Chemotherapy-Induced Nausea and Vomiting Resource

Introduction

This material updates the Oncology Nursing Society (ONS) Putting Evidence Into Practice (PEP) resource for chemotherapy-induced nausea and vomiting (CINV) previously published in 2009 (Eaton & Tipton, 2009). A team of nurse scientists, advanced practice nurses, and staff nurses summarized and appraised the new evidence and classified interventions by applying the ONS PEP weight of evidence classification schema (Mitchell & Friese, n.d.) by group consensus. Both prior evidence and new evidence were considered in the application of the weight of evidence classification. The search strategy and inclusion and exclusion criteria are provided in the Appendix. The evidence here is updated with literature through April 2011.

Problem

Nausea and vomiting are two common yet distinct symptoms. Nausea is a subjective sensation associated with the urge to vomit, whereas vomiting is the actual expulsion of gastric contents. Both symptoms can be accompanied by pallor, tachycardia, diaphoresis, and salivation; however, nausea is usually associated with hyperventilation, and vomiting is associated with slower respirations (Hawkins & Grunberg, 2009). CINV is a common side effect of many chemotherapy agents and may be described as anticipatory, acute, delayed, breakthrough, or refractory. Anticipatory, acute, and delayed CINV refer to occurrence of the symptom or symptoms in association with the time of chemotherapy administration. Anticipatory CINV occurs any time prior to the start of chemotherapy, acute CINV develops within the first 24 hours after chemotherapy, and delayed CINV appears any time after the first 24 hours. Breakthrough and refractory CINV can occur at any time after antiemetic therapy is administered; however, breakthrough CINV is responsive to rescue medication, but refractory CINV is unresponsive to rescue treatment (Kris, 2011). CINV has significant effects on patients’ physical, psychosocial, and financial well-being. CINV can cause dehydration, poor nutrition, electrolyte imbalances, esophageal tears, mental deterioration, social
isolation, inability to work and perform activities of daily living, increased medical costs, and poor quality of life. Patients who experience severe CINV may be required to discontinue potentially beneficial treatment (Hawkins & Grunberg, 2009; Wood, Chapman, & Eilers, 2011).

**Incidence**

Nausea and vomiting occur with varying frequency during the chemotherapy course. Table 1 lists the incidence rates of nausea and vomiting before (anticipatory), during (acute), and after (delayed) chemotherapy treatment. Patients report that nausea occurs more frequently, is more feared, and causes more distress than vomiting (Kris, 2011). The risk of developing CINV is related to treatment factors, such as the emetogenic potential, dose, and route of the chemotherapy agents, and patient factors, such as sex, age, prior history of pregnancy-related nausea or vomiting, motion sickness or anxiety, inadequate hydration, medications, and medical conditions (Feyer & Jordan, 2011). Anticipatory CINV is less prevalent than acute or delayed CINV, and aggressive preventive treatment, including antiemetics, anxiolytics, relaxation, and counseling with the initial chemotherapy course, can further decrease the occurrence (Trigg & Higa, 2010). Unfortunately, oncology physicians and nurses underestimate the incidence of acute and delayed nausea and vomiting, especially nausea, among many of their patients (Grunberg et al., 2004). Patients who experience CINV have an increased risk of CINV with future chemotherapy courses, and preventing CINV anytime during the course of chemotherapy is easier than treating it (Urba, 2011).

**Assessment**

Because CINV involves two distinct phenomena—nausea and vomiting—each must be assessed separately. Assessment of nausea relies on patients’ self-report because nausea is a subjective symptom that is usually rated by the patient. In contrast, vomiting is a sign that can be assessed by counting occurrences. Assessment of the patient’s experience of CINV forms the basis for nursing intervention.

Initial assessment prior to the first day of chemotherapy is recommended and should include identification of factors that increase the patient’s risk of developing CINV.

