

Comparison of Intra-Peritoneal Bupivacaine with Saline Solution after Laparoscopic Cholecystectomy

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ABSTRACT

Objective: To compare the mean pain score of intra-peritoneal bupivacaine versus saline solution in patients undergoing laparoscopic cholecystectomy for cholelithiasis.

Material and methods: Between April 2021 to October 2021, total 100 diagnosed patients of cholelithiasis having age 18-70 years, of either gender planned to undergo laparoscopic cholecystectomy under general anesthesia with ASA I-II were selected from Department of Surgery, Mayo Hospital, Lahore. In Bupivacaine group, Intra-peritoneal Bupivacaine was given. In Saline group, Intra-peritoneal Saline Solution was given. Laparoscopic Cholecystectomy was performed. Mean pain score was compared between Bupivacaine group and Saline group.

Results: Patients having age 18-70 years were selected. Mean age was 43.80 ± 15.60 years. The mean age of patients in Bupivacaine group was 43.3 ± 16.0 years and in Saline group was 44.3 ± 15.3 years. In Bupivacaine group and Saline group, mean pain score was 1.82 ± 0.75 and 4.72 ± 1.20 respectively. Significantly ($P=0.000$) low mean pain score was noted in Bupivacaine group as compared to Saline group.

Conclusion: There is a significant difference in mean pain score of intra-peritoneal bupivacaine versus saline solution in patients undergoing laparoscopic cholecystectomy for cholelithiasis.

Keywords: Cholelithiasis, Cholecystectomy, Intra-peritoneal Bupivacaine, Saline Solution.

INTRODUCTION

For symptomatic cholelithiasis, laparoscopic cholecystectomy has emerged as the gold standard. Because laparoscopic cholecystectomy requires shorter hospital stays, the majority of patients are released the day after surgery or on 1st post-operative day.¹⁻²

Reduced postoperative incisional pain is a significant advantage of laparoscopic surgery compared to open surgery, where the pain and discomfort from a big abdominal wall incision may be too great to allow for early discharge and may result in lengthy hospital stays.

In contrast, some patients may experience laparoscopic cholecystectomy-related discomfort, nausea, and vomiting that are severe enough to impede early discharge.³

Systemic analgesia is usually given for this postoperative pain. In many small surgeries and some laparoscopic operations as well, the peripheral use of local anesthetics for post-operative pain reduction has grown in popularity.

Bupivacaine's relatively potent anesthetic strength and longer action time of up to 6 hours have made it more popular for this usage. It is often administered at the ports used for the surgery.⁴

However, its use within the peritoneal cavity is not well studied for post-operative analgesic effects and the subsequent need of systemic analgesics, if any, after its intra-peritoneal use in Laparoscopic Cholecystectomy.⁵⁻⁶

MATERIAL AND METHODS

Between April 2021 to October 2021, total 100 diagnosed patients of cholelithiasis of age 18-70 years, of either gender planned to undergo laparoscopic cholecystectomy under general anesthesia with ASA I-II were selected from Department of Surgery, Mayo Hospital, Lahore.

Patients having perforation of gall bladder and bile contamination of peritoneum as assessed intra-operatively, patients with diabetes mellitus ($BSR > 186 \text{mg/dl}$), abdominal surgery, patients using corticosteroid, patients with history of allergy to bupivacaine, patients on non-steroidal anti-inflammatory within 2 weeks were excluded.

Two groups (Bupivacaine group and Saline group) were created randomly. In Bupivacaine group, intraperitoneal

bupivacaine was given. In saline group, intraperitoneal saline solution was given. Laparoscopic cholecystectomy was performed.

Bupivacaine 0.25% (20 cc) was used to infiltrate port sites prior to trocar insertion. Before the removal of trocars and desufflation, 30 cc bupivacaine 0.25% (Bupivacaine group) or 30 cc saline solution (Saline group) was administered to the upper surface of the liver, right sub-diaphragmatic space and gall bladder bed.

