

Original Article

Comparative Study of Postoperative Pain in Laparoscopic Cholecystectomy with and without Preoperative Intravenous Dexamethasone

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Abstract

Objective: The objective of this study was to associate mean postoperative pain score in cases undergoing laparoscopic cholecystectomy with and without preoperative intravenous dexamethasone.

Methods: This randomized controlled trial study was done at department of South Surgery, Mayo Hospital Lahore. In this study all 80 cases were taken after receiving permission from hospital ethical committee and taking well-versed consent. Using lottery method, cases were arbitrarily distributed into 2 groups, group-A and group-B. Same antibiotic for prophylaxis was given to all patients half to one hour before surgery. Group-A was given 2ml Normal Saline IV and cases selected in group-B were given dexamethasone of 8mg IV at time of induction of anesthesia. Postoperative Pain Score was noted at 6th hour of postoperative period with the help of Visual analogue Scale (VAS) as per operational definition.

Results: The mean age of cases in normal saline and dexamethasone group was 42.32 ± 15.44 years and 41.35 ± 14.24 years respectively. The minimum and maximum age in normal saline group was 18 and 65 while in dexamethasone group was 18 and 63 years. In normal saline group there were 9(22.5%) male and 31(77.5%) female cases while in dexamethasone group there were 8(20%) male and 32(80%) female cases. The mean postoperative pain score at 6th hour was 4.50 ± 1.66 in normal saline group and in dexamethasone group was 2.68 ± 0.69 with statistically lower mean pain in dexamethasone group, p -value < 0.05 .

Conclusion: Through the findings of this study it is concluded that the mean pain score after surgery at 6th hour was statistically lesser in dexamethasone group. So, in future by giving injection dexamethasone we can reduce the post operative analgesia and hospital stay by early discharging the cases.

Keywords: Laparoscopy, Cholecystectomy, dexamethasone.

How to cite this:

Hamid A, Iqbal M, Fazal MI, M Hassan, Ali F, Ali AA. Comparative Study of Postoperative Pain in Laparoscopic Cholecystectomy with and without Preoperative Intravenous Dexamethasone. JPak Soc Intern Med. 2022;3(2): 140-144

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DOI: <https://doi.org/10.70302/jpsim.v3i2.2227>

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Introduction

In the general adult population, the prevalence of gall-stone pathology is stated as 5%-27%, rendering it as one of the most common cause of patient presentation in the hospitals.¹ Granting 80% of the cases stay asymptomatic, it is crucial to outline the most appropriate way of treating this condition. Laparoscopic approach considered standard treatment choice as it has been shown to reduce pain, cosmetic issues, length of stay and morbidity compared with open surgery.²⁻⁴ Overnight observation of patients following Elective Laparoscopic Cholecystectomy still remains a common practice, which not only makes the patient anxious but also

creates patient burden in the hospital settings and economic instability.³

Laparoscopic cholecystectomy is undeniably superior to open surgery, however, postoperative pain continues to be a common ailment.⁵ There are multiple contributory factors to this post-operative pain, for which different types of analgesia have been administered.⁴ Currently, multimodal analgesia methodologies have been proposed to relieve postoperative pain.^{4,6}

Open surgery is generally considered more painful in comparison, but pain following Lap Cholecystectomy nonetheless constitutes a determining factor in late discharge after day-surgery and overnight stay following

the procedure.⁷

Dexamethasone, an anti-inflammatory agent which significantly decreases tissue edema during surgical procedure, has also displayed properties of diminishing post-operative pain scores.⁸ Dexamethasone is a low price corticosteroid which has anti-inflammatory effects, and some studies have also evaluated its effect on post-operative pain.^{7,8}

A study reported mean postoperative pain score in dexamethasone group was 2.9 ± 1.7 and in saline group was 4.8 ± 2.9 with significantly lower pain in dexamethasone group.⁸

The rationale of this study is to compare postoperative pain scores in cases undergoing laparoscopic cholecystectomy with and without preoperative intravenous dexamethasone. Local and international data is limited on postoperative pain.⁹⁻¹¹ In current study we will specifically compare mean postoperative pain scores with and without preoperative dexamethasone. As we conclude this study, it will facilitate us to control postoperative pain in the future, reducing the requirement of analgesia, decreasing morbidity with prolonged hospital stay after the procedure.

