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A COMPARATIVE STUDY OF PAIN RELIEF IN POSTOPERATIVE LAPAROSCOPIC CHOLECYSTECTOMY BY PORT SITE VERSUS GALLBLADDER FOSSA INFILTRATION OF ANAESTHETIC AGENTS

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Abstract
The widely performed laparoscopic cholecystectomy became the gold standard for treating cholelithiasis. Laparoscopy cholecystectomy is superior than open cholecystectomy in terms of pain management and shortened hospital stays. Both patient comfort and recovery depend on effective pain management.
Variable in intensity, kind, and duration, postoperative pain is the primary cause of delayed discharge for patients receiving day-care operations, such as laparoscopies, hence increasing hospital expenses and length of stay. An accelerated recovery and a shorter hospital stay are both possible with optimal management. It has been proposed that postoperative discomfort following laparoscopic cholecystectomy can be reduced by using local anaesthetic infiltration techniques such gallbladder fossa and port site infiltration. In our study male patients are more than female patients in both groups. Gender and pain are not statistically associated. Furthermore, there is no statistical connection between pain and age. Both control and study group showed comparable average pain levels of 2 on POD 3. P value showed statistically significant result in POD 3 and POD 4. Our study adds to the body of knowledge about the management of pain following laparoscopic cholecystectomy by proving that gallbladder fossa infiltration (GBFI) and port site infiltration (PSI) are both effective at reducing pain following surgery.

INTRODUCTION

The gold standard for treating cholelithiasis has been supplanted by the commonly used laparoscopic cholecystectomy. Due to their many benefits, laparoscopic procedures are preferred over open procedures. These benefits include decreased pain and analgesic requirement after surgery, enhanced respiratory function after surgery, a quicker recovery from gastrointestinal issues, a shorter recovery period after surgery, a lower risk of wound infection after surgery, and enhanced aesthetic appeal. [1-3]
One significant element influencing a patient's morbidity during their recovery is postoperative pain. Pain following a laparoscopic cholecystectomy, the pain can originate from three sources: the shoulder tip, which is caused by referred pain from the subdiaphragmatic region; the incision site, which is somatic pain; or the visceral structures, which cause visceral discomfort. [4]. Visceral discomfort primarily arises from three primary factors: stretching of the parietal peritoneum, development of inflammatory pain mediators, and irritation caused by blood.. Referred shoulder discomfort is frequently modest and is caused by leftover gas irritating the diaphragm.
Laparoscopic cholecystectomy is more favourable than open cholecystectomy in terms of pain management and shorter hospitalisation durations.[12] For surgical patients to receive the best treatment possible, pain management is medically necessary. Patients still endure a great deal of anguish despite advances in our knowledge of the biology of pain, the pharmacology of analgesics, and the creation of more efficient postoperative pain management approaches. Contrary to laparotomy, which causes parietal discomfort, laparoscopy causes visceral, somatic, and shoulder pain as a result of irritation to the diaphragm caused by CO2 pneumoperitoneum. Surgical pain experienced after a medical procedure is relieved through a variety of modalities, such as intramuscular or intravenous NSAIDs [6] and opioids [7], local anaesthetics infiltrated at the site of incision [8], local anaesthetics

infiltrated intraperitoneally [8], local anaesthetics with adjuvants [9], and regional anaesthesia techniques like epidurals and nerve blocks [10–11]. It has been discovered that these have inconsistent success rates. Gallstones grow increasingly prevalent as individuals age, with women exhibiting a higher susceptibility compared to men. Gallstones have a prevalence of 5% in males and 20% in females aged 50 to 65. The composition of gallstones primarily consists of cholesterol (75%), while the remaining 25% is composed of pigment. [13]
Sufficient pain management is necessary for both the comfort and healing of patients. It has been suggested that local anaesthetic infiltration methods, such as gallbladder fossa and port site infiltration, help reduce postoperative discomfort following laparoscopic cholecystectomy. The intent of this study was to assess and contrast pain relief levels in post operative laparoscopic cholecystectomy by port site versus gall bladder fossa infiltration of anaesthetic agents and also to determine the best post operative analgesic method post cholecystectomy. Prior to surgery, each patient received instructions on how to use the visual analogue scale (VAS), The scale utilises a zero to denote the absence of pain and a 10 to indicate the highest level of distress imaginable. Our study aimed to compare pain relief in post operative laparoscopic cholecystectomy by port site versus gall bladder fossa infiltration of anaesthetic agents and to determine to best post operative analgesic method post cholecystectomy.

