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COMPARISON OF INTRAPERITONEAL IRRIGATION PLUS PERIPORTAL INFILTRATION USING BUPIVACAINE VERSUS NO BUPIVACAINE AFTER LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT
Objective: To compare the outcome of intraperitoneal irrigation plus periportal infiltration using bupivacaine versus no bupivacaine after laparoscopic cholecystectomy
Study Design: Randomized controlled trial
Place and Duration of Study: Surgical Unit-2, Sahiwal Teaching Hospital, Sahiwal from April 2025 to October 2025.
Methodology: A total of 60 patients, consisting of 30 patients in each group, meeting the inclusion criteria, were selected for this study from the operation theater of Sahiwal Teaching Hospital, Sahiwal and underwent laparoscopic cholecystectomy in 6 months (from April 2025 to October 2025). The patients were randomly selected and divided into two groups using the lottery system. Group A patients did not receive any bupivacaine while Group B patients received 40ml of intraperitoneal 0.25% bupivacaine injection and additional 20ml of 0.25% bupivacaine at all four port sites (5ml at each site).
Results: Overall, patients who had bupivacaine (Group B) had significantly better postoperative pain management and needed less rescue analgesic administration than patients who did not receive bupivacaine (Group A). Also, patients who had bupivacaine (Group B) had lower mean scores of pain at most times following surgery. The cumulative dose of rescue analgesic medications over 24 hours was appreciably lower in Group B. Fewer patients in Group B needed rescue analgesic administration at 1, 6, and 12 hours following surgery.
Conclusion: Generally, bupivacaine was found to be of great use in supplementing postoperative pain management, ensuring a reduction in postoperative analgesic use.
Keywords: Laparoscopic cholecystectomy, Intraperitoneal irrigation, Periportal infiltration, Bupivacaine

INTRODUCTION

Cholecystectomy, or the removal of the gall bladder, is the current standard treatment for patients who present with symptomatic gallstones. Key-hole surgery, also known as laparoscopic cholecystectomy, is the procedure of choice for patients requiring cholecystectomy. Compared to open cholecystectomy, key-hole surgery boasts lower post-operative pain and shorter recovery times for patients.[1,2] Despite these improvements, post-operative pain has become one of the most crucial elements resulting in delayed hospital discharge times for patients undergoing key-hole cholecystectomy. The use of intraperitoneal local anesthetic during key-hole cholecystectomy has become an emerging approach aimed at reducing post-operative pain.[3]

Previous systematic reviews have shown that the use of local anesthetic agents via the intraperitoneal route (which involves the numbing of certain areas of the body) can help alleviate pain while having a low incidence of serious adverse events. However, the current levels of evidence are generally of low quality.[3,4] Patients who have laparoscopic cholecystectomies are prone to experience abdominal pain as a result of their surgery. Also, pain management still remains a concern. The use of intraperitoneal local anesthetics has been proposed as a strategy for preventing pain.[2,5]

Studies have found that irrigation of bupivacaine into the peritoneal cavity and infiltration at the port sites decreases the intensity of pain and the need for supplementary analgesics post-operatively, when compared to the group not receiving the bupivacaine infiltration and irrigation.[6] A clinical study carried out by Maharajan and Shrestha showed that none of the patients receiving bupivacaine infiltration had pain post-operatively (0%), while 40% of the non-bupivacaine group were plagued with pain. Additional analgesia administration was needed in 30% of bupivacaine patients, while none of the non-bupivacaine group needed it. These authors concluded that intraperitoneal and periportal infiltration of bupivacaine is an effective method to reduce pain following lap Cholecystectomy.[7]

Similarly, in the other study, Manan et al. found the average pain score at 24 hours post-operative to be 4.44±1.03 in the bupivacaine group and 4.80±0.99 in the control group. However, the difference was statistically insignificant (p=0.062). Nevertheless, the average consumption of analgesic was lower in the bupivacaine group (31.00±14.98) and was statistically significant (p < 0.001) when compared with the control (124.80±26.68).[3]

The rationale of this study was to evaluate the outcomes of intraperitoneal irrigation and periportal infiltration with bupivacaine compared to outcomes without bupivacaine following laparoscopic cholecystectomy. Previous studies have indicated an important reduction in postoperative pain and analgesic consumption following intraperitoneal irrigation and bupivacaine infiltration. There have been conflicting views from the previous researches. Due to limited studies available in Pakistan, it is important to conduct investigations in this context. Carrying out this study in our population will have important outcomes in improving postoperative pain relief.

