PONV prophylaxis guidelines

Determine the number of risk factors for PONV using the simplified risk score from Apfel.

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| --- | --- |
| Risk Factors | Points |
| Post operative Opioids | 1 |
| Non Smoker | 1 |
| Female Gender | 1 |
| History of PONV/Motion Sickness | 1 |
| Risk score = sum | 0…4 |

Base prophylaxis on risk score:

|  |  |  |  |
| --- | --- | --- | --- |
| Risk Score | Prevalence PONV | Prophylaxis:  No of Anti-emetics | Examples\* |
| 0 | 9% | 0-1 | ± Ondansetron 4 mg |
| 1 | 20% | 1 | Ondansetron 4 mg  ± Dexamethasone 4mg |
| 2 | 39% | 2 | Ondansetron 4 mg  +Dexamethasone 4mg  ± Propofol infusion |
| 3 | 60% | 3 | Ondansetron 4 mg  + Dexamethasone 4 mg  + Propofol infusion  ± Scopolamine patch |
| 4 | 78% | 4 | Ondansetron 4 mg  + Dexamethasone 4 mg  + Propofol infusion  + Scopolamine patch |

\* Combinations should be with drugs that have a different mechanism of action.

Consider strategies to reduce PONV baseline risk such as regional anesthesia instead of general anesthesia, adequate hydration, propofol for induction and maintenance; minimize the use of nitrous oxide and volatile anesthetics.

Please do not order an agent for treatment in PACU that has been used for prophylaxis.

References:

1. (Apfel, Laara et al. 1999)

1. (Apfel, Heidrich et al. 2012)

2. (Apfel, Korttila et al. 2004)

3. (De Oliveira, Castro-Alves et al. 2013)

4. (Gan, Diemunsch et al. 2014)

5. (Kooij, Vos et al. 2012)

6.(Mayeur, Robin et al. 2012)

Apfel, C. C., et al. (2012). "Evidence-based analysis of risk factors for postoperative nausea and vomiting." Br J Anaesth **109**(5): 742-753.

BACKGROUND: /st> In assessing a patient's risk for postoperative nausea and vomiting (PONV), it is important to know which risk factors are independent predictors, and which factors are not relevant for predicting PONV. METHODS: /st> We conducted a systematic review of prospective studies (n>500 patients) that applied multivariate logistic regression analyses to identify independent predictors of PONV. Odds ratios (ORs) of individual studies were pooled to calculate a more accurate overall point estimate for each predictor. RESULTS: /st> We identified 22 studies (n=95 154). Female gender was the strongest patient-specific predictor (OR 2.57, 95% confidence interval 2.32-2.84), followed by the history of PONV/motion sickness (2.09, 1.90-2.29), non-smoking status (1.82, 1.68-1.98), history of motion sickness (1.77, 1.55-2.04), and age (0.88 per decade, 0.84-0.92). The use of volatile anaesthetics was the strongest anaesthesia-related predictor (1.82, 1.56-2.13), followed by the duration of anaesthesia (1.46 h(-1), 1.30-1.63), postoperative opioid use (1.39, 1.20-1.60), and nitrous oxide (1.45, 1.06-1.98). Evidence for the effect of type of surgery is conflicting as reference groups differed widely and funnel plots suggested significant publication bias. Evidence for other potential risk factors was insufficient (e.g. preoperative fasting) or negative (e.g. menstrual cycle). CONCLUSIONS: /st> The most reliable independent predictors of PONV were female gender, history of PONV or motion sickness, non-smoker, younger age, duration of anaesthesia with volatile anaesthetics, and postoperative opioids. There is no or insufficient evidence for a number of commonly held factors, such as preoperative fasting, menstrual cycle, and surgery type, and using these factors may be counterproductive in assessing a patient's risk for PONV.

Apfel, C. C., et al. (2004). "A factorial trial of six interventions for the prevention of postoperative nausea and vomiting." N Engl J Med **350**(24): 2441-2451.

