

Implementation of a risk-score-dependent antiemetic protocol to reduce post-operative nausea and vomiting (PONV) in inpatient surgical patients

Eugene P. Eldridge, PharmD, RPh
PGY-1 Pharmacy Resident
St. Vincent Healthcare, Billings, MT
April 20, 2018



© Sisters of Charity of Leavenworth Health System, Inc. All rights reserved.

Disclosure

- IRB Status: Approved
- Co-investigators
 - Ben Jagodzinski, MD
 - Vandl Anderson, PharmD, BCPS
 - JoEllen Maurer, BPh, MHA, BCPS
- Conflicts of Interest: None
- Project Sponsorship: None



2

Learning Objectives

- Recognize the value of standardized protocols in achieving optimal healthcare
- Identify risk factors for PONV that could be utilized to create an antiemetic protocol



3

St. Vincent Healthcare

- Large rural community hospital
 - Part of the Sisters of Charity of Leavenworth (SCL) Healthcare System
 - Not-for-profit, faith-based
 - 286 beds
 - Level II Trauma Center



<http://billingsgaia.com/files/leavenworth-health-med/leavenworth-healthcare-recognized-in-national-survey-of-best-care-innovations/articles/05a11514c7f1467b480374224028a50f.html>



4

Background

- PONV occurs in an estimated 30 percent of surgical patients following general anesthesia
 - Can be as high as 80% in high-risk patients
- Increases distress and morbidity
- Delays patient discharge from the post-anesthesia care unit (PACU)
- Increases hospital unplanned admissions in daytime surgeries

Wheats EM, Tricca J, Zheng Z. Knowledge of and willingness to try acupuncture for postoperative nausea and vomiting: an Australian survey of surgical patients. *Acupuncture* 2017;35(3):346-50.

Chan T, Demerutis P, Halli AS, et al. Consensus guidelines for the management of postoperative nausea and vomiting. *Anaesth Analg* 2014;118(1):85-113.

Pierre S. Nausea and vomiting after surgery. *BMJ* 2005;330(7528):30-32.

Aphill CC, Lillis E, Kishoriana M, Gram CA, Rowel N. A simplified risk score for predicting postoperative nausea and vomiting: conclusions from cross-relations between test centers. *Anesthesiology* 1999;91(1):693-700.



5

Supportive Literature

- Mayeur et al.
 - Decrease in nausea at 24 hours post-operatively from 19% to 10.3% ($p < 0.001$)
 - Decrease in vomiting in the PACU from 12.4% to 2.3% ($p < 0.001$)
- Pierre et al.
 - Decrease in overall PONV from 49.3% to 14.3% ($p < 0.001$)
 - Decrease in PACU time from 99 minutes to 82 minutes ($p > 0.04$)

Pierre S, Corio G, Benoit H, Aphill CC. A risk score-dependent antiemetic algorithm effectively reduces postoperative nausea and vomiting: a combined quality improvement initiative. *Can J Anaesth* 2004;51(4):320-326.

Mayeur C, Rubin E, Kipnis E, et al. Impact of a prophylactic strategy on the incidence of nausea and vomiting after general surgery. *Ann Fr Anesth Reanim* 2012;31(2):53-57.



6

Background

- Literature has identified several risk factors that greatly increase PONV
 - Female gender
 - Non-smoking status
 - History of PONV or motion sickness
 - Use of opioids
- Interest to standardize PONV prophylactic care was expressed by surgeons, anesthesiologists, and pharmacists at St. Vincent Healthcare

Gen TJ, Demuroch P, Hebbi AS, et al. Consensus guidelines for the management of postoperative nausea and vomiting. *Anesth Analg*. 2014;118(1):85-113.

Background

- A risk-score-dependent antiemetic protocol was developed
 - Based on the Society for Ambulatory Anesthesia guidelines
 - With considerations for...
 - Major risk factors
 - Medication efficacy
 - Timing
 - Cost
 - Formulary

Gen TJ, Demuroch P, Hebbi AS, et al. Consensus guidelines for the management of postoperative nausea and vomiting. *Anesth Analg*. 2014;118(1):85-113.

Objectives

- Hypothesis: Implementation of the protocol will reduce PONV by 50%
- Primary Objective
 - The reduction in rate of PONV after implementation of the protocol
 - PONV defined as the administration of any antiemetic 1-72 hours post-operatively

Objectives

- Secondary Objective
 - The difference in the average number of antiemetics administered per patient after implementation of the protocol

Methods

Study Design	Retrospective, observational study
Inclusion Criteria	Patients ≥ 18 years of age that had surgery that required at least 24 hours of inpatient hospitalization post-operatively
Exclusion Criteria	Daytime surgeries

Methods

Sample Size	196 patients (98 patients in each arm) required to detect a 50% reduction in rate of PONV Based on 80% power and 0.05 alpha
Data Collection	Chart review in EPIC EMR of randomized sample
Data Analysis	Categorical data will be evaluated with a chi-square test and p-values will be reported

Our Protocol

Step One: Calculate patient risk

Risk Factor	Points
Female Gender	1
Non-Smoker	1
History of PONV/motion sickness	1
Post-Operative Opioid Use Expected	1
Total Points	

Guo TJ, Demerutis P, Habib AS, et al. Consensus guidelines for the management of postoperative nausea and vomiting. *Anesth Analg*. 2014;118(1):85-113.

