

Prevention of Postoperative Nausea and Vomiting in Gynecologic Patients: Lessons Learned from Protocol Standardization

Vincent H. Mabasa and Anita Lo

ABSTRACT

Background: Standardized protocols for the treatment and prevention of postoperative nausea and vomiting (PONV) have been used to optimize patient care. The effectiveness of a protocol depends on the user and on the antiemetic agents selected. Ridge Meadows Hospital, Maple Ridge, British Columbia, initiated its PONV protocol in 2002, but it had not previously been evaluated.

Objectives: To compare the efficacy of the Ridge Meadows Hospital PONV protocol with that of care provided to historical controls and to measure rates of compliance with the protocol.

Methods: The study was a chart review of 100 randomly selected gynecologic cases. Patient data from the end of the procedure until 48 h after surgery were analyzed. A patient was considered to have experienced an episode of postoperative nausea if such was recorded in the chart or an antiemetic drug was given during the study period. A patient was considered to have experienced an episode of postoperative vomiting if such was recorded in the chart.

Results: Because only 2 of 50 patients in the PONV protocol group had received care that was congruent with the protocol, it was impossible to fulfill the objectives of this study.

Conclusions: The low rate of compliance with the PONV likely resulted from the complexities of the algorithm and the lack of staff training. It is recommended that the protocol be either revised or abandoned.

Key words: postoperative nausea, postoperative vomiting, guidelines, antiemetic agents

RÉSUMÉ

Historique : Les protocoles standardisés pour le traitement et la prévention des nausées et vomissements postopératoires (NVPO) ont été utilisés pour optimiser les soins aux patients. L'efficacité d'un protocole dépend de la personne qui l'utilise et de l'antiémétique qui est choisi. L'hôpital Ridge Meadows, Maple Ridge en Colombie-Britannique a mis de l'avant son protocole NVPO en 2002, sans l'avoir préalablement évalué.

Objectifs : Comparer l'efficacité du protocole NVPO de l'hôpital Ridge Meadows aux soins prodigués aux patientes du groupe témoin historique et mesurer les taux d'adhésion au protocole.

Méthodes : L'étude consistait en un examen des dossiers médicaux de 100 patientes en chirurgie gynécologique choisies au hasard. Les données recueillies au cours des 48 heures ayant suivi la fin de l'intervention ont été analysées. Une patiente était réputée avoir eu un épisode de nausées postopératoires si cette information était consignée dans son dossier ou si un antiémétique lui avait été administré pendant la durée de l'étude. Une patiente était réputée avoir eu un épisode de vomissements postopératoires si cette information était inscrite son dossier.

Résultats : Étant donné que seulement deux des 50 patientes du groupe du protocole NVPO ont reçu des soins conformément au protocole, il a été impossible d'atteindre les objectifs de cette étude.

Conclusions : Le faible taux d'adhésion au protocole NVPO semble être attribuable la complexité de l'algorithme et au manque de formation du personnel. Il est recommandé soit de revoir le protocole, soit de l'abandonner.

Mots clés: nausées postopératoires, vomissements postopératoires, lignes directrices, antiémétiques

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INTRODUCTION

Postoperative nausea and vomiting (PONV) are common and distressing adverse events experienced after surgery. Factors that increase a patient's risk of experiencing PONV include female sex, obesity, stage in menstrual cycle, pain, and past history of PONV.^{1,2} The incidence of PONV can be as frequent as 70% to 80% in patients undergoing gynecologic surgery.^{3,4} Antiemetic agents play an important role in the prevention of PONV. However, more than 25% of patients continue to experience PONV 24 h after surgery despite prophylaxis.⁴

Standardized protocols are used to streamline therapy. Such protocols provide nurses with a structured approach to the selection of a medication without the need to contact physicians routinely.⁵ Use of standardized PONV protocols has been shown to provide clinical benefits including a reduction in the incidence of nausea and an increase in patient satisfaction.⁶

