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PONV prevention: still not enough

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Postoperative nausea and vomiting (PONV) remains one of the most common anesthesia-related complications, affecting about 30% of patients after surgery, and with an incidence reaching up to 80% in high-risk patients [1,2]. In addition to patient dissatisfaction, PONV may also lead to more serious consequences, such as adverse surgical outcomes [1].

The etiology of PONV remains unclear but involves patient, anesthetic, and surgical factors. Well-known patient-specific risk predictors include female gender, non-smoker status, and a history of motion sickness or PONV; anesthesia-related predictors include use of general anesthesia, volatile anesthetics or nitrous oxide, and postoperative opioids [2].

5-hydroxytryptamine 3 (5-HT_3) receptor antagonists and dexamethasone are commonly used drugs for PONV prophylaxis in clinical practice.

Palonosetron is a second-generation 5-HT_3 receptor antagonist showing antiemetic activity at both central and gastrointestinal sites. Palonosetron possesses unique mechanisms of action compared with first-generation 5-HT_3 receptor antagonists, including allosteric binding to 5-HT_3 receptors and subsequent receptor internalization; it also has a long half-life of 40 h [3]. These characteristics could increase therapeutic efficacy, in terms of preventing PONV, relative to other 5-HT_3 receptor antagonists, but the findings are inconsistent.

Dexamethasone is an inexpensive and widely available drug used to control nausea and vomiting. The precise mechanism of how dexamethasone prevents nausea and vomiting is poorly understood, but could involve inhibition of prostaglandin synthesis and reduced 5-HT_3 activity [4].

In this issue of the *Korean Journal of Anesthesiology*, Kim et al. [5] compared the effects of palonosetron and dexamethasone on preventing PONV in patients receiving patient-controlled epidural analgesia (PCEA) after total joint arthroplasty. They reported that the total incidence of PONV was lower in the palonosetron group compared with the dexamethasone group (18.4% vs. 36.7%, P = 0.042).

Patient-controlled analgesia (PCA), or PCEA, is widely used to control postoperative pain, where the opioid itself can cause nausea and vomiting. Chemoreceptor trigger-zone stimulation, vestibular stimulation, and delayed gastric emptying may be involved in opioid-induced nausea and vomiting [6].

Many studies have examined the ability of dexamethasone and serotonin receptor antagonists to reduce intravenous PCA-induced PONV, but few have investigated the prophylactic effects against PCEA induced nausea and vomiting. Kim et al. [5] addressed this issue and demonstrated that palonosetron was more effective than dexamethasone in preventing PONV. However, in this study, a considerable proportion of patients were at high risk for PONV. According to recent consensus guidelines [2], prophylactic therapy combined with two or more interventional/multimodal therapies is useful for patients at high risk of PONV. However, in this study, either palonosetron or dexamethasone was administered and the patients still showed the high incidence of PONV.

With increasing knowledge of the various etiologies and pathways involved in the pathophysiology of PONV, PONV guidelines have been developed to tailor antiemetic prophylaxis to specific groups of patients based on their relative risk. However, due to the busy clinical situation and overly complex guidelines, it is understandably difficult to follow elaborate individualized protocols [7]. As anesthesiologists, we should strive to identify combination therapies and multimodal strategies that can further reduce, or even eliminate PONV, and to simultaneously develop the most efficient protocol that can be easily adopted to a real clinical setting.

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