MATERIALS AND METHODS

Ethical approval was obtained from the Institutional Review Board of Sahiwal Teaching Hospital, Sahiwal prior to study commencement. The randomized controlled trial was conducted at Surgical Unit-II, Sahiwal Teaching Hospital, Sahiwal, over a six-month period from April 2025 to October 2025. The required sample size was calculated using the WHO sample size calculator and comprised 60 participants, with 30 patients allocated to each group. Participants were enrolled through non-probability consecutive sampling. Eligible patients were aged 20 to 60 years of either gender who underwent laparoscopic cholecystectomy for cholelithiasis as assessed by right hypochondrium pain and evidence of gallstones on ultrasonography. Patients graded as ASA III or ASA IV, patients with coexistent cardiac or renal diseases with serum creatinine >2.0 mg/dL, as well as those with bleeding disorders with international normalized ratio (INR) values >2 or prothrombin times >20 seconds were all considered to be exclusion criteria.

Written informed consent was obtained from all participants prior to enrollment. Baseline demographic and clinical data—including age, sex, body mass index (BMI), duration of cholelithiasis, ASA physical status, smoking history (>5 pack-years), diabetes mellitus (random blood sugar >200 mg/dL), hypertension (blood pressure ≥140/90 mmHg), alcohol consumption (>20 mL/day), and gallstone size—were recorded on a predesigned proforma.

Participants were randomly allocated into two groups using the lottery method. Patients assigned to Group A did not receive any bupivacaine while in Group B intraperitoneal bupivacaine, consisting of 40 mL of 0.25% solution instilled into the peritoneal cavity along with an additional 20 mL of the same concentration infiltrated at the four port sites (5 mL per port) at the end of surgery.

All procedures were performed under general anesthesia by a single surgical team with the assistance of the researcher to ensure uniformity. Operative duration and intraoperative blood loss were documented for each case. Following surgery, patients were transferred to the post-surgical ward and monitored for 24 hours. Pain assessment was carried out at 1, 2, 3, 6, 9, 12, and 24 hours postoperatively on VAS 0-10 where 0=no pain and 10 was most severe pain. Rescue analgesia was given if pain score was ≥4 and on patient demand while total analgesia dose was calculated for 24 hours.

All collected data were analyzed using SPSS version 25.0. Quantitative variables, including age, body mass index (BMI), duration of cholelithiasis, stone size, operative time, intraoperative blood loss, and pain scores, were presented as mean ± standard deviation. Qualitative variables such as sex, ASA physical status, smoking status, diabetes mellitus, hypertension and alcohol consumption were presented as frequencies and percentages. Both groups were compared for pain score at 1, 2, 3, 6, 9, 12, and 24 hours postoperatively on VAS 0-10 and total dose of rescue analgesia for 24 hours by using independent sample t-test and for need for analgesia by using chi-square test. A *p*-value of ≤0.05 was considered statistically significant.

Data were further stratified according to age, sex, BMI, duration of cholelithiasis, stone size, ASA status, smoking, diabetes, hypertension, alcohol intake, operative time, and intraoperative blood loss to control for potential effect modifiers. Following stratification, comparisons between the two groups were again carried out using the independent samples *t*-test for pain scores and amount of rescue analgesia. A *p*-value of ≤0.05 was taken as statistically significant.