In September 2002, the Pharmacy and Therapeutics Committee at Ridge Meadows Hospital (RMH), Maple Ridge, British Columbia, approved a standardized PONV protocol (Appendix 1). This protocol was initiated because the physicians felt that the nurses were ideally positioned to select an appropriate antiemetic agent, given their constant contact and familiarity with the patients. In the event that the first antiemetic agent was not effective, the protocol also allowed the nurse to select a different agent (according to a stepwise algorithm), again without the need to contact the physicians. The protocol was developed by the surgeons at RMH and was based on the evidence available at that time. The antiemetic agents included in the protocol were dimenhydrinate, metoclopramide, prochlorperazine, and ondansetron, and the order of their presentation was based on drug cost.

The effectiveness of the PONV protocol had not been evaluated previously. This study was initiated with the following purposes: to compare the occurrence of PONV episodes within 48 h after gynecologic surgery between patients receiving care according to the PONV protocol and historical controls; to determine the rate of compliance with the protocol; and to analyze the cost of using the protocol.

METHODS

A chart review of patients who had undergone gynecologic surgery at RMH was performed. The health records department identified all patients meeting the eligibility criteria (see below) and then randomly selected the 100 charts to be included in the study.

Patients who were 19 years of age or older who had undergone gynecologic surgery (laparoscopy, dilatation and curettage, examination under anesthesia, caesarean section, ovarian cystectomy, oophorectomy, salpingo-

oophorectomy, vaginal or abdominal hysterectomy, tubal ligation, or any combination of these procedures) were eligible for inclusion. The historical control group and the PONV protocol group consisted of patients who underwent surgery between September 1, 2000, and August 31, 2002, and between September 1, 2002, and September 1, 2003, respectively. Patients who had received an antiemetic agent up to 24 h before anesthesia, patients concurrently receiving antineoplastic chemotherapy or radiation therapy, and patients with hypersensitivity to dimenhydrinate, metoclopramide, prochlorperazine, or ondansetron were excluded.

Patient data were collected from the end of the gynecologic procedure up to 48 h after surgery and were divided into specific time frames: 0–4 h, 4–8 h, 8–12 h, 12–24 h, and 24–48 h. A patient was considered to have had an episode of postoperative nausea if nausea was charted or if she received any antiemetic agent during the study period. A patient was considered to have had an episode of postoperative vomiting if vomiting was noted in her chart.

A total of 100 cases were analyzed: 50 patients for the historical control group and 50 patients for the PONV protocol group. The incidence of PONV was compared between groups with a chi-square test. Calculations were performed under the conditions of 80% power and a significance level of 5%.

RESULTS

A total of 107 patient charts were reviewed, of which 7 were excluded, 5 because the patients had received an antiemetic agent within 24 h before anesthesia and 2 because the patients had been receiving concurrent chemotherapy. Therefore, 100 patients were included in the study. Patient characteristics are outlined in Table 1.

Significantly more patients in the PONV protocol group (32 or 64%) received intraoperative antiemetics compared to historical controls (14 or 28%) ($p < 0.05$). There were a total of 131 episodes of postoperative nausea in the PONV protocol group and 140 episodes in the historical control group (Figure 1). There were a total of 33 episodes of postoperative vomiting in the PONV protocol group and 28 episodes in the historical control group (Figure 2). There were no statistically significant differences in the incidence of PONV between the 2 groups in any time period.

