

Early Rehydration in Surgical Patients With Prolonged Fasting Decreases Postoperative Nausea and Vomiting

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Purpose: *The purpose of the project was to reduce the incidence of postoperative nausea and vomiting (PONV) in adult surgical patients who fasted for more than 12 hours with the administration of a preinduction intravenous fluid (IVF) bolus.*

Design: *This interdisciplinary project used the Plan-Do-Study-Act model for quality improvement.*

Methods: *After institutional approval, 381 consecutive adult surgical patients were evaluated for participation; 148 patients fasted more than 12 hours and met inclusion criteria to receive a 1 liter, IV fluid bolus before anesthesia induction. All patients received general inhalational anesthesia and prophylactic doses of dexamethasone and ondansetron, along with peripheral nerve blocks appropriate for surgical case type.*

Findings: *Only 96 (64%) qualified patients received the complete bolus before anesthesia induction. In this group, the incidence of PONV was 4.25%.*

Conclusion: *The use of a simple rehydration protocol reduced the incidence of PONV in patients with prolonged fasting times. Time and personnel constraints were identified as barriers that prevented full compliance with the protocol.*

Keywords: *postoperative nausea and vomiting, preoperative care, fluid therapy.*

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POSTOPERATIVE NAUSEA AND VOMITING (PONV) is a complex, largely preventable morbidity affecting 20% to 80% of surgical patients.¹ Patients report that they would rather experience postoperative pain than severe

nausea or vomiting.^{2,3} PONV decreases patient satisfaction and potentially increases postoperative complications (wound dehiscence, pulmonary aspiration, esophageal rupture, and dehydration) and health care costs (delay in discharge, unplanned admissions, antiemetic use, and nursing staff time).⁴⁻⁶ Recent consensus guidelines have identified multiple evidence-based risk factors for PONV in adults, along with strategies to reduce baseline risk.⁷ However, either financial or time constraints may limit the use of risk reduction measures and increase the probability of PONV. This interdisciplinary quality improvement (QI) project identified a high-risk subset of patients and initiated a simple, cost-effective solution that substantially reduced the rate of PONV.

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Background

Identifying the Problem

The postanesthesia care unit (PACU) registered nurses (RNs) in a suburban, for-profit specialty surgical hospital were concerned that patients who recovered from surgery in the late afternoon had a higher incidence of PONV than patients who recovered in the morning. The RNs also reported more antiemetic administration to afternoon patients and that discharge was often delayed. The anesthesia team routinely administered a 2-drug combination prophylaxis to all patients that included dexamethasone 4 to 8 mg at the beginning, and ondansetron 4 mg near the end of the anesthetic administration.⁸ Because all preoperative patients received PONV prophylaxis, we analyzed a sample of patients in an attempt to validate the reported observations and determine potential contributory factors.

A preliminary 30-day review of surgical hospital patients demonstrated a PONV rate of 14.6% (N = 315). Because the perianesthesia nurses identified a specific issue with the later cases of the day, we examined the nil per os (NPO) time in this sample and discovered that 52% of patients were NPO for 12 hours or longer. Surgery hospital policies dictate that patients are NPO after midnight before the day of surgery, regardless of the scheduled start time of the case. This policy is inconsistent with preoperative practice guidelines on fasting that recommend, under most circumstances, clear liquids up to 2 hours preoperatively.⁹ Thus, for any patient who was not scheduled as the first case of the day, there was a probable NPO time of more than 8 hours.

We then reviewed the subset of 46 patients who experienced PONV and were unable to identify any clear pattern in the data on age, body habitus, time under anesthesia, or surgery type that potentially explained the PONV (Table 1). None of the patients underwent bowel preparation, a preoperative activity reported to contribute to adverse physiological effects attributable to dehydration.¹⁰ All the PONV patients were NPO for 8 hours or more, with an average NPO time of 13 hours and a range of 8 to 19 hours. Notably, the only easily modifiable factor identified in this sample was the duration of NPO time,

Table 1. Demographics of Baseline Patients With PONV (N = 46)

Female/Male	48%/52%
Mean body mass (SD) (kg)	93.6 (19.8)
Range (kg)	52-172
Mean anesthesia time (SD) (min)	109 (56)
Range (min)	55-261
Mean NPO time (SD) (h)	13 (1.4)
Range (h)	8-19
Number of patients by surgical category (% of total)	
Arthroscopic joint upper/ lower extremity	14 (30.4)
Laparoscopic cholecystectomy or hernia repair	8 (17.4)
Open upper/lower extremity	7 (15.2)
Total joint replacement or ACL reconstruction (with PNB)	6 (13)
Laminectomy/coccygectomy	3 (6.5)
Podiatric	2 (4.3)
Ear, nose, or throat	2 (4.3)
Open hernia repair	2 (4.3)
Mastectomy/excision mass	2 (4.3)
Gastrointestinal/rectal	0

PONV, postoperative nausea and vomiting; SD, standard deviation; NPO, nil per os; ACL, anterior cruciate ligament; PNB, peripheral nerve block.

suggesting that an intervention aimed at either initiating perioperative rehydration therapy or reducing NPO time was justified.

The Context of the Problem

Presurgical fasting guidelines have been updated and revised several times during the last 2 decades in an attempt to improve patient satisfaction and outcomes while maintaining patient safety.^{7,11,12} The most recent guidelines recommend that, in healthy patients, clear liquids may be ingested up to 2 hours before sedation or anesthesia.^{7,9,13} Despite these recommendations, however, prolonged fasting times in patients scheduled for surgical procedures continue both locally and globally.¹⁴⁻¹⁶ In particular, patients scheduled for afternoon surgery have significantly longer NPO times than those scheduled for morning surgery,¹⁵ commonly because the scheduled surgery time is not taken into account when preoperative instructions are given.

It has been proposed that dehydration and hypovolemia caused by prolonged fasting has both

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