



CODEN [USA]: IAJPBB

ISSN : 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**

SJIF Impact Factor: 7.187

<http://doi.org/10.5281/zenodo.4017081>Available online at: <http://www.iajps.com>

Research Article

**EFFICACY OF PREOPERATIVE DEXAMETHASONE TO
DECREASE NAUSEA AND VOMITING AFTER
LAPAROSCOPIC CHOLECYSTECTOMY**

Dr. Ifrah Tahir, Dr. Sana Abid, Dr. Sheeza Amjad

Fatima Jinnah Medical University, Lahore

Article Received: July 2020**Accepted:** August 2020**Published:** September 2020**Abstract:**

Laparoscopic cholecystectomy (LC) is one of the most common, popular, and accepted procedures in patients with symptomatic gallstones. Although serious adverse events are rare following laparoscopic cholecystectomy, 50% to 75% of patients experience post-operative nausea and vomiting (PONV). Several randomized controlled trials have shown that a single pre-operative dose of Inj. Dexamethasone is effective in reducing postoperative nausea and vomiting and the need for antiemetics after laparoscopic cholecystectomy because it is freely available, economical, and a single dose does not have any significant side effects, so it should be used more frequently in patients undergoing cholecystectomy laparoscopy.

Aim: The objective of the present study is to investigate the outcome in terms of Post-operative nausea and vomiting within 24 hours in patients undergoing Laparoscopic Cholecystectomy receiving preoperative dexamethasone and those not receiving.

Place and Duration: This randomized, placebo-controlled, double-blind study will be conducted at the Surgical Unit-II of Sir Ganga Ram Hospital, Lahore for one-year duration from March 2019 to March 2020.

Methods: 100 patients; 50 in each group with 80% power of study, 5% significance level and taking percentages of vomiting and nausea in both Dexamethasone and placebo groups, i.e., 14% and 46% respectively.

Results and Conclusion: Dexamethasone improves the surgical outcome by reducing disabling symptoms of nausea and vomiting without apparent side effects. However, there is no evidence in reduction of postoperative pain or analgesic requirements in this trial. So preoperative dexamethasone 8mg may be used as a routine in patients two hours before undergoing elective laparoscopic cholecystectomy.

Key words: laparoscopic cholecystectomy, dexamethasone, nausea and vomiting.

Corresponding author:**Dr. Ifrah Tahir,**

Fatima Jinnah Medical University, Lahore

QR code



Please cite this article in press Ifrah Tahir et al, *Efficacy Of Preoperative Dexamethasone To Decrease Nausea And Vomiting After Laparoscopic Cholecystectomy.*, Indo Am. J. P. Sci, 2020; 07(09).

INTRODUCTION:

Laparoscopic cholecystectomy (LC) is one of the most common, popular and accepted procedures in patients with symptomatic gallstone disease¹ due to its many advantages such as small wound size, improved cosmetic outcomes, short post-operative hospital stays, reduced morbidity, cost-effectiveness and early return for work. Although serious adverse events are rare following laparoscopic cholecystectomy, 50% to 75% of patients experience post-operative nausea or vomiting (PONV). The origin of postoperative nausea and vomiting after laparoscopic cholecystectomy is not entirely clear. Female gender, long-term inhalation of carbon dioxide, duration of surgery, use of nitrous oxide, use of slightly hypoxic mixtures during anesthesia, and postoperative opioids have been suggested as potential risk factors. PONV can lead to serious complications such as aspiration, dehydration, electrolyte disturbances, and incision site disorder. It can also lead to increased medical costs. Another effect of PONV is its effect on the patient, some consider him more disabled than the operation itself. Glucocorticoids are well known for their analgesic, anti-inflammatory, immunomodulatory, and antiemetic properties, although the mechanisms by which glucocorticoids exert their effects are far from elucidated. Several randomized clinical trials have been conducted involving a wide variety of major and minor surgical procedures to investigate the effect of perioperative administration of a single dose of glucocorticoid on the outcome of surgery. The overall postoperative outcomes were either positive in favor of the glucocorticoid group or no differences between the study groups, with postoperative nausea and vomiting and pain as the most significantly improved outcome parameters. The LC data showed questionable effects in pain, nausea and vomiting, but with greater satisfaction and shorter day hospital stay. The aim of this randomized, double-blind, placebo-controlled study was to investigate whether a single dose of dexamethasone before surgery would improve nausea, vomiting and pain in a patient undergoing laparoscopic cholecystectomy. Like Inj. Dexamethasone is widely available, economical, and a single dose does not have any significant side effects, therefore it should be used more often in patients undergoing laparoscopic cholecystectomy.