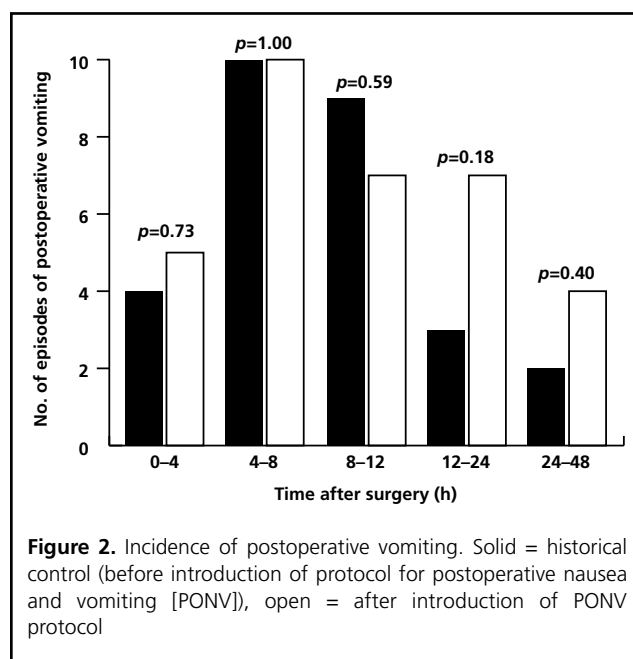
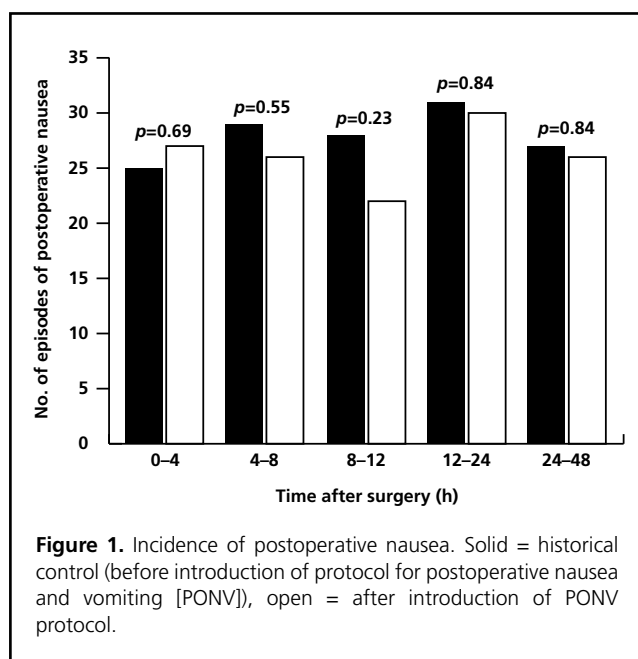
Compliance with the PONV protocol was confirmed for only 2 of the 50 patients in the PONV protocol group. The most common reasons for noncompliance included not administering medications around the clock (20 patients) and not starting with dimenhydrinate (18 patients) (Figure 3). The drug cost for 50 patients was \$245.52 in the PONV protocol group and \$229.41 in the historical control group.



Table 1. Demographic Characteristics of Patients in a Study of a Standardized Protocol for Postoperative Nausea and Vomiting (PONV)

Characteristic	Mean \pm SD or No. (%) of Patients	
	Historical Control	PONV Protocol
No. of patients	50	50
Age (years)	49.1 \pm 14.6	50.3 \pm 15.5
Weight (kg)	70.2 \pm 12.9	73.3 \pm 18.3
Height (cm)	161.0 \pm 8.8	163.0 \pm 5.9
Cigarette smoking	12 (24)	13 (26)
Previous surgery	35 (70)	29 (58)
Previous PONV	14 (28)	12 (24)
Gynecologic surgery data		
ASA classification*		
I (normal healthy patient)	13 (26)	8 (16)
II (mild systemic disease)	32 (64)	36 (72)
III (severe systemic disease)	5 (10)	5 (10)
Unknown	0	1 (2)
Type of surgery		
Abdominal hysterectomy + salpingo-oophorectomy	4 (8)	4 (8)
Hysterectomy	36 (72)	35 (70)
Salpingo-oophorectomy	2 (4)	2 (4)
Other	8 (16)	9 (18)
Intraoperative antiemetic	14 (28)	32 (64)
Duration of surgery (min)	66.1 \pm 17.7	73.2 \pm 22.5
Duration of hospital stay (days)	3.9 \pm 1.1	3.9 \pm 0.8

