Nausea/Vomiting Associated with Surgery - Adult

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson’s specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient’s care. This algorithm should not be used to treat pregnant women.

**Note:** Strategies to minimize the risk of PONV:
- Minimization of perioperative opioids with the use of multimodal analgesia and regional anesthesia
- Avoidance of volatile anesthetics
- Proper intravascular hydration
- Implementation of total intravenous anesthesia

1. MD Anderson risk factors
   - Patient specific risk factors:
     - Female gender
     - Non-smoking status
     - History of post-operative nausea/vomiting (PONV) or motion sickness
     - Age < 50 years
   - Anesthetic risk factors:
     - Use of volatile anesthetics
     - Post-operative opioids
   - Surgical risk factors:
     - Duration of anesthesia > 3 hours
     - Type of surgery (abdominal, gynecologic, breast, head & neck surgery)

2. See Appendix A – Antiemetic Medication Options for Prophylaxis or Intraoperative Use

**PATIENT PRESENTATION**

- Patient scheduled for surgery
  - Assess patient for risk factors
    - No risk factors
      - No more than one drug prophylaxis
    - One-two risk factors
      - Give two drug prophylaxis
    - Three or more risk factors
      - Give three-four drug prophylaxis
  - Patient sent to PACU after surgery

(see Page 2)
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**TREATMENT**

Patient in PACU after surgery

- Patient experiences post-operative nausea/vomiting in PACU?
  - Yes
    - Prophylaxis or intraoperative antiemetic received?
      - Yes
        - Nausea/vomiting resolved in < 6 hours?
          - Yes
            - Refer to patient’s post-op orders and discharge as indicated
          - No
            - Refer to Appendix B for additional treatment options
      - No
        - Refer to Appendix B for treatment options
  - No
    - Patient will be managed per Surgeon’s post-op orders

- Assess pre- and intraoperative antiemetic treatment
  - Yes
    - Prophylaxis or intraoperative antiemetic received?
      - Yes
        - Nausea/vomiting resolved in < 6 hours?
          - Yes
            - Refer to patient’s post-op orders and discharge as indicated
          - No
            - Refer to Appendix B for additional treatment options
      - No
        - Refer to Appendix B for treatment options
  - No
    - Patient will be managed per Surgeon’s post-op orders

- Notify Anesthesiology
### APPENDIX A: Antiemetic Medication Options for Prophylaxis or Intraoperative Use

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anticholinergics</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Scopolamine Patch (Transderm Scop®) | 1.5 mg disc placed behind ear at least 2 - 4 hours before surgery | • Caution in patients > 60 years old  
• Patch may be applied the night prior to surgery  
• If not discontinued prior to hospital discharge, patients should be instructed in the safe removal and disposal of the patch |
| **Benzodiazepines**         |                                                  |                                                                                                   |
| Midazolam (Versed®)         | 35 - 75 mcg/kg IV                                | • May be given pre-operatively or intra-operatively                                               |
| **Butyrophenones**          |                                                  |                                                                                                   |
| Droperidol (Inapsine®)      | 0.625 mg IV                                      | • Most effective if given at the end of surgery  
• Requires 2 - 3 hours of EKG monitoring  
• Avoid in patients with prolonged QTc interval                                                   |
| Haloperidol (Haldol®)       | 1 mg IV                                          | • Give at the end of surgery  
• Risk of QTc prolongation precludes its use as a first-line agent  
• Alternative to droperidol                                                                   |
| **Corticosteroids**         |                                                  |                                                                                                   |
| Dexamethasone               | 4 mg IV                                          | • Give shortly after induction  
• Avoid in labile diabetic patients                                                                |
| **Neurokinin-1 Receptor Antagonists** | 40 mg PO                             | • Give within 3 hours before the induction of anesthesia                                           |
| Aprepitant (Emend®)         |                                                  |                                                                                                   |
| **Phenothiazines**          |                                                  |                                                                                                   |
| Promethazine (Phenergan®)   | 6.25 mg IV                                       | • Give shortly after induction  
• 6.25 mg dose may require a second dose after 15 minutes; may repeat up to 3 times for a maximum dose of 25 mg  
• Should not be used in children ≤ 2 years old  
• Risk of QTc prolongation                                                                      |
| Prochlorperazine (Compazine®)| 5 - 10 mg IV                                     | • Give at the end of surgery  
• Risk of QTc prolongation                                                                        |
| **Serotonin Antagonists**   |                                                  |                                                                                                   |
| Ondansetron (Zofran®)       | 4 mg IV                                          | • Give at the end of surgery  
• Risk of QTc prolongation increases with increasing dose                                            |
| Granisetron                 | 0.35 - 3 mg IV                                   | • Give at the end of surgery  
• For patients with history of delayed (post-discharge) post-operative nausea and vomiting  
• Risk of QTc prolongation                                                                      |

1 Availability varies based on supply
# APPENDIX B: Antiemetic Medication Options for Treatment or Rescue

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serotonin Antagonists</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ondansetron (Zofran&lt;sup&gt;®&lt;/sup&gt;)</td>
<td>First Line Agent 2 mg IV</td>
<td>Risk of QTc prolongation increases with increasing dose</td>
</tr>
<tr>
<td><strong>Phenothiazines</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Promethazine (Phenergan<sup>®</sup>) | Second Line Agents 6.25 mg IV | ● 6.25 mg dose may require a second dose after 15 minutes; may repeat up to 3 times for a maximum dose of 25 mg  
  ● Risk of QTc prolongation       |
| Prochlorperazine (Compazine<sup>®</sup>) | 5 - 10 mg IV | Risk of QTc prolongation                                                                  |
| **Butyrophenones**    |                |                                                                                              |
| Droperidol (Inapsine<sup>®</sup>)<sup>1</sup> | Third Line Agents 0.625 mg IV | ● Requires 2 - 3 hours of EKG monitoring  
  ● Avoid in patients with prolonged QTc interval |
| Haloperidol (Haldol<sup>®</sup>) | 1 mg IV | ● Risk of QTc prolongation precludes its use as a first-line agent  
  ● Alternative to droperidol |
| **Prokinetic**        |                |                                                                                              |
| Metoclopramide (Reglan<sup>®</sup>) | Rescue 10 mg IV |                                                                                              |
| **Dopamine Antagonist** |                |                                                                                              |
| Amisulpride (Barhemsys<sup>®</sup>) | Rescue 10 mg IV | ● Less likely to cause adverse reactions such as extrapyramidal  
  ● May prolong QTc interval |

Notes:

- When nausea and vomiting occur post-operatively, treatment should be administered with an antiemetic from a DIFFERENT pharmacologic class than the drug given for prophylaxis initially.

- Re-dosing should only occur if ≥ 6 hours has elapsed since the last dose from that class was given.

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**SUGGESTED READINGS**


Eberhart, L. H., & Morin, A. M. (2011). Risk scores for predicting postoperative nausea and vomiting are clinically useful tools and should be used in every patient: Con – “life is really simple, but we insist on making it complicated.” *European Journal of Anaesthesiology, 28*(3), 155-159. https://doi.org/10.1097/EJA.0b013e3283427f4f


Pierre, S. (2011). Risk scores for predicting postoperative nausea and vomiting are clinically useful tools and should be used in every patient: Pro - “Don't throw the baby out with the bathwater.” *European Journal of Anaesthesiology, 28*(3), 160-163. https://doi.org/10.1097/EJA.0b013e328342fd86

This practice consensus statement is based on majority expert opinion of the Nausea and Vomiting experts at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

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