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### Post-Operative Nausea and Vomiting

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# 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, otological, 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-HT<sub>3</sub>), dopamine 2 (D<sub>2</sub>), 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, 2011)

### RISK FACTORS OF PONV

Patient-specific	Anaesthetic	Surgical
<ul style="list-style-type: none"> <li>Female gender</li> <li>Non smoking status</li> <li>History of PONV / motion sickness</li> </ul>	<ul style="list-style-type: none"> <li>Volatile anesthetics</li> <li>Nitrous oxide</li> <li>Intraoperative and post operative opioids usage</li> </ul>	<ul style="list-style-type: none"> <li>Duration of surgery</li> <li>Types of surgery</li> </ul>

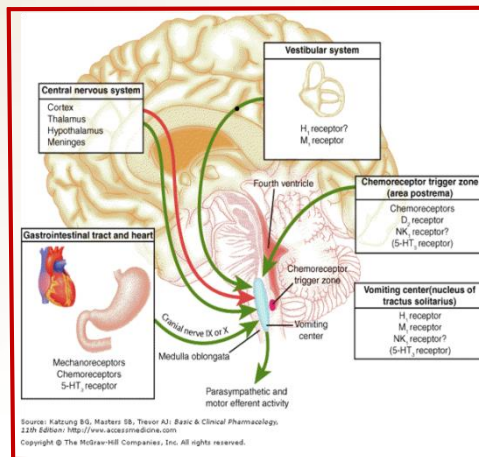
(Image retrieved from <http://slideplayer.com/slide/4493914/>)

## Signs and Symptoms

- PONV will occur immediately after and up to 48 hours post-surgery
- Uneasiness of the stomach, gagging, reflux of gastric contents, involuntary and forceful contraction of the stomach resulting in expulsion of gastric contents
- Not able to hold food or fluids down without gagging or vomiting
- Fatigue, dehydration, headache, lightheadedness, dizziness, pain, and dehiscence of the surgical incision

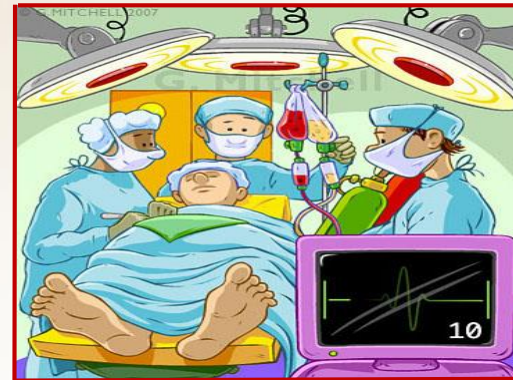
## Pathophysiology

- PONV is complex and not well understood
- The vomiting center is stimulated by the glossopharyngeal, hypoglossal, and vagal nerves
- The chemoreceptor trigger zone (CRTZ) and the nucleus tractus solitarius (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 5HT<sub>3</sub> 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



(Image retrieved from [http://www.moosemedia.net/main/work/illustration/p\\_2/](http://www.moosemedia.net/main/work/illustration/p_2/))

## Implications 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)
- N<sub>2</sub>O, 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: 5HT<sub>3</sub>, D<sub>2</sub>, H<sub>1</sub>, NK<sub>1</sub>, mACh
- The most common medications used are Zofran, Dexamethasone, Promethazine, Scopolamine, Metoclopramide, and Emend
- 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 providers 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

- Apfel, C. C., Meyer, A., Orhan-Sungur, M., Jalota, L., Whelan, R. P., & Jukar-Rao, S. (2012). Supplemental intravenous crystalloids for the prevention of postoperative nausea and vomiting: quantitative review. *British journal of anaesthesia*, 108(6), 893-902.
- Chandrakantan, A., & Glass, P. S. A. (2011). Multimodal therapies for postoperative nausea and vomiting, and pain. *British journal of anaesthesia*, 107(suppl 1), i27-i40.
- Chatterjee, S., Rudra, A., & Sengupta, S. (2011, August 21). Current Concepts in the Management of Postoperative Nausea and Vomiting. Retrieved May 30, 2016, from <http://www.hindawi.com/journals/arp/2011/748031/>
- De Oliveira Jr, G. S., Castro-Alves, L. J. S., Ahmad, S., Kendall, M. C., & McCarthy, R. J. (2013). Dexamethasone to prevent postoperative nausea and vomiting: an updated meta-analysis of randomized controlled trials. *Anesthesia & Analgesia*, 116(1), 58-74.
- Hasudungan, A. (2013, August 19). Physiology of Vomiting. Retrieved June 17, 2016, from <https://www.youtube.com/watch?v=L7jbp5xdw4>
- Horn, C. C., Wallisch, W. J., Homanics, G. E., & Williams, J. P. (2014). Pathophysiological and neurochemical mechanisms of postoperative nausea and vomiting. *European journal of pharmacology*, 722, 55-66.
- Kovac, A. L. (2013). Update on the management of postoperative nausea and vomiting. *Drugs*, 73(14), 1525-1547.
- Pierre, S., & Whelan, R. (2012, August 11). Nausea and Vomiting after Surgery. Retrieved May 24, 2016, from <http://ceaccp.oxfordjournals.org/content/13/1/28.full>
- Shibli, K. U. (2013). Postoperative nausea and vomiting (PONV): A cause for concern. *Anaesthesia Pain & Intensive Care*, 17(1), 6-9.
- Stanford Medicine. (2014, January 30). PONV Prophylaxis Guidelines. Retrieved May 24, 2016, from [http://ether.stanford.edu/policies/PONV\\_prophylaxis\\_guidelines.html](http://ether.stanford.edu/policies/PONV_prophylaxis_guidelines.html)