Methods

Setting: This study was planned to be done at department of South Surgery, Mayo Hospital Lahore.

Study design: It was a randomized controlled trial

Duration: It was done in 6 months.

Sampling method: Non-probability uninterrupted sampling

Sample size: Sample size is of 80 patients (40 cases in either group) that is calculated at confidence level of 95% and 80% test power, and calculating expected mean pain score in dexamethasone group as 2.9 ± 1.7 and in saline group as 4.8 ± 2.9 .¹²

Sample Selection Criteria

Inclusion Criteria:

- All cases of either gender
- Patients of aged 18-65 years
- Elective laparoscopic surgery for Chronic Cholecystitis (as per operational definition)

Exclusion Criteria:

- Hepatitis B and C positive (was assessed by kit method)
- Any Cardiac disease (was assessed on their history and medical record)
- Chronic pain diseases/conditions (was assessed by history)
- If they are diabetic (blood fasting sugar level $>125\text{mg/dl}$)

- Patients with diagnosis of Chronic Liver Disease (was assessed by history, clinical examination and ultrasound abdomen)
- Patients converted to open cholecystectomy (during surgery)
- Previous History of Steroid intake (was assessed on their medical record)

Data Collection Procedure

All data was collected on prescribed proforma. In this study all 80 (40 cases in each group) meeting selection criteria were taken from outdoor department of South Surgery Mayo hospital Lahore. After getting approval from hospital ethical committee and taking informed consent basic information like age, gender and contact details was taken from every case at the time of admission. All cases were operated under general anesthesia by consultants having more than 5 years of experience. Using lottery method, cases were divided randomly into 2 groups, A and B. Same antibiotic for prophylaxis was given to all patients half to one hour before surgery. Group-A was given 2ml Normal Saline IV and cases selected in group-B were given dexamethasone of 8mg IV at time of induction of anaesthesia. Zero hour was taken as time of extubation of anesthesia. All patients were given same post-operative treatment like Inj ceftriaxone, Inj Rizek and Inj provas according to body-weight. Postoperative Pain Score was noted at 6th hour of postoperative period with the help of Visual analogue Scale (VAS) as per operational definition.

Data Analysis

SPSS version 22 was used to enter and analyzed data. For quantitative data like age and pain, mean \pm S.D was used. Frequency and percentage was used for categorical data like gender. To compare pain in both groups independent sample t-test was used taking p-value <0.05 as noteworthy. To report that was effected by modifiers was stratified for age, gender and BMI. Post stratification independent sample t-test was used taking p-value ≤ 0.05 as noteworthy.

Results

The Average age of cases in normal saline and dexamethasone group was 42.32 ± 15.44 years and 41.35 ± 14.24 years respectively. The minimum and maximum and maximum age in normal saline group was 18 and 65 while in dexamethasone group was 18 and 63 years. Table – 1

In normal saline group there were 9(22.5%) male and 31(77.5%) female cases while in dexamethasone group there were 8(20%) male and 32(80%) female cases. Table – 2

There were 11(27.5%) obese and 29(72.5%) non-obese

cases in normal saline group and 10(25%) were obese and 30(75%) were non-obese cases in dexamethasone

Table 1: Descriptive Statistics of Age in both Study Groups

		Mean	S.D	Min.	Max.
Age (years)	Normal saline (n=40)	42.32	15.44	18.00	65.00
	Dexamethasone(n=40)	41.35	14.24	18.00	63.00
	Total (n=80)	41.84	14.77	18.00	65.00

Table 2: Frequency Distribution of Gender in both Study Groups

Gender		Study groups		Total
		Normal saline	Dexame- thasone	
Male		9(22.5%)	8(20.0%)	17(21.2%)
		31(77.5%)	32(80.0%)	63(78.8%)
Total		40(100.0%)	40(100.0%)	80(100.0%)

group. Table – 3

The mean postoperative pain at 6th hours was 4.50 ± 1.66 in normal saline group and in dexamethasone group was 2.68 ± 0.69 with statistically lower mean pain in dexamethasone group, p-value < 0.05. Table – 4

