

# Impact of Opioid-Free Anesthesia on Postoperative Nausea & Vomiting: A Scoping Review

Miranda Morrison, SRNA; Abigail Ramsey, SRNA; Alexandria Sawicki, SRNA; Madison Scholl, SRNA  
Faculty Advisor: Dr. Dwayne Accardo, CRNA  
College of Nursing - The University of Tennessee Health Science Center - Memphis, TN

## Purpose

- The purpose of this DNP Scoping Review is to compare the current literature regarding the incidence of postoperative nausea and vomiting (PONV) in adult patients who underwent general anesthesia when opioids are used intraoperatively versus a multimodal non-opioid-based intraoperative general anesthetic plan
- Specific Aims:
  - Incidence of postoperative nausea & vomiting
  - Postoperative rescue antiemetic administration
  - Length of stay in postoperative anesthesia care unit (PACU)
  - Incidence of intraoperative adverse events

## Methods

- Scoping Review: Searched three databases**
  - CINAHL
  - PubMed/Medline
  - Cochrane
- Rapid Critical Appraisal**
  - 16 articles met inclusion criteria
  - 10 articles met higher quality of evidence
    - RCA completed
- Data Summary**
  - Opioid based anesthesia
  - Non-opioid based anesthesia
  - History of PONV
  - Patient report of PONV
  - Number of rescue antiemetics administered
  - PACU time
  - Adverse events
- Outcome Synthesis Table**

↓, ↑, →, NE, NR, ✓ (select symbol and copy as needed)	1 Shah, S. B., et al. 2020.	2 Grape, et al. 2019.	3 Massoth, C., et al. 2021.	4 Siddiqui, T., et al. 2021.	5 Hakim, K. Y. K., et al. 2019.	6 Choi, E. K., et al. 2017.	7 Mulier, H., et al. 2020.	8 Bharti, et al. 2018.	9 Mulier, J. P., et al. 2018.	10 King, C. A., et al. 2020.
Outcome #1 IOPONV	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Outcome #2 PORAA	NE	↓	↑	↓	NR	↓	↓	NR	NR	—
Outcome #3 LOSIP	↓	↑	↑	↑	—	↑	NR	↑	NR	NR
Outcome #4 IOIAE	—	—	—	—	—	—	↓	—	↓	NR

**SYMBOL KEY:** ↑ = Increased, ↓ = Decreased, — = No Change, NE = Not Examined, NR = Not Reported, ✓ = applicable or present  
**LEGEND:** 1=Shah, S. B., et al. (2020); 2=Grape, et al. (2019); 3=Massoth, C., et al. (2021); 4= Siddiqui, T., et al. (2021); 5=Hakim, K. Y. K., et al. (2019); 6= Choi, E. K., et al. (2017); 7=Mulier, H., et al. (2020); 8=Bharti, et al. (2018); 9= Mulier, J. P., et al. (2018); 10= King, C. A., et al. (2020).  
**Article Key:** IOPONV= Incidence of postoperative nausea & vomiting, PORAA= Postoperative rescue antiemetic administration, LOSIP= Length of stay in PACU (postoperative anesthesia care unit), IOIAE= Incidence of intraoperative adverse events.

## Background

- Opioid-based general anesthesia is the most common practice since the introduction of fentanyl in the early 1970s (Massoth et al., 2021).
- Opioids provide many benefits for patients undergoing anesthesia:
  - Decreased sympathetic response
  - Analgesia
  - Decreased perioperative hypnotic requirements
- Negative side effects of opioid administration include:
  - PONV
  - Longer hospital stay
  - Electrolyte imbalances
  - Postoperative bleeding
  - Aspiration of gastric contents (Choi et al., 2019)
    - Dependency
    - Respiratory Depression
    - Constipation/Ileus

## Results

Nine randomized controlled trials and one systematic review were examined in a scoping review.

- Incidence of PONV
  - All studies concluded the incidence of PONV is decreased using a non-opioid pain management approach.
- Antiemetic Use
  - Four of the ten studies demonstrated a decreased antiemetic use with a non-opioid pain management approach.
- PACU Length of Stay
  - Five of the ten studies concluded using a non-opioid pain management approach decreased PACU length of stay.
- Adverse Intraoperative Outcomes
  - Two of the ten studies showed decreased adverse intraoperative outcomes using a non-opioid pain management approach.

## Implications for Practice

- Although opioids do have a place within an anesthetic plan, they contribute significantly to PONV which causes costly complications.
- Opioid-free anesthesia contributes significantly to the reduction of healthcare cost in a multitude of ways.
- Opioid-free anesthesia reduces PONV, allows for earlier ambulation and discharge, and it takes away the risk of addiction.
- The outcomes of opioid-free anesthesia saves the hospital money in many ways, but more importantly it can significantly improve patient outcomes and experiences.

