Biological and Clinical Sciences Research Journal
eISSN: 2708-2261; pISSN: 2958-4728
www.bcsrj.com
DOI: https://doi.org/10.54112/bcsrj.v2024i1.1328
*Biol. Clin. Sci. Res. J., Volume, **2024**: 1328*
Original research article

POST-OPERATIVE PORT SITE PAIN AFTER GALL BLADDER RETRIEVAL FROM EPIGASTRIC VS UMBILICAL PORTS IN LAPAROSCOPIC CHOLECYSTECTOMY

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(Received, 27th August 2024, Revised 20th November 2024, Published 30th November 2024)

Abstract: *Laparoscopic cholecystectomy (LC) is a widely performed procedure for gallstone disease. While epigastric and umbilical ports are commonly used for gallbladder retrieval, their comparative impact on postoperative discomfort, complications, analgesic requirements, and hospital stay remains underexplored. Identifying the optimal port site can improve patient outcomes and safety.* ***Objective:*** *The purpose of the present study was to assess postoperative discomfort, analgesic requirements, complication rates, and duration of hospitalization in patients undergoing LC with gallbladder retrieval either through the epigastric or the umbilical port in order to draw a conclusion on which port site offers better results in terms of patient comfort and safety.* ***Methods:*** *After the ethical approval from the institutional review board, this randomized controlled trial study was conducted at FRPMC PAF hospital from August 2023 to July 2024. Through non-probability consecutive sampling, 100 patients aged 18-65 years, of both gender, diagnosed with gallstones confirmed with ultrasound were included in the present study. Patients with suspected or proven G.B malignancy, coagulation disorder, obstructive jaundice, acute pancreatitis or emergency cases were excluded from the present study. After the informed consent, patients were randomly divided in to two groups: Group A- Epigastric port site (n=50) and Group B- Umbilical port site (n=50).* ***Results:*** *By 12 hours, the epigastric port group had a lower mean pain score of 4.14±3.04 compared to 5.4±3.3 in the umbilical port group (P=0.056). Analgesic requirements were also similar between the groups, with the epigastric port group requiring an average of 93.6±56.6 mg and the umbilical port group 99.96±55.3mg, yielding a p-value of 0.507. Complications were significantly more common in the epigastric port group, with 29 patients (58%) experiencing complications compared to 19 patients (38%) in the umbilical port group, and a p-value of 0.032.* ***Conclusion:*** *The selection of the port in laparoscopic cholecystectomy does not seem to be critical regarding the duration of either surgery or hospitalization; however, an increased complication rate and trends of postoperative pain do underline the importance of port selection.*

Keywords: Gall stones, pain score, epigastric port, Umbilical port.

Introduction

The Laparoscopic cholecystectomy (LC) has steadily replaced the open cholecystectomy as the procedure of choice in the surgical treatment of patients with symptomatic gallstone disease since it is less invasive, patients are discharged earlier, and have been reported to have lesser pain than those who underwent open cholecystectomy (1). However, pain at different port site and post operatively persists to be a major concern affecting the comfort and recovery process of the patients. One of the primary factors contributing to postoperative pain is port-site pain, which depends on prominent aspects such as the size of the port, its placement site, and the manipulation of the tissues during surgery (2).

Another parameter by which LC is defined is gallbladder retrieval site. For this purpose, surgeons normally employ the umbilical or the epigastric port and both these sites differ in terms of their anatomical and physiological properties that may determine the amount of pain a patient will experience (3). The umbilical port is usually preferred because of lesser muscle and nerve inventions in this area as compared to the epigastric port where there is significant dissection of muscles that could lead to more postoperative pain (4). On the other hand, the effect of gallbladder retrieval through these two ports on postoperative pain remains ill-defined, despite the conflicting data available in the literature (5).

