

Comparison of Dexamethasone with Ondansetron for Prevention of Post-Operative Nausea and Vomiting

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ABSTRACT

Objective: To examine the effectiveness of dexamethasone and ondansetron in reducing the incidence of post-operative nausea and vomiting (PONV) in patients following laparoscopic surgery.

Patients and Methods: A total number of 100 patients who were planned for laparoscopic surgery under general anesthesia having age 20-60 years were included in this study from a tertiary care hospital from Dec-2019 to June-2021. Patients were divided in to two group using Draw randomization technique. Group I; in these patients IV dexamethasone 8 mg was given at the time of induction of anesthesia. Group II; in these patients Ondansetron (4 mg IV) was given at induction of anesthesia. After completing the surgery and shifting the patient to the recovery room frequency of PONV within 6 hours after surgery was noted.

Results: Mean age of the patients was 43.31±10.41 years. There were 54 (54.00%) male patients and 46 (46.00%) female patients. There were 75 (75.00%) patients with ASA I and 25 (25.00%) patients with ASA II. PONV occurred in 11 (22.00%) patients in dexamethasone group and in 21 (42.00%) patients in ondansetron group (p-value 0.03).

Conclusion: After laparoscopic surgery, dexamethasone decreased the prevalence of nausea and vomiting. A single dosage of dexamethasone was proven to be a safe and cost-effective alternative to a single dose of ondansetron.

Keywords: Dexamethasone, Ondansetron, post-operative Nausea and vomiting.

INTRODUCTION

Anxiety, dehydration, metabolic abnormalities, wound disruption, and delayed recovery are all possible consequences of postoperative nausea and vomiting (PONV).¹ PONV affects between 20 to 80 percent of the population, and it is a significant economic and social burden. Laparoscopic surgery has been identified as a significant risk factor of PONV.²

Antiemetics administered prophylactically may help to minimize total PONV-related resource consumption and expenses, resulting in improved patient satisfaction.³ Several measure are employed to reduce the risk of PONV, including utilizing single or multiple medications for prophylaxis, changing anaesthetic method, or combining all of them in a multimodal strategy to provide maximal protection.⁴

Ondansetron acts as an anti-emetic by antagonizing vomiting signals that go via the afferent route from the stomach or smallintestine to solitary tract nucleus. Though ondansetron is successful in avoiding PONV, its expensive cost has limited its widespread usage.⁵ In 1981, researchers discovered that the corticosteroid dexamethasone was an excellent anti-emetic for cancer treatment patients.⁶ Towards the induction of anesthesia rather than at the end, dexamethasone has been shown to be most effective.⁷ Dexamethasone's anti-emetic properties remain a mystery, though. Prostaglandin production may be inhibited in the central nervous system, or serotonin turnover may be decreased.^{8,9}

The purpose of the proposed study is to compare the efficacy of dexamethasone with ondansetron in reducing the frequency of PONV in patients after laparoscopic surgery under general anesthesia.

MATERIAL AND METHODS

A total of 100 patients who underwent laparoscopic surgical procedures under general anesthesia were included from Dec-2019 to June-2021. Patients having age 20-60 years of both genders having ASA I and ASA II were included. Patients taking pre-operative anti-emetics were excluded. An informed consent was taken from all patients before including their data in the study.

Patients were divided in to two group using Draw randomization technique. Group I; in these patients IV dexamethasone 8 mg was given at the time of induction of anesthesia. Group II; in these patients Ondansetron (4 mg IV) was given at the time of induction of anesthesia.

In all patients general anesthesia was given by consultant anaesthetists. After completing the surgery and shifting the patient to the recovery room frequency of PONV within 6 hours after surgery was noted in all patients according to the criteria given in the operational definitions. Data regarding patient's age, gender, ASA status, BMI and PONV of the patients was noted.

The statistical analysis was performed using SPSS v20.0. The chi-square test was used to examine the differences in PONV across the groups. A p-value of <0.05 was considered significant.

RESULTS

Mean age of the patients included in this study was 43.31±10.41 years. Minimum age was 20 years and maximum age was 60 years. Mean body mass index (BMI) of patients was 25.39±4.34 kg/m². Minimum BMI was 18.10 kg/m² and maximum weight was 39.10 kg/m². There were 54 (54.00%) male patients and 46 (46.00%) female

patients (Figure 1). There were 75 (75.00%) patients with ASA I and 25 (25.00%) patients with ASA II (Figure 2).

PONV occurred in 11 (22.00%) patients in dexamethasone group and in 21 (42.00%) patients in ondansetron group (p-value 0.03) (Table 1).

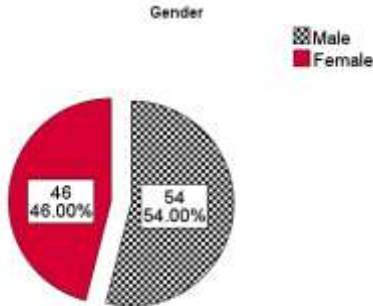


Figure 1: Frequency of Gender.

