Head and neck cancer (HNC) encompasses several malignancies arising from different structures in the head and neck. The management of HNC is complex and requires multidisciplinary involvement with a range of treatment options that may lead to complications that have negative effects on patient outcomes. This article presents the role of surgery as primary treatment for HNC and describes postoperative complications, factors related to the development of complications, their clinical implications, and management. Comprehensive pre- and postoperative care is crucial in decreasing the incidence of complications and their impact on patient outcomes. Nurse need to be vigilant to prevent, monitor, and care for patients at risk for postoperative complications to decrease their morbidity, enhance their quality of life, and extend survival.

Surgical resection is the mainstay of treatment for head and neck cancer (HNC) (Carr, 2010), a number of cancers that collectively encompass about 5% of all cancer incidence in the United States (Jemal, Siegel, Xu, & Ward, 2010). Surgery is used as a single or combined treatment modality. Unfortunately, surgical procedures may be complicated by cardiac, pulmonary, and other comorbid disorders; infection; hemorrhage; shock; renal failure; and thromboembolic events. Site-specific complications, such as dysphonia or dysarthria, airway obstruction, dysphagia, mucositis, and severe pain also may occur as a result of surgery (Mendenhall, Werning, & Pfister, 2008). With adjunct chemotherapy and/or radiation, other potential complications arise.

The needs of patients with HNC are unique because of the physical and psychological impact of the disease and its treatment. No other area of the body is as exposed and nowhere else are scars, defects, and disfigurement as noticeable. In addition, vital organs for ingestion and breathing, as well as cranial nerves and vessels, are located here. Surgery has some degree of impact and the occurrence of complications may exacerbate a potentially negative impact on patient outcomes. Patients are susceptible to complications for a variety of reasons. Wound infection, for instance, is of particular concern because patients often are immunocompromised from their disease, neoadjuvant therapy, medications, transfusions, malnutrition, substance abuse, and comorbidities. Postsurgical complications can have a profound impact on patient outcomes by increasing levels of physical and emotional pain and hospitalization time, as well as decreasing quality of life (QOL) (Paydarfar & Birkmeyer, 2006).

Preventing surgical complications of the head and neck is, therefore, imperative for the delivery of high-quality care and improvement of patient outcomes. By knowing and taking into consideration factors associated with postoperative complications, recovery can be enhanced. Nursing interventions implemented to monitor and care for patients at risk for developing complications, promote prevention, and enhance prompt management of symptoms can decrease morbidity. The purpose of this article is to describe the role of surgery as primary treatment for HNC, describe postoperative complications and factors related to their development, and discuss their clinical implications and management.

Literature Review

A computerized search of the electronic databases (CINAHL®, PubMed, Ovid, and MEDLINE®) was performed using the timeframe 1970 to October 2011. The terms head and neck cancer, surgery, surgical complications, management, quality of life, and cost were entered as key words. Results were limited to English language, nonintervention descriptive studies that
included postoperative complications in HNC. The reference lists of articles identified by this search strategy also were searched. Twenty-eight descriptive articles were identified. Of those, 14 directly assessed surgical complications for patients with HNC, and seven of those included QOL implications. Three articles described the epidemiology, risk factors, diagnosis, and treatment of HNCs.

**Role of Surgery in Head and Neck Cancer**

In general, surgery represents the standard of care in the early stages of HNC, although radiation and chemotherapy may in some cases be used as single-modality treatment (Lang et al., 2009). For early stages (stages I and II), patients are operated on with curative intent. In advanced stages, surgery reduces tumor size, improves QOL, and enables continuing therapy with radiation or chemotherapy (Carr, 2010). Choice of therapy is determined by patient and physician preference, as well as clinical factors including tumor site, extent of disease, treatment morbidity, nutritional status, and concomitant health problems (Ganly et al., 2009).

Depending on location and stage, patients may need more than one operation for cancer removal and restoration of appearance and function. Surgical interventions include endoscopic sinus surgery, laryngectomy, pharyngectomy, maxillectomy, glossectomy, mandibulectomy, parotidectomy, tracheostomy, and neck dissection (Lang et al., 2009). If the surgery requires major tissue removal, reconstructive surgery may be necessary (National Cancer Institute, 2012). Surgical salvage therapy is used to eradicate all remaining or recurrent tumors in patients who initially receive radiation therapy or chemotherapy (Ivan et al., 2003).