A number of papers has assessed the predictors of postoperative pain after LC the result of which showed that pain around the port-site incisions is one of the main sources of postoperative pain. Bisgaard et al. (2001) noted that the overall postoperative pain was significantly contributed to by incisional and visceral pain with more massive ports creating more traumas to elicit discomfort (6). Wills et al. (2000) also observed that the visible umbilical port was less painful because of its better anatomical position compared to the epigastric port that often cuts through muscles (7). The patient who had gallbladder retrieved through the umbilical port reported less pain, and needed fewer analgesic after operation according to the study done by Hussain et al. (2013) (8). However, there is still a gap in more comparative works for the standardization of port-site selection in LC. The purpose of the present study was to assess postoperative discomfort, analgesic requirements, complication rates, and duration of hospitalization in patients undergoing LC with gallbladder retrieval either through the epigastric or the umbilical port in order to draw a conclusion on which port site offers better results in terms of patient comfort and safety.

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Methodology

After the ethical approval from the institutional review board, this randomized controlled trial study was conducted at FRPMC PAF hospital from August 2023 to July 2024. Through non-probability consecutive sampling, 100 patients aged 18-65 years, of both gender, diagnosed with gallstones confirmed with ultrasound were included in the present study. Patients with suspected or proven G.B malignancy, coagulation disorder, obstructive jaundice, acute pancreatitis or emergency cases were excluded from the present study. After the informed consent, patients were randomly divided in to two groups: Group A- Epigastric port site (n=50) and Group B- Umbilical port site (n=50). Patients demographics including age, gender, BMI and ASA class was documented using a pre-designed performa. All the operations were performed according to the same surgical procedure, and the four-port LC method was used. All patients underwent gallbladder dissection after routine procedures, without any complications. Using the designated group, the gallbladder was removed through the epigastric or umbilical port. The umbilical port was 10 mm and was created near the umbilical stalk which is less innervated as compared to other body parts, the epigastric port was 10 mm and required dissection though layers of muscle and fascial layers. Pain intensity was measured by means of the Visual Analog Scale (VAS) at 1, 6, 12, 24 and 48 hours after the operation. For pain management needs, the use of analgesics was reported, focusing on NSAIDs and opioids. The surgery duration and hospital stay was also documented. In a standardized Postoperative Pain Management Protocol, all the patients were followed up. Possible operation-related and post laparoscopic complications such as port-site infections, combinations of postoperative hernias were also observed in both the groups. SPSS version 26 was used to analyse the data. Categorical variables were presented as frequency and percentage, while continuous variables were presented as Mean± S.D. T-Test was utilized to compare the different parameters in both the groups. P value ≤0.05 was considered significant.

Results

Table 1 presents the demographic and clinical parameters of the study participants, comparing those who underwent gallbladder retrieval through the epigastric port (N=50) with those who had retrieval through the umbilical port (N=50). The average age of participants was similar between the two groups, with the epigastric port group having a mean age of 45±15.2 years and the umbilical port group 44.74±16.1 years (p= 0.937). Gender distribution was also comparable, with 50% males and 50% females in the epigastric group, and 52% males and 48% females in the umbilical group (p=0.844). Body Mass Index (BMI) was slightly higher in the epigastric port group, averaging 30.6±5.8 kg/m² compared to 28.8±6.8 kg/m² in the umbilical port group, p-value of 0.19. Regarding the American Society of Anesthesiologists (ASA) scores, there was a notable difference: 40% of the epigastric port group had an ASA score of I, compared to 18% in the umbilical group. Conversely, the umbilical port group had a higher percentage of patients with ASA scores of II (48%) and III (34%) compared to the epigastric group (32% for ASA II and 28% for ASA III), with a p-value of 0.056. The duration of surgery was comparable between the two groups. The average surgical time for the epigastric port group was 75.26±26.74 minutes, while the umbilical port group had a mean duration of 77.56±26.7 minutes (p=0.686) (Figure 1). Table 2 provides an overview of the postoperative parameters for patients undergoing gallbladder retrieval through either the epigastric or umbilical port. Postoperative pain scores were assessed at various time intervals. At 1 hour post-surgery, the epigastric port group reported a mean pain score of 4.6±3.2, compared to 5.48±2.8 in the umbilical port group (P= 0.162), At 6 hours, the pain score was slightly lower in the umbilical group (4.38±3.18) compared to the epigastric group (4.9±3.2). By 12 hours, the epigastric port group had a lower mean pain score of 4.14±3.04 compared to 5.4±3.3 in the umbilical port group (P=0.056). Analgesic requirements were also similar between the groups, with the epigastric port group requiring an average of 93.6±56.6 mg and the umbilical port group 99.96±55.3mg of ketorolac, yielding a p-value of 0.507 (Figure 2). Complications were significantly more common in the epigastric port group, with 29 patients (58%) experiencing complications compared to 19 patients (38%) in the umbilical port group, and a p-value of 0.032. Hospital stay durations were comparable, with the epigastric port group having an average stay of 4.4±2.1 days and the umbilical port group 4.08±1.97 days, resulting in a p-value of 0.418.