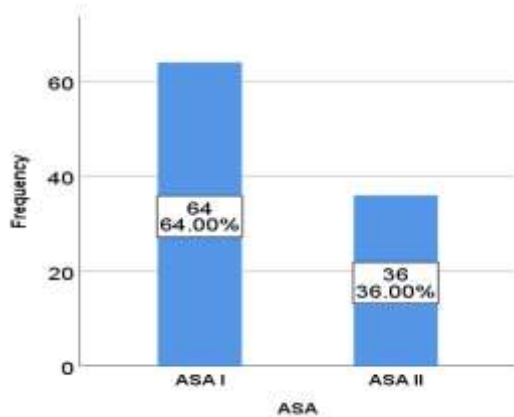


Figure 2: Frequency of ASA.

Table 1: Comparison of PONV between the Groups.

PONV	Study Groups		P-value
	Dexamethasone	Ondansetron	
Yes	11 (22.00%)	21 (42.00%)	0.032
No	39 (78.00%)	29 (58.00%)	

DISCUSSION

PONV can even be more uncomfortable than postoperative pain after laparoscopic operations. PONV may even possibly postpone the patient's discharge from the hospital. 100 When antiemetic prophylaxis is not utilized, the incidence of PONV after laparoscopic cholecystectomy may be as high as 63%.¹⁰ PONV prophylaxis is most typically treated with dexamethasone and ondansetron. Dexamethasone is an effective antiemetic prophylactic at a dosage of 5–8mg, while ondansetron is indicated at a dose of 4mg for prophylaxis in individual clinical investigations.¹¹

Dexamethasone was shown to be an effective antiemetic first time in 1981.¹² It has long been established that glucocorticoids have a significant role in postoperative physiology, inflammatory, humoral, and immunological response. No one knows for sure how glucocorticoids

reduce nausea and vomiting, although centrally mediated anti-emetic activity through prostaglandin synthesis inhibition or endogenous opioids inhibition are likely explanations.¹³ Infection, delayed wound healing, and other adverse effects are the most common concerns associated with the use of dexamethasone therapy. However, many studies in the literature have shown that a single dosage of dexamethasone does not result in a rise in problems.^{14,15} In a meta-analysis of perioperative administration of a high dosage of methylprednisolone (30-35 mg/kg), there were no notable adverse effects found.¹⁶ Dexamethasone prophylaxis did not cause any post-operative issues in our study.

There has been a huge breakthrough with the introduction of serotonin (5HT3) receptor antagonists in 1991 since they do not induce side effects that were previously noticed with routinely used antiemetic medicines. At no point does Ondansetron cause any drowsiness or affect the vital signs in any way. They have an effect on the chemoreceptor trigger zone and on vagus nerves in the gastrointestinal system. Many studies have demonstrated that Ondansetron is an effective therapy and preventive for PONV.¹¹

In present study we found significantly lower rate of PONV in dexamethasone group as compared to the ondansetron group, PONV occurred in 11 (22.00%) patients in dexamethasone group and in 21 (42.00%) patients in ondansetron group.

Kumar et al. found PONV in 35% patients who received Ondansetron, 30% patients in whom dexamethasone was given.¹⁷ While D'souza et al revealed that frequency of PONV is significantly less (22.6%) when dexamethasone is used alone as compared to Ondansetron alone (51.6%).¹⁸ Studies have found mixed outcomes regarding efficacy of dexamethasone versus ondansetron in preventing the frequency of PONV.

Biswas et al. in laparoscopic tubal ligation patients, examined the effects of ondansetron (4mg), dexamethasone (8mg), and ondansetron with dexamethasone vs. placebo in their study. Among the Ondansetron patients, 60% found to have decreased PONV, whereas 63% in the dexamethasone group experienced decreased PONV.¹⁹

In another study, Yuksek et al. discovered that ondansetron was superior to dexamethasone in terms of preventing postoperative nausea and vomiting (PONV) (incidence of PONV 35 percent versus 55 percent, respectively), with a statistically significant difference only in the first 3 hours postoperatively when used for PONV prophylaxis at induction.²⁰

Although the research population was diverse, the findings of Apfel CC et al in their very large trial enrolling 5199 high-risk surgical patients revealed a similar decrease in PONV by ondansetron and dexamethasone prophylaxis of around 26 percent, despite the study population being diversified.²¹

A study by Grimsehl K and colleagues assessed the efficacy of ondansetron 4 mg vs marzine 50 mg as an equipotent for PONV prophylaxis administered at the time of induction in gynecological laparoscopic operations. They discovered that there was no difference between the two

groups when it came to the incidence of PONV (54 percent vs 56 percent).²²

CONCLUSION

Anti-emetics should be used in patients having laparoscopic surgery because of the high prevalence of PONV. After laparoscopic surgery, dexamethasone decreased the prevalence of nausea and vomiting. A single dosage of dexamethasone was proven to be a safe and cost-effective alternative to a single dose of ondansetron.

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