

Acute Pain Management – Post Operative Nausea and Vomiting	Clinical Guideline
Integrated Pain Management Service - IPMS	Register No: 06004 Status: Public

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Contributes to CQC Outcome	4

Consulted With	Post/Committee/Group	Date
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1. Purpose

- 1.1 Post-operative nausea and vomiting (PONV) can be defined as 'nausea and vomiting that occurs within the first 24 hours after surgery'. The guideline has been developed to assist in the management of patients, who are 16 years or older at risk of / or experiencing PONV.

2. Introduction

- 2.1 PONV is a common complication following surgery. It has been associated with physiological and psychological effects which can cause delayed recovery after surgery. PONV may directly cause airway compromise, aspiration pneumonia, fluid depletion and electrolyte imbalance, oesophageal rupture, venous hypertension, increased stress to the patient's wound, which may lead to wound dehiscence, even loss of vision in patients following ophthalmic surgery. Also it can cause fatigue, low mood, distress, and pain.

3. Scope

- 3.1 The guideline is intended to be used to identify patients, aged 16 years and older, who are at risk of / or who are experiencing PONV. It can be used to formulate a prophylactic anti-emetic plan, and provides guidance for active treatment of PONV post-operatively. It can be used by medical and nursing staff.

4. Staff & training

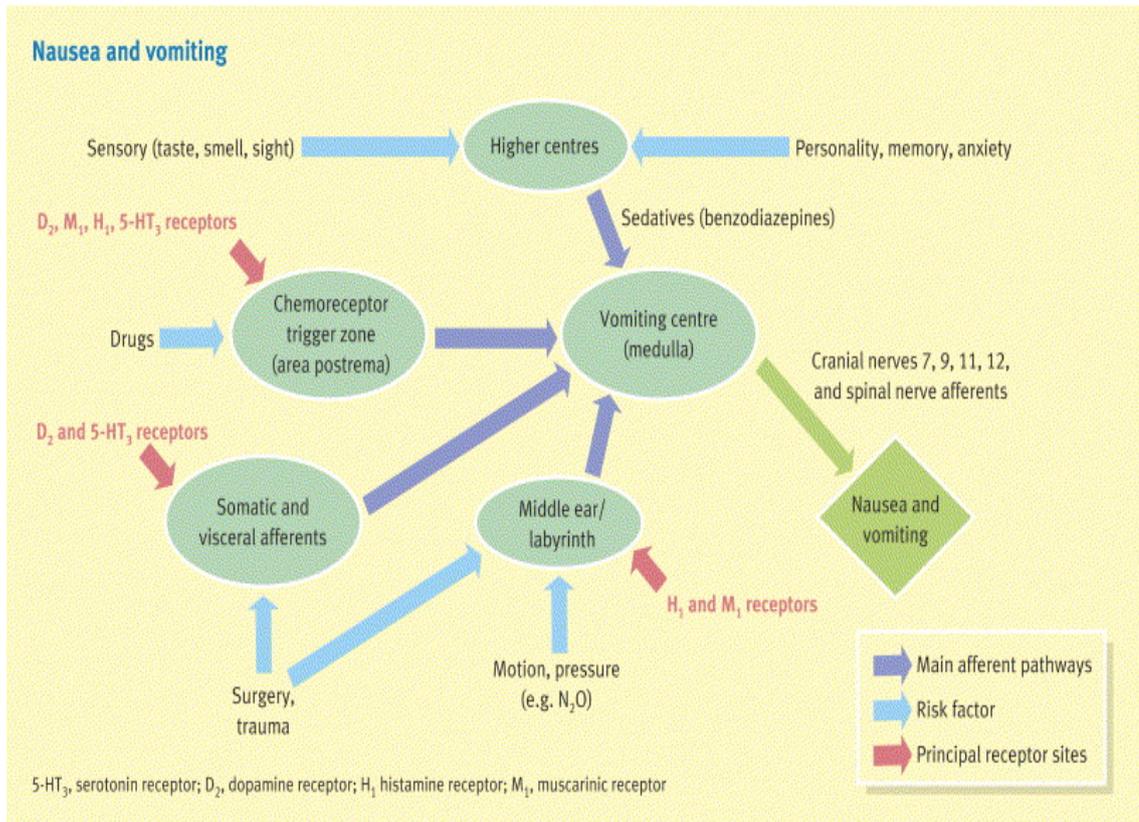
- 4.1 This guideline is provided for use by trained nurses and medical staff involved in the care of patients at risk from PONV. It also provides evidence-based guidance for trust pharmacists.
- 4.2 Medical staff are expected to understand the need for the assessment of PONV and the clinical importance of treating this promptly and safely.
- 4.3 Training and education is provided by the IPMS, both formally and informally for all clinical staff. The IPMS is available for advice and consultation via the pager system, and through the PAS referral system.
- 4.4 Medical staff will be informed of revised guidelines via senior medical staff within the IPMS at audit meetings and twice yearly teaching sessions for all FY1 and FY2 doctors.
- 4.5 Corporate services will ensure that the guideline is uploaded to the intranet and the website and notified to staff via Focus.