Table 1: Demographic and clinical parameters of the study participants

Parameters	Epigastric port (N=50)	Umbilical port (N=50)	P Value
Age (years)	45±15.2	44.74±16.1	0.937
Gender			0.844
Male	25 (50%)	26 (52%)	
Female	25 (50%)	24 (48%)	
BMI (kg/m^2)	30.6±5.8	28.8±6.8	0.19
ASA Score			0.056
I	20 (40%)	9 (18%)	
II	16 (32%)	24 (48%)	
III	14 (28%)	17 (34%)	

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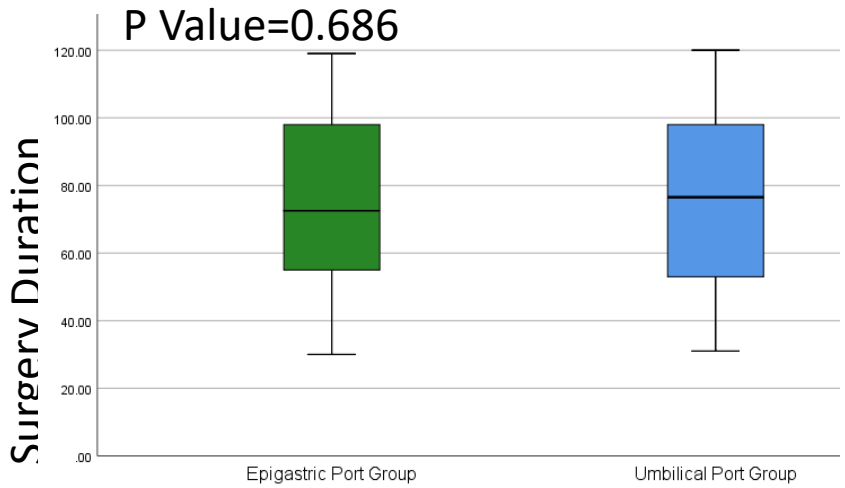

