PONV Prophylaxis Guidelines

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For scoring system, use the bolded simplified risk factors (up to 4) based on Apfel et al.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Female gender</td>
<td>2.57</td>
<td>2.32–2.84</td>
</tr>
<tr>
<td>2. Prior PONV</td>
<td>2.09</td>
<td>1.90–2.29</td>
</tr>
<tr>
<td>or motion sickness</td>
<td>1.77</td>
<td>1.55–2.04</td>
</tr>
<tr>
<td>3. Nonsmoking status</td>
<td>1.82</td>
<td>1.68–1.98</td>
</tr>
<tr>
<td>4. Postoperative opioid use</td>
<td>1.47</td>
<td>1.31–1.65</td>
</tr>
</tbody>
</table>

Probability of PONV based on the number of independent risk factors [Apfel, 1999, Gan 2014]

<table>
<thead>
<tr>
<th>Total # of risk factors</th>
<th>PONV probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10%</td>
</tr>
<tr>
<td>1</td>
<td>20%</td>
</tr>
<tr>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>4</td>
<td>80%</td>
</tr>
</tbody>
</table>

Recommended antiemetic prophylaxis

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low risk (no risk factors)</td>
<td>“wait and see”</td>
</tr>
<tr>
<td>Medium risk (1-2 risk factors)</td>
<td>pick 1 or 2 interventions</td>
</tr>
<tr>
<td>High risk (3-4 risk factors)</td>
<td>&gt;2 interventions &amp; multimodal approach</td>
</tr>
</tbody>
</table>

Additional risk factors (not used in scoring system)

- Age < 50 (0.88 per decade, 0.84–0.92)
- Use of volatile anesthetics (1.82, 1.56–2.13)
- Nitrous oxide (1.45, 1.06–1.98)
- Duration of anesthesia (1.46 h−1, 1.30–1.63)
- Neostigmine dose >2.5mg
- Intraoperative opioids
- Larger doses of opioids (periop or postop)

Surgery types associated with higher PONV risk

- Gynecologic
- Abdominal (open and especially laparoscopic)
- Urologic
- Strabismus, tympanoplasty and adenotonsillectomy (in children only)
Additional risk factor for procedures/situations critical to avoid emesis

- increased ICP
- jaw wired shut

Options for PONV prophylaxis

Consider patient preferences, cost-effectiveness, and reducing baseline risk (avoid/minimize nitrous, post-op opioids, volatile anesthetics)

Medications

Preoperative

- Scopolamine
- Meclizine
- Perphenazine
- NK-1 receptor antagonist (Aprepitant /Fosaprepitant)
- Gabapentin

Beginning of surgery (Induction)

- Dexamethasone
- Metoclopramide
- Palonosetron
- Promethazine

End of surgery

- 5HT3 antagonist (Ondansetron)
- Haloperidol
- Prochlorperazine
- Ephedrine, 0.5 mg/kg IM

Anesthesia methods

- Propofol anesthesia (TIVA)
- Regional anesthesia

Combination therapies with proven efficacy

- Droperidol + dexamethasone
- 5-HT3 receptor antagonist + dexamethasone
- 5-HT3 receptor antagonist + droperidol
- 5-HT3 receptor antagonist + dexamethasone + droperidol
- Ondansetron + casopitant or scopolamine

If prophylaxis fails or was not received

- use antiemetic from different class than prophylactic drug
- readminister a drug only if >6h after PACU admission
- do not readminister scopolamine or dexamethasone
Rescue medication:
- Propofol bolus (short-acting)
- Haloperidol
- Ondansetron

Overview of antiemetic medications

- **Aprepitant** – NK-1 receptor antagonist. 40-80 mg PO
- **Dexamethasone** – corticosteroid, prophylactic dose of 4-8mg IV after induction of GA. Possible risks include increased risk of post-op infection, elevated blood glucose. Relative contraindication in labile diabetic patients.
- **Fosaprepitant** – IV form of aprepitant, NK-1 receptor antagonist 150mg IV (available in UW formulary) off-label option for patients presenting with PONV symptoms who cannot (yet) tolerate oral medication. Avoid in severe liver failure (Child-Pugh score >9)
- **Gabapentin** 600mg PO 1-2h prior to surgery.
- **Haloperidol** – butyrophenone derivative. 0.5-2.5mg IV or IM. Concern for prolonged QTc, not recommended as first-line therapy, not FDA approved as antiemetic in IV formulation. Caution with anticholinergics, other QTc prolonging drugs.
- **Meclizine** – antihistamine, 50 mg PO (on UW formulary as PO)
- **Mirtazapine** - noradrenergic and specific serotonin antidepressant, 30 mg PO. Avoid in patients taking MAOIs, linezolid, methylene blue. Do not use in pediatric patients (black box warning for suicidal ideation, not FDA approved for pediatric use).
- **Metoclopramide** – phenothiazine. Not effective at low doses (10mg), only at 25-50mg doses. Side effects dyskinesia and extrapyramidal symptoms, increased with increasing doses. Caution with perphenazine as this may increase risk.
- **Ondansetron** – 5-HT3 receptor antagonist. 4mg IV at end of surgery prior to emergence. Redose only after 6 hours. Concern for prolonged QTc.
- **Palonosetron** – 5-HT3 receptor antagonist. 0.075 mg IV at induction. Side Effects: Prolonged QT interval, headache, constipation, dizziness, elevated liver enzymes
- **Perphenazine** - phenothiazine derivative (typical antipsychotic) used preventively. High dose – risk of dyskinesia, extrapyramidal symptoms. Caution if giving with metoclopramide. Max 8-16mg/day PO in divided doses.
- **Propofol** (bolus for induction and maintained at 20mcg/kg/min throughout surgery) (Erdem, 2008), or as part of TIVA. Can also be used as a rescue in the PACU (20mg bolus) for short-term effect.
- **Prochlorperazine** - phenothiazine derivative, given at end of surgery, 5-10mg IV.
- **Promethazine** – phenothiazine derivative, given at induction/start of surgery, 12.5-25mg IV. (black box warning due to risk of vascular injury from intra-arterial injection or subcutaneous injection, as well as respiratory depression in pediatrics). Side effects: Sedation, EPS, central anticholinergic syndrome. CAUTION: sedation effects can be severe, cause apnea. Caution with closed angle glaucoma. Also, extravasation causes severe tissue damage that frequently requires surgical intervention /possible amputation
- **Scopolamine**– anticholinergic. 1.5mg transdermal patch, 2-4h time to onset. Side effects – visual disturbance, dry mouth, dizziness. Avoid in age>60
References


