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Original research article

INCIDENCE OF POST-OPERATIVE NAUSEA AND VOMITING IN LAPAROSCOPIC CHOLECYSTECTOMY WITH A SINGLE DOSE OF PREOPERATIVE DEXAMETHASONE

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Abstract: *Laparoscopic cholecystectomy is a commonly performed surgical procedure that frequently results in post-operative nausea and vomiting (PONV). Dexamethasone, a synthetic glucocorticoid with potent anti-inflammatory, immune-modulating, analgesic, and anti-emetic effects, effectively reduces the incidence of PONV after laparoscopic cholecystectomy. In this double-blind, placebo-controlled study, we aimed to investigate the efficacy of a single 8 mg dose of dexamethasone in preventing PONV in patients undergoing laparoscopic cholecystectomy. Sixty patients were randomized into two groups: group A, who received an 8 mg dexamethasone injection in a 2-ml preparation, and group B, who received normal saline during induction. Both groups received standardized anesthesia. Post-operatively, the incidence of nausea and vomiting was observed in both groups. Our study's findings indicate that no substantial variances were observed between the two cohorts in terms of medical or demographic factors. However, a lower proportion of patients in group A exhibited post-operative nausea and vomiting (PONV), while group B had a higher demand for anti-emetic medications to alleviate PONV symptoms. Thus, we can infer that administering a solitary dose of dexamethasone before laparoscopic cholecystectomy can reduce the risk of post-operative complications in patients.*

Keywords: Cholelithiasis; laparoscopic cholecystectomy; dexamethasone; post-operative nausea and vomiting.

Introduction

Laparoscopic cholecystectomy, a minimally invasive procedure for gallbladder removal, has become the preferred approach due to its advantages in reducing post-operative pain, recovery time, and hospital stay compared to traditional open surgery (Agarwal et al., 2015). However, one common challenge associated with laparoscopic cholecystectomy is the occurrence of post-operative nausea and vomiting (PONV). PONV can be distressing for patients and may lead to complications, including wound dehiscence, dehydration, and delayed discharge (Sweis et al., 2013). Anti-emetic medications have been a mainstay in preventing PONV, with various drugs and regimens employed to mitigate these symptoms (Gan et al., 2020).

Among the pharmacological interventions, dexamethasone, a potent glucocorticoid, has shown promise as an effective prophylactic agent against PONV (Gan et al., 2020). Dexamethasone's anti-inflammatory and anti-emetic properties make it a potential candidate for reducing the incidence of PONV in patients undergoing laparoscopic cholecystectomy. Several studies have explored its use in preventing PONV with favorable outcomes. However, dexamethasone administration's optimal dosage and timing remain subjects of ongoing investigation (Khalaj et al., 2013).

This study aims to contribute to the body of evidence by assessing the incidence of post-operative nausea and vomiting in patients undergoing laparoscopic cholecystectomy after receiving a single preoperative dose of dexamethasone. Understanding the potential benefits and risks associated with dexamethasone administration in this context is crucial for optimizing patient outcomes and reducing the burden of PONV following this common surgical procedure. We seek to provide valuable insights for clinical practice and patient care by addressing this research question.

Methodology

After obtaining approval from the hospital ethics committee and informed consent, 60 patients were computer-randomized for a double-blind placebo-controlled study. The patients studied were ASA I or II, aged 20 to 60 yr, and underwent general anesthesia for elective laparoscopic cholecystectomy. Patients who had received anti-emetics within 48 hours before surgery or had a history of motion sickness, chronic pain disorder, or pregnancy were excluded. Each patient was randomly allocated to one of the two groups using a computer-generated random number table. Group A received 8 mg dexamethasone in 2-ml preparation 1 minute before anesthesia induction, and Group B received 2-ml normal saline. Study medications were prepared by a single-house surgeon in two identical syringes, who administered the drugs to blind the surgeon and anesthetist.

