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Efficacy of prophylactic dexamethasone in prevention of postoperative nausea and vomiting

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Abstract *Objective:* Many trials have been conducted with regard to the relative benefits of prophylactic anti-emetic interventions given alone or in combination, yet the results remain unknown. This study reviewed the efficacy of a single prophylactic dose of dexamethasone on postoperative nausea or vomiting (PONV) after abdominal hysterectomy.

Methods: In a prospective study of 100 women undergoing total abdominal hysterectomy (TAH) under general anesthesia, the dexamethasone group (n = 50) received a single dose (8 mg) immediately after the operation, and the saline group (n = 50) received a dose of saline as a placebo, in addition to conventional management. The incidence of nausea, vomiting, the need for an anti-emetic and patient satisfaction with the management of PONV were evaluated during the first 24 postoperative hours.

Results: The overall frequency of nausea during the initial postoperative 24 in the dexamethasone and saline groups were 12% and 18%, respectively, and vomiting was 10% and 16%, respectively (P = 0.001). However, there was a lower need for a rescue anti-emetic drugs in the dexamethasone group (18% vs 24%), but it was not statistically significant (P = 0.06).

Conclusion: The results of this study indicate that a single prophylactic dose of dexamethasone after an operation can reduce postoperative nausea and vomiting.

1. Introduction

Postoperative nausea and vomiting (PONV) is an unpleasant and relatively common occurrence

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sequel of general anesthesia that may increase morbidity, prolong hospital stay and can lead to serious complications [1,2]. The overall incidence of PONV in adults is 20%—30%; the incidence rate in patients of high-risk groups can be as high as 70%—80% [3]. The incidence of postoperative nausea or vomiting depends on numerous non-anesthetic factors, including the type of surgery, duration of surgery, use of postoperative opioids, age, smoking, history of motion sickness and previous postoperative nausea history [4,5].

The etiology and consequences of PONV are complex when taking into consideration patients' medical- and surgery-related factors. A thorough understanding of these factors is necessary for the management of PONV [6]. The most common drugs used for the treatment of PONV include butyrophenones, benzamides, histamine receptor antagonists, muscarinic receptor antagonists, and 5-HT3 (5-hydroxy tryptamine 3) receptor antagonists. Non- pharmacologic treatment methods, such as acupuncture, electro-acupuncture, transcutaneous electrical nerve stimulation (TENS), and acupressure have also been studied for their efficacy in the prevention of PONV [7]. There are no completely effective anti-emetic agents for this condition, but recommendations for treatment strategies are separately available. The optimal strategy for prevention and management of PONV is still controversial. Even though many drugs have been studied for the prevention of PONV, prophylaxis is not very effective, may be costly, and has a potential risk of adverse drug reactions [8,9]. Tong J. Gan, et al. reported ''reducing baseline risk factors can significantly decrease the incidence of PONV. Strategies recommended to reduce baseline risk include: the avoidance of general anesthesia by the use of regional anesthesia; preferential use of propofol infusions; avoidance of nitrous oxide; avoidance of volatile anesthetics; minimization of peri-operative opioids and adequate hydration [10]''.

Dexamethasone is a high-potency, long-acting glucocorticoid with little mineralocorticoid effect, with a biologic half-life of 36—72 h that has been extensively used in the perioperative setting. Dexamethasone is a low-cost and effective anti-emetic drug, with minimal side effects after a single-dose administration [3]. Dexamethasone was first reported to be an effective anti-emetic regimen in patients receiving cancer chemotherapy [11]. Recently, studies showed that dexamethasone can be effective in preventing PONV in adults and children. Compared with other preventive medications, dexamethasone has equal or even better efficacy in reducing the incidence of PONV and has the advantages of low cost and longer effectiveness as well. Although the action mechanism of dexamethasone is hitherto not fully understood, animal studies have confirmed that the vomiting center in the brain stem plays a central role [12—14].

The purpose of this study was to evaluate the efficacy of a single prophylactic dose of dexamethasone treatment for reducing PONV in women undergoing general anesthesia for abdominal hysterectomy.

2. Methods

This prospective, double-blind, placebo-controlled study was designed and conducted on 100 women undergoing abdominal hysterectomy for various indications. All patients were referred to Shahid Sadoughi hospital in Yazd from June 2009 to September 2010. The adopted protocol was approved by the hospital research and ethics committee (Institutional Review Board) in accordance with the Helsinki declaration. All women were interviewed individually by the researcher. Written informed consent was obtained from all the patients.

Sample size estimations were based on the results of a previous study, and assuming an α level of 0.05 and β error of 0.8, 44 patients were needed per group to detect a 10 point difference on a 0—100 visual analog nausea scale score. To account for possible loss to follow-up, it was decided to include 50 patients per trial arm.

Women were excluded from the study if they had a known allergy/hypersensitivity to dexamethasone, nausea or vomiting within 24 h before their operation, had received an anti-emetic within 48 h before surgery, or had any gastrointestinal disorders (*e.g.*, esophagitis, gastritis). Before entry into the study, patients provided detailed medical histories and demographic information.

All surgeries were performed under general anesthesia. In this hospital, general anesthesia was comprised of pre-medication of 2 mg midazolam intravenous (IV) and induction anesthesia fentanyl 2 μg/kg + propofol 2 mg/kg IV with ventilation of N2O - O2 (50—50) and infusion of propofol 100—200 mg/kg/min as maintenance anesthesia.

At the end of the surgery, the patients were randomly allocated to either the administration of a single dose of dexamethasone 8 mg IV (50 women) or saline 2 mL IV (50 women) as a placebo, in addition to conventional management. Randomization was performed with a computer-driven random