

**THE EFFECT OF DEXAMETHASONE ON POST LAPAROSCOPIC CHOLECYSTECTOMY NAUSEA AND VOMITING****Khalid Shakir Abdul-kareem<sup>\*</sup>, Mazin H Al-Hawaz<sup>@</sup> & Jasim D Saud<sup>#</sup>**

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**Abstract**

Nausea and vomiting are of the main symptoms affecting patients following laparoscopic procedures with rates ranging between 5-45% in ambulatory surgery cases, they may lead to adverse effects including patients' demoralization, increased pain level and prolonged hospital stay and so increasing costs of health services.

This study determines the effects of preoperative dexamethasone on post laparoscopic cholecystectomy nausea and vomiting.

One hundred patients, admitted for laparoscopic cholecystectomy, were divided into two groups. One given dexamethasone intraoperatively, the other received no drug. Both groups received similar anesthetic, surgical and postoperative drug management.

The patients were followed in the first twenty-four hours for the development of nausea and vomiting.

Nausea and vomiting were significantly reduced in the group receiving dexamethasone on the day of operation with statistical significance. So dexamethasone (8 mg) is recommended to be routinely given at the time of induction of laparoscopic cholecystectomy, since it reduces nausea and frequency of vomiting post laparoscopic cholecystectomy.

**Introduction**

Laparoscopic cholecystectomy is one of the most common elective surgical procedures in the western world<sup>1</sup>, and as other laparoscopic surgery is associated with a high incidence of postoperative nausea and vomiting<sup>1</sup> which will increase convalescence period and in turn increases cost of health services. With increasing experience, minimal access surgery offers cost-effectiveness both to health services and to employers by shortening operating times, shortening hospital stay and allowing faster recuperation<sup>1</sup>.

Unfortunately, postoperative nausea and vomiting (PONV) continues to have negative clinical and economic consequences<sup>2-5</sup>. Published rates of PONV in ambulatory surgery patients vary widely, ranging from 5-45%<sup>3,4,6</sup>. It typically occurs in 20 to 30% of surgical cases, with considerable variation in frequency reported between studies

(range 8 to 92%)<sup>7</sup>. PONV is a common problem and results in patient weakness and demoralization. It may have an adverse effect on the outcome of surgery including wound dehiscence and pulmonary aspiration if the patient's airway is unprotected. Prolonged nausea and vomiting results in increased pain levels and a prolonged hospital stay.

The followings are predisposing factors for nausea and vomiting in postoperative patients:

- Poorly controlled pain.
- Use of opioids.
- Surgery on the gastrointestinal tract, orthopedic surgery or ear, nose and throat (ENT) surgery.
- Female sex.
- Young adult.
- History of preoperative vomiting.
- History of motion sickness or migraine.
- Acute gastric dilatation<sup>8</sup>.

The first laparoscopic cholecystectomy was performed on September 12, 1985 by the German surgeon Erich Mühe<sup>9-11</sup> Different measures used to overcome this problem including; Serotonin receptor antagonists, ensuring adequate hydration, decompression of stomach with orogastric tube before the end of the procedure, intravenous non-steroidal anti-inflammatory drugs (NSAIDs) provide superb pain relief and diminish the need for postoperative narcotics and steroids<sup>12-15</sup>.

Dexamethasone was also tried in the prevention of PONV; it is a potent synthetic member of the glucocorticoid class of steroid drugs. It acts as an anti-inflammatory and immunosuppressant. It is 20 to 30 times more potent than the naturally occurring hormone cortisol<sup>16-19</sup>. The mechanism by which glucocorticoids alleviate nausea and vomiting is not fully understood, but the effects are probably centrally mediated via inhibition of prostaglandin synthesis or inhibition of the release of endogenous opioids<sup>20-23</sup> The analgesic effects of glucocorticoids are provided through inhibition of the phospholipase enzyme and accordingly blockage of both the cyclo-oxygenase and the lipo-oxygenase pathway in the inflammatory chain reaction<sup>20</sup>, as well as suppressing tissue levels of bradykinin<sup>24-25</sup> and release of neuropeptides from nerve endings<sup>26</sup>, both of which may enhance nociception in inflamed tissue and the surgical wound.

Many studies held to pick-up the most effective and appropriate way to achieve the target goals of minimally invasive surgery.

Data from laparoscopic cholecystectomy have shown questionable effects in pain, nausea, and vomiting<sup>17-19</sup> but with higher satisfaction and shorter stay in the day-care unit<sup>17</sup>

The aim of this study is to assess the value of administering dexamethasone at the time of induction in laparoscopic cholecystectomy in reducing PONV.

## Patients and Methods

Collection of patients consulting Al Sadr teaching hospital in Basrah between March and October 2010 was performed randomly. The patients included were diagnosed clinically and radiologically as cases of chronic calculus cholecystitis who were admitted for elective laparoscopic cholecystectomy.

Complicated cases who were converted to open cholecystectomy were excluded from the study.

One hundred cases were included, a questionnaire was filled for each patient.

