**Guideline for the prevention and treatment of Postoperative Nausea and Vomiting (PONV) in adults**

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**Division & Speciality:**  
Clinical Support / Anaesthetics and Theatres

**Version:**  
6

**Ratified by:**  
Acute Pathway Governance  
Medicine Management Committee

**Scope (Target audience, state if Trust wide):**  
Anaesthetists, recovery staff, ward staff on perioperative wards, clinical pre-operative assessment unit staff.

**Review date (when this version goes out of date):**  
20 April 2025

**Explicit definition of patient group to which it applies (e.g. inclusion and exclusion criteria, diagnosis):**  
Adult patients at NUH who will be having, or have had, a procedure involving an anaesthetic.  
Excluding: paediatric patients, obstetric patients, palliative care patients, oncology patients where speciality guidelines are already in use.

**Changes from previous version (not applicable if this is a new guideline, enter below if extensive):**  
Dual anti-emetic therapy recommended for all patients with Apfel score of 1 or higher.  
Midazolam, when used in combination with other anti-emetics, further reduces the incidence of PONV (Only to be used by anaesthetists).  
Minimise pre-op fasting and ensure adequate hydration with THINK DRINK.  
Intra-operative anti-emetic recommendations are dexamethasone, droperidol, ondansetron and cyclizine (if suitable in that order).  
Buccal prochlorperazine, ondansetron and cyclizine in the management of PONV on the ward in that order.  
Emphasis on prescribing laxatives and anti-emetics for patients who will need opiates post-operatively.

**Summary of evidence base this guideline has been created from:**  
See reference list

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*This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt contact a senior colleague or expert. Caution is advised when using guidelines after the review date or outside of the Trust.*
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   1.2 Risk Assessment
   1.3 Reducing the baseline risk
   1.4 P6 Acupuncture
   1.5 Intra-operative anti-emetics
   1.6 Prescribing

2. Treatment of PONV in theatre recovery areas

3. Treatment of PONV on the ward and other areas

4. Treatment of Acute Dystonic Reactions

Appendix 1: NUH Adult Postoperative Nausea and Vomiting (PONV) label

Application

This guideline applies to the prevention and treatment of postoperative nausea and vomiting (PONV) in adults at the Nottingham University Hospitals.

It is not intended for use in the following circumstances / patient groups:

1. Obstetrics
2. Paediatrics
3. Medical patients
4. Oncology patients (unless for post-operative use)
5. Palliative care

Aim

To reduce the incidence and severity of PONV in the first 48 hours after surgery. PONV is common, distressing for the patient and leads to delays in post-operative recovery and discharge from hospital.

This is guideline only. The interpretation and application of clinical guidelines will remain with the responsibility of the individual clinician. If in doubt contact a senior colleague or expert.

This guideline is updated from Version 5 (2017).

The majority of this version retains the same guidance as version 5. This version contains new advice regarding:

- Dual anti-emetic therapy recommended for all patients with Apfel score of 1 or higher.
- Midazolam, when used in combination with other anti-emetics, further reduces the incidence of PONV. (Only to be used by anaesthetists)
- Minimise pre-op fasting and ensure adequate hydration with THINK DRINK.
• Intra-operative anti-emetic recommendations are dexamethasone, droperidol, ondansetron and cyclizine.
• Buccal prochlorperazine, ondansetron and cyclizine in the management of PONV on the ward and in that order.
• Emphasis on prescribing laxatives and anti-emetics for patients who will need opiates post-operatively.

1. Prevention

1.1 Risk Factors for PONV

Figure 1: PONV risk factor summary.

This diagram outlines the intraoperative and postoperative risk factors for PONV in adults.

The size of each segment is proportional to the odds ratio of PONV associated with each risk factor.

Figure 1: PONV risk factor summary:
The figure reused with permission from the American Society for Enhanced Recovery.
1.2: Risk Assessment

An Apfel PONV score should be given to all patients pre-operatively (see Table 1). Patients with a score of 1 or more should receive multimodal PONV prophylaxis (See 1.3).

Table 1: Apfel scoring system for PONV risk factors

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1</td>
</tr>
<tr>
<td>Non-smokers</td>
<td>1</td>
</tr>
<tr>
<td>History of PONV and/or motion sickness</td>
<td>1</td>
</tr>
<tr>
<td>Post-operative opioid use likely</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Points Score</th>
<th>% Risk of PONV</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
<td>Low risk*</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>Medium risk – prescribe 2 agents</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>60</td>
<td>High risk – prescribe at least three anti-emetics</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

* Consider the patient to be at high risk of PONV if any opioid, other than remifentanil, is used by any route (including spinal and epidural). Post-operative opioids are more likely to cause PONV than opioids administered intra-operatively.