Figure 1: Surgery duration in both study groups

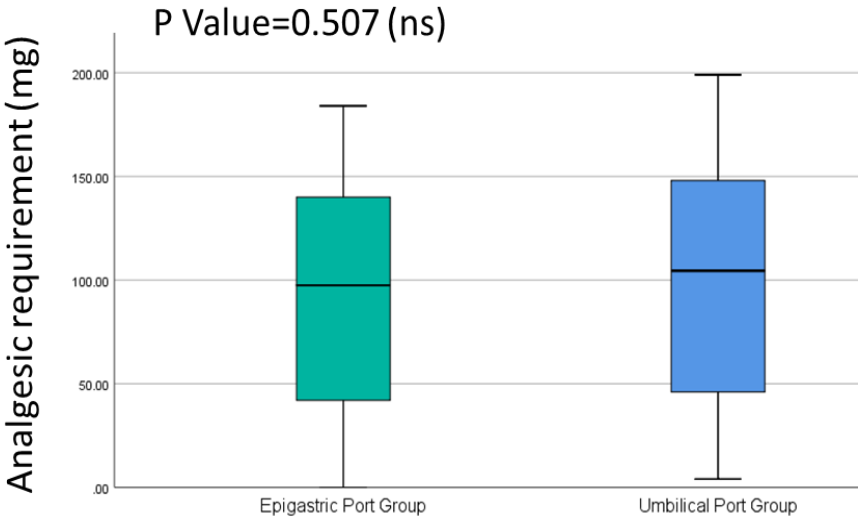

Figure 2: Analgesic Requirements in both study groups

Table 2: Post-operative parameters of the study participants

Post-operative Pain Score	Epigastric port (N=50)	Umbilical port (N=50)	P Value
1Hr	4.6±3.2	5.48±2.8	0.162
6Hr	4.9±3.2	4.38±3.18	0.445
12Hr	4.14±3.04	5.4±3.3	0.056*
24Hr	4.68±2.8	5.48±3.0	0.155
48Hr	4.82±3.4	4.54±2.9	0.68
Analgesic requirements (mg)	93.6±56.6	99.96±55.3	0.507
Complications	29 (58%)	19 (38%)	0.032*
Hospital stay (days)	4.4±2.1	4.08±1.97	0.418

Discussion

This paper aims to offer a critical assessment and analysis of postoperative results regarding gallbladder removal through the epigastric vs umbilical ports in LC. The outcomes indicate several significant observations regarding the effects of port selection on postoperative pain, uses of analgesics, the occurrence of complications, and hospitalization days. Our study results indicate that the few pain scores were slightly higher in the umbilical port group at different time points although, it was statistically significant at 12 hours only (p=0. 056). These results correspond to the findings of the recent literature. Hajong et al. (2019) argued that one disadvantage of umbilical port pain is that it can be even higher during the beginning of

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treatment but remarked that this effect may decrease in the long term because of the interindividual differences observed regarding pain (9). This variability raises a concern since even small deviations in the perceived pain level can decrease the comfort and healing rate of the patients. Though the umbilical port is regarded as being less traumatic; the above trend could be due to variation in pain threshold and structural arrangement of umbilical area (10). Pain relief medication showed that the two groups were comparable in the total amount of analgesia required (p=0. 507). This finding is similar to research conducted by BasKent et al. (2023), according to which although, pain scores were different in both groups, total analgesic utilization was equivalent. This means that although the units of pain intensity can be different the units of medication required for pain relief do not differ depending on the port selection (11). This maybe the reason why different pain perception at the port site is alleviated by standard pain management protocols that may be applied. One of the significant observations of this study is that 58% of the patients in the epigastric port group experienced some complications while only 38% of those in the umbilical port group had complications (p= 0. 032). This is in agreement with the study done by Karthik et al. (2013) which reported a more frequent incidences of port-site infection and hernia especially with the epigastric port because of dissecting more tissue (12). The higher complication rate in the epigastric port group underlines the necessity of paying close attention to surgical skills and the location of ports as it influences patients' safety and results directly (13). In this current study we also used hospital stay duration as an outcome variable for the comparison of the two groups however there was no much difference between them (p=0.418). This result supports Sood et al. (2020) where the authors noted that the modality of port selection had no significant influence over the duration of hospital stay (14). This means that although choice of a port may dictate features that are right after surgery such as pain and complications, the choice does not have a bearing on the overall time required for recovery (15).

Conclusion

Finally, it is noteworthy that this study identifies complex relationships between different aspects of port selection during laparoscopic cholecystectomy. While performing time and length of stay did not reveal any differences, port choice does correlate to pain control and complications. Thus, the increased risk of complications linked to the epigastric port is still a concern and infers that the umbilical port may provide comparable satisfaction and results concerning patients' comforts while minimizing harms. Further studies must be carried out on refining of these technicalities in order to eradicate any complications that may arise and establish other aspects that may affect the postoperative recovery period.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate.
Approved by the department Concerned. (IRBEC-FRPMC PAF-0369/23)
Consent for publication
Approved
Funding
Not applicable

Conflict of interest

The authors declared an absence of conflict of interest.

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MANSOOR IQBAL (Assistant professor)
Drafting
AUN ALI (Associate professor) & YOUSUF LAKDAWALA (Professor)
Concept & Design of Study

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