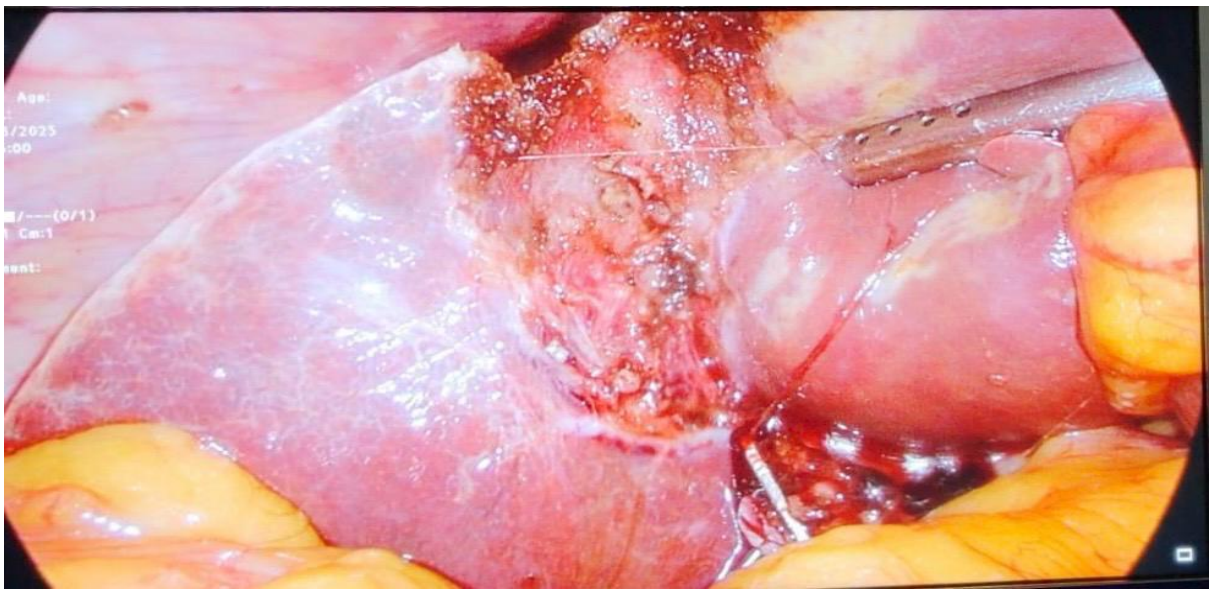
MATERIALS AND METHODS

The Saveetha Medical College and Hospital in Chennai, India, served as the study's location. This was a 12-month observational hospital-based study that ran from March 2023 to March 2024. Patients at the gastrointestinal department's in-patient unit were the subject of the study. A total of thirty patients were enrolled in this experiment, with fifteen assigned to the research group and the remaining fifteen assigned to the control group. The Institutional Ethics and Review Committee granted ethical clearance for the study, and participants gave informed consent after receiving the necessary counselling. Patients who undergone laparoscopic cholecystectomy make up the study population. Our study plan is to assess the analgesic effects of administering anaesthetic drugs via gall bladder fossa infiltration in the study group versus port site infiltration in the control group of patients. All patients scheduled for an elective laparoscopic cholecystectomy and patients who are older than eighteen years were included in our analysis. Patients with diabetes mellitus were not included in the study due to their reduced pain threshold resulting from neuropathies. Individuals who underwent a laparoscopic cholecystectomy but were on opioids or tranquillizers for longer than a week were not included. Patients who underwent an intraperitoneal drain for whatever reason or who had their laparoscopic cholecystectomy changed to an open one was not eligible to participate in the trial.

The anaesthetic agent infiltrated was 0.25% Bupivacaine:

1. 5mL (1mL= 2.5mg bupivacaine) per port site (4) in patients undergoing PSI.
2. 20mL (1mL= 2.5mg bupivacaine) in gall bladder fossa for patients undergoing GBFI.