5. Pathophysiology of nausea and vomiting

- 5.1 PONV can be caused by a number of factors. Opioids are **not** the only cause for PONV. The 2 main areas that are activated to cause PONV are the Medulla Oblongata and the Chemoreceptor Trigger Zone (CTZ). Nausea and vomiting is under the control of the Central Nervous System (CNS) via the vomiting centre in the Medulla Oblongata and the CTZ in the floor of the 4th ventricle. See below.

- 5.2 The Medulla can be stimulated by the Pharyngeal, Vagal, and midbrain afferent nerves and by the Limbic system.
- Pharyngeal / gag reflex can be stimulated by mechanical irritations, for example, by the insertion of a naso-gastric tube, laryngeal mask airway, or endotracheal tube airway.
 - The Vagal afferent nerves can be stimulated by intubation, suctioning that irritates the Carina, from noxious substances in the duodenum or stomach, and/or distention / contraction of the gastrointestinal tract.
 - The midbrain afferents can be stimulated by anaesthesia alone, but also if there is a change in intracranial pressure in the case of neurological procedures.
 - The Limbic system, involved in the emotional processing, can be activated by the learned response of anticipatory vomiting. Pre-emptive anxiolysis with Benzodiazepines has shown to help this group of patients; other strategies involve increasing patient information, having vomit receptacles close to the patient post –operatively.
- 5.3 The CTZ sits outside the blood-brain barrier and contains several different receptors. It lies in the Postrema on the floor of the 4th ventricle and contains multiple receptor sites that may activate emetic responses.
- CTZ receptors include Dopamine type 2, Serotonin type 3 (5-HT₃), Histamine type 1, muscarinic cholinergic type 1, and Neurokinin type 1. Blocking these receptors forms the basis of pharmacological interventions. This is why a multi-modal anti-emetic regime is suggested.
 - The CTZ can also be triggered by the vestibular nerve, when extremes in motion, pressure is applied. Positioning peri-operatively and the length of procedure may cause this activation.
- 5.4 Opioids and other agents can activate the parasympathetic nervous system, delaying GI motility, which may lead to nausea and vomiting.
- 5.5 Cytokines are inevitably released post-surgery which will trigger the release of tachykinins such as Substance P (which are involved in the transmission of pain and nausea). Concentration of receptors for this neuropeptide (neurokinin type 1) is high in the vomiting centre.
- 5.6 Relative hypovolaemia and dehydration associated with pre-op fasting and bowel preparation also contribute to PONV. Adequate hydration pre-operatively will reduce PONV.

Diagram 1, summarises the different pathophysiologies involved in nausea and vomiting.



6. Pre-operative assessment and prophylactic anti-emetic plan

6.1 Predicting the occurrence of PONV can be made. A simplified risk score for predicting postoperative nausea and vomiting was formulated by Apfel et al in 1999. This has been validated several times since and is the best predictive tool at present.

Risk Assessment tool used to predict likelihood of Patient PONV

Risk Factor (each risk factor carries 1 point)	Score
History of PONV / motion sickness	
Non-smoker	
Female	
Postoperative opioid use	
Total for patient	

6.2 Using Apfel's risk assessment tool, the level of risk can be quantified. Low risk patients score 0-1, where there is a 10 to 20% possibility of them experiencing PONV. Moderate risk patients score 2, where there is a 40% possibility of this group experiencing PONV, and High Risk patients score 3- 4, their potential to experience PONV lies between 60 to 80%.

6.3 All patients should be prescribed a structured prophylactic anti-emetic regime, by their anaesthetist.

- 6.4 Additional research concludes that the use of Intra-operative volatile anaesthetics, the use of nitrous oxide, the use of large doses of Neostigamine, and the inclusion of intra-operative opioids may further increase the risk of PONV.
- 6.5 The PONV Risk Assessment should be carried out on all patients who are to undergo surgery.
- 6.6 Pre-operative assessment and prophylactic anti-emetic algorithm

7. Algorithms to Apply

MEHT Algorithm for pre-operative assessment for PONV and prophylactic anti-emetic regime – attached as Appendix 1

Pharmacological considerations for anti-emetic prophylaxis – attached as Appendix 2

Appendix 3: MEHT algorithm for the Treatment of Post-operative Nausea and vomiting

8. Infection Control

- 8.1 Trust policy for prevention of cross infection to be adhered to for all patient contact procedures. The infection prevention practice within MEHT is for all staff to have strict hand hygiene before and after patient contact. Any equipment must be cleaned between patients unless it is a single use item which will be disposed off appropriately as per the Waste Management Policy
- 8.2 Use Aseptic Non-Touch Technique (ANTT) when administering injections.