All the patients received a similar standardized anesthetic regimen. Anesthesia was induced with propofol (2mg/kg i.v) and was maintained with nitrous oxide and isoflurane. Suxamethonium was used to relax the patients before intubation, and neostigmine was used for reversal. The patients were placed in reverse Trendelenburg position with the right side up. The abdomen was insufflated with carbon dioxide with intra-abdominal pressure of 10-16 mm Hg. After surgery, patients were transported to the surgical ward, where they were observed for the 1st, 6th, and 24th hours for any episode of nausea or vomiting or whether the patient required any anti-emetic drug in the post-operative

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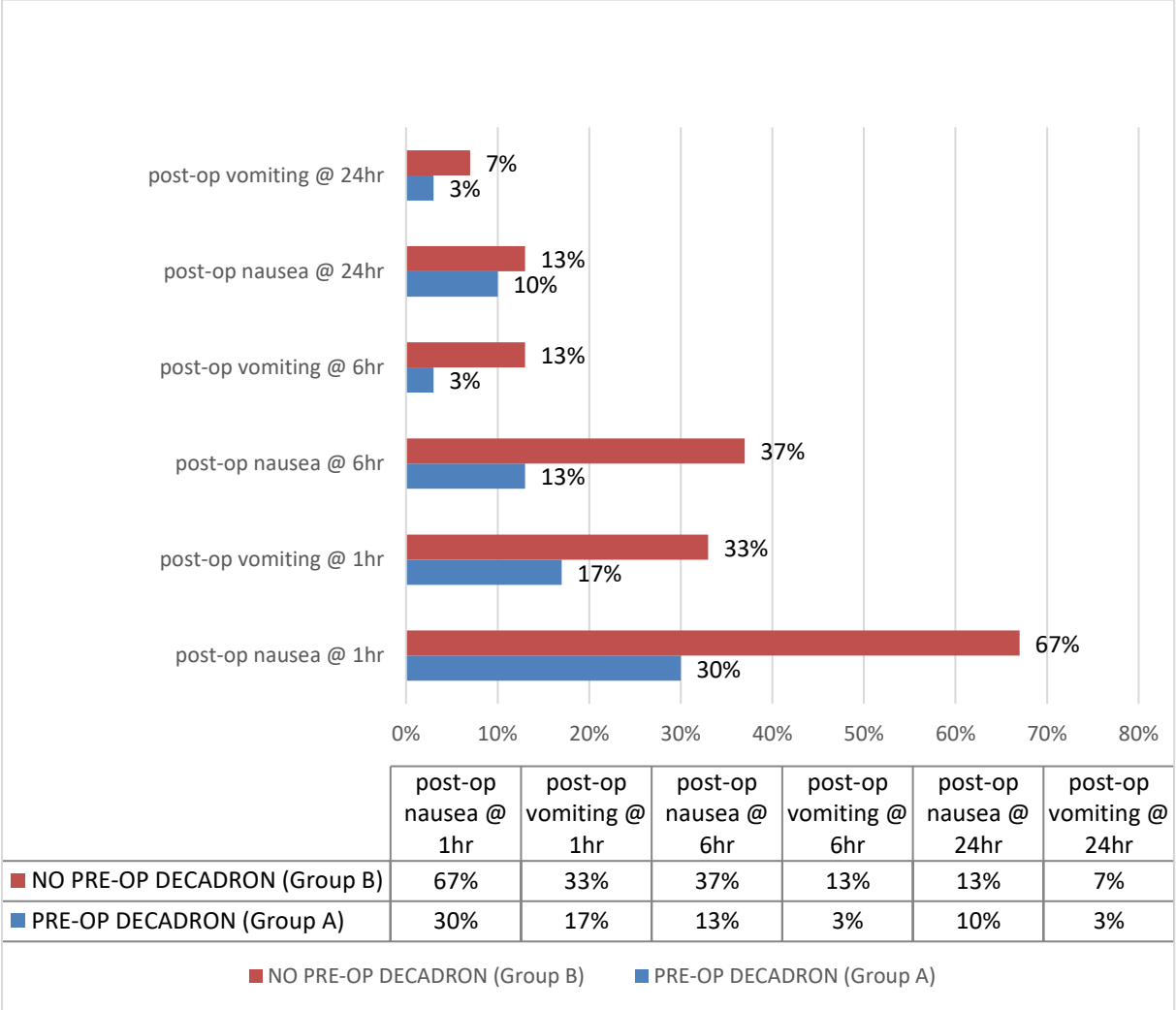
period. Ondansetron or metoclopramide was used if any episode of vomiting occurred.
The Excel software analyses the data and makes the bar and pie charts.

