

Refractory post operative nausea vomiting,

In a population with multiple risk factors the incidence of postoperative nausea vomiting in 80% of population has negative effect on patient satisfaction with anaesthesia, and is one of the most common causes of unplanned hospital admissions in day case surgery. There can be severe complications following postoperative nausea vomiting such as Boerhaave Syndrome, airway compromise and emphysema, considering these facts it should be essential for every Anaesthesiologist to aim for a PONV free recovery.

What are the risk factors?

1. Female gender.
2. History of motion sickness.
3. Young age.
4. Use of volatile anaesthetics.
5. longer duration of anaesthesia.
6. Administration of nitrous oxide.
7. Pain
8. Hypotension
9. Drugs like opioids
10. Gastrointestinal abnormality(ileus etc.)
11. Unnecessary nasogastric tube.
12. Mobilization.
13. Increased eye pressure(acute glaucoma).

Even if this allows pre-operative risk identification, the prediction is not highly accurate.

Therefore it is recommended that PONV should be given to every patient with one or more risk factors.

Prophylaxis;

1. In high risk patients General Anaesthesia without volatile anaesthetics or nitrous oxide.

2.The use of one or more antiemetics of different groups, decreases the risk of PONV more effectively than the use of just one type of antiemetic.

3.Multimodal approach is very effective

4.Liberal use of prophylactic antiemetics.

5.Give prophylaxis to all patients regardless of the individual risk score.

6.Antiemetics are generally cheap and with less side effects.

7.Specific to certain surgeries.

TREATMENT OF ESTABLISHED PONV;

The 5-HT₃(serotonin) receptor antagonists are the most investigated antiemetics for prophylaxis and treatment of PONV.Between 6-24hrs postoperatively 5-HT₃ Receptor antagonists are less successful

In preventing vomiting.Granisetron may be associated with better efficacy.The newest 5HT₃ Receptor antagonist Palonosetron , has a longer half life than ondansetron, therefore be more appropriate for the prevention of PONV in the extended post operative period.It also seems to be more effective for prophylaxis and shows fewer side effects such as headache or Q-T interval prolongation.

Glucocorticoids;Dexamethasone is an effective drug in preventing PONV.in preventing PONV. It is a long acting drug with delayed onset of action and should be given before the induction to achieve maximum prophylaxis. Dexamethasone added to other antiemetics with immediate onset of action such as 5HT₃ antagonists or a dopamine antagonists(haloperidol) significantly decreased the recurrence of PONV.

Antiemetics; dimenhydrinate and cyclizine are commonly used in practice.

Neurokinin-1 receptor antagonists(NK-1 RA) are the newest class of antiemetics studies focusing on prophylaxis of PONV showed that NK-1 RA are as effective as 5HT₃ Antagonists and more potent in preventing vomiting.The newer NK-1 RA casopitant and rolapitant have a longer half life(upto 120 hrs.)

Cholinergic Antagonists; An antiemetic with a long lasting prevention of PONV is transdermal scopolamine when administered before surgery it prevents PONV significantly for 24-48hrs. postoperatively. As a cholinergic antagonists its side effects include dry mouth and visual disturbances.

Butyrophenone; Dopamine antagonists such as droperidol reduce PONV and there have been several trials investigating their effectiveness for treatment. Although they have been found to be effective in treatment and prophylaxis of PONV there have been reports of cardiac arrhythmias and QT prolongation which have led to a controversial debate and the issuing of warnings.

There is evidence that droperidol at the recommended doses is more potent than the recommended and investigated doses of metoclopramide. It is reassuring to note that low dose droperidol is also effective.

Metoclopramide; Antiemetic with less potency than the conventional antiemetic like ondansetron or dexamethasone. It has the side effect of tachycardia & hypotension.

HOW TO USE ANTIEMETIC IN PRACTICE;

All antiemetic techniques which are used for prevention can be used for treatment also. scopolamine & dexamethasone both have got a very slow onset of action hence very slow onset of action. The choice of antiemetic depends on the individual's previous history of PONV & the use of drugs like opioids intraoperatively wherein we can administer antidote to opioids. The treatment should be individualized.

GROUP	DRUG	ADULT DOSE mg/kg	CHILD DOSE mg/kg	SIDE EFFECTS
5 HT3 receptor antagonist	Ondansetron,	4	0.1	Headache, obstipation, elevated transaminases, QT prolongation, No side effects for Palonosetron
	dolasetron,	12.5	0.35	
	tropisetron ,	2	0.1	
	granisetron ,	1	0.02	
	palonosetron	0.075		
NK1 receptor antagonist	Aprepitant	40		Headache, obstipation , elevated transaminases , dry mouth , drowsiness.
	Fosaprepitant	115		
Glucocorticoids	Dexamethasone	4-8	0.15	Hypotension , tachycardia, hypertension , increased blood sugar .

Antihistamines	Dimenhydrinate cyclizine	62 50	0.5	Drowsiness, dry mouth , tachycardia, QT prolongation , visual disturbances, dysuria
Cholinergic antagonists	Scopolamine	1 per 24h {transdermal}		Visual disturbances , dry mouth , confusion, hallucination .
Butyrophenone	Droperidol haloperidol	0.625-1.25 1-2	0.01	QT prolongation, hypotension , reflexive tachycardia , drowsiness, dystonia, anxiety ,agitation ,insomnia, dyskinesia, headache, hypotension , dry mouth , visual disturbances, QT prolongation.
Benzamide	Metaclopramide	25		Hypotension , reflexive tachycardia, dyskinesia.

monitored carefully. Propofol has been used with a patient controlled mode esp. useful in chemotherapy induced vomiting. Midazolam in lower doses can also act as antiemetic.

ACUPRESSURE; It is a nondrug option to decrease the incidence of PONV, with minor side effects. The pressure is given at the P6 ACUPOINT. This technique will be very useful when drug treatment is contraindicated like pregnancy and lactation.

Summary: Having a high recurrence rate established PONV should be treated immediately aggressively, and effectively using a multimodal approach. Even though all antiemetic classes can be used for the treatment of PONV, 5HT₃ RAs are the best investigated antiemetics to date. With an NNT BETWEEN 2,3, and 4,7 they can be effectively prevent further vomiting. Palonosetron, a new 5HT₃ RA shows benefits deriving from its longer half life and fewer side effects. NK1RAs have also been shown to be very effective, in fact being the most effective currently available class of drugs for vomiting. Thus for patients suffering from refractory vomiting, NK1RAs might in the future be the key to treatment.

The challenges with the treatment are (1) to ensure that relief is guaranteed quickly, and (2) that nausea is recognized as the most important aspect of PONV. Therefore if patients are not asked about the occurrence of PONV, there is a high chance that it will be missed, both in the PACU and on the ward. If PONV becomes refractory to the drugs already given, a bolus of propofol 10-20 mg given repeatedly may turn out to be a useful rescue option. If this works, a continuous infusion of propofol can be tried. Repetition of drugs given as prevention or treatment may be considered for the short-acting interventions (eg. ondansetron), after 6 hours following the initial dose. As for prophylaxis, it is more effective to combine antiemetics of different classes to achieve a better better treatment of established PONV.