METHODS AND METHODS:

Setting: This randomized, placebo-controlled, double-blind study will be conducted at the Surgical Unit-II of Sir Ganga Ram Hospital, Lahore for one-year duration from March 2019 to March 2020.

Sample size: 100 patients; 50 in each group with 80% test power, 5% significance level, and intake of percent vomiting and nausea in both dexamethasone and placebo groups, i.e. 14% and 46%, respectively.

Sampling technique: Non-probability purposive sampling

sampling Inclusion criteria:

1. Patients undergoing laparoscopic cholecystectomy.
2. Age from 13 to 60 years.
3. American Society of Anesthesiology class I and II.

Exclusion criteria:

1. Previous post-operative nausea and vomiting, motion sickness or dizziness.
2. Patients who received an anti-emetic within 48 hours prior to surgery.
3. American Society of Anesthesiology class III and IV.
4. Age over 65.
5. Treatment with steroids.

Data collection procedure: Patients meeting the inclusion and exclusion criteria were admitted from the outpatient clinic. They were assessed on the basis of history, clinical examination, and basic research, and informed consent was obtained for the purpose, procedure, risk and benefits of surgery. 100 patients were randomized into two equal groups using a random number of tables, i.e. Saline (Group S) or Dexa (Group D). Each group received either intravenous saline (2 ml) (Group S) as placebo or dexamethasone (8 mg) intravenously (Group D). These drugs were prepared by the staff nurse on duty and administered by the doctor on duty two hours before the start of the operation. Postoperative nausea and vomiting was assessed in the first 24 hours after surgery. The number of nausea and vomiting episodes was also recorded. A sample size of 109 patients was predetermined with an alpha error of 0.05 and a beta error of 0.95. Episodes of nausea and vomiting will be recorded by the doctor on duty in the first 24 hours after surgery.

RESULTS:

Six patients (11%) in the treated group and 17 (30%) in the control group had postoperative nausea ($p = 0.028$) (Table 3); the mean score on the visual analogue scale was 4 (1.4) and 4.4 (1.9), respectively ($p = 0.247$). Six patients (11%) treated with dexamethasone vomited compared with 17 (30%) treated with placebo ($p = 0.028$) (Table 3).

Table 1: Gender distribution

Gender	D-Group (n=53)		S-Group (n=56)	
	Frequency	%age	Frequency	%age
Male	7	13.2	5	8.9
Female	46	86.7	51	91

The absolute risk reduction (ARR) for both nausea and vomiting was 0.19 (95%, i.e. 0.04 to 0.33). Nausea and vomiting decreased significantly over the entire follow-up period compared to placebo: in particular, eleven patients (21%) in the treatment group had post-operative nausea and vomiting compared with 29 (52%) in the placebo group ($p = 0.001$) (Tab. 2).

Table 2: Demographic data

Group	D Group	S Group
Age (years)	42.3(13) {mean (s.d.)}	42.6(14) {mean (s.d.)}
Male/ Female)	7/46	5/51
ASA (I-II)	49-4	50-6
Duration of surgery (Mins)	65(35-95)	64(38-110)
Duration of Anaesthesia(minutes)	75(50-165)	77(60-170)

The ARR for post-operative nausea and vomiting was 0.32 (95%, i.e. 0.15 to 0.49). Sixteen patients (30%) receiving dexamethasone and seven (13%) receiving placebo required postoperative deep I / M Inj. Diclofenac sodium during hospital stay ($p = 0.056$).

Table 3: Effect of 8mg dexamethasone given 2 hours before surgery in patients undergoing laparoscopic cholecystectomy

	D Group (n=53)	S Group (n=56)	P
Nausea	06(11%)	17(30%)	0.028
Vomiting	06(11%)	17(30%)	0.028
Postoperative nausea and vomiting	11(21 %)	29(51%)	0.001
Metoclopramide required	09(17%)	28(50%)	<0.001
Diclofenace Sodium required	16(30%)	07(13%)	0.058

Nine patients (17%) in the treatment group and 28 (50%) in the placebo group received Inj. Metoclopramide during hospital stay ($p = 0.001$) (Table 2), ARR 0.34 (95%, i.e. 0.18 to 0.50). No side effects of dexamethasone have been observed. There was no conversion to open procedure in any of the groups.