Step Two: Using calculated total risk, initiate recommended intervention

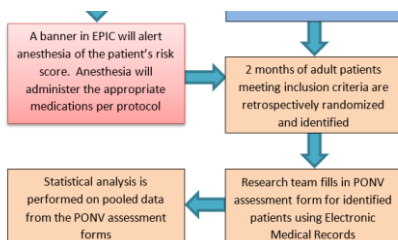
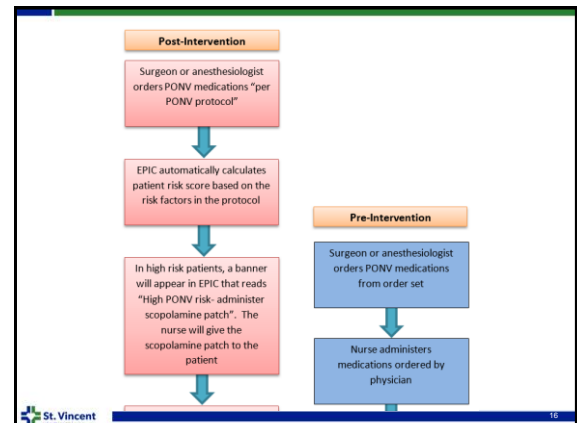
Number of Risk Factors	PONV Risk	Risk Category	Recommended Intervention
14	10%	Low	No intervention required
1	20%		
2	40%	Medium*	Dexamethasone 4 mg IV x 1 preoperatively
3	60%		
4	80%	High*	Scopolamine patch x 1 preoperatively AND Dexamethasone 4 mg IV x 1 preoperatively AND Ondansetron 4 mg IV at end of surgery

Guo TJ, Demerutis P, Habib AS, et al. Consensus guidelines for the management of postoperative nausea and vomiting. *Anesth Analg*. 2014;118(1):85-113.

Additional Recommendations

1. Reduction of baseline risk (warranted in medium to high risk patients):
2. Avoidance of general anesthesia in favor of regional anesthesia
3. Use of propofol for induction/maintenance of anesthesia
4. Avoidance of nitrous oxide
5. Avoidance of volatile anesthetics
6. Minimization of intraoperative/post-operative opioids
7. Adequate hydration

Guo TJ, Demerutis P, Habib AS, et al. Consensus guidelines for the management of postoperative nausea and vomiting. *Anesth Analg*. 2014;118(1):85-113.



Results

- Pre-implementation data complete
 - 731 surgical patients from December 1, 2017 - January 31, 2018 were randomized with Microsoft Excel 2010
 - 120 patients that met inclusion criteria analyzed
- Primary endpoint: **35% PONV rate** was detected
 - Similar to rate predicted from literature
- Secondary endpoint: **0.78 antiemetic medications** administered per patient

Guo TJ, Demerutis P, Habib AS, et al. Consensus guidelines for the management of postoperative nausea and vomiting. *Anesth Analg*. 2014;118(1):85-113.

Results

- Currently in the process of implementing the protocol
 - Challenges encountered along the way
 - Stakeholders, EPIC update, working with system (SCL Health)
 - Anesthesia Live started in January 2018
 - Have been working on creating an efficient handoff process between nursing and anesthesia
 - Expected to go live with protocol in April
- Post-implementation data to come

Future Directions

- Test out variations in the protocol
 - 2 drugs versus 1 drug for moderate risk group
- Trial different methods to improve handoff process between nursing and anesthesia
 - Coming up with an efficient process has been challenging
- Study of general versus IV anesthesia
- Study of cost-savings with implementation of protocol

Knowledge Check

- What have studies shown in regards to the use of a standardized protocol for PONV prophylaxis versus standard of care?
 - A) Decreased time spent in the PACU
 - B) Decreased rate of PONV at 96 hours
 - C) Decreased rate of PONV at 24 hours
 - D) Both A and C

Knowledge Check

- What have studies shown in regards to the use of a standardized protocol for PONV prophylaxis versus standard of care?
 - A) Decreased time spent in the PACU
 - B) Decreased rate of PONV at 96 hours
 - C) Decreased rate of PONV at 24 hours
 - D) Both A and C**

Knowledge Check

- Which of the following is **not** a risk factor associated with PONV?
 - A) Female gender
 - B) Age ≥ 65
 - C) History of PONV or motion sickness
 - D) Non-smoking status

Knowledge Check

- Which of the following is **not** a risk factor associated with PONV?
 - A) Female gender
 - B) Age ≥ 65**
 - C) History of PONV or motion sickness
 - D) Non-smoking status

References

1. Gan TJ, Diemunsch P, Habib AS, et al. Consensus guidelines for the management of postoperative nausea and vomiting. *Anesth Analg*. 2014;118(1):85-113.
2. Weeks EM, Trinca J, Zheng Z. Knowledge of and willingness to try acupuncture for postoperative nausea and vomiting: an Australian survey of surgical patients. *Acupunct Med*. 2017;35(5):345-351.
3. Pierre S. Nausea and vomiting after surgery. *BJA Educ*. 2013;13(1):28-32.
4. Apfel CC, Läärä E, Koivuranta M, Greim CA, Roewer N. A simplified risk score for predicting postoperative nausea and vomiting: conclusions from cross-validations between two centers. *Anesthesiology*. 1999;91(3):693-700.
5. Pierre S, Corno G, Benais H, Apfel CC. A risk score-dependent antiemetic approach effectively reduces postoperative nausea and vomiting—a continuous quality improvement initiative. *Can J Anaesth*. 2004;51(4):320-325.
6. Mayeur C, Robin E, Kipnis E, et al. Impact of a prophylactic strategy on the incidence of nausea and vomiting after general surgery. *Ann Fr Anesth Reanim*. 2012;31(2):53-57.

Questions and Contact Information

Eugene Eldridge, PharmD
PGY-1 Pharmacy Resident
St. Vincent Healthcare
eugene.eldridge@svchs.net
(262) 221-3552