Using VAS analogue score used to assessing the severity of pain. After data validation and input into Microsoft Excel, analyses were performed with Chi-square tests and descriptive statistics. As percentages and proportions (%), the findings of measurements on categorical (qualitative) data were displayed. The link between analgesic efficacy in patients who have undergone port site block and patients who have undergone gall bladder fossa block was examined using SPSS Software, Chi square tests, and unpaired t-tests.



A comparison of qualitative factors was looked at using the chi-square test. The data distribution was assessed using the Unpaired t test for comparing quantitative variables between groups. A statistically significant significance threshold was determined to be a p-value below 0.05.

RESULTS

Table 1: Patients' demographic data

Demographic data		Control group (n=15)	Study group (n=15)
Gender	Male	11 (73%)	10 (67%)
	Female	4 (27%)	5 (33%)
Age	>20 years	1 (6%)	1 (6%)
	21-30 years	5 (34%)	4 (28%)
	31-40 years	4 (28%)	5 (34%)
	41-50years	3 (20%)	2 (13%)
	51-60 years	1 (6%)	2 (13%)
	>60 years	1 (6%)	1 (6%)

Figure 1: VAS

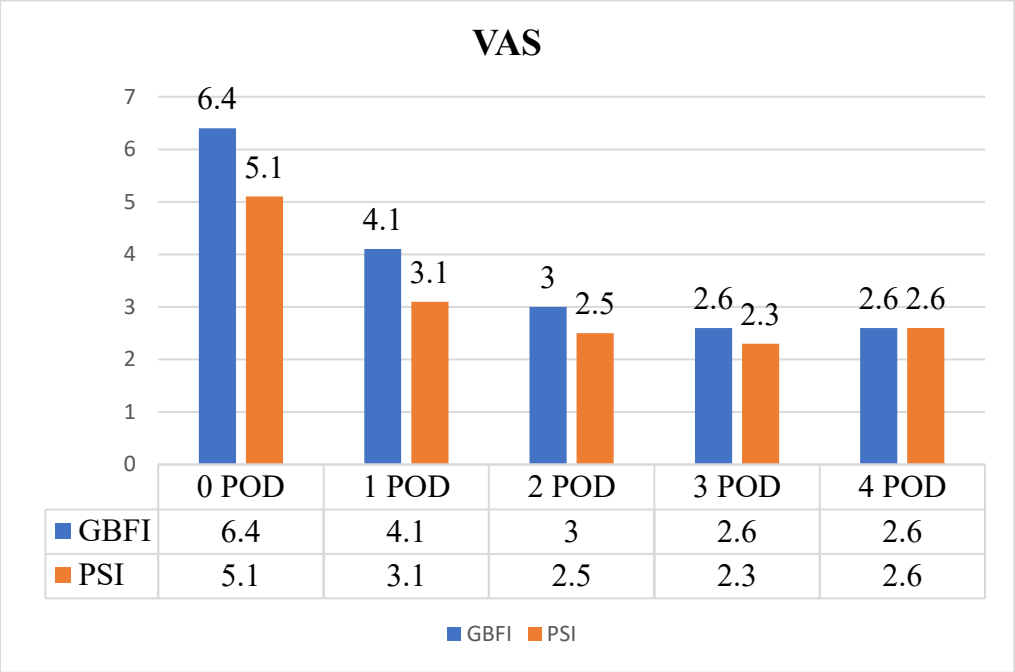


Table 2: VAS

VAS score	Gbfi-15 Mean± SD	Psi 15 Mean± SD	P value
0 POD	6.4±2.1	5.1±2.2	0.1090
1 POD	4.12±1.8	3.1±1.7	0.1484
2 POD	3±1.4	2.5±1.1	0.02860
3 POD	2.6±0.3	2.3±0.1	0.0010
4 POD	2.6±0.3	2.6±0.3	0.0010