RESULTS

The baseline demographic and clinical parameters for patients in both groups are demonstrated in Table 1. The mean ages for patients in Group A and Group B were comparable with 38.33± 9.48 years and 40.67 ± 11.64 years, respectively. Body mass index for patients in Group A and Group B showed a slight disparity with 27.37 ± 4.11

kg/m² and 26.02 ± 4.23 kg/m², respectively. Variability for patients with longer durations of cholelithiasis showed significant differences with 9.67 ± 12.05 months for Group A and 4.93 ± 3.95 months for Group B. Mean size for stones can be considered equal for both groups with 30.53 ± 16.46 mm and 29.33 ± 17.01 mm for patients in Group A and Group B, respectively. The operative time for patients who received bupivacaine showed significant differences with 74.17 ± 20.47 min compared with 61.17 ± 18.08 min for patients who did not receive bupivacaine. Blood loss in patients from Group B showed significant variability with 26.83 ± 8.65 ml compared with 20.67 ± 8.06 ml for patients from Group A. With respect to categorical variables, it can be demonstrated that most cases for both groups consisted of patients who are female with 27 (90.0%) patients for Group A and 23 (76.7%) for Group B. Patients who were allocated to ASA I accounted for 24 (80.0%) for Group A and 19 patients (63.3%) for Group B. Smoker patients were fewer with 3 (10.0%) for Group A compared with 7 (23.3%) for Group B. Patients with diabetes for both groups were 7 (23.3%) for Group A and 10 (33.3%) for Group B. Similarly, patients with hypertension for both groups were 10 (33.3%) for Group A and 11 (36.7%) for Group B. Finally, no patients from Group A have reported history with alcoholism. For patients from Group B, 4 (13.3%) reported alcohol.

Table 2 illustrates the comparison between post-operative pain intensity and total rescue analgesic requirements between the two groups for the first 24 hours. Patients in Group B, who received bupivacaine, showed lower levels of pain intensity for the first post-operative period compared to patients in Group A, who did not receive bupivacaine. At 1st hour post-operatively, the mean VAS score was higher in Group A (5.80 ± 1.40) than Group B (2.47 ± 0.93), and there was an extremely significant difference between them ($p < 0.001$). The same was true for the 2nd (3.00 ± 0.58 vs 2.03 ± 0.61) and 3rd hours (2.37 ± 0.49 vs 1.57 ± 0.56); all with significant difference ($p < 0.001$). At the 6th hour post-operatively, pain intensity was higher in both groups, but patients in Group A still complained of high pain (3.93 ± 1.38) compared to patients in Group B (2.07 ± 0.90), and there was a significant difference between them ($p < 0.001$). However, at the 9th hour, though the mean VAS was high in Group A (3.27 ± 0.78) than Group B (2.83 ± 1.28), it was not significant ($p = 0.121$). At the 12th hour, there was significant difference between the two groups, as patients in Group A had higher VAS values (3.40 ± 1.63) than patients in Group B (1.70 ± 1.17); $p < 0.001$. At the 24th hour, patients in both groups had minimal pain, but the intensity was still low in Group B (0.50 ± 0.63) compared to Group A (1.47 ± 1.27); $p < 0.001$. The total rescue analgesic requirements within 24 hours were higher in Group A (70.00 ± 27.66 mg) than Group B (21.00 ± 19.53 mg), and the difference was significant ($p < 0.001$). This study showed that the use of bupivacaine was associated with significant reduction of post-operative pain intensity and rescue analgesic requirements within the first post-operative day.