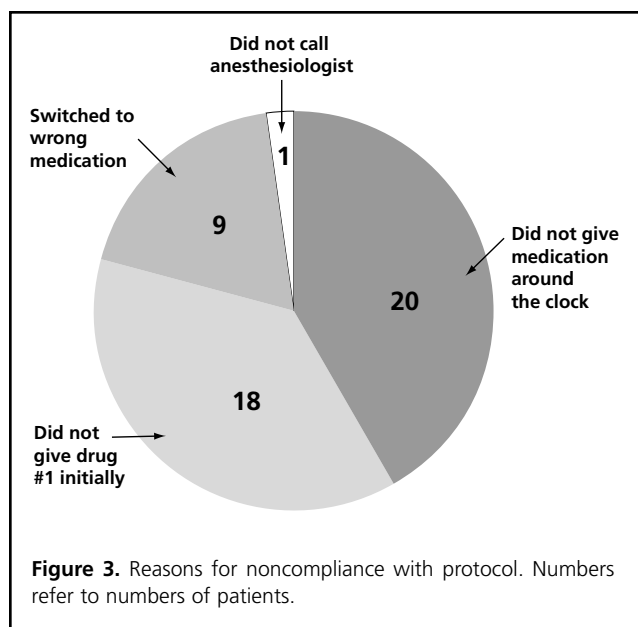
*Classification of physical status of the American Society of Anesthesiologists.



DISCUSSION

The objectives of this study could not be met because of poor compliance with the PONV protocol. As a result, both the historical control and the PONV protocol groups reflected outcomes achieved with standard care.

The use of a standardized protocol for the prevention and treatment of PONV has some advantages. Ideally, it should enhance patient care by allowing more timely access to the appropriate antiemetic therapy. However, use of a standardized protocol leads to additional responsibility for nurses and



increases their workload. Furthermore, if the program is to be successful, nurses must be familiar with the properties of the medications used, such as duration of efficacy, onset of action, and time to peak effects, in order to properly monitor the efficacy of the medications and respond appropriately.

The low compliance rate with the PONV protocol was perhaps not surprising, given its complexity. The nurses in the surgical ward of the hospital agreed that it was difficult to decipher the instructions of the protocol, and they felt that the training provided had been inadequate. In addition, there were some concerns about the design of the protocol. In particular, the sequence and type of medications did not reflect current guidelines. Despite the fact that serotonin antagonists have consistently shown superior efficacy compared with other antiemetic agents for prevention of PONV,⁷ the protocol used ondansetron as the agent of last resort. Furthermore, metoclopramide has been shown to be no better than a placebo⁸ but was included in the protocol. Finally, the dose of dimenhydrinate given in the protocol was not optimal and would have to be increased to achieve higher efficacy. As a result, it is recommended that the PONV protocol be revised extensively or abandoned.

This study was limited by its retrospective design and the use of a historical control group. The information collected relied highly on the accuracy of the records and was therefore subject to bias. There was an attempt to minimize bias by random selection of the charts included in the analysis. In addition, for consistency, one investigator (V.H.M.) was responsible for all data collection.

The ideal standardized PONV protocol should be based on the current literature and should be easy to follow. In addition, outcomes experienced by patients receiving care according to the protocol should be continually evaluated to ensure optimal effectiveness. Adequate training is required for the health care providers involved in its use. Finally, pharmacists can play a leading role in the initiation and maintenance of such a protocol.