Results

Sixty patients aged 20-60 years were considered, with female preponderance: 88% female and 12% male. Two groups with equal participants were made. Group A constituted all patients with pre-op 8 mg in. dexamethasone in 2-mL preparation at the time of induction, while Group B was made for patients who received 2-mL normal saline. Nausea and vomiting were compared in both groups after the 1st, 6th, and 24th post-operative hours. Also, both groups' demand for anti-emetics was compared in the 24-hour post-operative period. After 1st post-operative hour, nausea was reported in 67% of group B, while only 30% of patients in group 1 experienced nausea.
Similarly, 33% of patients from Group 2 and 17% from Group A had an episode of vomiting during 1st post-operative hour. When compared at the 6th post-operative hour, 37% from group B and 13 % of patients from group A experienced nausea. As a decline in the episodes of nausea and vomiting was observed compared to 1st post-operative hour for nausea, the vomiting pattern followed the same. Only 13 % of patients had an episode of vomiting from group B and just 3 % from group A. After 24 post-operative hours, the two groups' episodes of nausea and vomiting still showed much difference. 13% from Group B and 10% from Group A showed nausea, while just 7% from Group B and 3% of patients from Group A had episodes of vomiting, as shown in Figure 1. In short, after the 1st, 6th, and 24th post-operative hours, both groups experienced nausea and vomiting, but group B was at the upper hand all the time, while small percentages of patients with group A showed these characteristics. The same was observed in terms of post-operative anti-emetic demand. 13% from Group B and 7% patients from Group A were administered anti-emetic doses, keeping its requirement in mind, as shown in Figure 2..



	post-op nausea @ 1hr	post-op vomiting @ 1hr	post-op nausea @ 6hr	post-op vomiting @ 6hr	post-op nausea @ 24hr	post-op vomiting @ 24hr
NO PRE-OP DECADRON (Group B)	67%	33%	37%	13%	13%	7%
PRE-OP DECADRON (Group A)	30%	17%	13%	3%	10%	3%

Figure 1 – Comparison of post-operative nausea and vomiting in both groups

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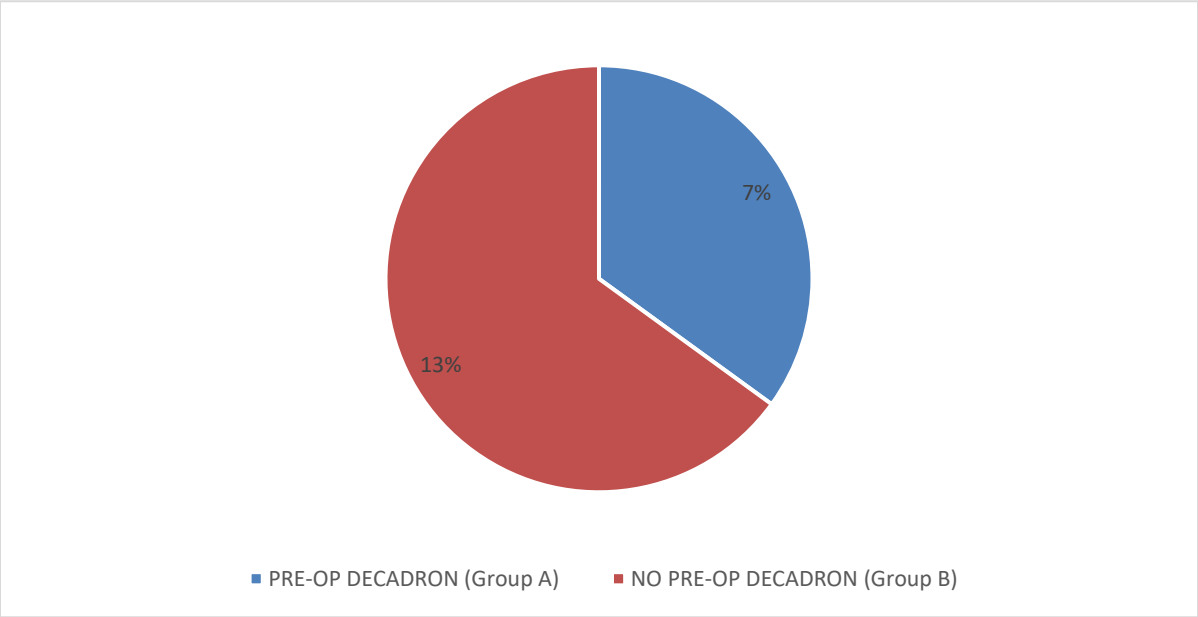