*Laparoscopic and gynaecological surgery are associated with a high risk of PONV.*

Patients who are having day case procedures or are scheduled for early ambulation should be managed particularly carefully to avoid PONV.

Patients having procedures where it would be dangerous for them to vomit should be managed as though they were a high risk patient. These include jaw wiring procedures, diaphragmatic hernia repair, oesophageal anastomoses, neurosurgery and ophthalmic procedures (this list is not exhaustive).

1.3 Reducing the baseline risk

The baseline risk of PONV is reduced by:

- Using local or regional anaesthetics rather than general anaesthesia.
- Keeping the patient well hydrated pre and intra-operatively.
- Using Total Intravenous Anaesthesia (TIVA).
- Avoiding volatile anaesthetic agents.
- Avoiding the use of nitrous oxide.
- Adequate intra-op analgesia to reduce the need for PACU delivered opioids.
Post-operative opioids cause more nausea than intra-operative opioids.

- Prescribing regular laxatives and anti-emetics if the patient is likely to need post-operative opioids including PCAs and epidurals.
- Consider pre-operative gabapentin 600-900mg orally 1-2 hours before surgery both for nausea and when neuropathic pain may be an issue.

The evidence for the efficacy of PONV prophylaxis is much stronger than PONV treatment with rescue medications.

### 1.4 P6 Acupuncture / Acupressure

Stimulation of the P6 acupuncture point at the wrist is an effective non-pharmacological technique for preventing PONV. It is used at NUH under the guidance of the Acute Pain Service, who should be contacted for advice about its use.

### 1.5 Intra-operative Anti-emetics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Route</th>
<th>Side Effects</th>
<th>Cautions</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexamethasone</td>
<td>3.3 – 6.6mg</td>
<td>IV</td>
<td>Cataract subcapsular, electrolyte imbalance, fatigue, fluid retention, GI discomfort, headache, impaired healing, hypertension, menstrual cycle irregularities, mood altered, nausea, osteoporosis, peptic ulcer, psychosis, skin reactions, sleep disorders, weight gain, Cushing’s syndrome.</td>
<td>Avoid in patients with lymphoma (tumour lysis syndrome) and diabetes (rise in blood glucose). Congestive cardiac failure, epilepsy, glaucoma, previous steroid myopathy, history of TB, hypertension, hypothyroidism, infection, myasthenia gravis, ocular herpes simplex, peptic ulcer, recent intestinal anastomosis, recent MI, thromboembolic disorders, UC.</td>
<td>At induction After anaesthesia</td>
</tr>
<tr>
<td>Ondansetron</td>
<td>4mg</td>
<td>IV</td>
<td>Common: constipation, feeling hot, headache, abnormal sensation Uncommon: Arrhythmias, chest pain, hiccups, hypotension, movement disorders, oculogyric crisis, seizure Acute Dystonic Reactions*</td>
<td>Avoid in patients with long QT syndrome. Risk of locked-in-syndrome Adenotonsillar surgery, electrolyte disturbances, subacute intestinal obstruction</td>
<td>20 minutes prior to end of surgery</td>
</tr>
<tr>
<td>Droperidol**</td>
<td>625micro grams – 1.25mg (625micro grams elderly)</td>
<td>IV</td>
<td>Agitation, amenorrhoea, arrhythmias, constipation, dizziness, drowsiness, dry mouth, erectile dysfunction, gynaecomastia, hyperprolactinaemia,</td>
<td>Blood dyscrasias, cardiovascular disease, predisposition to seizures, diabetes, epilepsy, myasthenia gravis, history of</td>
<td>End of surgery</td>
</tr>
</tbody>
</table>

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Not an exhaustive list of side-effects and cautions, please refer to BNF for further information

*See 4.0 Acute Dystonic Reactions

**Droperidol has previously been underused due to a 2001 study showed significant cardiac side effects however this was with high doses of 25mg and above. Droperidol in the above doses has a good safety profile and good efficacy as an anti-emetic.

Patients with an Apfel score of 1 or more should receive at least two anti-emetics with different mechanisms of action. One of these should be ondansetron (unless contraindicated).