Table 3 shows the comparison of the need for rescue analgesia between the two groups. However, in both groups of surgery, the need for rescue analgesia in the first hour after operation was significantly higher in Group A patients [27 (90.0%)] compared with Group B patients [4 (13.3%)], and the result was found to be of statistical significance ($p < 0.001$). In the second hour after surgery, just 1 (3.3%) patient from Group A required additional analgesia. In Group B also, the need for additional analgesia was the same as in the first hour; none of the patients required rescue analgesia. But the result was not found to be of statistical significance ($p > 0.05$). In the third hour after the operation in both groups of surgery, no patient from either of the groups required rescue analgesia. Hence, no comparison was possible. However, the need for rescue analgesia in the sixth hour increased in both groups. In Group A, the need for rescue analgesia was significantly higher in 16 (53.3%) of the patients. However, in Group B also, just 2 (6.7%) patients required additional rescue analgesia. Hence, the result reached the desired level of significance ($p < 0.001$). In the ninth hour after the surgery in both groups of surgery, the need for rescue analgesia further increased. In Group A, the requirement of rescue analgesia was significantly higher in 10 (33.3%) of the patients. In Group B also, the requirement of rescue analgesia was significantly higher in 12 (40.0%) of the patients. However, the result was not found to possess significance ($p > 0.05$). In the twelfth hour after the surgery in both groups of surgery, the requirement of rescue analgesia was significantly higher in Group A [12 (40.0%)] of the patients. However, in Group B of the surgery, just 3 (10.0%) of the patients required additional rescue analgesia. Hence, the result reached the desired level of significance ($p < 0.05$). In the twenty-fourth hour after the surgery in both groups of surgery, the need for additional rescue analgesia was significantly higher in Group A of the surgery. Just 3 (10.0%) of the patients in Group A of the surgery required additional rescue analgesia. However, in Group B, none of the patients required additional rescue analgesia.

Stratified analysis indicated that there was a beneficial effect of bupivacaine observed across most strata. This included various age groups, both male and female, BMI classes, sizes of stones, ASA grading, smoking status, and presence of associated conditions such as diabetes and hypertension. Overall, in most strata, Group B had lower VAS scores and decreased analgesic demand. Though there were some strata where there were no significant changes in VAS scores (younger age group, male gender, low BMI, longer operative times, and longer duration of disease), there were consistent reductions in analgesic needs with bupivacaine (Table 4)

Table 1: Descriptive statistics

Variables	Group-A Without bupivacaine		Group-B With bupivacaine	
	Mean	S.D	Mean	S.D
Continuous variables				

Age (Year)	38.33	9.48	40.67	11.34
BMI (kg/m^2)	27.37	4.11	26.02	4.23
Duration of Cholelithiasis (month)	09.67	12.05	4.93	3.95
Size of stone (mm)	30.53	16.46	29.33	17.01
Operative time (min)	61.17	18.08	74.17	20.47
Intraoperative blood loss (ml)	20.67	8.06	26.83	8.65
Categorical variables	**Number**	**Percentage**	**Number**	**Percentage**
Gender				
Male	03	10.0	07	23.3
Female	27	90.0	23	76.7
ASA physical status				
ASA-I	24	80.0	19	63.3
ASA-II	06	20.0	11	36.7

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Smoking				
Yes	03	10.0	07	23.3
No	27	90.0	23	76.7
Diabetes				
Yes	07	23.3	10	33.3
No	23	76.7	20	66.7
Hypertension				
Yes	10	33.3	11	36.7
No	20	66.7	19	63.3
Alcoholism				
Yes	0	0	04	13.3
No	30	100	26	86.7

Table 2: Comparison of pain scores and total amount of rescue analgesia at 24 hours

Variables	**Group-A Without bupivacaine**		**Group-B With bupivacaine**		**P value**
	Mean	**S.D**	**Mean**	**S.D**	
Pain scores					
VAS score at 1 hour	5.80	1.40	2.47	0.93	<0.001
VAS score at 2 hours	3.00	0.58	2.03	0.61	<0.001
VAS score at 3 hours	2.37	0.49	1.57	0.56	<0.001
VAS score at 6 hours	3.93	1.38	2.07	0.90	<0.001
VAS score at 9 hours	3.27	0.78	2.83	1.28	0.121
VAS score at 12 hours	3.40	1.63	1.70	1.17	<0.001
VAS score at 24 hours	1.47	1.27	0.50	0.63	<0.001
Total amount of rescue analgesia at 24 hours	70.00	27.66	21.00	19.53	<0.001

