Putting a stop to postop nausea and vomiting

Risk factor assessment and well-chosen drug therapy may prevent or relieve this "big little problem."

By Susan Fetzer, PhD, RN

FOR PATIENTS RECOVERING from surgery, the biggest obstacle isn't pain, sore throat, or having to depend on others for care. It's postoperative nausea and vomiting (PONV). A 2001 survey found the average patient would be willing to spend more than $100 out of pocket to avoid postoperative GI distress.

Despite anesthetic and surgical advances, the estimated incidence of PONV is as high as 30% for low-risk patients and 80% for high-risk patients. New drug therapies show promise in controlling early PONV—yet nearly half of patients may experience nausea and vomiting after discharge from ambulatory surgery units. They suffer an uncomfortable recovery and are more likely to require hospitalization.

We nurses can help change that. For starters, we can help minimize PONV by identifying high-risk patients preoperatively and implementing multimodal therapy based on risk assessment. Plus, we can teach postoperative patients and their families strategies to help them cope with the discomfort and potentially debilitating effects of PONV.

Assessing risk

PONV is more likely to follow certain types of surgeries—for instance, eye surgery; ear, nose, and throat surgery; gynecologic surgery; and gallbladder surgery. Yet the specific surgery doesn't predict PONV.

On the other hand, having a PONV risk factor independently predicts an untoward event. Strong evidence confirms four patient-related and three anesthesia-related risk factors. By identifying your patient's risk factors preoperatively and using a simple risk-scoring tool, you can determine the baseline risk for PONV and help develop a prophylactic management plan. (See *Determining your patient's risk factors and risk score.*)

Prophylactic interventions

A patient's PONV risk score determines the number of prophylactic interventions required; a high risk score warrants more interventions. (Universal prophylaxis for all elective surgery patients is ineffective and thus not recommended.)

Prophylactic interventions include:

- minimizing anesthesia factors (such as use of volatile anesthetic gases) that increase the PONV risk
- administering prophylactic drugs
- optimizing hydration before and during surgery.

Research also supports the use of prophylactic complementary interventions, such as P6 acupoint

Determining your patient's risk factors and risk score

Strong evidence suggests the following factors increase the risk of postoperative nausea and vomiting (PONV). Those marked with an asterisk* are independent risk factors:

- female gender*
- history of PONV or motion sickness*
- nonsmoker*
- postoperative opioid administration*
- use of volatile anesthetics
- use of nitrous oxide anesthesia.

Weak evidence points to these factors as increasing the PONV risk:

- younger age
- surgery longer than 60 minutes.

Scoring your patient's risk

After totaling your patient's independent risk factors, use the table below to find the patient's risk category.

Number of independent risk factors	PONV risk category
0 to 1	10% to 20% (low risk)
2	40% (moderate risk)
3	60% (severe risk)
4	80+% (very severe risk)

stimulation. In this technique, the practitioner stimulates the area between the flexor tendons and three fingerbreadths distal to the handwrist crease, using acupuncture needles or acupressure.

A multimodal approach to pain management, such as use of nonsteroidal anti-inflammatory drugs in conjunction with regional analgesia, also reduces the risk of PONV.

Prophylactic drugs

Antiemetic drugs act on specific receptors in the brain's chemoreceptor trigger zone (CTZ) and the nucleus tractus solitarius (NTS)—both of which send messages to the vomiting center in the mid-brainstem. The CTZ contains dopamine, muscarinic, histamine-1 (H_1), serotonin, neurokinin-1 (NK_1), and opioid receptors. The NTS contains dopamine, serotonin, histamine, and muscarinic receptors.

For PONV prophylaxis, the patient typically receives drugs that act on several receptor types simultaneously. For a patient with a PONV risk score above 3, the anesthetist may select multiple drugs, each acting on a different receptor type, for multimodal prophylaxis. Research shows that H_1-receptor blockers, NK-receptor antagonists, serotonin ($5\text{-}HT_3$)-receptor antagonists, and muscarinic-receptor blockers are effective in PONV prophylaxis. Dexamethasone also is well established as an effective (and relatively low-cost) prophylactic antiemetic, though its exact mechanism is unknown.

Drugs that directly increase GI motility, such as metoclopramide, haven't been shown to offer effective prophylaxis. Although it's a dopamine-receptor blocker, metoclopramide usually is given in a dosage too low (10 mg I.V.) to affect the CTZ.

On the other hand, droperidol (also a dopamine-receptor blocker) does have prophylactic antiemetic properties. But the Food and Drug Administration requires stringent cardiac monitoring during its administration, so its use in ambulatory surgical patients isn't practical.

Adequate hydration

Dehydration can play a role in PONV: Low blood pressure compromises intestinal perfusion and can cause GI intolerance. After consulting the anesthetist, inform healthy patients scheduled for elective procedures that they may drink clear fluids up to 2 hours before surgery (unless contraindicated). Additional supplemental I.V. fluids can help prevent PONV in high-risk patients.

Rescue treatment

Sometimes, even a patient deemed at low risk experiences PONV. And high-risk patients receiving multimodal treatment still have a 20% risk of PONV. Both groups require rescue treatment. The first priority is promoting hydration, which active vomiting can further compromise.