Radical neck dissection was performed at the turn of the 19th century to remove the entire ipsilateral lymphatic structures en bloc from the mandible to the clavicle and from the infrahyoid muscles to the anterior border of the trapezius. As the concept of organ preservation evolved, conservation of specific structures (e.g., spinal accessory nerve, sternocleidomastoid muscle, internal jugular vein) was instituted. Standardized terminology to describe different types of neck dissection include radical, modified, selective, and extended dissection. Selective neck dissection has been subclassified into supraomohyoid, postero-lateral, lateral, and anterolateral (Robbins et al., 1991).

Reduced invasiveness of these surgical subtypes has resulted in an overall decrease in surgical complications. Primary surgical management often is used in the early stages of HNC with limited disease burden. Unfortunately, novel surgical approaches have had little effect on overall HNC mortality, in part because the recurrence rate remains high and prognosis of recurrent disease is poor. Patients with residual or recurrent disease often require salvage surgery with another treatment modality. Compared to initial surgical treatment, the postoperative mortality of salvage therapy is substantially higher (Agra et al., 2003).

Reconstructive surgery is primarily done to correct functional and cosmetic defects caused by initial surgical treatment. Reconstructive surgery often includes Using tissue or “flaps” from other anatomical sites for repair. Complications related to tissue transfer have declined since the 1980s because of advances in operative techniques (Urken et al., 1994). Part of the microsurgical reconstruction failure has been correlated to pulmonary problems and alcohol withdrawal issues in patients with a considerable history of tobacco and alcohol use (Morgan, Breau, Suen, & Hanna, 2007).

**Surgical Complications**

Complications may be divided into general ones and those unique to specific tumor sites. General surgical complications affect the cardiovascular, respiratory, neurologic, gastrointestinal, and renal systems (Dindo, Demartines, & Clavien, 2004). Common surgical complications across sites include dysphagia, flap failure, wound infection, delayed wound healing, wound dehiscence, and hemorrhage. Site-specific complications vary depending on the location of the tumor (see Figure 1). Pain, nausea, vomiting, and fever, although not exclusive surgical complications, are symptoms important to manage for their potential negative effect on homeostasis and wound healing.

The overall management of HNC has evolved into increasingly complex, combined-modality programs and integration of new diagnostic and therapeutic technologies (Forastiere, Koch, Trotti, & Sidransky, 2001). Unlike other solid tumors involving one organ, HNC encompasses several anatomical structures, each with a set of unique complications. Oral cancer, for instance, has a higher rate of complications related to infection because of the unsterile nature of the mouth. Research studies about the incidence rate of surgical complications after head and neck surgery are, therefore, difficult to compare, and they report a wide range in incidence of complications. Several factors contributing to discrepancy include type of surgical procedure (primary treatment, reconstruction, or salvage); prior use of radiotherapy or chemotherapy; extent of disease; extent of surgery; and lack of standardization in terms of definition, grading, and classification of complications (Paydarfar & Birkmeyer, 2006).

Estimates of complications after head and neck dissection range from 6%–28% (Tracy & Spiro, 2010) compared to 29%–61% after chemoradiotherapy (Morgan et al., 2007). The use of adjuvant chemotherapy or radiotherapy affects postoperative surgical results either by adding unique adverse effects or exacerbating those of surgery. Other researchers have failed to identify a negative influence on incidence of surgical complications after neoadjuvant radiation or chemotherapy (Jones, Jarrah, Song, Kaufman, & Markowitz, 2007; Lavertu et al., 1998).

**Management and Prevention**

Comprehensive pre- and postoperative care is crucial in decreasing the incidence of complications and their impact on QOL.

**Preoperative:** Prior to surgery, patients are required to sign a consent form granting the surgeon permission to operate. Patients should have an understanding of the risk-benefit ratio of surgery, the operation and usual course of the postoperative phase, outcomes and long-term prognosis, and functional recovery (Lester, 2009). A thorough preoperative assessment is essential and includes education about postoperative functionality.

The preoperative assessment begins with a comprehensive review of past and current medical history, performance status, social history, nutritional status, medications, laboratory tests, imaging studies, and additional identification of potential
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Factors leading to the development of complications. Patients need to understand normal airway anatomy, physiology, and anticipated body image alterations that will take place. When a patient is expected to require a tracheostomy for an extended time, teaching tracheostomy care is essential (Martin, 1989). An alternative communication method (e.g., use of an erasable writing board, a writing pad, word alphabet boards, electronic text board) should be established and practiced prior to surgery, and a timeline for weaning and removal should be outlined (Happ, Roesch, & Kagan, 2004).