The patients were randomized into two equal groups, one group of patients was given (dexamethasone 8 mg) intravenously at the time of induction and the other group receives no dexamethasone injection. The same procedure was carried out for all patients. All laparoscopies were performed by attending surgeons. All patients received a similar general anesthesia, postoperative injectable antibiotics. The duration of surgery was recorded (from induction of anaesthesia till extubation), then patients were discharged to the surgical ward and there they were prescribed analgesia, and were kept on intravenous (fluid and antibiotics) and nothing by mouth.

The development of nausea and attacks of vomiting were recorded for the first six hours post-operatively and then during the next eighteen hours of the first post-operative day.

The patients were usually discharged home if fully mobilized and vital signs were normalized, usually next morning.

Patients were asked about development of nausea and attacks of vomiting during the next twenty-four hours after surgery which divided into two intervals (first six hours) and (next eighteen hours).

Nausea was classified into:

No nausea = marked No

Mild nausea = marked mild

Moderate-severe nausea = marked moderate-severe

The number of vomiting attacks classified into:

No attack = marked No

1 attack = marked mild

2 or 3 attacks = marked moderate

More than 3 attacks = marked severe<sup>13</sup>

Data were analyzed using Chi square test and Fisher exact test.  $P < 0.05$  was considered to be statistically significant.

## Results

The hundred patients complaining from calculus cholecystitis were eighty-five females and fifteen males.

The average age of patients in the Dexamethasone group was (40.8) years, ranging from (11–75) years, while the average age of patients in the control group was (39.5) years, ranging from (18–67) years. For the Dexamethasone

group, the average age for females was (39.8) years, ranging from (11–75) years, and the average age for males was (46.2) years, ranging from (25–62) years. For the control group the average age of females was (41) years, ranging from (18–67) years, and the average age for males was (45) years, ranging from (30–60) years. The duration of surgery was ranging between thirty-five and eighty-five minutes, with an average of fifty-eight minutes.

For the Dexamethasone group, the duration of surgery was ranging from forty to seventy five minutes with an average of fifty six minutes. While for the control group, the duration of surgery was ranging from thirty five to eighty five minutes with an average of fifty seven minutes as in table I below.

**Table I: Showing general features of patients include in this study**

Variables		Dexamethasone group	Control group
Age	Range	11-75 yr	18-67 yr
	Average	40.8 yr	39.5 yr
Females	Range	11-75 yr	18-67 yr
	Average	39.8 yr	41 yr
Males	Range	25-62 yr	30-60 yr
	Average	46.2 yr	48 yr
Duration of surgery	Range	40-75 min.	35-85 min.
	average	56 min.	57 min.

In the first interval (0-6) hours, the overall patients developing nausea and vomiting were 14 in Dexamethasone group and 25 in the control group.

The patients with nausea were 13 and 24 in the Dexamethasone and control groups respectively and those with vomiting were 2 and 13 in the Dexamethasone and control groups respectively, figure (1).

While in the overall twenty four hours postoperatively, patients developing

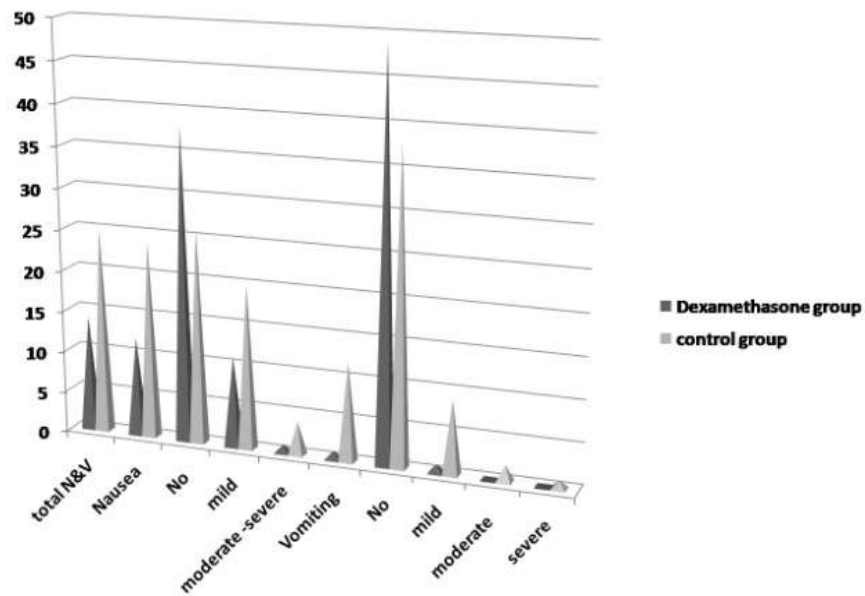
nausea and vomiting were 16 in the Dexamethasone group and 26 in the control group.

In same that period (overall twenty four hours) those patients developing nausea were 15 in the Dexamethasone group and 24 patients in the control group, while 3 patients in the Dexamethasone group and 13 patients in the control group developed vomiting in the whole twenty four postoperative hours, figure (2).