Thirty patients were split into two groups: the study group had GB Fossa infiltration of local anaesthetic agents, while the control group received port site infiltration of the same agents.
Table 1 shows Patients' demographic data In gender distribution, control group 73% were male whereas 27% were female. In Study group 67% were male whereas 33% were female. In our study male patients are more than female patients in both groups. Age wise distribution shows six categorial patients in our study. In control group, majority (34%) of the patients were aged between 21-30 years followed by 28% of the patients were aged between 31-40 years, 20% of the patients were aged between 41-50 years and 6% in three categories are less than 20 years, 51-60 years and more than 60 years old patients. In study group, majority (34%) were aged between 31-40 years, 28% of the patients were aged between 21-30 years, 13% patients in two categories are 41-50 years and 51-60 years. And the least percentage (6%) was in two age categories are less than 20 years and older than 60 years. Based on our study results there is no statistical association between gender and pain. Also, there is no statistical relationship between age and pain. The principal outcome measure was the degree of pain that patients experienced following surgery, which was determined on postoperative day 0 to 5 (POD 0-5) using the Visual Analogue Scale (VAS). Individuals undergoing GBFI reported an average pain score of 6.4 on POD 0, whereas individuals receiving PSI reported an average value of 5.1. In the GBFI group, the average pain score dropped to 4.12 by POD 1, while in the PSI group, it declined to 3.178. The average pain scores on POD 2 were 2.5 for PSI and 3 for GBFI. Lastly, both groups showed comparable average pain levels of 2 on POD 3. P value showed statistically significant result in POD 3 and POD 4.

DISCUSSION

Extensive study has been conducted on the use of intraperitoneal injection of local anaesthetic solution to achieve pain relief after surgery. Additionally, it has the advantage of decreasing the requirement for parenteral opioids and NSAIDs, promoting early ambulation, and lowering the occurrence of postoperative nausea and vomiting..
A common surgical treatment that produces better results in terms of postoperative discomfort, recovery time, cosmetic problems, and morbidity is laparoscopic cholecystectomy (LC). [14] French surgeon Phillipe Mouret carried out the first laparoscopic cholecystectomy (LC) that was documented in 1987.Since then, the suggested

course of action for the treatment of symptomatic gallstones has been LC. [14] Due to its shorter recovery period, Laparoscopic surgery (LC) has become the widely accepted and most effective method for treating gallbladder problems.. The treatment is not completely painless, even though this approach causes less postoperative discomfort than standard surgery. Postoperative discomfort following a laparoscopic cholecystectomy remains the most common symptom. For the treatment of symptomatic gallstone disease, at present ,generally acknowledged and recommended to remove the gallbladder by minimally invasive surgical techniques. Minimising colon manipulation and avoiding subcostal incisions minimise postoperative pain, expedite return of function, and shorten hospital stays overall. There are many different and complex factors that can contribute to discomfort after LC.

Numerous research detailed different approaches to pain relief following LC. Intraperitoneal local anaesthetic (IPLA) is a noteworthy treatment method since its positive effect is directly associated with pain characteristics following LC, principally caused by pneumoperitoneum. The available evidence on IPLA's effectiveness in LC yield contradictory findings. Therefore, doing a systematic review would be informative in order to present evidence supporting the use of IPLA in LC. A multitude of systematic assessments were published, focusing on postoperative pain and safety concerns, providing a range of perspectives. [15-18] Our study aligns with Lee et al.'s meta-analysis, confirming GBFI and PSI effectiveness for post-cholecystectomy pain relief. Notably, Lee et al.'s [19] analysis did not address statistical differences between the techniques.

Nida shahid et al [20] found that, in the early post-operative phase following laparoscopic cholecystectomy, patients who was the recipient of a local injection of bupivacaine at the port resulted in a reduction in pain intensity and an extended period of rescue analgesia as compared to the control group.

Hilvering et al [21] study results demonstrated that there was no significant difference in postoperative abdominal discomfort, as judged by the Visual Analogue Scale (VAS), between patients who received intraoperative levobupivacaine and those who received a placebo after laparoscopic cholecystectomy (LC). The observed result was contrary to expectations, as previous research indicated that levobupivacaine would have a distinct impact on postoperative pain..

Our research contributes to the body of knowledge about the management of Pain experienced by people after undergoing laparoscopic cholecystectomy, by demonstrating the efficacy of both port site infiltration (PSI) and gallbladder fossa infiltration (GBFI) in reducing postoperative pain.

CONCLUSION

Anaesthetic agent infiltration into the gallbladder fossa and port site both seem to be useful in reducing postoperative pain in individuals having laparoscopic cholecystectomy. Although there were slight discrepancies in the level of pain. ratings between the two methods at particular intervals, both strategies offered adequate pain management for the duration of the recovery period. Clinicians can be confident in their capacity to reduce postoperative pain and improve patient comfort throughout recovery by selecting either GBFI or PSI based on patient characteristics, surgical preferences, and resource availability.

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