Comorbid conditions such as pulmonary, cardiac, metabolic, renal, and hepatic disease represent additional risks and challenges to postoperative recovery. Diabetes mellitus is significantly correlated with postoperative complications in laryngeal and hypopharyngeal cancers, as well as in complications after radiation therapy (Sakai et al., 2011). Tobacco and alcohol use are known risk factors associated with postoperative recovery, particularly postoperative alcohol intake and continued smoking (Lester, 2009). De Boer et al. (1995) reported that 27% of patients with stage I laryngeal cancer and 13% of patients post–total laryngectomy continued to smoke, although both groups smoked significantly less. Alcohol consumption results, on the other hand, remained high at 20% for stage I and 56% for patients post–total laryngectomy (de Boer et al., 1995). Patients who are identified as substance abusers should be referred to treatment programs that can be coordinated with their cancer treatment.

Postoperative: Close monitoring of patient parameters such as vital signs, hematologic status, oxygenation, intake and output, and electrolyte balance are important for complication surveillance, particularly in the first 12 hours after surgery. Table 1 lists common complications, signs and symptoms, management, and prevention guidelines.

Identification of potential areas of complications forms the basis for a postoperative plan of care. During the immediate postoperative period, the priority is airway patency, followed by wound care, nutrition, communication, and body image changes (Bressler, 1999). The airway may be compromised from intractable edema, uncontrolled secretions, hemorrhage, venous congestion, anesthesia, or preexisting pulmonary conditions (Sievers, 2010). A tracheotomy with a laryngectomy tube set in place ensures an adequate airway. Close monitoring of the airway and sterile suctioning performed every eight hours or as needed will help prevent infection (nosocomial pneumonia) and obstruction (Bressler, 1999). Deep breathing, coughing, early ambulation, and frequent position changes are simple but important measures to minimize airway complications.

Hemorrhaging from the surgical site may occur after surgery; therefore, drains are placed on either side of the skin flaps (Bressler, 1999). The drains prevent the accumulation of blood, fluid, and air, and help identify excessive bleeding. The amount and color of drainage is assessed regularly. Excessive hemorrhage from carotid artery or jugular vein injury requiring transfusion or packed red blood cells represents a potentially life-threatening complication.

Nutritional deficits may have an impact on delayed wound healing, risk for infection, immunosuppression, and neurologic function. Unfortunately, more than half of patients with HNC are cachectic or compromised from the cancer itself, and report drinking and/or smoking, endocrine problems, inability to eat, and financial deficits that result in inadequate nutrition (Devins,
Otto, Irish, & Rodin, 2010). As a result of chemotherapy or irradiation, patients also may present with xerostomia, oral mucositis, infections, and dysphagia (Campbell et al., 2004). Therefore, a dietary plan that ensures adequate nutrition and hydration is essential. At the time of surgery, patients are kept without food or liquids by mouth and have a nasogastric tube inserted during the first 24 hours postoperative to decompress the stomach and prevent ileus and nausea and vomiting (Sievers, 2010). Once bowel sounds are present, tube feedings begin. Patients deemed able to swallow and eat will gradually resume oral feedings. Other patients, depending on the extent of surgery and history of radiation therapy, may require enteral feeding for a longer period of time. In that case, nasogastric tube feedings are switched to percutaneous endoscopic gastrostomy tube feedings (Carr,

