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Original Research Article

Postoperative Port Site Complications of Patient Undergoing Laparoscopic Cholecystectomy

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Abstract: *Laparoscopic cholecystectomy is the standard surgical treatment for symptomatic gallstones. Despite being minimally invasive, port site complications such as pain, infection, and abscess can occur and may affect recovery and satisfaction.* ***Objective:*** *To determine the frequency of postoperative port site complications of patients undergoing laparoscopic cholecystectomy at Hayatabad Medical Complex, Peshawar.* ***Methods:*** *This study was conducted on a sample of 172 patients aged 18 to 65 years undergoing laparoscopic cholecystectomy for symptomatic gallstones. Patients with uncontrolled diabetes, uncontrolled hypertension, or chronic liver and kidney disease were excluded. Postoperative port site complications were evaluated within 30 days, such as pain, infection, and abscess. SPSS 21 was used for data analysis. Associations were assessed using the chi-square test, with P values significant at ≤ 0.05.* ***Results:*** *The mean age of 172 patients in the present study was 42.30 ± 14.32 years. Gender-wise, females had a higher majority at 75.6%. Postoperative port site complications were infection, observed in 13 (7.6%) cases, pain in 11 cases (6.4%), and abscess in 4 cases (2.3%). No statistically significant associations were found between the complications and demographic factors.* ***Conclusion:*** *Laparoscopic cholecystectomy is a safe procedure with minimal port site complications, such as infection (7.6%), pain (6.4%), and abscess (2.3%).*

Keywords: Laparoscopic cholecystectomy, port site infection, postoperative pain, surgical site abscess, complications, descriptive study

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Introduction

Laparoscopic cholecystectomy is a surgical procedure commonly performed to remove a diseased gallbladder worldwide. This technique has become an ideal approach to treating a variety of gallbladder complaints, including acute and chronic cholecystitis, gallstones, and acalculous cholecystitis. Indications for open cholecystectomy largely overlap with those of laparoscopy, as the open surgery is generally reserved for complex cases, including gallbladder malignancies, where it remains the most conclusive treatment choice. A study reported an estimated 20 million individuals with gallstone disease, with roughly 300,000 cholecystectomies performed annually in the US. 1In the general population, about 10% asymptomatic gallstones, of which 20% ultimately develop symptoms like biliary colic. Within this group, around 4% may experience difficulties such as acute cholecystitis, choledocholithiasis, or gallstone ileus. (1-4)

The probability of gallstone formation increases with age and female gender compared to males. In the old, gallstones are found in nearly 20% of women and 5% of men. Cholesterol calculi account for almost 75% of gallstones, while the remaining are mainly pigmented stones. (5, 6)

Potential complications of cholecystectomy reported are bleeding and infection. Hemorrhage is relatively common due to the liver's rich vascular supply, and avoiding substantial blood loss requires surgeons to have a systematic understanding of arterial anatomical variations. The gravest complication comprises inadvertent injury to the common bile duct that may require further surgeries for the restoration of proper bile drainage. (7,8) One study documented the postoperative outcomes of laparoscopic cholecystectomy port-site complications, which were infection in 14.1% of patients, postoperative pain in 8.5% and abscess formation in 4.2%. (9)

Though conversion from laparoscopic to open cholecystectomy is less common in the current era due to growing surgical expertise. Open conversion comprises a larger abdominal incision, which can complicate postoperative pain management and sometime lead to less favorable results. It is significant to recognize that choosing to convert to open surgery should not be viewed as a failure, but rather as a deliberate, patient-oriented decision made to improve surgical outcomes. (10,11)

Due to the scarcity of local literature on this subject, the goal of this study is to determine the frequency of postoperative port-site complications among patients undergoing laparoscopic cholecystectomy at our healthcare facility. By identifying factors contributing to port site complications and exploring preventive strategies, the findings of this research will also enhance patient safety and guide clinical practice to mitigate the impact of these adverse events, eventually advancing the field of laparoscopic surgery.

Methodology

This descriptive study was conducted in the Department of General Surgery, Hayatabad Medical Complex, Peshawar. An ethical certificate was obtained from the hospital's IRB (Approval no. 1982/HMC/QAD-F). The study was conducted (08-10-2024--08-04-2025). The sample size for the current study was 172, calculated using the OpenEPI sample size calculator, with a previous frequency of abscess formation of 4.2%, a 95% confidence interval, and a margin of error of 3%. A non-probability consecutive sampling technique was employed.

Included patients were aged between 18 and 65 years, of either gender, who underwent laparoscopic cholecystectomy for symptomatic gallstones. Gallstones were confirmed on ultrasonography as echogenic structures within the gallbladder lumen. The surgical procedure was performed under general anaesthesia using a minimally invasive technique by making three to four abdominal incisions, via which a tube equipped with a camera and light was inserted to provide a live stream on a screen, which allowed the surgeon to see the internal structures of the abdomen. Patients with uncontrolled diabetes mellitus, uncontrolled hypertension, and chronic liver or kidney disease were omitted.

The study benefits and objectives were well explained to the patients before taking their consent. Demographic data, including age, gender, body mass index, residence, socioeconomic status, employment status, and educational status, were recorded.

All the patients who underwent the laparoscopic procedure were assessed for postoperative port site complications occurring within a 30-day follow-up period. Complications were port site infection, which was diagnosed clinically based on the presence of localized pain (VAS >3), erythema, swelling, warmth, and purulent discharge at the surgical site. Postoperative pain was assessed using the Visual Analogue Scale; a pain score greater than 3 was considered positive. An abscess was diagnosed based on swelling, redness, warmth, and fluctuance, confirmed by ultrasonographic evidence of a round or oval fluid collection with internal echoes. All the evaluations were conducted under the guidance of an experienced surgeon.