9. Audit & monitoring

- 9.1 Spot audit of practice in PONV is carried out by the pain team yearly.
- 9.2 All major surgery patients receiving an intravenous morphine PCA or epidural analgesia are reviewed and evaluated for PONV by the pain team.
- 9.3 A teaching programme for both medical and nursing staff is undertaken in liaison with the Training and Development department, which incorporates this subject.
- 9.4 A link pharmacist for the pain team monitors prescribing of anti-emetics on all surgical wards, and feeds back at pain team meetings.

10. References

Chatterjee,S., Rudra,A., and Sengupta,S. (2011) 'Current concepts in the management of postoperative nausea and vomiting'. Anaesthesiology Research and Practice

Apfel,C.C., Laara,E., Koivuranta,M., Greim,C.A., Roewer,N. (1999) 'A simplified risk score for predicting postoperative nausea and vomiting:conclusions from cross validations between two centres'. Anaesthesiology, vol.91, no.3, pp.693-

Apfel CC, Kranke P, Eberhart LHJ, Roos A, Roewer N. Comparison of predictive models for postoperative nausea and vomiting. British Journal of Anaesthesia. 2002; 88: 234-240

4Gan,T.J. (2007) 'Guidelines for the Management of PONV' Anaesthesiology News March 2007

Smith Collins,A. (2011) 'Postoperative Nausea and vomiting in Adults: Implications for Critical Care'. Critical Care Nurse Vol.31, no.6, pp36-45

Chandrakantan,A., Glass,P.S.A. (2011) 'Multimodal therapies for postoperative nausea and vomiting, and pain'. British Journal of Anaesthesia 107 (S1):i27-i40

(2011) 'PONV-Recommendations for risk assessment, prophylaxis and therapy – results of an expert panel' Epub March 46(3) pp158-70.

www.medscape.com/viewarticle/782388_print

- Risk Assessment carried out
- Inform Anaesthetist, Surgical Team prior to surgery, and at the point of handover to Theatres patients who score a moderate to high risk of PONV

Document PONV Risk Assessment score			
Level of Risk	Low (0-1)	Moderate (2)	High (3-4)
% chance of PONV	10-20%	40%	60-80%
Where vomiting may cause increased risk of surgical complications post op, an extra point may be added to the total PONV risk score. For example, intracranial surgery, intraocular surgery, where patients jaw is wired, etc.			

For patients at Low risk no prophylactic regime is necessary, unless vomiting may cause risk of surgical complications (see above)

For patients at Moderate to high risk a prophylactic regime is advised. This is the anaesthetists' decision.

Anaesthetic considerations

- Length / type of surgery
- Regional anaesthesia
- Use of total IV anaesthesia (TIVA) with Propofol
- Adequate hydration, especially with colloids
- Use of intraoperative supplemental Oxygen
- Reduce / avoid use of volatile anaesthetics
- Reduce / avoid use of nitrous oxide
- Limiting the dose of Neostigmine to 2.5mg in adults
- Multimodal analgesia post op

Pharmacological considerations

- Prior to induction
- On induction
- End of surgery
- Post-operatively

See box below

Pharmacological considerations for the anti-emetic prophylaxis			
Timing of administration	Drug	Route of administration	Dose (ADULT DOSES ONLY)
Night before up to 4 hours before the end of surgery	Scopolamine	Transdermally	1 patch
Peri-operatively	Dexamethasone	Intravenously	4 – 8 mg
	Ondansetron	Intravenously	4 mg
Discharge to the ward	1 st line - Ondansetron	Intravenously / orally	4mg tds
	2 nd line - Cyclizine	Orally. IV cyclizine to be considered if ondansetron is not tolerated or contra-indicated but orally is the preferable route.	50mgs tds
	3 rd line - Promethazine Hydrochloride	IM / orally	25-50mg
	Prochlorperazine	Intramuscularly	12.5 mg