<table>
<thead>
<tr>
<th>Complication</th>
<th>Signs and Symptoms</th>
<th>Treatment and Management</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed wound healing</td>
<td>Impaired circulation, inflammation, and infection</td>
<td>Treatment of underlying process, wound cultures, wound care, and hyperbaric oxygen treatment</td>
<td>Fluid balance and nutrition</td>
</tr>
<tr>
<td>Dysphasia</td>
<td>Not being able to swallow, odynophagia, coughing or gagging when swallowing, sensation of food getting stuck along the alimentary tract, gurgling with respiration, drooling, hoarseness or voice impairment or disturbance, aspiration, regurgitation, unexpected weight loss, and dehydration</td>
<td>Direct and indirect swallow therapy, physical therapy, range-of-motion exercises, speech therapy, and strength exercises. In addition, hold breath to close vocal cords before and during swallowing; cough while exhaling after the swallow to expectorate remaining food or fluids on top of cords to prevent aspiration; and limit diet to liquids and pureed foods. Also, consider palatal augmentation prosthesis.</td>
<td>Prophylactic swallowing exercises and changing bolus size and temperature</td>
</tr>
<tr>
<td>Fever</td>
<td>Sweating, shivering, muscle aches, dehydration, headache, general weakness, and loss of appetite</td>
<td>Administer supportive medications, treat the underlying cause, identify organism, and treat with appropriate antibiotics.</td>
<td>Minimize exposure to infectious organisms (e.g., frequent hand washing, sterile procedures).</td>
</tr>
<tr>
<td>Fistula</td>
<td>Frequent or continuous coughing</td>
<td>Use iodoform gauze packing with antibiotic solution for wound care, maintain airway clearance and, in case of tracheostomy, maintain cuff inflation and suction as needed. In addition, monitor surgical closure.</td>
<td>Wound assessment and surveillance</td>
</tr>
<tr>
<td>Flap failure</td>
<td>Necrosis</td>
<td>Treat with surgical repair.</td>
<td>Wound surveillance</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>Incisional blood loss, hypotension, tachycardia, and shock</td>
<td>Maintain compression at wound site and consider transfusion or surgery.</td>
<td>Monitor vital signs.</td>
</tr>
<tr>
<td>Infection</td>
<td>Incisional erythema, warmth, and swelling; discharge or abscess; malaise; fever; pain; hypotension tachycardia; tachypnea; increased white cell count; and positive cultures</td>
<td>Blood cultures, fluid and electrolyte replacement and fluid resuscitation, antibiotic therapy, pain control, and sponge baths</td>
<td>Meticulous wound care; follow hand washing protocol and use sterile procedures.</td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>Postsurgical, after local or general anesthesia, or delayed from chemotherapy</td>
<td>Antiemetic regimen, electrolyte replacement, and fluid balance</td>
<td>Monitor fluid and electrolyte balance and return to oral fluid intake.</td>
</tr>
<tr>
<td>Pain</td>
<td>Subjective; varies from person to person and expected postoperatively; and abnormal vital signs</td>
<td>Pain from surgery is expected to be moderate to severe. Relief in this setting is best achieved with opioids.</td>
<td>Pain assessment and adequate proactive management</td>
</tr>
<tr>
<td>Speech impairment or speechlessness</td>
<td>Dysarthria and voice impairment or disturbance</td>
<td>Speech therapy, exercises to increase strength, artificial larynx (electrolarynx), esophageal or tracheoesophageal speech, and alternative communication methods</td>
<td>Preoperative education and counseling; practice communicating with recommended aide.</td>
</tr>
<tr>
<td>Wound dehiscence</td>
<td>Bleeding, pain, swelling, redness, fever, broken sutures, and open wound</td>
<td>Drug therapy, antibiotic therapy, medical treatment, surgical intervention, surgical removal of contaminated dead tissue, and placement of a temporary or permanent piece of mesh to bridge the gap in the wound. When appropriate, change wound dressing frequently to prevent infection and allow wound exposure to air to accelerate healing and prevent infection, and allow growth of new tissue from below. In addition, resuture incisional area.</td>
<td>Wound assessment and surveillance</td>
</tr>
</tbody>
</table>

Note. Based on information from Bressler, 1999; Happ et al., 2004; Kendrick et al., 2011; Lazarus, 2006; Manikantan et al., 2009; Martin, 1989.
Discharge Advice and Planning

HNC has a great impact on a person’s day-to-day activities, such as speaking, breathing, eating, and drinking, as well as lasting effects on physical, psychological, and psychosocial needs. Tailored follow-up care is crucial for this patient population. Consultations with members of the multidisciplinary team are indicated. Discharge instructions need to include short-term and long-term needs, including wound care, tracheostomy care (if warranted), dietary changes, pain management, dental hygiene, psychological care, alcohol and smoking cessation, and sexual function (de Leeuw, Prins, Merkx, Marres, & van Achterberg, 2011) (see Figure 2).

Discharge planning must include the patient’s family. Both patients and families require educational reinforcement in the form of skills training, written plans, and telephone follow-up. Verbal advice needs to accompany written instructions to which patients and family can refer. The amount of information can be overwhelming, so the provider should reinforce teaching whenever possible.

The task of educating the patient must be a multidisciplinary effort. Close coordination and communication with other health professionals are essential (de Leeuw et al., 2011). Patients may need additional nursing care at home. The patient needs to be evaluated for current and future problems to determine whether a referral is warranted.

Effects on Quality of Life

In addition to the physiologic impact, postoperative complications present a challenge to a patient’s QOL. In general, physical, cognitive, emotional, and social function affect QOL (Schliephake & Jamil, 2002). The impact on QOL is strongly correlated with patient performance status, tumor site and stage, gender, and age (Hammerlid, Silander, Hörnema, & Sullivan, 2010). The goal is to restore health, prevent complications, and minimize weight loss, thereby ensuring recovery.

