10-2019

A Case Of Severe Postoperative Nausea And Vomiting.

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A Case Of Severe Postoperative Nausea and Vomiting (PONV)

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Introduction

It's important to identify the risk factors for PONV during pre-anesthetic evaluation. The strategies for reduction and management of PONV include: Reducing precipitating factors, modifying anesthesia techniques and administering antiemetic medications preemptively.

Case Description

A 45-year-old, 66 kg female with a family history of malignant hyperpyrexia and severe PONV from prior surgeries with total intravenous anesthesia (TIVA) presented for L4-L5 lumbar discectomy. Multimodal approach to prevent PONV was used along with TIVA for an hour-long GA. In addition to perioperative hydration with 3 liters of lactated ringers she received dexamethasone 10 mg, ondansetron 4 mg and diphenhydramine 25 mg intraoperative ly. She received 975 mg of acetaminophen preoperatively and 1 mg hydromorphone at induction of GA. Postoperatively her nausea was successfully managed with 1 mg of haloperidol.

Case Discussion

PONV risk factors: Female gender; children; non-smoker; history of motion sickness or PONV.

Anesthesia-related risk factors: General Anesthesia; concentration and duration of inhalational anesthetic agents; cumulative opiate dosage; nitrous oxide.

Surgery-related risk factors: ENT surgery; strabismus surgery; laparoscopic procedures.; gynecological surgery.

AFEL Scoring for identification of patients at risk of PONV (each of these risk factors increases the risk of PONV by 20%): (1) Female. (2) Non-smoker. (3) Cumulative opiate dosage. (4) History of motion sickness or PONV.

Receptors: (1) Histamine H1. (2) Dopaminergic D2. (3) Muscarinic M1. (4) Neurokinin 1. (5) Hydroxytryptamine (5HT3).

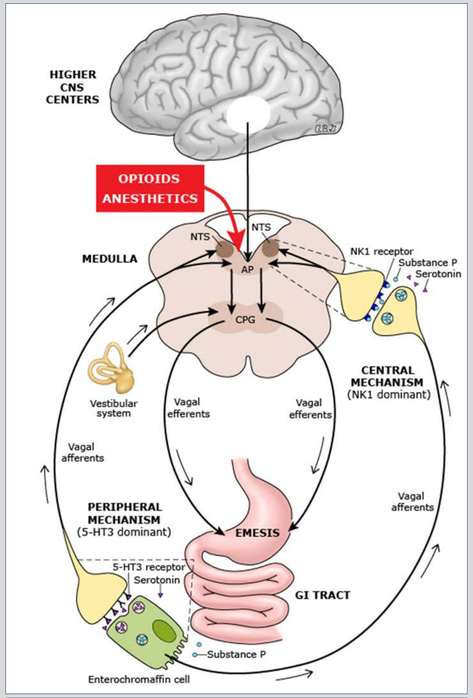

Figure 1: Postoperative nausea and vomiting may occur via multiple peripheral and central mechanisms, mediated by a variety of neurotransmitters and receptors.
NTS: nucleus tractus solitarius; AP: area postrema; CPG: central pattern generator; NK1: neurokinin 1; 5 HT3:5-hydroxytryptamine (serotonin); GI: gastrointestinal; CNS: central nervous system.
[Feinleib, et al. UpToDate, September 2017. Copyright 2017.]

Nitrous Oxide and PONV	
Volatile anesthetic agents are the main cause for early nausea and vomiting. The pro-emetogenic effect is greater than for any other risk factor.	
1.	A meta-analysis of 30 studies showed that nitrous oxide moderately increases PONV 33% vs. 27%.
2.	The emetogenic effect can be effectively controlled with antiemetics.[3]
3.	Nitrous oxide does not increase PONV if its use is limited to one hour.[3]
4.	Some studies did not report increased incidence of PONV with use of nitrous oxide.
Preventive Strategies for PONV	
1.	Avoid general anesthesia
2.	Avoid or minimize the dosing of volatile anesthetic agents
3.	Use total intravenous anesthesia
4.	Adequate hydration
5.	Use multimodal analgesia
Hydration and PONV	
1.	A 2019 meta-analysis of 41 randomized controlled trials showed that perioperative administration of 10ml/kg of crystalloids decreases the incidence of PONV (n=4200).[4]
2.	A 30ml/kg of lactated ringers solution reduces PONV in children with strabismus surgery and adenotonsillectomy.

Antiemetic use in the perioperative period/receptors			
1.	Scopolamine patch (M1)	2.	Ondansetron (5HT3)
3.	Diphenhydramine (HI)	4.	Haloperidol (D2)
5.	Metoclopramide (D2, HT3)		

CONCLUSION

The primary factor for PONV is use of volatile anesthetic agents; the risk of PONV depends upon their dosage. The elimination of volatile anesthetic agents, the use of multimodal analgesia to limit opiates, and use of anti-emetics, all reduce the incidence of PONV.

References

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