Pharmacology of Antiemetics

Update and Current Considerations in Anesthesia Practice

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KEYWORDS

• Antiemetics • Postoperative nausea and vomiting • Anesthesia • Serotonin receptor • Neurokinin-1 receptor • Dopamine receptor • Anticholinergics • P6 acupuncture point

KEY POINTS

- Postoperative nausea and vomiting (PONV) is associated with delayed recovery and patient dissatisfaction after surgical procedures. A key component of management is identifying risk factors and high-risk populations.
- Stratification by PONV likelihood allows anesthesiologists to optimize the use of prophylactic antiemetics.
- Advances in pharmacologic therapeutics have resulted in agents targeting different pathways associated with the mediation or modulation of nausea and vomiting, both centrally and peripherally.
- This review focuses on these novel agents and the clinical aspects of their use in patients postoperatively.
- Combination therapies are also reviewed; studies reveal that 2 or more antiemetic agents acting on different receptors improve efficacy when compared with a single agent.

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INTRODUCTION

Efficiency is crucial for the successful management of an operating room with the best patient outcomes and patient satisfaction. It is crucial to prevent complications that can lead to delays, including postoperative nausea and vomiting (PONV). PONV is the most common complication observed in the postanesthesia care unit.[1] This complication is attributed to the use of volatile anesthetics such as sevoflurane and desflurane during surgery. Ten percent to 30% of patients experience PONV and it is reported as the number one fear of patients undergoing surgical procedures. Uncontrolled PONV may lead to delays in the discharge of patients from the postanesthesia care unit, which in turn may cause delays in operating room turnover.[2–8] These operating room delays may be costly to the hospital and add unnecessary stress to the work environment. Both PONV and surgical delays have a negative effect on patient satisfaction, which may lead to patients seeking services elsewhere.[2] Therefore, the management and prevention of PONV is crucial for the best patient outcome and for the success of health care providers.

SOCIOECONOMIC FACTORS OF POSTOPERATIVE NAUSEA AND VOMITING

Several socioeconomic factors contribute to the development of PONV. A direct cost analysis has demonstrated that the use of certain antiemetic and anesthetic drugs, both intraoperatively and postoperatively, have a significant impact on patient economic status. The total cost of antiemetics was 2% of total perioperative drug cost in a randomized, controlled study of patients receiving 2 types of anesthetics.[9] This study gave an example of propofol total intravenous anesthesia being a more economically sound choice for a select group of patients than isoflurane–nitrous oxide anesthesia, with both techniques being similar and with the same duration of hospital stay. There is also discussion of economic gain when choosing anesthetic or antiemetic treatment options, that shorten the stay in the postanesthesia care unit.[9]

A postoperative survey given to 8 patients undergoing elective surgery showed that those who developed PONV were willing to pay up to $200 for a medication that completely eliminated PONV.[10] Several other previous studies have shown that the willingness of patients of higher socioeconomic status are more likely to be willingness to pay for antinausea and antivomiting medications is higher than their counterparts.[10–12] Greater patient income, increasing age, and being married were all independent covariates that increased the willingness to pay more for antiemetic and antinausea medications. Overall, socioeconomic factors such as race, income level, smoking status, and gender contribute to PONV.

RISK FACTORS FOR NAUSEA AND VOMITING—FACTORS THAT CONTRIBUTE

A crucial component to the management of PONV is the identification of risk factors and high-risk populations. Stratification by PONV likelihood allows anesthesiologists to optimize the use of prophylactic antiemetics. Historically, PONV risk factors have been identified since the late 1800s. Although many of the early, traditional studies focused on individual factors, they often failed to control for other variables. It was not until the 1990s that modern PONV research began, in which linear regression models simultaneously identified multiple independent variables. This analytical modernization refuted many earlier findings and is the source of many contradictions in the literature.

Risk factors are frequently divided into patient, surgical, and anesthetic variables. These variables can be combined using multiple scoring systems for quantification