Combinations of two or more anti-emetics are more effective in preventing PONV than one medicine given alone.

Several studies have reported that midazolam, when used in combination with antiemetic agents, further decreases PONV. This is even at subhypnotic doses <0.05mg/kg and at induction.

1.6 Prescribing

The administration of intra-operative anti-emetics must be recorded on the NUH prescription chart via the NUH PONV label (see Appendix 1). If the PONV label is used, it is attached to the “As required” section of the NUH prescription chart to cover two sections:

1. Theatre and recovery administration (the white upper half of the label)
   - Ensure that anti-emetics which have been given in theatre have been signed for in the “Prescribed by”, the “Given by” and the “Time given” boxes (including selecting the dose given).
• Prescribe any anti-emetics to be given as rescue drugs in recovery on the PONV label, by signing the "Prescribed by" box and selecting the required dose.
• Cross though the anti-emetics that are not appropriate for that patient in recovery.

2. PRN dosing (orange bottom half of the label)
• Needs to be completed for the ward by deleting any of the three drugs which are not suitable for that patient and signing the bottom of the label.

It is the responsibility of the anaesthetist to ensure that intra-operative anti-emetics are recorded and post-operative anti-emetics are prescribed before transferring the patient’s care to the recovery staff.

If a patient is being managed as high risk for PONV, regular anti-emetics should also be prescribed for ward use.

If ondansetron, cyclizine or prochlorperazine are prescribed regularly, the corresponding “As required” section for these drugs must be crossed through on the PONV label section for ward administration.

2. Treatment of PONV in theatre recovery areas

Patients should be regularly assessed for nausea and vomiting. This needs rapid treatment unless the patient does not want treatment and there is no medical risk from vomiting.

1. Administer appropriate anti-emetics
   • Prescribed on the PONV label (white and orange areas)
   • Consider inserting an acupuncture pin as per the PONV label
   • Seek advice from anaesthetist if none prescribed

2. Exclude medical and surgical causes:
   • Hypotension
   • Hypovolaemia
   • Temperature – hypothermia, or patient feels too warm
   • Infection

The patient should not be returned to the ward while moderate/severe PONV is uncontrolled.

Additional rescue anti-emetics to be administered by anaesthetists only:
   • Midazolam 1-2mg IV
   • Low dose propofol 20mg IV (short duration of action)
   • Do not repeat a dose of ondansetron within 4 hours.
   • Do not repeat a dose of dexamethasone within 8 hours.
3. Treatment of PONV on the ward and other areas

PONV must be recorded on their observation chart. Ensure that an IV cannula is present and patent. Give intravenous fluids to maintain hydration. Anti-emetics to be given IV unless mild PONV.

**Are there regular anti-emetics prescribed? Does the patient already have a PC6 acupuncture pin inserted? If not please access PC6 pins**

- **Yes**
  - Give prescribed regular anti-emetics.
- **No**
  - Give two anti-emetics from orange section of PONV label (give IV when possible).

**Give alternative anti-emetic from orange section of PONV label (some anti-emetics can cause nausea).**

**Continued N&V**

**Consider 3rd anti-emetic.**

- **Ensure other causes of PONV have been assessed and managed (see below).**

**Once N&V has stopped:**

- Reassessment to be done within one hour.

**Seek medical advice immediately if N&V continues despite 3 anti-emetics**

- Prochlorperazine every 12 hours
- Cyclizine every 8 hours
- Ondansetron may be given every 6 hours

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Multimodal anti-emetic therapy is more effective than multiple doses of one medication.

If these measures have been initially successful but nausea and/or vomiting is a persistent problem, ensure that the effective anti-emetics are prescribed for regular administration. Prochlorperazine is a highly effective, cheap option and can be prescribed at 5mg tds orally.

With persistent PONV consider the following treatments, which must be prescribed before administration:

- **IV droperidol 625 micrograms -1.25mg**
  - Particularly if nausea is a problem. Use the smaller dose first.

- **Give IV dexamethasone 3.3 -6.6mg**
  - If not given within the last 8 hours.
  - Use with caution in concurrent infection (immunosuppression), lymphoma (tumour lysis syndrome) and diabetes (glycaemic control).