Infections can result from the surgical procedure itself, nosocomial risk, delayed wound healing, or from a preexisting condition. For “unclean” surgery, usually of the oral cavity, prophylaxis with antibiotics is often used. Wound infections often are polymicrobial and exact identification of pathogens can be problematic (Rodrigo, Sureda, Bernaldez, & Collado, 2004). For that reason, providing meticulous wound care and using hand hygiene guidelines are important. Suture lines should be assessed for drainage, temperature, color, and dehiscence. If infection is suspected, wound and blood cultures are warranted and antibiotics started. Persistent wound infections can lead to flap necrosis, fistula formation, wound breakdown, sepsis, and shock.

Fistula formation potentially affects airway patency. A fistula is an abnormal connection or passageway between an organ, vessel, or intestine and another structure. Fistulas of the head and neck region include orocutaneous, otorhgeal, tracheoesophageal, and pharyngocutaneous fistulas, as well as pharyngostomy. Fistulas pose a risk to the airway by draining saliva into the tracheostomy (as in orocutaneous and otorhgeal fistulas) or by passage of saliva and food from the trachea into the esophagus (as is the case with tracheoesophageal fistulas) (Martin, 1989). Following physicians orders, fistulas are packed and frequently monitored for infection or delayed healing, which may warrant surgical repair (Bressler, 1999).

Speech impairment can be temporary, limited to the postoperative period and resolved by discharge, or permanent from the removal of organs vital for speech. Speechlessness during the immediate postoperative period is usually the result of intubation or from oral or laryngeal swelling (Happ et al., 2004). Rodriguez and Blischak (2010) proposed that speech deficit “limits patients’ ability to self-report critical information during the postoperative period” (p. 110), particularly at a time when they need to communicate symptomatology, have questions about care, or need to request care. Lack of consistency in a method of communication, and variability in the ability of nurses and family members to understand gestures, signals, or lip reading, exacerbate confusion and frustration (Happ et al., 2004). Interventions designed to alleviate communication shortcomings (e.g., written aids) should be identified, developed, and practiced preoperatively. Patients with long-term speech problems need to be referred to a speech pathologist.

Some patients do not lose their ability to speak altogether but, rather, have articulation difficulties. Dysarthria can result from postoperative tongue impairment, reduced range of motion, decreased control, and decreased ability to manipulate and propel food, consequently resulting in difficulty swallowing (Lazarus, 2006). Tongue strengthening exercises can be taught to improve coordination and accuracy of tongue movement (Carr, 2010).

Tongue strengthening is equally important for improvement of dysphagia. For swallowing to occur, the tongue must initiate the passage of bolus into the back of the oral cavity (oral phase) and the tongue base contributes the necessary force to pass the bolus into the pharynx (pharyngeal phase) (Lazarus, 2006). Surgical interventions can cause specific anatomical or neurologic defects incurring site-specific patterns of dysphagia and aspiration (Manikantan et al., 2009). In supraglottic laryngectomy, where the epiglottis, false cords, aryepiglottic folds, and one or two laryngeal epiglottic nerves are removed, aspiration can occur from incomplete airway closure, pharyngeal residue spilling, or inadequate laryngeal elevation (Manikantan et al., 2009). The reported incidence of dysphagia following total laryngectomy can range anywhere from 10%-60% (Kronenberger & Meyers, 1994).

FIGURE 2. Essential Areas of Nursing Care in Head and Neck Cancer

Note. Based on information from de Leeuw et al., 2011.
Implications for Practice

- Patients scheduled for head and neck cancer (HNC) surgery need comprehensive pre- and postoperative instruction to manage their care and enhance their recovery.
- Nurses need to monitor patients with HNC closely for postoperative complications, particularly those at high risk who may be immunocompromised; had received neoadjuvant therapy, steroids, or transfusions; abuse alcohol or tobacco; or have other diseases such as diabetes.
- Discharge planning for short- and long-term needs of patients with HNC must include the family. Teaching has to be multifocused and include skills training, written plans, referrals, telephone calls, and clinic follow-up.

Conclusion

Prevention, detection, and management of postoperative complications by nurses play an important role in achieving positive patient outcomes. Oncology nurses must be knowledgeable about common complications associated with HNC surgery. A need exists to develop guidelines for the prevention, treatment, and management of complications because of a lack of standardization for classifying them. When nurses are vigilant to prevent, monitor, and care for patients with postoperative complications, their morbidity and mortality will be decreased and their QOL will be enhanced.

References


The book Site-Specific Cancer Series: Head and Neck Cancer offers more information about head and neck cancer. To access, open a barcode scanner on your smartphone, take a photo of the code, and your phone will link automatically. Or, visit http://esource.ons.org/ProductDetails.aspx?sku=INPU0541.


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