Preventing Aspiration: A Common and Dangerous Problem for Patients With Cancer

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Aspiration is the inhalation of oropharyngeal or gastric contents into the lower airways, which can lead to pneumonitis or pneumonia (Swaminathan & Naderi, 2008). As a result of the cancer disease process and cancer treatments, individuals with cancer often are at high risk for the condition. Efforts to prevent aspiration are imperative for patient safety in this vulnerable population.

Mechanisms and Sequelae of Aspiration

Swallowing is divided into four distinct phases involving five cranial nerves and 26 muscles and requires coordination of motor, neural, cognitive, and behavioral processes (Lee-Chiong, 1998; Mikita & Callahan, 2008). An abnormality in any of the nerves, muscles, or processes can result in ineffective swallowing or gastrointestinal reflux. As a result, saliva and ingested materials (e.g., food, medications, oropharyngeal bacteria, other infectious agents) can be aspirated. Aspiration occurs in as many as 45% of healthy individuals, but the aspirate is cleared from the pulmonary tree by intact cough and gag reflexes and does not result in aspiration syndrome (Marom et al., 1999).

Aspiration can result in aspiration pneumonitis or aspiration pneumonia (Swaminathan & Naderi, 2008). Aspiration pneumonitis is an acute, chemical injury caused by inhalation of gastric contents. It occurs most often in people with acute changes in levels of consciousness from conditions such as seizures, central nervous system tumors, drug or alcohol intoxication, and anesthesia during surgery. The amount of damage caused is related to the amount and pH of fluid aspirated: High volumes and acidic pH increase the extent of damage (Asia, 2004; Marom et al., 1999). Infection usually does not occur during the early stages of pneumonitis because of the relative sterility of gastric contents. Exceptions include patients with bowel obstruction or gastroparesis and those taking proton pump inhibitor medications. Infection can occur later in the process.

Aspiration pneumonia is the development of pulmonary infiltrate from chronic inhalation of small amounts of colonized oropharyngeal secretions, which can lead to infection. Patients who develop aspiration pneumonia often have impaired airway defense mechanisms that prevent them from removing bacteria and other infectious material from the lower airways. Poor mechanical airway defense mechanisms include impaired gag and swallow reflexes and impaired respiratory ciliary movement (e.g., smoking induced). Immunosuppression can further contribute to the development of infection. Poor dentition and oral hygiene predispose people to the aspiration of oropharyngeal bacteria and thus aspiration pneumonitis and lung abscess (Terpenning et al., 2001).

Causes of aspiration, including cancer-related risk factors, are outlined in Figure 1. They include conditions that impair consciousness, affect the swallow and gag reflexes, and cause gastrointestinal reflux. Aspiration of gastric contents resulting from gastroesophageal reflux is related to metabolic abnormalities or abnormalities of the esophagus, stomach, pyloric valve, celiac plexus, lungs, abdomen, or nervous system. The risk of aspiration in older adults is believed to be related to the increased incidence of dysphagia, gastroesophageal reflux, and stroke, as well as poor oral care in this age group (Marik, 2001). Treatments, such as tube feedings and artificial airways, also can increase risk.

Detecting Aspiration

Symptoms of aspiration include gagging with oral intake, coughing, hoarseness, sore throat, wheezing, and shortness of breath. Aspiration also can be “silent,” with no overt symptoms. When pneumonia results, hypoxia, fever, night sweats, purulent sputa, abnormal breath sounds, and respiratory distress can occur (Swaminathan & Naderi, 2008). Pneumonitis causes dyspnea and hypoxia, which can progress quickly to respiratory failure (Mikita & Callahan, 2008).
Preventing Aspiration

The location at which aspiration is initiated and where it tracks determine interventions to minimize it. Physical positioning, management of medications, modification of oral intake and activity, and cognitive training may help to minimize the risk of aspiration. Evidence-based interventions in patients receiving tube feedings and those with artificial airways also can prevent aspiration. Examples of those interventions are outlined next.

Physical Positioning

For patients who are weak, are paralyzed on one side, or have unilateral anatomic changes of the oral cavity, pharynx, esophagus, or trachea, minimize aspiration during oral intake by positioning the patient on the affected side. The patient’s head should be rotated to the affected side and tilted to the stronger side (“Identification and Nursing Management of Dysphagia in Adults With Neurological Impairment,” 2000). Patients should be turned and repositioned frequently to maximize drainage of oropharyngeal secretions. The head of the bed should be placed at 30°–45° unless contraindicated (e.g., hypotension, orthopedic abnormalities of the spine or hips). During oral intake, elevating the head of the bed to 90° with hips and knees at the same angle to the midline of the trunk is ideal; feet should be flat on the floor (“Identification and Nursing Management of Dysphagia in Adults With Neurological Impairment”). High Fowler’s position can be used in bed-ridden patients. Flexing the head slightly forward to drop the chin down is recommended for those with neurologic deficits such as brain tumors (“Identification and Nursing Management of Dysphagia in Adults With Neurological Impairment”; Fellows et al., 2000; Palmer & Metheny, 2008). Patients who must remain supine should be placed on their right side to minimize aspiration.

Medications

Nurses should evaluate patients’ medication records for sedating medications and those that impair the ability to swallow (e.g., opioids, hypnotics, antianxiety agents, muscle relaxants), decrease lower esophageal sphincter pressure (e.g., anticholinergics, calcium channel blockers), and interfere with the gag and cough reflexes (e.g., alcohol, sedatives, anticholinergics, anesthetics). Because of the many comorbidities in patients with cancer, discontinuing such medications may not always be possible. A pharmacist can identify drugs that interfere with aerodigestive tract function, suggest alternatives, and calculate times of peak drug concentration to maximize functioning at meal time. Controlling pain, nausea, and vomiting; avoiding constipation; optimizing gastric emptying; and maximizing alertness and neurologic function, together with proper positioning and dietary modifications, will foster oral intake while decreasing the risk of aspiration.