Figure 2 – Comparison of 24-hour anti-emetic dose requirement in both groups

Discussion

Laparoscopic surgery has become an accepted and common procedure for patients with cholelithiasis because it has decreased the morbidity associated with open cholecystectomy. However, PONV has been frequently reported in LC. It may be associated with several factors: long periods of carbon dioxide insufflation, biliary duct injury, intraoperative use of sevoflurane/ isoflurane, fentanyl and glycopyrrolate, and female sex (Duems-Noriega and Arino-Blasco, 2015; Odom-Forren, 2022).

In 1981, dexamethasone was first reported as an effective anti-emetic in cancer chemotherapy patients.3 Since then, dexamethasone has been reported to be effective as an anti-emetic in many studies and is equal to or better than other anti-emetic agents, such as ondansetron, metoclopramide, and droperidol (Herrstedt, 2004; Shashidhar, 2010). Recently, it has been reported to be effective in many gynecological and pediatric surgeries (Lerman, 1992). We found that it was also effective for PONV after LC.

The mechanism of the anti-emetic action of dexamethasone is not fully understood. However, it has been suggested that central or peripheral inhibition of secretion or production of serotonin or central inhibition of prostaglandin synthesis may have some role. Dexamethasone also seemed to reduce post-operative pain and length of stay in the hospital compared to placebo (Chu et al., 2014; Hendren et al., 2015; Zhong et al., 2021).

Although we included only a small number of patients in our study, data analysis shows that a single dose of dexamethasone given at the time of induction reduces PONV after LC, which is comparable to other studies done in the past.

It is not an expensive drug, and according to our results and other previous studies, it can be used regularly at the time of induction in LC, and it has been found more effective in preventing PONV than other anti-emetic drugs available (Neufeld, 2009; Shaheed, 2017; Syrous et al., 2021).

The time of administrating the drug is quite important because several hours are required for a complete and effective action. So, administrating it a few minutes before the surgery starts is considered best (Chou et al., 2016; De Vries et al., 1994).

Surgeons have been reluctant to use glucocorticoid therapy because of possible side effects like delayed wound healing and wound infection. However, these adverse effects related to a single dose of dexamethasone are rare, and no single report related to side effects of a single dose of dexamethasone was found in the literature. In our study, there were no adverse reactions. No delayed wound healing or infections were observed (Kulick et al., 1986; Woodcock et al., 2020). We noticed a reduced incidence of fever in patients who received a single dose of dexamethasone, possibly due to its anti-inflammatory action..

Conclusion

As obvious from this study, administration of a single dose of dexamethasone preoperatively in laparoscopic cholecystectomy patients decreased the incidence of nausea and vomiting and decreased demand for an anti-emetic dose within 24 hours post-operatively. The same can be applied in any setup to decrease post-operative complications of nausea and vomiting, and it can also prove helpful to decrease the burden of post-operative anti-emetics..

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate.
Approved by the department Concerned.
Consent for publication
Approved
Funding
Not applicable

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Conflict of interest

The authors declared an absence of conflict of interest.

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