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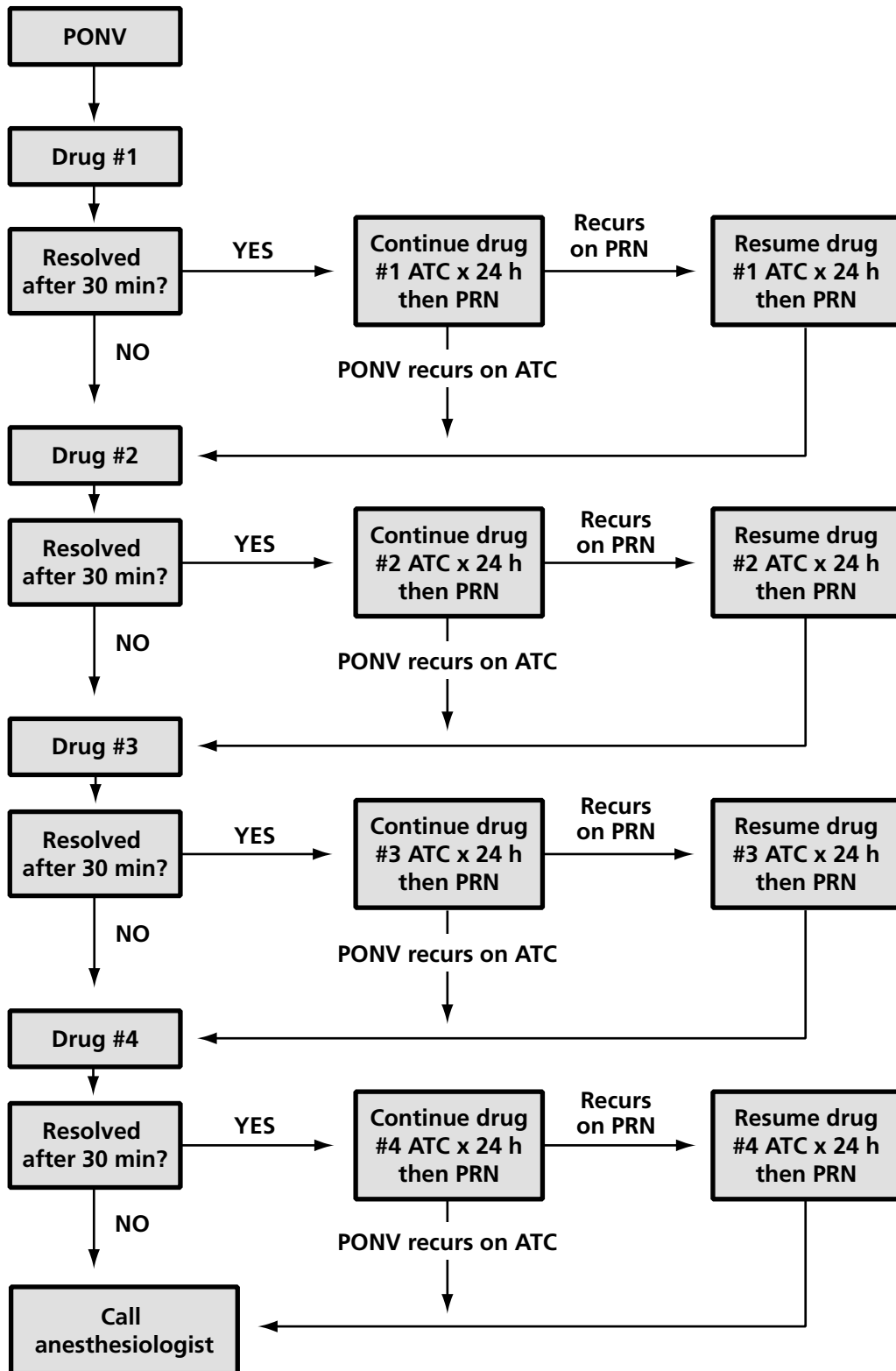
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Appendix 1. Ridge Meadows Hospital protocol for treatment of postoperative nausea and vomiting (PONV). Medications for nausea and vomiting: drug #1 = dimenhydrinate 10–25 mg IV PRN/ATC q15min up to 50 mg q24h; drug #2 = metoclopramide 10 mg IV q6h PRN/ATC; drug 3 = prochlorperazine 5–10 mg IM q4h PRN/ATC, maximum 40 mg/day; drug #4 = ondansetron 4 mg IV q8h PRN/ATC. ATC = around the clock, PRN = as needed.