Table 3: Comparison of need for rescue analgesia

Effect modifiers	**Group-A Without bupivacaine**		**Group-B With bupivacaine**		**P value**
	No.	**%**	**No.**	**%**	
Analgesia required at 1 hour					
Yes	27	90.0	04	13.3	p <0.001
No	03	10.0	26	86.7	
Total	30	100.0	30	100.0	
Analgesia required at 2 hours					
Yes	01	03.3	0	0	p = 0.313
No	29	96.7	30	100.0	
Total	30	100.0	30	100.0	
Analgesia required at 3 hours					
Yes	0	0	0	0	No statistics are computed because
No	30	100.0	30	100.0	

					analgesia is constant at 3 hrs
Total	30	100.0	30	100.0	
Analgesia required at 6 hours					
Yes	16	53.3	02	6.7	p <0.001
No	14	46.7	28	93.3	
Total	30	100.0	30	100.0	
Analgesia required at 9 hours					
Yes	10	33.3	12	40.0	p = 0.592
No	20	66.7	18	60.0	
Total	30	100.0	30	100.0	

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Analgesia required at 12 hours					
Yes	12	40.0	03	10.0	p = 0.007
No	18	60.0	27	90.0	
Total	30	100.0	30	100.0	
Analgesia required at 24 hours					
Yes	03	10.0	0	0	p = 0.076
No	27	90.0	30	100.0	
Total	30	100.0	30	100.0	

Table 4: Stratification for effect modifiers with regard to pain scores and need for rescue analgesia

Variables	**Group-A Without bupivacaine**		**Group-B With bupivacaine**		**P value**
	Mean	**S.D**	**Mean**	**S.D**	
Age 20-40 (Year)					
VAS score at 24 hours	1.00	0.90	0.47	0.62	p=0.054
Total amount of rescue analgesia at 24 hours	61.67	26.17	22.94	19.92	p<0.001
Age 41-60 (Year)					
VAS score at 24 hours	2.17	1.46	0.54	0.66	p=0.001
Total amount of rescue analgesia at 24 hours	82.50	25.98	18.46	19.51	p<0.001
Male					
VAS score at 24 hours	1.00	1.00	0.43	0.53	p=0.259
Total amount of rescue analgesia at 24 hours	60.00	30.00	17.14	16.03	p=0.016
Female					
VAS score at 24 hours	1.52	1.31	0.52	0.66	p=0.002
Total amount of rescue analgesia at 24 hours	71.11	27.78	22.17	20.66	p<0.001
BMI < 25					
VAS score at 24 hours	1.56	1.33	0.69	0.75	p=0.066
Total amount of rescue analgesia at 24 hours	63.33	35.00	25.38	20.66	p=0.004
BMI ≥ 25					
VAS score at 24 hours	1.43	1.28	0.35	0.49	p=0.002
Total amount of rescue analgesia at 24 hours	72.86	24.31	17.65	18.55	p<0.001
Duration of cholelithiasis ≤ 12 months					
VAS score at 24 hours	1.29	1.11	0.17	0.40	p=0.041
Total amount of rescue analgesia at 24 hours	60.00	24.49	25.05	12.24	p=0.009
Duration of cholelithiasis > 12 months					
VAS score at 24 hours	2.50	2.12	0.40	0.54	p=0.065
Total amount of rescue analgesia at 24 hours	90.0	42.42	18.00	16.43	p=0.016
Size of stone ≤ 30 mm					
VAS score at 24 hours	1.37	1.34	0.61	0.60	p=0.035

Total amount of rescue analgesia at 24 hours	69.47	30.08	26.67	17.48	p<0.001
Size of stone ≥ 31 mm					
VAS score at 24 hours	1.64	1.20	0.33	0.65	p=0.004
Total amount of rescue analgesia at 24 hours	70.91	24.27	12.50	20.05	p<0.001

