take stool softeners at least as long as you take pain medication. If you are sent home with antibiotics, please take all of them even if you feel fine. Crush all pills to promote easy swallowing.

• Notify your doctor if any of the following occur: increased pain, swelling, redness, draining, or bleeding at the incisional site; vomiting; excessive weakness; tarry (black) stools; new, unexplained symptoms (they may be adverse effects of drugs used in treatment); unexplained progressive weight loss; or continuous diarrhea.

• Keep follow-up appointments so that your physician can monitor your progress and condition.

The American Cancer Society, survival support groups, social workers, chaplains, counselors, and smoking (nicotine) cessation programs may be helpful.[8]

Conclusion

Esophageal cancer remains difficult to treat. Patients who undergo esophagectomy experience decreased morbidity and mortality with more comprehensive nursing care. This article provides a basis for nurses to better understand esophageal cancer and the perioperative management of risks and complications of esophageal surgery.

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CE Test Form

Care of Patients After Esophagectomy

Objectives:

1. Identify the clinical findings associated with esophageal cancer
2. Describe the postoperative complications of esophagectomy
3. Discuss important aspects of nursing care of patients after esophagectomy

Mark your answers clearly in the appropriate box. There is only 1 correct answer. You may photocopy this form.

1.	**a**	**2.**	**a**	**3.**	**a**	**4.**	**a**	**5.**	**a**	**6.**	**a**	**7.**	**a**	**8.**	**a**	**9.**	**a**	**10.**	**a**
	b		**b**		**b**		**b**		**b**		**b**		**b**		**b**		**b**		**b**
	c		**c**		**c**		**c**		**c**		**c**		**c**		**c**		**c**		**c**
	d		**d**		**d**		**d**		**d**		**d**		**d**		**d**		**d**		**d**

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CE Test Questions

Care of Patients After Esophagectomy

1. How many new cases of esophageal cancer are diagnosed each year?
   a. 2000
   b. 5000
   c. 8000
   d. 12 000

2. Squamous cell carcinoma mainly occurs in what part of the esophagus?
   a. Lower part
   b. Gastroestophageal junction
   c. Upper part
   d. Epithelial surface of stomach

3. Adenocarcinoma arises mainly in what part of the esophagus?
   a. Upper part
   b. Middle part
   c. Upper and middle parts
   d. Distal part

4. Where do distal metastases of esophageal cancer most often occur?
   a. Pancreas
   b. Lower colon
   c. Lungs
   d. Brain

5. In what country is esophageal cancer endemic?
   a. China
   b. Germany
   c. Italy
   d. Turkey

6. Which of the following is a common early sign of esophageal cancer?
   a. Dysphagia
   b. Hiccups
   c. Heartburn
   d. No notable sign

7. Involvement of the regional lymph nodes is associated with what type of 5-year survival rate?
   a. ≥ 45%
   b. ≥ 30%
   c. ≥ 20%
   d. ≤ 15%

8. In the TNM staging system for esophageal cancer, what stage corresponds to a tumor invading adventitia?
   a. Stage 0
   b. Stage 1
   c. Stage IIB
   d. Stage III

9. What is the most common cause of morbidity and mortality after esophageal resection?
   a. Bleeding
   b. Infection
   c. Cardiopulmonary complications
   d. Gastric necrosis

10. After esophagectomy, patients are restricted from taking anything by mouth for how many days?
    a. 3 to 5 days
    b. 5 to 7 days
    c. 7 to 9 days
    d. 9 to 11 days