Make sure that the following have been assessed and managed appropriately:

- Dehydration or hypovolaemia
- Hypotension
- Infection
- Inadequate oxygenation
- Pain
- Patient is too warm or too cold
- Hunger
- Mouth hygiene
- Foul or upsetting smells in the vicinity of the patient

**Opioid Medication**

If opioid medication is considered a contributing factor then consider the following:

- Reduce opioid dose if possible
- Consider non-opioid alternatives
  - Paracetamol, NSAIDs, Gabapentinoids, regional anaesthesia.
- Changing the opioid or its delivery regimen (e.g. decrease rate of PCA bolus delivery)
  - This may require consultation with either the Acute Pain Service or an on-call anaesthetist.
- Contact the Pain Management Service for consideration of other strategies (other drugs, acupuncture and psychological strategies).

Patients should be strongly encouraged to take regularly prescribed anti-emetics even if not feeling nauseous.
Giving two anti-emetics of different modalities is more effective than giving repeat doses of 1 drug.

4. Treatment of Acute Dystonic Reactions

Dystonic reactions are very rare. They may occur after the administration of metoclopramide, cyclizine, prochlorperazine, droperidol and ondansetron.

<table>
<thead>
<tr>
<th>Oculogyric Crisis</th>
<th>Spasm of the extraorbital muscles, causing upwards and outwards deviation of the eyes. Blephorospasm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torticollis</td>
<td>Head held turned to one side</td>
</tr>
<tr>
<td>Opisthotonus</td>
<td>Painful forced extension of the neck. When severe, the back is involved and the patient arches off the bed</td>
</tr>
<tr>
<td>Macroglossia</td>
<td>The tongue does not swell, but it protrudes and feels swollen</td>
</tr>
<tr>
<td>Buccolinguual Crisis</td>
<td>May be accompanied by trismus, risus sardonius, dysarthria and grimacing</td>
</tr>
<tr>
<td>Laryngospasm</td>
<td>Uncommon but frightening</td>
</tr>
<tr>
<td>Spasticity</td>
<td>Trunk muscles and less commonly limbs can be affected</td>
</tr>
</tbody>
</table>

Do not ignore these symptoms – they may be extremely frightening for the patient.

If acute dystonia is suspected, call an anaesthetist or other suitably experienced doctor and reassure the patient till treatment is commenced.

**Treatment: IV procyclidine 5 -10 mg**

- STAT dose
- Symptoms often disappear within 5 -10 minutes.
- Occasionally patients may require further doses, and may take 30 minutes up to 2 hours to obtain relief (for further information, refer to the BNF).

When the episode is treated;
- Inform the patient which drug caused the acute dystonia (if known)
- Document this in the notes, GP letter and on the prescription chart
- Discontinue the prescription for the offending drug
- For further advice consult the Medicines Information Unit at NUH pharmacy (ext.64185or 61200, Monday to Friday 0900-1700).
- This reaction may need to be formally reported to the MHRA through the “Yellow Card” scheme on-line (available online here or via www.mhra.gov.uk)
Reference


Nottingham City Hospital NUH Post-op Nausea and Vomiting clinical audit 2020/2021. Quality improvement project number 19-535Q.

Opinions of NUH anaesthetic consultants.

Appendix 1: Sticker

NUH Guidelines for the prevention and treatment of postoperative nausea and vomiting (PONV) in adults, Version 6 Review date April 2026

Medicines Management Committee order code: NUH00420S

Attach to the NUH general prescription chart in the “As required” section.

<table>
<thead>
<tr>
<th>Theatre and Anaesthesia : Anti-emetic Prescription</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ref: NUH Guidelines for the prevention and treatment of PONV in adults Version 6 – Review date April 2025</td>
</tr>
<tr>
<td>Acupuncture pin inserted in Anterior forearm Left / Right (please circle)</td>
</tr>
<tr>
<td>PONV prophylaxis (for use in Theatre and Recovery)</td>
</tr>
<tr>
<td>IV Dexamethasone</td>
</tr>
<tr>
<td>IV Droperidol</td>
</tr>
<tr>
<td>IV Ondansetron</td>
</tr>
<tr>
<td>IV Cyclizine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nausea &amp; vomiting treatment (recovery units and wards)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prochlorperazine buccal tablet 3 to 6 mg 12 hour minimum interval</td>
</tr>
<tr>
<td>Date</td>
</tr>
<tr>
<td>Date</td>
</tr>
</tbody>
</table>

| Signature: | Print name: | Date: | / | NUH00420S April 2021 |

Dimensions: length 19cm, height 7.5cm