BACKGROUND: Untreated, one third of patients who undergo surgery will have postoperative nausea and vomiting. Although many trials have been conducted, the relative benefits of prophylactic antiemetic interventions given alone or in combination remain unknown. METHODS: We enrolled 5199 patients at high risk for postoperative nausea and vomiting in a randomized, controlled trial of factorial design that was powered to evaluate interactions among as many as three antiemetic interventions. Of these patients, 4123 were randomly assigned to 1 of 64 possible combinations of six prophylactic interventions: 4 mg of ondansetron or no ondansetron; 4 mg of dexamethasone or no dexamethasone; 1.25 mg of droperidol or no droperidol; propofol or a volatile anesthetic; nitrogen or nitrous oxide; and remifentanil or fentanyl. The remaining patients were randomly assigned with respect to the first four interventions. The primary outcome was nausea and vomiting within 24 hours after surgery, which was evaluated blindly. RESULTS: Ondansetron, dexamethasone, and droperidol each reduced the risk of postoperative nausea and vomiting by about 26 percent. Propofol reduced the risk by 19 percent, and nitrogen by 12 percent; the risk reduction with both of these agents (i.e., total intravenous anesthesia) was thus similar to that observed with each of the antiemetics. All the interventions acted independently of one another and independently of the patients' baseline risk. Consequently, the relative risks associated with the combined interventions could be estimated by multiplying the relative risks associated with each intervention. Absolute risk reduction, though, was a critical function of patients' baseline risk. CONCLUSIONS: Because antiemetic interventions are similarly effective and act independently, the safest or least expensive should be used first. Prophylaxis is rarely warranted in low-risk patients, moderate-risk patients may benefit from a single intervention, and multiple interventions should be reserved for high-risk patients.

Apfel, C. C., et al. (1999). "A simplified risk score for predicting postoperative nausea and vomiting: conclusions from cross-validations between two centers." Anesthesiology **91**(3): 693-700.

BACKGROUND: Recently, two centers have independently developed a risk score for predicting postoperative nausea and vomiting (PONV). This study investigated (1) whether risk scores are valid across centers and (2) whether risk scores based on logistic regression coefficients can be simplified without loss of discriminating power. METHODS: Adult patients from two centers (Oulu, Finland: n = 520, and Wuerzburg, Germany: n = 2202) received inhalational anesthesia (without antiemetic prophylaxis) for various types of surgery. PONV was defined as nausea or vomiting within 24 h of surgery. Risk scores to estimate the probability of PONV were obtained by fitting logistic regression models. Simplified risk scores were constructed based on the number of risk factors that were found significant in the logistic regression analyses. Original and simplified scores were cross-validated. A combined data set was created to estimate a potential center effect and to construct a final risk score. The discriminating power of each score was assessed using the area under the receiver operating characteristic curves. RESULTS: Risk scores derived from one center were able to predict PONV from the other center (area under the curve = 0.65-0.75). Simplification did not essentially weaken the discriminating power (area under the curve = 0.63-0.73). No center effect could be detected in a combined data set (odds ratio = 1.06, 95% confidence interval = 0.71-1.59). The final score consisted of four predictors: female gender, history of motion sickness (MS) or PONV, nonsmoking, and the use of postoperative opioids. If none, one, two, three, or four of these risk factors were present, the incidences of PONV were 10%, 21%, 39%, 61% and 79%. CONCLUSIONS: The risk scores derived from one center proved valid in the other and could be simplified without significant loss of discriminating power. Therefore, it appears that this risk score has broad applicability in predicting PONV in adult patients undergoing inhalational anesthesia for various types of surgery. For patients with at least two out of these four identified predictors a prophylactic antiemetic strategy should be considered.

De Oliveira, G. S., Jr., et al. (2013). "Dexamethasone to prevent postoperative nausea and vomiting: an updated meta-analysis of randomized controlled trials." Anesth Analg **116**(1): 58-74.

BACKGROUND: Dexamethasone has an established role in decreasing postoperative nausea and vomiting (PONV); however, the optimal dexamethasone dose for reducing PONV when it is used as a single or combination prophylactic strategy has not been clearly defined. In this study, we evaluated the use of 4 mg to 5 mg and 8 mg to 10 mg IV doses of dexamethasone to prevent PONV when used as a single drug or as part of a combination preventive therapy. METHODS: A wide search was performed to identify randomized clinical trials that evaluated systemic dexamethasone as a prophylactic drug to reduce postoperative nausea and/or vomiting. The effects of dexamethasone dose were evaluated by pooling studies into 2 groups: 4 mg to 5 mg and 8 mg to 10 mg. The first group represents the suggested dexamethasone dose to prevent PONV by the Society for Ambulatory Anesthesia (SAMBA) guidelines, and the second group represents twice the dose range recommended by the guidelines. The SAMBA guidelines were developed in response to studies, which have been performed to examine different dosages of dexamethasone. RESULTS: Sixty randomized clinical trials with 6696 subjects were included. The 4-mg to 5-mg dose dexamethasone group experienced reduced 24-hour PONV compared with control, odds ratio (OR, 0.31; 95% confidence interval [CI], 0.23-0.41), and number needed to treat (NNT, 3.7; 95% CI, 3.0-4.7). When used together with a second antiemetic, the 4-mg to 5-mg dexamethasone group also experienced reduced 24-hour PONV compared with control (OR, 0.50; 95% CI, 0.35-0.72; NNT, 6.6; 95% CI, 4.3-12.8). The 8-mg to 10-mg dose dexamethasone group experienced decreased 24-hour PONV compared with control (OR, 0.26; 95% CI, 0.20-0.32; NNT, 3.8; 95% CI, 3.0-4.3). Asymmetric funnel plots were observed in the 8-mg to 10-mg dose analysis, suggesting the possibility of publication bias. When used together with a second antiemetic, the 8-mg to 10-mg dose group also experienced reduced incidence of 24-hour PONV (OR, 0.35; 95% CI, 0.22-0.53; NNT, 6.2; 95% CI, 4.5-10). In studies that provided a direct comparison between groups, there was no clinical advantage of the 8-mg to 10-mg dexamethasone dose compared with the 4-mg to 5-mg dose on the incidence of postoperative nausea and/or vomiting. CONCLUSIONS: Our results showed that a 4-mg to 5-mg dose of dexamethasone seems to have similar clinical effects in the reduction of PONV as the 8-mg to 10-mg dose when dexamethasone was used as a single drug or as a combination therapy. These findings support the current recommendation of the SAMBA guidelines for PONV, which favors the 4-mg to 5-mg dose regimen of systemic dexamethasone.