**Table II: Showing the distribution of patients having nausea and/or vomiting**

Patients' Groups	0-6 hr			6-24 hr			Overall 24 hr		
	Nausea	Vomit.	PONV	Nausea	Vomit.	PONV	Nausea	Vomit.	PONV
Dexamethasone	12 24%	1 2%	14 28%	6 12%	1 2%	6 12%	15 30%	3 6%	16 32%
Control	24 48%	12 24%	25 50%	7 14%	4 8%	9 18%	24 48%	13 26%	26 52%

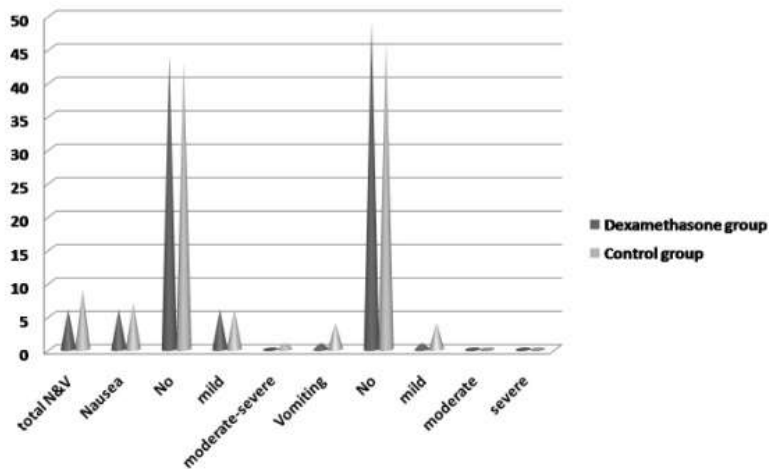
**Figure 1: (0-6 postoperative hours nausea and vomiting)**



**Table III: Distribution of patients having Nausea and Vomiting in 1st six hours**

Groups	Classification Of Nausea And Vomiting									
	Total nausea and vomiting	Nausea	No Nausea	Mild Nausea	Moderate-Severe Nausea	Vomiting	No Vomiting	Mild Vomiting	Moderate Vomiting	Severe Vomiting
Dexamethasone	14 28%	12 24%	38 76%	11 22%	1 2%	1 2%	49 98%	1 2%	0 0%	0 0%
Control	25 50%	24 48%	26 52%	20 40%	4 8%	12 24%	38 76%	9 18%	2 4%	1 2%

**Figure 2: (6-24 postoperative hours nausea and vomiting)**



**Table IV: Distribution of patients having Nausea and Vomiting in the entire twenty four hours**

Groups	Classification Of Nausea And Vomiting									
	Total nausea and vomiting	Nausea	No Nausea	Mild Nausea	-Severe Moderate Nausea	Vomiting	No Vomiting	Mild Vomiting	Moderate Vomiting	Severe Vomiting
Dexameth.	16 32%	15 30%	35 70%	14 28%	1 2%	3 6%	47 94%	3 6%	0 0%	0 0%
Control	26 52%	24 48%	26 52%	20 40%	4 8%	13 26%	37 54%	9 18%	3 6%	1 2%

**Discussion**

Glucocorticoids are important modifiers of the postoperative physiologic inflammatory, humoral, and immunologic responses by regulation of the trauma-induced humoral mediators<sup>20</sup>.

No other randomized, clinical trials in any type of surgery using high doses of methylprednisolone or any doses of dexamethasone have reported a significant increase in infections or all-over complications<sup>21</sup>.

A meta-analysis study concluded that preoperative administration of high-dose methylprednisolone (30–35 mg/kg), a dose many times more than the dose used

in this study, was not associated with significant side effects. The meta-analysis included trials of major surgical procedures, combined with studies in trauma and spinal cord injury<sup>22</sup>.

Also, from a meta-analysis on postoperative nausea and vomiting, a single varying dose of dexamethasone did not increase infectious complications or other complications<sup>23</sup>.

In meta-analysis study of 17 randomized controlled trials, a single dose of dexamethasone in combination with 5-Hydroxytryptamine 3 receptor antagonists significantly reduced

postoperative nausea and vomiting when compared with placebo, but the optimal dose of this combination still needs to be identified<sup>23</sup>.

In this study, during the first six postoperative hours there was significant decrease of the number of patients developing nausea in the Dexamethasone group in comparison with patients having nausea in the same period of the control group, with the (P of < 0.05 X<sup>2</sup> test).

Also in the same period, the severity of nausea was significantly reduced in the Dexamethasone group in comparison to the control group with (P of < 0.05 X<sup>2</sup> test).

These results are similar to other study held in Denmark<sup>24</sup>.

On the other hand during the entire twenty- four postoperative hours, there was significant decrease in the number of patients developing vomiting in the Dexamethasone group in comparison to the control group with the (P of < 0.05 X<sup>2</sup> test). That is in concordance with the results of the study held in Denmark, where in, the vomiting significantly reduced during the entire 24 postoperative hours in the Dexamethasone group<sup>24</sup>.

### Conclusion

Dexamethasone (8 mg) is safe and significantly reduced the post laparoscopic cholecystectomy nausea and vomiting.

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