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Simplified algorithm for the prevention of postoperative nausea and vomiting: a before-and-after study

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Abstract

Background: Poor adherence to guidelines aimed at reducing the incidence of postoperative nausea and vomiting (PONV) is well known. In a before-and-after study, we tested the effectiveness of a simplified algorithm for PONV prophylaxis on the incidence of PONV.

Methods: In the first audit, we examined the adherence to our institutional guidelines for PONV prevention. In response to the results of this audit, we introduced a simplified algorithm for PONV prevention [female patients receiving triple prophylaxis (dexamethasone and ondansetron plus either a target-controlled infusion with propofol or droperidol) and male patients receiving double prophylaxis, dexamethasone, and ondansetron]. The impact of the simplification of the PONV algorithm was evaluated in a second audit. In both audits, we reviewed the medical records of all adult patients undergoing elective non-cardiac non-day-case surgery under general anaesthesia and being admitted to our post-anaesthesia care unit during two arbitrarily chosen weeks. We assessed the incidence of nausea, vomiting, and PONV after 1 and 24 h, and the compliance with the departmental algorithm for PONV prophylaxis.

Results: After simplification of the PONV algorithm, the overall incidence of PONV within 24 h after surgery was significantly lower than before the implementation of the simplified PONV algorithm (22% vs 33%, P=0.02). The PONV incidence within 1 h was comparable between the audits (11% vs 14%, P=0.45). The adherence to departmental guidelines for PONV prophylaxis was significantly higher after the implementation of the simplified PONV algorithm (46% vs 18%, P=0.0001).

Conclusions: A simplified algorithm for PONV prophylaxis resulted in a significant reduction in the PONV incidence and better compliance with the PONV algorithm.

Key words: guidelines; postoperative nausea and vomiting; compliance

Editor's key points

- Identification of patients at risk of PONV and appropriate anti-emetic prophylaxis are poorly done, especially by junior staff.
- A simplified algorithm, weighted towards near-universal PONV prophylaxis, was evaluated.
- This study demonstrates clinically important improvements in PONV prophylaxis and resultant risk reduction in PONV.

Postoperative nausea and vomiting (PONV) is amongst the most frequently occurring complications in patients undergoing surgery with general anaesthesia.[1] PONV has been described as the 'big little problem' of anaesthesia, referring to the fact that—despite being for patients the most undesirable outcome after surgery—PONV has been ignored or at least considered to be inevitable by anaesthesiologists for a long time.[1,2] In fact, anaesthesiologists should consider PONV prophylaxis as an essential part of high-quality care, as important as providing sufficient pain relief. Awareness for unambiguous risk assessment and prediction, the implementation of a departmental PONV management algorithm, and the repetitive evaluation of patients' outcome are crucial for quality control and management.[3]

An extensive body of research exists on the causes, prediction, prevention, and treatment of PONV, which has resulted in the development of risk scores, guidelines, and evidence-based treatment protocols.[4,5] Unfortunately, limited knowledge of the guidelines and low adherence to them are a well-known problem.[6,7]

The first consensus guidelines for the management of PONV were published in 2003,[8] with updates in 2007 and 2014.[5,8,9] In accordance with the latest version of these guidelines, we introduced our departmental algorithm for PONV prophylaxis in 2014.

As part of a continuous quality control, in 2016, we performed the first institutional audit to assess the incidence of PONV in patients undergoing surgery under general anaesthesia outside the surgical day-case centre. We also evaluated compliance with the departmental guidelines for the prevention and management of PONV. The results of this first audit prompted us to simplify our institutional algorithm for the prophylaxis of PONV. The impact of this simplification was assessed in a second quality audit approximately 1 yr after the implementation. We hypothesized that the simplified guidelines would result in a lower overall PONV incidence, driven by a better compliance with the algorithm for PONV prevention.

Methods

Study design and intervention

We used a quasi-experimental design by performing an uncontrolled before-and-after study to assess the provider performance before and after the introduction of the simplified institutional guideline for PONV prophylaxis in our department.[10] For this, the first quality audit was performed during an arbitrarily chosen period of 5 working days [from Tuesday, January 12, 2016 until Monday, January 18, 2016 (with exclusion of the weekend)]. At this time, our departmental algorithm for the prevention and management of PONV recommended a risk-adapted strategy in accordance with the most recent international guidelines (Fig. 1).[5,9] This algorithm

had been implemented by educational information sessions, and by providing the algorithm to all anaesthesiologists and nursing staff via email and the hospital information system. After designing and implementing a new simplified algorithm (Fig. 2) in March 2016, the second quality audit took place over another arbitrarily chosen period of 5 working days (from Monday, November 28, 2016 until Friday, December 2, 2016). The audit protocols were approved by the Ethics Committee of the University Hospitals Leuven, Belgium (EC OG032, October 5, 2015 and on March 16, 2016 for the first and second audits, respectively). Individual patient consent was waived as per decision of the Ethical Committee.

Study population

We included all adult patients (≥18 yr) admitted to our post-anaesthesia care unit (PACU) who had undergone elective non-cardiac non-day-case surgery under general anaesthesia. The exclusion criteria were emergency procedures for which no preoperative data were available and patients expected to require overnight ventilation.

Study site

In the central operation suite, our department annually provides anaesthesia care for >19 000 non-cardiac surgical procedures in 20 operation rooms. In 2016, these procedures included procedures after which patients were admitted to the intensive care unit (n=273), emergency surgeries (n=166), and procedures in children (n=131). After the exclusion of these patients, the number of eligible procedures was 13 030 for the whole year. This results in 251 procedures per week that were eligible for the audits.

All operation rooms are staffed with residents in all stages of their specialization (1st–5th year of residency) who were supervised by anaesthesia consultants in a 1:3 ratio; 75% of supervisors and 30% of residents working in our department were present in both periods of the audits.

For elective surgery, all patients were preoperatively assessed in a specialized pre-anaesthesia consultation, in which four residents work under the supervision of one consultant. As part of the preoperative evaluation, the residents are asked to document the presence/absence of the four established PONV risk factors: female sex, non-smoking, history of PONV/motion sickness, and postoperative use of opioids.[11] With this information, the hospital information system automatically calculates the Apfel risk score,[11] which is then indicated on the preoperative evaluation sheet that accompanies the patient into the operation room.

Neither the anaesthesia consultants nor the residents were aware of the performance of the audits.

Data documentation

The medical records of the included patients were reviewed by a research collaborator and an anaesthesiologist. Appropriate data were retrieved from the preoperative anaesthesia evaluation sheets (digitally stored in our hospital information system), from the intra- and postoperative anaesthesia records (manually written, scanned, and digitally stored in our hospital information system) and, for all events occurring after discharge from the PACU, from the electronic medical records (also digitally stored).

The following information was documented: sex, age, ASA physical status, the documented Apfel risk score (which is automatically calculated by our hospital information system after entering the risk factors and printed on the preoperative