Gan, T. J., et al. (2014). "Consensus guidelines for the management of postoperative nausea and vomiting." Anesth Analg **118**(1): 85-113.

The present guidelines are the most recent data on postoperative nausea and vomiting (PONV) and an update on the 2 previous sets of guidelines published in 2003 and 2007. These guidelines were compiled by a multidisciplinary international panel of individuals with interest and expertise in PONV under the auspices of the Society for Ambulatory Anesthesia. The panel members critically and systematically evaluated the current medical literature on PONV to provide an evidence-based reference tool for the management of adults and children who are undergoing surgery and are at increased risk for PONV. These guidelines identify patients at risk for PONV in adults and children; recommend approaches for reducing baseline risks for PONV; identify the most effective antiemetic single therapy and combination therapy regimens for PONV prophylaxis, including nonpharmacologic approaches; recommend strategies for treatment of PONV when it occurs; provide an algorithm for the management of individuals at increased risk for PONV as well as steps to ensure PONV prevention and treatment are implemented in the clinical setting.

Kooij, F. O., et al. (2012). "Automated reminders decrease postoperative nausea and vomiting incidence in a general surgical population." Br J Anaesth **108**(6): 961-965.

BACKGROUND: Guidelines to minimize the incidence of postoperative nausea and vomiting (PONV) have been implemented in many hospitals. In previous studies, we have demonstrated that guideline adherence is suboptimal and can be improved using decision support (DS). In this study, we investigate whether DS improves patient outcome through improving physician behaviour. METHODS: Medical information of surgical patients is routinely entered in our anaesthesia information management system (AIMS), which includes automated reminders for PONV management based on the simplified risk score by Apfel and colleagues. This study included consecutive adult patients undergoing general anaesthesia for elective non-cardiac surgery who were treated according to the normal clinical routine. The presence of PONV was recorded in the AIMS both during the recovery period and at 24 h. Two periods were studied: one without the use of DS (control period) and one with the use of DS (support period). DS consisted of reminders on PONV both in the preoperative screening clinic and at the time of anaesthesia. RESULTS: In the control period, 981 patients, of whom 378 (29%) were high-risk patients, received general anaesthesia. Overall, 264 (27%) patients experienced PONV within 24 h. In the support period, 1681 patients, of whom 525 (32%) had a high risk for PONV, received general anaesthesia. In this period, only 378 (23%) patients experienced PONV within 24 h after operation. This difference is statistically significant (P=0.01). CONCLUSION: Automated reminders can improve patient outcome by improving guideline adherence.

Mayeur, C., et al. (2012). "Impact of a prophylactic strategy on the incidence of nausea and vomiting after general surgery." Ann Fr Anesth Reanim **31**(2): e53-57.

BACKGROUND: This study aimed to evaluate the implementation of a strategy to prevent postoperative nausea and vomiting (PONV) in patients undergoing general surgery. STUDY DESIGN: Prospective observational study. METHODS: A first period was observational. During a second period, a strategy to prevent PONV was based on five risk factors (RF) identified after the first phase. From two RF, antiemetic treatment was given according to the number of RF. The incidence of PONV was recorded in postoperative anaesthesic care unit (PACU) and at the 24th postoperative hour (24h). RESULTS: We prospectively enrolled 823 patients. Implementation of a prophylactic PONV strategy was associated with a decrease of nausea in PACU from 29.9 to 9.8% (P<0.001) and at 24h from 19 to 10.3% (P<0.001). Vomiting decreased from 12.4 to 2.3% (P<0.001) in PACU and from 5.6 to 3.7% at 24h (non-significant). CONCLUSION: Prophylaxis of PONV by the administration of antiemetic treatment according to a strategy based on a local risk score was efficient and associated with a significant decrease of PONV.

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