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Physical status of ASA-I					
VAS score at 24 hours	1.08	1.06	0.26	0.56	p=0.004
Total amount of rescue analgesia at 24 hours	63.75	25.50	12.63	15.21	p<0.001
Physical status of ASA-II					
VAS score at 24 hours	3.00	0.89	0.91	0.53	p<0.001
Total amount of rescue analgesia at 24 hours	95.00	22.58	35.45	18.09	p<0.001
History of smoking YES					
VAS score at 24 hours	3.33	0.57	0.86	0.90	p=0.003
Total amount of rescue analgesia at 24 hours	100.00	17.32	30.00	17.32	p<0.001
History of smoking NO					
VAS score at 24 hours	1.26	1.16	0.39	0.49	p=0.002
Total amount of rescue analgesia at 24 hours	66.67	26.74	18.26	19.69	p<0.001
History of diabetes (Yes)					
VAS score at 24 hours	2.86	0.90	0.80	0.42	p<0.001
Total amount of rescue analgesia at 24 hours	94.29	20.70	33.00	17.02	p<0.001
History of diabetes (No)					
VAS score at 24 hours	1.04	1.06	0.35	0.67	p=0.016
Total amount of rescue analgesia at 24 hours	62.61	25.44	15.00	18.20	p<0.001
History of hypertension YES					
VAS score at 24 hours	1.90	1.44	0.82	0.40	p=0.028
Total amount of rescue analgesia at 24 hours	78.00	28.98	32.73	16.18	p=0.016
History of hypertension NO					
VAS score at 24 hours	1.25	1.16	0.32	0.67	p=0.004
Total amount of rescue analgesia at 24 hours	66.00	26.83	14.21	18.35	p<0.001
History of alcohol intake YES					
VAS score at 24 hours	Cannot be computed because one group is empty				-
Total amount of rescue analgesia at 24 hours	Cannot be computed because one group is empty				-
History of alcohol intake NO					
VAS score at 24 hours	1.47	1.27	0.50	0.64	p=0.001
Total amount of rescue analgesia at 24 hours	70.00	27.66	19.62	20.68	p<0.001
Operative time ≤ 75 min					
VAS score at 24 hours	1.33	1.09	0.40	0.50	p=0.001
Total amount of rescue analgesia at 24 hours	67.50	25.41	19.50	17.61	p<0.001
Operative time 76-150 min					
VAS score at 24 hours	2.00	1.89	0.70	0.82	p=0.076
Total amount of rescue analgesia at 24 hours	80.00	36.33	24.00	23.66	p=0.002
Intraoperative blood loss 10-30 ml					
VAS score at 24 hours	1.41	1.26	0.56	0.65	p=0.004
Total amount of rescue analgesia at 24 hours	69.31	27.89	22.80	19.90	p<0.001
Intraoperative blood loss 31-50 ml					
VAS score at 24 hours	3.00	0.00	0.20	0.44	p=0.005

Total amount of rescue analgesia at 24 hours	90.00	0.00	12.00	16.43	P=0.012

DISCUSSION

This randomized comparison study of intraperitoneal irrigation and periportal infiltration of bupivacaine, as a method of postoperative pain relief, did show significant reduction in postoperative pain scores and rescue analgesic use in the first 24 hours post-laparoscopic cholecystectomy, when compared to no use of local anesthetics. This was seen to be most effective in the early postoperative period but was effective in the late postoperative period as well.

The intensity of pain, measured using the Visual Analogue Scale, was significantly reduced at 1, 2, 3, 6, 12, and 24 hours postoperatively in the bupivacaine group. The largest difference between both groups was found at 1 hour, indicating the clinical significance of the analgesic action during the early postoperative period. Although the difference was not significant at 9 hours, the intensity of pain was still lower in the bupivacaine group. The re-emergence of the significant difference at both 12 and 24 hours indicates that the combined intraperitoneal and periportal approach might offer long-lasting relief from pain. The concomitant reduction in the total dose of Rescue Analgesics used is a critical indicator of the clinical significance of the pain relief difference between the two groups. These results are consistent with previous studies.