Then patients were shifted in ward and followed-up there for 24 hours. After 24 hours, for the assessment of pain, VAS used and pain score was noted on pre-designed proforma along with demographic profile.

For statistical analysis SPSS version 20 was used. Age, duration of symptoms and pain score was presented in form of mean and SD. For the comparison of mean pain score between Bupivacaine group and Saline group, student t test was used.

RESULTS

Patients having age 18-70 years were selected. Mean age was 43.80 ± 15.60 years. The mean age of patients in Bupivacaine group was 43.3 ± 16.0 years and in Saline group was 44.3 ± 15.3 years. In Bupivacaine group and Saline group, mean pain score was 1.82 ± 0.75 and 4.72 ± 1.20 respectively. Significantly ($P=0.000$) low mean pain score was noted in Bupivacaine group as compared to Saline group. (Table 1) Total 25 (50%) male patients belonged to Bupivacaine group and 18 (36%) male patients belonged to Saline group. Total 25 (50%) female patients belonged to Bupivacaine group and 32 (14%) female patients belonged to Saline group. Among male patients, mean pain score in Bupivacaine group was 2.00 ± 0.76 and in Saline group was 4.44 ± 1.25 . Statistically significant ($P=0.000$) difference of mean pain score was seen between the Bupivacaine group and Saline group. Among female patients, mean pain score in Bupivacaine group was 1.64 ± 0.70 and in Saline group was 4.88 ± 1.16 . Difference of mean pain score between the both study groups was significant ($P = 0.000$). (Table 2) Total 3 age groups (18-35 years, 36-50 years and >50 years) were created. In age group 18-35 years, 18 patients belonged to Bupivacaine group and 15 patients belonged to Saline group. In Bupivacaine group and Saline group, mean pain score was 1.83 ± 0.79 and 4.47 ± 1.19 . Statistically significant ($P=0.000$) difference of mean pain score between the both groups was seen. In age group 36-50 years, 12 patients belonged to

Bupivacaine group and 17 patients belonged to Saline group. In Bupivacaine group, mean pain score was 1.83 ± 0.72 while in Saline group, mean pain score was 4.76 ± 1.20 . Difference of mean pain score between the groups was significant ($P = 0.000$). In >50 years age group, 20 patients belonged to Bupivacaine group and 18 patients belonged to Saline group. In Bupivacaine group and Saline group, mean pain score was 1.80 ± 0.77 and 4.89 ± 1.23 respectively. Difference of mean pain score was significant ($P=0.000$). (Table 3) In 1-4 hours duration of symptoms group, mean pain score in Bupivacaine group and Saline group was 1.54 ± 0.66 and 4.47 ± 1.18 . Difference was significant with p value 0.000. In 5-8 hours duration of symptoms group, mean pain score in Bupivacaine group was 1.67 ± 0.52 and in Saline group was 5.20 ± 1.10 . Difference was significant with p value 0.000.

Table-1: Comparison of mean pain score between the both groups

Groups	N	Mean	SD	p-value
Bupivacaine	50	1.82	0.75	0.000
Saline Solution	50	4.72	1.20	

Table-2: Stratification for gender

Gender	Groups	N (%)	Mean	p-value
Male	Bupivacaine	25 (50)	2.00	0.000
	Saline Solution	18 (36)	4.44	
Female	Bupivacaine	25 (50)	1.64	0.000
	Saline Solution	32 (14)	4.88	

Table-3: Stratification for age

Age Groups	Groups	N (%)	Mean	p-value
18-35	Bupivacaine	18	1.83	0.000
	Saline Solution	15	4.47	
36-50	Bupivacaine	12	1.83	0.000
	Saline Solution	17	4.76	
>50	Bupivacaine	20	1.80	0.000
	Saline Solution	18	4.89	