You can play a role in choosing a specific rescue antiemetic. Find out which prophylactic antiemetics your patient has already received; the rescue antiemetic should be one that affects different receptor sites than the drugs already given. For example, if your patient received an H_1-receptor blocker before or during surgery, a $5\text{-}HT_3$ antagonist might be a good choice for a rescue drug. (See *Prophylactic and rescue antiemetics.*)

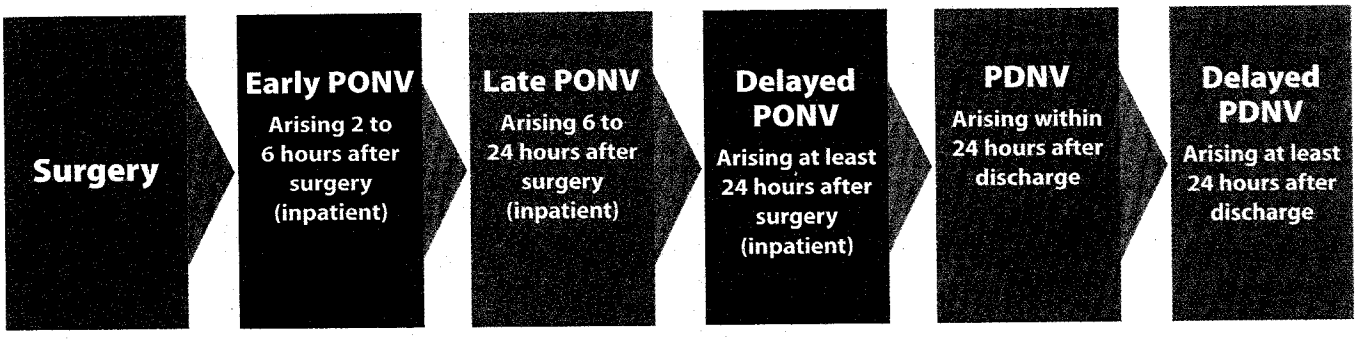
Prophylactic and rescue antiemetics

To effectively administer multimodal therapy for postoperative nausea and vomiting, you need to know which receptors are affected by the available prophylactic and rescue antiemetics.

Antiemetic	Use (P = Prophylactic; R = Rescue)	Receptor(s) affected
aprepitant (Emend)	P	$neurokinin_1$
dexamethasone (Decadron)	P, R	unknown
dimenhydrinate (Dramamine)	P, R	$histamine_1$ $muscarinic_1$
diphenhydramine (Benadryl)	P, R	$histamine_1$ $muscarinic_1$
dolasetron (Anzemet)	P, R	serotonin ($5\text{-}HT_3$)
droperidol (Inapsine)	P, R (inappropriate for outpatients)	$dopamine_2$
granisetron (Kytril)	P, R	$5\text{-}HT_3$
metoclopramide (Reglan)	R	$dopamine_2$
ondansetron (Zofran)	P, R	$5\text{-}HT_3$
prochlorperazine (Compazine)	R	$dopamine_2$
promethazine (Phenergan)	R	$dopamine_2$ $histamine_1$ $muscarinic_1$
scopolamine (Transderm Scop)	P, R	$histamine_1$ $muscarinic_1$

Timeline for PONV and PDNV

This flowchart shows the timing of symptom onset for the various categories of postoperative nausea and vomiting (PONV) and post-discharge nausea and vomiting (PDNV).



When nausea and vomiting arise after discharge

It's bad enough when a postoperative patient experiences nausea and vomiting in the hospital, where healthcare professionals are available to provide intervention. All too often, though, nausea and vomiting are delayed until after discharge. (See *Timeline for PONV and PDNV*).

High-risk ambulatory surgery patients should be identified and given prophylactic antiemetics. Aprepitant (Emend), the newest antiemetic, was approved in 2007 for surgical outpatients. An NK_1-receptor antagonist originally developed for chemotherapy-induced nausea, it has shown promise in surgical patients when given as a single oral dose within 3 hours of anesthesia.

Prophylactic antiemetics and adequate hydration can help ambulatory surgical patients avoid both early and late postdischarge nausea and vomiting (PDNV). Still, on follow-up assessment, many patients report PDNV and delayed PDNV. So during outpatient discharge education, teach patients and home caregivers how to manage nausea and vomiting. Provide instructions on appropriate food and fluid choices, and encourage frequent intake of clear liquids in small amounts. Advise patients to avoid acidic fruit juices and milk-based products immediately after surgery because these can increase gastric secretions. Caution them not to drink excessive amounts of carbonated beverages, such as soft drinks, which can distend the stomach.

Recommended postop intake

"Flat" ginger ale can be helpful in easing PONV. A meta-analysis of five randomized research studies found that 1 g of ginger reduced PONV more effectively than placebo. Also, animal studies show ginger works on serotonin receptors. Recommend popsicles, apple juice, and electrolyte drinks as well.

Other nursing interventions

Many patients stop taking pain medication when they experience PDNV. This can backfire, because pain has an emetic effect. However, opioids may stimulate the vomiting center, so patients with suspected opioid-induced PDNV may need to switch to an anti-inflammatory agent. Be sure to teach your patient not to take anti-inflammatory agents, opioids, or antibiotics on an empty stomach.

Urge patients to contact the physician or surgical center if PDNV persists. (In a recent survey, fewer than 4% of ambulatory surgery patients with significant PDNV said they'd contacted a healthcare provider about the problem.) Explain that postdischarge rescue antiemetics can be prescribed for use after discharge.

Despite the relatively little research done on PONV and PDNV, we can offer nursing care consistent with the results of inpatient studies and evidence-based guidelines. With more than 65% of surgeries taking place in outpatient facilities and most patients returning home within 4 hours, PONV and PDNV affect significant numbers. With effective nursing interventions, you can help prevent this "big little problem." ★

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