Post-Operative Nausea and Vomiting

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Introduction

- Post-operative nausea and vomiting (PONV) is any nausea or vomiting that follows immediately after and up to 48 hours after surgery (Pierre & Whelan, 2012).
- PONV is one of the biggest and most common complaints and one out of three surgical patients will experience it (Pierre & Whelan, 2012).
- It is debilitating and can cause serious consequences to the patient and to the hospital.
- Risk factors for PONV: female gender, non-smoker, perioperative opioid use, history of PONV or motion sickness, and certain surgeries such as gynecological, laparoscopic, ophthalmological, ontological, and ear-nose-throat (Pierre & Whelan, 2012).
- To decrease the incidence, a multimodal approach is used perioperatively.
- Different anti-emetic medications are used in combination to work on the multiple receptors that affect the vomiting center.
- Receptors that affect the vomiting center: serotonin (5-HT3), dopamine (D2), neurokinin 1 (NK1), histamine 1 (H1), and muscarinic acetylcholine (mACH) (Pierre & Whelan, 2012).
- When using multiple medications and therapies to block receptors, 98% of patients did not develop PONV (Chatterjee, Rudra, & Sengupta, 2013).

Pathophysiology

- PONV is complex and not well understood.
- The vomiting center is stimulated by the glosopharyngeal, hypoglossal, and vagal nerves.
- The chemoreceptor trigger zone (CRTZ) and the nucleus tractus solitaries (NTS) are located in the brain stem and send signals to the vomiting center (Pierre et al., 2012).
- Vagal afferent nerves, vestibular system, and the limbic system can stimulate the vomiting center (Chatterjee et al., 2011).
- There are several receptors that will stimulate nausea and vomiting.
- mACH receptors signal the vomiting center to cause nausea and vomiting.
- Circulating substances in the blood, such as toxins, activates D1 and SHT3 in the CRTZ which sends signals to the vomiting center (Hasudungan, 2013).
- Motion sickness activates the vestibulocochlear nerve, stimulating H1 and mACH receptors, which then stimulates the CRTZ, and then the vomiting center (Hasudungan, 2013).
- The higher center of the brain is activated by painful stimuli, rancid smells, and corrupt scenes which activate the vomiting center (Hasudungan, 2013).
- Vagal sensory nerve fibers in the stomach are stimulated from certain foods or toxins that irritate the gastric lining which then stimulate the vomiting center (Hasudungan, 2013).
- The vomiting center can be triggered by opioids, volatile anesthetics, drug reactions, anticholinergics, nitrous oxide, dehydration, anxiety, pain, and motion.

Pathophysiological Significance

- Anesthesia providers need to be aware of the risk factors, pathophysiology, high risk medications, and preventative strategies for PONV.
- By knowing the pathophysiology of PONV and getting a detailed history from the patient, the anesthesia provider can determine the appropriate multimodal approach for each individual patient, and decrease the chance of the patient getting PONV.

Imperilments for Nursing

- PONV is very serious because it can be debilitating for the patient and cause complications.
- Regional anesthesia and NSAIDs should be used to decrease the use of opioids (Chatterjee et al., 2011).
- N2O, inhalational agents, Etomidate, and Ketamine should be avoided because they are emetogenic agents.
- Anticholinesterases should be used correctly based on the need for neuromuscular blockade reversal due to their ability to cause PONV (Chatterjee et al., 2011).
- Total intravenous anesthesia (TIVA) is another strategy to prevent PONV.
- Use different anti-emetics that work on all five receptors: SHT3, D2, H1, NK1, mACH.
- The most common medications used are Zofran, Dexamethasone, Promethazine, Scopolamine, Metoclopramide, and Emerend.
- Consider using an anxiolytic and aggressive hydration at 25ml/kg (Chatterjee et al., 2011).

Conclusion

- PONV prevention is essential for safe patient care.
- The CRNA should have a planned multimodal approach, specified for each patient.
- One third of patients without prophylaxis will develop PONV (Chatterjee et al., 2011).
- Consequences of PONV include delayed discharge from PACU, unanticipated hospital stays, pulmonary aspiration, patient discomfort, and dehiscence of surgical incision (Chatterjee et al., 2011).
- Anesthesia provides can significantly improve the quality of patient care and satisfaction if they are able to identify high-risk patients and know the appropriate prophylactic treatment (Chatterjee et al., 2011).

References