In a randomized clinical trial with n = 80 subjects, Ahmad et al.[8] investigated the efficacy of 40 mL of 0.25% bupivacaine when used intraperitoneally and at port sites. Their results indicate significantly lower average scores on the visual analog scale of pain in the intervention group at 1, 4, and 8 h post-op. However, the intervention led to significantly reduced requirements for pain relief. Rescue pain control was significantly lower in the intervention group ($p < 0.001$). These results are comparable with ours in that their intervention resulted in pain control and less pain relief agent. However, their intervention waned earlier.[8]

Pandove et al.[9] conducted a prospective RCT and divided patients into three groups to be analyzed for trocar site infiltration alone, IP alone, and both combined IP and trocar site infiltration using 0.25% bupivacaine (60 patients). They demonstrated that trocar site and combined methods were superior to the IP technique alone for pain scores and that somatic pain is a significant contributing factor to both intra- and postoperative pain relief for patients undergoing LC. Though Pandove et al.[9] did not detail analgesic requirements, they are in line with our strategy to combine both pain pathways.

Mishra et al.[10] studied pre-incisional port-site infiltration with 20 mL of 0.5% bupivacaine versus IP technique with the same amount after gallbladder removal (60 patients). The authors concluded that both VAS and supplementary analgesic consumption were lower in patients who received port-site infiltration than in the IP technique. This study, although it doesn't have a combined technique group, further supports our idea that port-site somatic blockade may be superior to IP techniques alone.[10]

Joris et al.[11] compared the effect of 80 mL IP bupivacaine 0.125% with the addition of epinephrine versus saline control on the onset of visceral (24%), parietal (24%), and shoulder pain (24%), as well as analgesic requirements. The results show that there was no significant difference in the IP bupivacaine pain regimen for the onset of visceral, parietal pain, and shoulder pain or analgesic requirements. The discrepancy in results could be due to multiple factors associated with differences in the distribution characteristics and the lack of port site infiltration.[11]

Mraovic et al.[12] showed a significant reduction in pain and analgesic consumption up to 8 h post-op when compared to saline controls. This serves to reinforce its analgesic potential when used effectively at the close of surgery.[12]

In a study by Louizos et al[13] formally assessed the effects of the multimodal combination of pre-incisional and intraperitoneal levobupivacaine (a stereoisomer of bupivacaine) by randomly assigning 108 patients to one of four groups. They found significantly lower pain scores with the combination compared to any single modality or the placebo group over 24 h, thus validating the additive effects of our proposed combination through multimodal blockade, which includes pre-incisional somatic and intraperitoneal blocks.

A comparison study conducted by Sharma et al.[14] comparing the dose intraperitoneal and periportal bupivacaine with ropivacaine, with infiltration in the later, revealed significant diminutions in the intensity of visceral as well as parietal pain in the early post-operative period for the two, despite there being a significant difference in the total dose of rescue analgesics. This study further exemplifies the use of intraperitoneal as well as infiltration of local anesthetics, which is effective, in addition to the aspect of varying durations for the two.[14]

Cumulatively, the weight of the current evidence supports multimodal approaches to local anesthetic modalities (both IP and port-site infiltration) to achieve better pain outcomes than single-modal approaches. Those trials addressing single IP instillation have yielded variable outcomes, and some have indicated a modest, albeit short-lived, analgesic effect, whereas others have not revealed a significant analgesic efficacy difference. The present results align with high-quality data, (such as the study by Louizos et al.), supporting additive efficacy when addressing somatic and visceral inputs for analgesia.

CONCLUSION

In conclusion, intraperitoneal irrigation, in conjunction with periportal infiltration of bupivacaine, was shown to provide statistically significant, as well as clinically significant, reduction in intensity of pain as well as in rescue analgesic consumption in the first 24 hours post-operatively in patients undergoing laparoscopic cholecystectomy. This method is a simple, useful supplement to multi-modal post-operative analgesic regimes.

ETHICAL APPROVAL:
This study was approved by the Institutional Review Board of Sahiwal Teaching Hospital, Sahiwal (Approval No.341../IRB/SLMC/SWL… dated : 30/ 04/ 2025)

PATIENT'S CONSENT: Informed consent was obtained from each participant for the use of their data in this research.

COMPETING INTEREST: The authors declare no conflict of interest

AUTHORS CONTRIBUTION: SARS: Study design, data collection, analysis, interpretation, and drafting of the manuscript
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