Table 4: Postoperative nausea and vomiting (D Group, n=53)

Parameters	Yes	No
Post-operative vomiting nausea and	11(21%)	42(79%)

Table 5: Postop nausea & vomiting (S Group, n=56)

Parameters	Yes	No
Postop nausea and vomiting	29(51%)	27(49%)

Table 6: Postoperative nausea and vomiting (n=109)

Parameters	Yes	No	Total
PONV (D Group)	11(21%)	42(79%)	n=53
PONV (S Group)	29(51%)	27(49%)	n=56
	40	69	n=109

DISCUSSION:

Nausea and vomiting are a person's protective reflexes against the absorption of toxins, as well as a response to specific stimuli. These symptoms are often mentioned by patients as their most important problem in the perioperative period. PONV can lead to serious complications such as aspiration, dehydration, electrolyte disturbances, and incision site disorder. It can also lead to increased medical costs, especially in outpatient and unplanned hospitalizations. Nausea and vomiting are one of the most unpleasant experiences with surgery and one of the most common causes of poor postoperative patient satisfaction scores. The causes of PONV are multiple, including throat stimulation, gastrointestinal distension, abdominal distension, abdominal surgery, anesthetic, pain, opioids, hypoxia, hypotension, vestibular disturbances, and psychological factors. There are certain factors that may predispose a patient to postoperative nausea and vomiting, such as age (more in children), gender (women), history of nausea and vomiting, motion sickness, long duration of surgery and depth of anesthesia, carbon dioxide retention, careless handling, lack of skills of the anaesthesiologist, type of surgery, and number of visitors during recovery. PONV is multifactorial during laparoscopic cholecystectomy, and none of the available antiemetic drugs can antagonize the entire neurotransmitter system. Accordingly, a combination of different classes of antiemetics is preferred to control PONV in high-risk surgical patients. In this study, postoperative nausea and vomiting were high, i.e. 51% in the control group that received saline as placebo. Among the antiemetic drugs currently prescribed for PONV, the serotonin subtype 3 antagonists (eg, Ondansetron and granisetron) are expensive. Other currently used, cheaper antiemetics (eg, anticholinergics, antihistamines, and dopamine receptor antagonists) have side effects such as sedation, dry mouth, restlessness, blood pressure changes, and extrapyramidal symptoms. Dexamethasone, a corticosteroid, is an inexpensive and effective antiemetic drug with minimal side effects after a single dose. It was first described in 1981 as an effective antiemetic in patients receiving anti-cancer chemotherapy. Dexamethasone also reduces the incidence of PONV²⁹. Dexamethasone 8 mg is also effective in treating PONV after LC. However, the lower dose has yet to be assessed. In this study, Inj. 8 mg of dexamethasone was used intravenously because it is cheap, readily available in the hospital, safe to administer, and easy to prepare an injection. After the successful use of dexamethasone in the prevention and treatment of chemotherapy-induced vomiting, the drug was evaluated and found to be effective in treating PONV. First, corticosteroids

can lower the levels of 5 - hydroxytryptophan in nervous tissue by depleting its tryptophan precursor. Second, the anti-inflammatory properties of corticosteroids may prevent the release of serotonin in the gut. Third, dexamethasone may potentiate the main effects of other antiemetics through pharmacological receptor sensitization. Studies have shown that replacing a volatile anesthetic with propofol reduces the risk of postoperative nausea and vomiting by approximately 19%, while replacing nitrous oxide with nitrogen reduces this risk by approximately 12%. In this study, PONV was high in the control group, i.e. 51% as Inj. Pentothal and isoflurane were used to facilitate induction of anesthesia. In general, the biological activity of glucocorticoids begins 1-2 hours after administration, so in this study, dexamethasone was administered 120 min before skin incision. The effects are likely to be centrally conserved by inhibiting both prostaglandin synthesis and endogenous opioid release. Wound healing, post-operative infections, or other complications were not associated with the use of dexamethasone in this study. These results are similar to others reported in the literature. In the present study, a single dose of 8 mg of dexamethasone did not infect the wound or delay wound healing. In addition, no other side effects were found after a single dose of dexamethasone.

CONCLUSION:

Dexamethasone improves the outcomes of surgery by reducing the disabling symptoms of nausea and vomiting with no apparent side effects. However, there is no evidence of a reduction in post-operative pain or analgesic requirements in this study. Therefore, pre-operative cholecystectomy 8 mg can be used routinely in patients two hours before elective laparoscopic cholecystectomy.

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