Ensure that patients with underlying gastrointestinal reflux disease (also known as GERD) are treated optimally with antacids, H₂ blockers, omeprazole, metoclopramide, or betanechol (Lee-Chiong, 1998). Patients with gastroparesis from diabetes or tumor should receive treatment with metoclopramide and erythromycin (Donthireddy et al., 2007). For patients experiencing nausea and
vomiting from chemotherapy, tumor, or increased intracranial pressure; administer antiemetics 30–60 minutes prior to meals in the lowest effective dose to avoid sedation. Although not proven to be of benefit, mouthwashes containing topical anesthetics are used frequently for relief of pain associated with oral mucositis (Harris, Eilers, Harriman, Cashavelly, & Maxwell, 2008). Do not administer such mouthwashes in proximity to mealtime, and check for a gag reflex prior to oral intake (Bensinger et al., 2008).

**Oral Intake**

Modification of oral intake can minimize aspiration. Allow a rest period of 30 minutes or more prior to meals in the lowest effective dose to avoid sedation. Although not proven to be of benefit, mouthwashes containing topical anesthetics are used frequently for relief of pain associated with oral mucositis (Harris, Eilers, Harriman, Cashavelly, & Maxwell, 2008). Do not administer such mouthwashes in proximity to mealtime, and check for a gag reflex prior to oral intake (Bensinger et al., 2008).

**Oral Care**

For patients with poor dentition, consider dental consultation and intervention depending on their status and progression. Routine oral hygiene decreases the microbial load in secretions and thus decreases infection risk (Terpenning et al., 2001). If a patient has his or her jaw immobilized because of surgery, wire cutters should be at the patient’s bedside to enable intervention if the airway becomes obstructed. Families and caregivers should be taught methods to avoid aspiration, the Heimlich maneuver, and the use of wire cutters and suctioning.

**Cognitive Interventions**

Cognitive interventions include cueing, redirection of attention, and swallowing exercises. Those with dementia or other perceptive impairments may benefit from chin and throat stroking to remind them to swallow (Lee-Chiong, 1998; Palmer & Metheny, 2008).

**Considerations for Special Populations**

**Tube-Fed Patients**

Many patients with cancer require tube feedings, especially during combined-modality treatment for tumors of the esophagus, head and neck, or lung. Feeding tubes decrease pharyngeal sensation, interfere with esophageal sphincter function, depress the cough reflex, and increase pooling of secretions in the hypopharynx, putting patients at risk for aspiration. In addition, incorrect placement or displacement after initial correct placement can lead to aspiration. The American Association of Critical-Care Nurses (2005) recommended that nasogastric or nasoenteric tubes placed at the bedside be verified by radiologic confirmation before feedings or medications are administered to prevent aspiration. Immediately after radiologic confirmation, the tube’s exit site from the nose or mouth should be marked and the external length of the tube assessed for changes in length. Reassessment of placement should occur at routine intervals. No single bedside method to reconfirm placement has been found to be 100% reliable (American Association of Critical-Care Nurses). Observing the contents of aspirate and checking pH have limitations. Measuring pH and assessing gastric contents are most accurate in fasting patients, not during times when a tube feeding is running, and certain medications also can affect pH (Metheny et al., 2006). The auscultatory method (injecting air while listening with a stethoscope) has been found to be effective only 35% of the time in differentiating between gastric and small-bowel placement (Metheny, McSweeney, Wehrle, & Wiersema, 1990) and only 45% of
the time in differentiating between placement above and below the diaphragm (Kearns & Donna, 2001); therefore, it should never be used as the only method to confirm placement.

Always administer feedings with the head of the bed elevated at least 30° and maintain that position for at least one hour after administration (Metheny et al., 2006). Check residuals prior to initiating tube feeding. Residuals greater than 200 ml require evaluation of the rate and volume of feedings. In general, continuous feedings are associated with less aspiration than bolus regimens (Palmer & Metheny, 2008). Nausea, vomiting, abdominal pain, cramping, and bloating are symptoms of delayed gastric emptying that can be improved with prokinetic agents, such as metoclopramide. Continuous tube feedings should be stopped for at least an hour prior to procedures during which a patient may have to lie flat, such as radiation.

Artificial Airways

A common misconception is that artificial Airways prevent aspiration, but they actually increase its risk because of decreased laryngeal elevation and laryngeal sensation, abnormal laryngeal closure, and loss of protective reflexes. Cuff pressures of 20–25 cm of water are recommended because higher occlusion pressures can increase aspiration risk (Fellows et al., 2000). Frequent suctioning of ventilated patients is necessary to remove oropharyngeal secretions. Maintaining the head of the bed at 30° reduces aspiration in such patients and may be facilitated by the use of a simple bed-mounted device (Williams, Chan, & Kelly, 2008). Patients with permanent tracheostomies should be taught to expectorate frequently and should be instructed to use positioning to avoid aspiration.

Conclusion

Patients with cancer present unique challenges in detecting, preventing, and managing aspiration, which may be chronic, acute, or intermittent. Preventing aspiration averts pneumonia and pneumonitis. Which prevention interventions are applied should be determined by each patient’s unique situation.

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