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Nausea</th>
<th>Vomiting</th>
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<tbody>
<tr>
<td>Anticipatory</td>
<td>10%–31%</td>
<td>2%–8%</td>
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<tr>
<td>(Aapro et al., 1994; Morrow et al., 1998)</td>
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<tr>
<td>Acute</td>
<td>30%–40%</td>
<td>13%</td>
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<tr>
<td>(Hawkins &amp; Grunberg, 2009; Kris, 2011)</td>
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<tr>
<td>Delayed</td>
<td>52%–62%</td>
<td>28%–50%</td>
</tr>
<tr>
<td>(Cohen et al., 2007; Grunberg et al., 2004)</td>
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This can facilitate tailoring preventive interventions for individual patients. Ongoing assessment and reassessment allows monitoring of all phases of CINV (anticipatory, acute, and delayed) that occur as a result of different mechanisms and can change over time. More frequent assessment needs to occur when patients develop breakthrough or refractory CINV. Various types of pharmacologic and nonpharmacologic management strategies should be incorporated into the CINV assessment.

**Risk Factors**

Emetogenic potential of the chemotherapy drug or regimen is the major determinant of CINV development. Emetogenic potential is categorized as high, moderate, or low based on the proportion of patients who would be expected to experience CINV as a result of receiving the specific agent or chemotherapy regimen (Hesketh et al., 1997; National Comprehensive Cancer Network [NCCN], 2011). Listings of chemotherapeutic agents according to emetogenic potential have been provided in guidelines (Multinational Association of Supportive Care in Cancer [MASCC], 2011; NCCN, 2011). The use of recommended antiemetics based on the emetogenic potential of the patient’s treatment reduces CINV development (NCCN, 2011).

A number of other factors increase the risk of CINV in general, and the risk of anticipatory CINV. Risk factors for nausea alone may vary somewhat from factors that may predict emesis (Pirri et al., 2011). Factors that appear to increase the risk of CINV are shown in Figure 1. These include younger age (younger than 50–60 years old), female gender, having history of morning sickness during pregnancy, low alcohol use (approximately 0–4 drinks per week), anticipatory nausea or vomiting, surgery prior to adjuvant chemotherapy with or without radiation therapy, and treatment duration longer than three months (Pirri et al., 2011; Warr, Street, & Carides, 2011). Studies also suggest that history of motion sickness (Morrow, 1984, 1985; Shih, 1985).

**Figure 1. Factors That Can Increase Risk of Chemotherapy-Induced Nausea and Vomiting (CINV)**

- Moderate to high emetogenic potential of the planned chemotherapy regimen
- Cisplatin: dose of 80 mg/m² or greater or multiple-day cisplatin
- Prior experience of CINV
- Age: younger than 50–60 years old
- Female gender
- History of morning sickness during pregnancy
- History of motion sickness
- Alcohol intake less than four drinks per week
- Premorbid anticipatory nausea or vomiting
- Prior cancer surgery with or without radiation therapy
- Treatment duration longer than three months
- History of nausea with stress or anxiety
- Patient expectation of CINV

*Note.* Based on information from Booth et al., 2007; Dibble et al., 2007; Morrow, 1984, 1985; Pirri et al., 2011; Roscoe et al., 2004; Shih et al., 2009; Warr et al., 2011.
Wan, & Chan, 2009), nausea with stress (Dibble et al., 2007) or anxiety (Shih et al., 2009), and patient expectation with regard to CINV (Booth et al., 2007; Roscoe et al., 2004) are factors that increase the CINV risk. These factors may also influence the effectiveness of various antiemetic strategies and regimens.

**Clinical Measurement Tools**

Table 2 lists some instruments for clinical measurement of CINV. The Index of Nausea, Vomiting, and Retching (INVR) is designed to measure frequency, severity, and distress of CINV. The MASCC Antiemesis Tool (MAT) measures frequency and severity of acute (day 1) and delayed (days 2–4) CINV. The MAT is available at www.mascc.org/mc/page.do?sitePageId=88041 in several languages (see Figure 2). The numeric rating scale (NRS) is interchangeable with the INVR in its measure of nausea. The NRS is also the part of the MAT. Similar to the NRS, a visual analog scale (VAS) also can be used to measure nausea. The Common Terminology Criteria for Adverse Events (CTCAE) is used to grade CINV according to its severity (see Table 3). The Functional Living Index–Emesis (often referred to as FLIE) measures CINV and evaluates the influence of CINV on functional status.

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