## References

- Bharti, N., Pokale, S. N., Bala, I., & Gupta, V. (2018). Analgesic efficacy of dexmedetomidine versus fentanyl as an adjunct to thoracic epidural in patients undergoing upper abdominal surgery: a randomized control trial. *Southern African Journal of Anaesthesia and Analgesia*, 24(1), 16-21. <https://doi.org/10.1080/22201181.2018.1433599>
- Choi, E. K., Seo, Y., Lim, D. G., & Park, S. (2019). Postoperative nausea and vomiting after thyroidectomy: A comparison between dexmedetomidine and remifentanyl as part of balanced anesthesia. *Korean Society of Anesthesiologists*, 70(3), 299-304. <https://doi.org/10.4097/kjae.2017.70.3.299>
- Grape, S., Kirkham, K. R., Frauenknecht, J., & Albrecht, E. (2019). Intra-operative analgesia with remifentanyl vs. dexmedetomidine: a systematic review and meta-analysis with trial sequential analysis. *Anaesthesia*, 74(6), 793-800. <https://doi-org.ezproxy.uthsc.edu/10.1111/anae.14657>
- Hakim, K. Y. K., & Wahba, W. Z. B. (2019). Opioid-free total intravenous anesthesia improves postoperative quality of recovery after ambulatory gynecologic laparoscopy. *Anesthesia: Essays and researches*, 13(2), 199-203. [https://doi.org/10.4103/aer.AER\\_74\\_19](https://doi.org/10.4103/aer.AER_74_19)
- King, A. C., Perez-Alvarez, M. I., Bartholomew, A. J., Bozzuto, L., Griffith, K., Sosin, M., Thibodeau, R., Gopwani, S., Myers, J., Fan, K. L., & Tousimis, E. A. (2020). Opioid-free anesthesia for patients undergoing mastectomy: A matched comparison. *The Breast Journal*, 26(1) 1742-1747. <https://doi.org/10.1111/tbj.13999>
- Massoth, C., Schwellenbach, J., Saadat-Gilani, K., Weiss, R., Pöpping, D., Küllmar, M., & Wenk, M. (2021). Impact of opioid-free anesthesia on postoperative nausea, vomiting and pain after gynaecological laparoscopy - A randomised controlled trial. *Journal of Clinical Anesthesia*, 75, 110437. <https://doi.org/10.1016/j.jclinane.2021.110437>
- Mulier, H., De Frene, B., Benmeridja, L., Vanhoorebeek, F., Denis, B., Casaer, B., Rogge, F. J., Leleu, K., & Mulier, J. (2020). Impact of opioid-free anesthesia on complications after deep inferior epigastric perforator flap surgery: A retrospective cohort study. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, 74, 504-511. <https://doi.org/10.1016/j.bjps.2020.09.004>
- Mulier, J. P., Wouters, R., Dillemans, B., & Dekock, M. (2018). A randomized controlled, double-blind evaluating the effect of opioid-free versus opioid general anaesthesia on postoperative pain and discomfort measured by the QoR-40. *Scient Open Access* 2(1), 1-6.
- Siddiqui, T., Choudhary, N., Kumar, A., Kohli, A., Wadhawan, S., & Bhadoria, P. (2021). Comparative evaluation of dexmedetomidine and fentanyl in total intravenous anesthesia for laparoscopic cholecystectomy: A randomised controlled study. *Journal of Anaesthesiology Clinical Pharmacology*, 37(2), 255-260.
- Shah, S. B., Chawla, R., Pahade, A., Mittal, A., Bhargava, A. K., & Kumar, R. (2020). Comparison of pectoralis plane blocks with ketamine-dexmedetomidine adjuncts and opioid-based general anaesthesia in patients undergoing modified radical mastectomy. *Indian Journal of Anaesthesia*, 64(12), 1038-1046. [https://doi.org/10.4103/ijaa.IJAA\\_8\\_20](https://doi.org/10.4103/ijaa.IJAA_8_20)
- Tufanogullari, B., White, P. F., Peixoto, M. P., Kianpour, D., Lacour, T., Griffin, J., Skrivaneck, G., Macaluso, A., Shah, M., & Provost, D. A. (2008). Dexmedetomidine infusion during laparoscopic bariatric surgery: The effect on recovery outcome variables. *Anesthesia & Analgesia*, 106(6), 1741-1748. <https://doi.org/10.1213/ane.0b013e318172c47c>