MEHT algorithm for the Treatment of Post-operative Nausea and Vomiting –

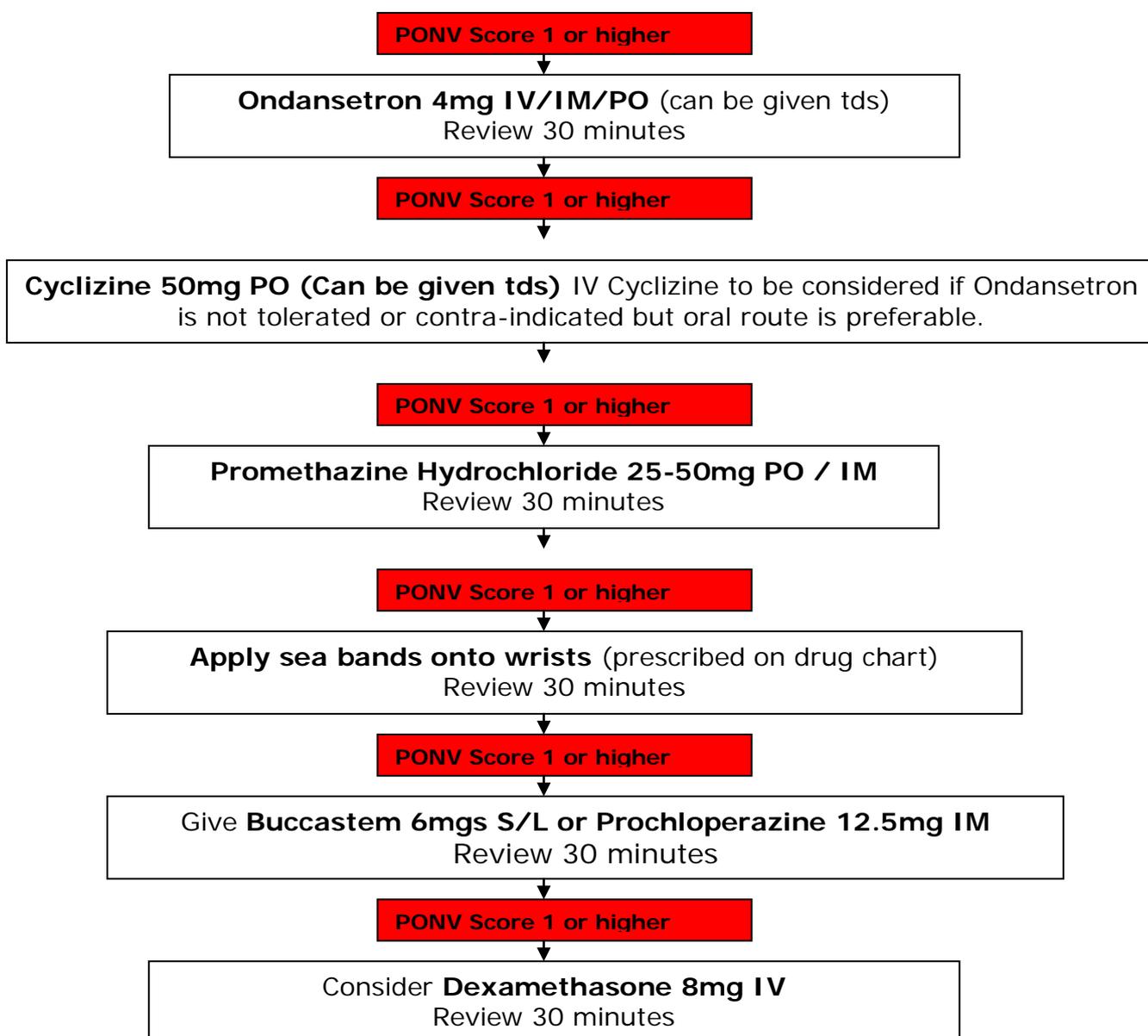
1. Assess and document PONV score. Adjust frequency of assessment depending on score.

0 – No nausea or vomiting	2 – Vomited once
1 – Nausea only	3 – Vomited more than once

2. Check for other causes of PONV

• Pain	• Side effects of certain drugs	• Blocked NG tube
• Hypoxia	• Hypotension	• Intra-abdominal pathology
• Hypovolaemia	• Infection	• Ileus

3. Treatment (check for previous anti-emetics already given anaesthetic record, prescription chart)



PONV considerations

Treat PONV promptly	Stop mobilizing	If patient NBM ensure adequate hydration IV
DO NOT WITHDRAW OPIOIDS	Keep patient in quiet area	Gradually increase oral fluids
Use multi-modal analgesia	No sudden / fast movements	Aspirate/remove/insert naso-gastric tube