Table-4: Stratification for duration of symptoms

Duration of Symptoms	Groups	n	Mean	p-value
1-4 hours	Bupivacaine	13	1.54	0.000
	Saline Solution	17	4.47	
5-8 hours	Bupivacaine	6	1.67	0.001
	Saline Solution	5	5.20	
9-12 hours	Bupivacaine	5	1.80	0.002
	Saline Solution	8	4.25	
13-16 hours	Bupivacaine	11	1.91	0.000
	Saline Solution	9	5.22	
>16 hours	Bupivacaine	15	2.07	0.000
	Saline Solution	11	4.82	

Table-5: Stratification for educational status

Educational Status	Groups	n	Mean	p-value
Illiterate	Bupivacaine	17	1.88	0.000
	Saline Solution	15	5.27	
Primary	Bupivacaine	14	1.64	0.000
	Saline Solution	10	4.60	
Middle	Bupivacaine	10	1.90	0.000
	Saline Solution	15	4.40	
Matric & above	Bupivacaine	9	1.89	0.000
	Saline Solution	10	4.50	

In 9-12 hours duration of symptoms group, mean pain score was 1.80 ± 0.84 and 4.25 ± 1.16 respectively in Bupivacaine group and Saline group. Difference of mean pain score was significant with p value 0.002. In 13-16 hours duration of symptoms group, mean pain score was 1.91 ± 0.83 in Bupivacaine group while 5.22 ± 1.09 in Saline group. Difference of mean pain score was significant with p value 0.000. In >16 hours duration of symptoms group, mean pain score in Bupivacaine group was 2.07 ± 0.80 and in Saline group was 4.82 ± 1.33 . Difference of mean pain score between the both groups was significant with p value 0.000. (Table 4) Mean pain score of illiterate patients of Bupivacaine group and Saline group was 1.88 ± 0.86 and 5.27 ± 0.88 respectively. Difference was significant with p value 0.000. Among primary pass patients, mean pain score in Bupivacaine group was 1.64 ± 0.63 and in Saline group was 4.60 ± 1.17 . Difference was significant with p value 0.000. In middle group, mean pain score in Bupivacaine group and Saline group was 1.90 ± 0.88 and 4.40 ± 1.30 respectively. Difference was significant with p value 0.000. In Matric & above group, mean pain score was 1.89 ± 0.60 and 4.50

± 1.35 respectively in Bupivacaine group and Saline group. Difference was significant with p value 0.000. (Table 5)

DISCUSSION

Present study was planned with aim to compare mean pain score of intra-peritoneal bupivacaine versus saline solution in patients undergoing laparoscopic cholecystectomy for cholelithiasis. Patients having age 18-70 years were selected. Mean age was 43.8 ± 15.6 years. The mean age of patients in Bupivacaine group was 43.3 ± 16.0 years and in Saline group was 44.3 ± 15.3 years. In Bupivacaine group and Saline group, mean pain score was 1.82 ± 0.75 and 4.72 ± 1.20 respectively. Significantly ($P=0.000$) low mean pain score was noted in Bupivacaine group as compared to Saline group. In study of Shalan H et al, laparoscopic pelvic surgery was performed, they reported significantly lower mean pain score after using bupivacaine. ⁷ Goldstein A et al used in their study intraperitoneal 0.5% bupivacaine, ropivacaine and saline instillation (0.75%), they reported that ropivacaine had good pain control than bupivacaine. ⁸ In study of Bhardwaj et al, laparoscopic cholecystectomy was performed, they found good pain control by using bupivacaine. ⁹ Some other studies also found good post-operative pain control after using bupivacaine 0.25% and 0.125% bupivacaine after performing laparoscopic cholecystectomy. ¹⁰⁻¹¹ In a systemic review, total 24 studies of laparoscopic cholecystectomy were selected in which intra-peritoneal local anaesthesia was used. Total 12 studies reported excellent pain control post-operatively. ¹² There are a few other studies in which local anaesthetic instillation has failed to show the efficacy. "These failures were could be because of use of lower dosage, lower concentration or because the entire dose was instilled under right hemidiaphragm." ¹³⁻¹⁴

CONCLUSION

Results of present showed that mean pain score was significantly low while using bupivacaine as compared to Saline solution in cases underwent laparoscopic cholecystectomy.

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