When data was stratified for age, in 18-40 years of age group the mean postoperative pain score in normal saline group was 4.50 ± 1.86 and in dexamethasone group the mean pain was 2.67±0.66 with significantly lower mean pain in dexamethasone group. In 41-60 years of age group the mean pain was 4.50 ± 1.56 in normal saline group and 2.68 ± 0.75 in dexamethasone group, with significantly lower mean pain in dexame-
thasone group, p-value < 0.05. Table – 5

When data was stratified for gender, in male cases the mean pain in normal saline group was 4.89 ± 1.60 and in dexamethasone group the mean pain was 2.70 ± 0.57 with significantly lower mean pain in dexamethasone group. In female cases the mean pain in normal saline group was 4.18 ± 1.68 and in dexamethasone group the mean pain was 2.6 5 ± 0.8, with significantly lower mean pain in dexamethasone group, p-value < 0.05. Table – 6

When data was stratified for BMI, in obese cases the mean pain in normal saline group was 5.45 ± 1.57 and in dexamethasone group the mean pain was 2.30 ± 0.48 with significantly lower mean pain in dexamethasone group. In non-obese cases the mean pain in normal saline group was 4.13 ± 1.57 and in dexamethasone group the mean pain was 2.80 ± 0.71, with significantly lower mean pain in dexamethasone group, p-value < 0.05. Table – 7

Table 3: Frequency Distribution of Obesity in both Study Groups

		Study groups		Total
		Normal saline	Dexame- thasone	
BMI	Obese	11(27.5%)	10(25%)	21(26.2%)
	Non-obese	29(72.5%)	30(75%)	59(73.8%)
	Total	40(100.0%)	40(100.0%)	80(100.0%)

Table 4: Comparison of Mean Pain at 6th hours in both Study Groups

		Mean	S.D	Min.	Max.
Pain at 6 th hours	Normal saline (n=40)	4.50	1.66	2.00	7.00
	Dexamethasone (n=40)	2.68	0.69	2.00	4.00
	Total (n=80)	3.59	1.56	2.00	7.00

Table 5: Comparison of Mean Pain at 6th hours in both Study Groups with Respect to Age Groups

Age groups (years)	Study groups	No.	Mean	S.D	p-value
18-40	Normal saline	16	4.50	1.86	<0.001
	Dexamethasone	21	2.67	0.66	
41-60	Normal saline	24	4.50	1.56	<0.001
	Dexamethasone	19	2.68	0.75	

Table 6: Comparison of Mean Pain at 6th Hours in both Study Groups with Respect to Gender

Gender	Study groups	No.	Mean	S.D	p-value
Male	Normal saline	9	5.33	1.58	<0.001
	Dexamethasone	8	2.62	0.52	
Female	Normal saline	31	4.26	1.63	<0.001
	Dexamethasone	32	2.69	0.74	

Table 7: Comparison of Mean Pain at 6th hours in both Study Groups with Respect to BMIs

BMI	Study groups	No.	Mean	S.D	p-value
Obese	Normal saline	11	5.45	1.57	<0.001
	Dexamethasone	10	2.30	0.48	
Non-obese	Normal saline	29	4.13	1.57	<0.001
	Dexamethasone	30	2.80	0.71	

Discussion

Laparoscopic cholecystectomy (LC) has more benefits as compared to laparotomy which include a shorter hospital stay, cost effectiveness, and better analgesia with better pulmonary volume and tension of oxygen in arteries. In western countries laparoscopic cholecystectomy is considered as one of the most common elective procedures. Following an uncomplicated LC,

recovery period and hospital stay of the patients is affected by pain management, fatigue and socioeconomic factors.^b

A number of factors are responsible for pain after laparoscopic procedure and a wide variety of post operative pain reduction modalities have been suggested accordingly.¹⁴

Various studies have reported that saturation of local anesthetic agents, washing out remaining CO₂ and pre-operative administration of dexamethasone and anti-inflammatory agents lead to a better pain management after surgery.^{15,16} Newer studies on multimodal analgesia suggest that combined use of all these methods can be more effective.¹⁷ Glucocorticoids are commonly used to relieve pain, for anti-inflammatory, immune modifying, and for the control of nausea and vomiting, however the physiology of glucocorticoids exerting these effects is not known.¹⁸ The timing for IV dexamethasone for the control of postoperative pain is not obvious so far.¹⁹ However single IV dose of dexamethasone when used before surgery reduces PONV and pain after surgery.²⁰ 0.1 mg/kg of dexamethasone is used in multimodal pain management and in PONV prevention.¹²

The mean age of cases in normal saline and dexamethasone group was 42.32 ± 15.44 years and 41.35 ± 14.24 years respectively. The minimum and maximum and maximum age in normal saline group was 18 and 65 while in dexamethasone group was 18 and 63 years. In normal saline group there were 9(22.5%) male and 31(77.5%) female cases while in dexamethasone group there were 8(20%) male and 32(80%) female cases. In other study, mean age of cases were almost similar 46.40 ± 10 years and 44.8 ± 8.12 Gender distribution is also similar in study done by Mohtadi et al, 15(24.59%) male and 46(75.40%) female in normal saline group and 14(22.95%) male and 47(77.0%) female in dexamethasone group.²⁰ Therefore, there is no difference among age and gender distribution in these researches. Hence, Injection dexamethasone can be given in broad range of age groups irrespective of the gender status.

In current study the mean postoperative pain at 6th hour was 4.50 ± 1.66 in normal saline group and in dexamethasone group was 2.68 ± 0.69 with statistically lower mean pain in dexamethasone group, p-value < 0.05. Another study reported almost similar statistics i.e. mean postoperative pain score in dexamethasone group was 2.9 ± 1.7 and in saline group was 4.8 ± 2.9 with significantly lower pain in dexamethasone.¹² In another study Mohtadi et al. evaluated the role of one dose of IV dexamethasone in pain management following a laparoscopic cholecystectomy. This was a double blind study which involved a total number of 122 (of ages 18-60) subjects. Dosage of meperidine used in 1st 24 hours after surgery and its subsequent effect in pain

management was evaluated which showed a significant reduction in pain intensity in meperidine group (p < 0.01). This was evaluated at 2nd, 6th and 12th post op hour.²⁰ The findings are similar to our findings at 6th hours of surgery.

Moreover another research was done to relate the analgesic properties of intravenous dexamethasone given 1 hour before surgery with multimodal analgesia given during laparoscopic cholecystectomy. One hundred twenty patients between the ages of 20 to 65 years were selected and put arbitrarily into 3 groups (n = 40, in one group). The subjects of the group N were injected with injection N/S normal saline (placebo) 1 hour pre operatively plus also afterward the dissection of Gall Bladder. Participants of S1 Group were injected with IV dexamethasone 8mg one hour pre operatively and normal saline subsequently the dissection of gall bladder. Subjects of the S2 group were injected with normal saline one hour pre operatively and dexamethasone 8 mg afterward dissection of gall bladder. The outcomes of the study showed that Visual Analogue Scale (VAS) Score of S1 and S2 group were significantly lesser as compared to the N group. However, the VAS scores of group 1 and group 2 did not differ significantly. The analgesia intake of S1 and S2 group was essentially lesser than N group. Conclusively a singular dosage of IV dexamethasone (8 mg) that was injected one hour pre operatively was operational in managing pain after laparoscopic cholecystectomy. The painkilling effect of preoperative IV injection dexamethasone one hour afore vs during operation was not considerably changed.²¹ In our study, Injection Dexamethasone is given before surgery at time of induction of anesthesia and is effective in reducing postoperative pain. The time of giving dexamethasone to patient is significant in decreasing postoperative pain, as commencement of its natural effect is one or two hour of its dose.²²

From results of our study, injection dexamethasone can be used in other laparoscopic surgeries and it can also lead to decrease analgesia consumption. Decrease postoperative pain leads to early mobilization of patient, mood enhancement, decrease tiredness, increase desire for food, decrease hospital stay by early discharge of patient and so it will also be very cost effective.²²

Conclusion

Through the findings of this study it is concluded that the mean postoperative pain score after 6 hours of surgery was proven to be lower in dexamethasone group statistically. So, in future by giving Inj. dexamethasone we can reduce the post operative analgesia and hospital stay by early discharging the cases.

Conflict of Interest: None

Funding Source: None

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