SPSS 21 was used for analysing the data. Age and BMI were presented as mean and SD. Port site complications, gender, socioeconomic status, education status, employment status, and residence were presented as frequencies and percentages. The chi-square test was used to assess associations, with a significance level of $P \leq 0.05$.

Results

In the present study, 172 patients underwent laparoscopic cholecystectomy. Their mean age was 42.30 ± 14.32 years, and their mean BMI was 26.27 ± 2.26 kg/m².

The majority of the patients were females, 130 (75.6%) (Figure 1). Table 1 presents the demographic profile of the patients who underwent laparoscopic cholecystectomy.

Postoperative port site complications were analysed. Infection was observed in 13 (7.6%) cases. Pain was reported in 11 (6.4%) cases. Abscess developed in 4 (2.3%) cases. The majority of patients, 144 (83.7%), had no complications (Table 2).

They conducted a subgroup analysis to observe possible associations between port site complications and demographics. No statistically significant association was found for any of the demographic variables (Table 3).

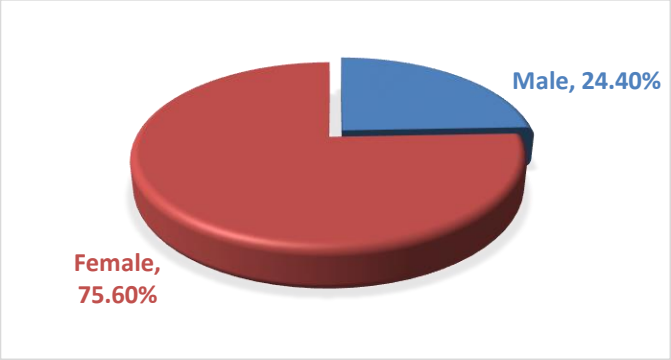

Figure 1: Gender distribution

Table 1: Demographics

Demographics		n	%
Employment status	Employed	68	39.5%
	Unemployed	104	60.5%
Education	Literate	77	44.8%
	Illiterate	95	55.2%
Area of residence	Urban	93	54.1%
	Rural	79	45.9%
Socioeconomic status	Lower (> 50K)	70	40.7%
	Middle (50K to 100K)	72	41.9%
	Higher (> 100K)	30	17.4%

Table 2: Postop port site complications

Postop port site complications	n	%
Infection	13	7.6%
Pain	11	6.4%
Abscess	4	2.3%
No complications	144	83.7%

Table 3: Association of postop port site complications with demographics

Demographics		Postop port site complications				P value
		Infection	Pain	Abscess	No complications	
Age distribution (Years)	18 to 35	23.1%	9.1%	0.0%	38.9%	0.16
	36 to 50	46.2%	45.5%	75.0%	29.9%	
	51 to 65	30.8%	45.5%	25.0%	31.2%	
BMI (Kg/m2)	18 to 24.9	23.1%	27.3%	25.0%	34.0%	0.82
	> 24.9	76.9%	72.7%	75.0%	66.0%	
Gender	Male	23.1%	36.4%	25.0%	23.6%	0.82
	Female	76.9%	63.6%	75.0%	76.4%	
Employment status	Employed	46.2%	45.5%	75.0%	37.5%	0.43
	Unemployed	53.8%	54.5%	25.0%	62.5%	
Education	Literate	46.2%	36.4%	75.0%	44.4%	0.61
	Illiterate	53.8%	63.6%	25.0%	55.6%	
Area of residence	Urban	46.2%	54.5%	50.0%	54.9%	0.94
	Rural	53.8%	45.5%	50.0%	45.1%	
Socioeconomic status	Lower (> 50K)	38.5%	45.5%	50.0%	40.3%	0.85
	Middle (50K to 100K)	30.8%	36.4%	25.0%	43.8%	
	Higher (> 100K)	30.8%	18.2%	25.0%	16.0%	

Discussion

Studies have underscored the superior safety profile of laparoscopic cholecystectomy while recognizing several potential port site morbidities. (13,14) The central theme across several studies is the low incidence of port site complications, which is generally reported as below 10% (3, 4). Infection is the predominant complication, though reported rates vary widely, from as low as 0% in some cohorts to approximately 6% in others. (15,16) This variance is often associated with differences in surgical technique, especially the method of gallbladder extraction and fascial closure. The use of sterile instruments is strongly emphasized as a simple and cost-effective measure to reduce wound infection rates substantially. (17) The complications also depend on the approach used for pneumoperitoneum; the open approach increases the risk of complications as compared to the closed approach. (15) The Site of gallbladder extraction can also influence the comfort of patients, with retrieval through the umbilical port associated with lower pain scores compared to the epigastric port. (18)

Although we excluded patients with diabetes mellitus, studies showed that it is associated with a higher risk of postoperative wound infection.19 Another associated factor is the inflammatory status of the gallbladder at the time of surgery; procedures performed for acute cholecystitis or empyema have a greater risk of complications compared to elective surgeries for chronic calculous disease. (20, 21)

In contrast, demographic variables such as age and gender are reported to be insignificant in relation to port site complications. (13)

The collective discussion in these studies ultimately reinforces laparoscopic cholecystectomy as the standard of care, characterised by a favourable safety profile, with port site issues relatively infrequent and often mitigable (1, 2). Emphasis is placed firmly on preventive surgical technique: secure fascial closure of larger port sites, routine utilisation of a retrieval bag, and judicious antibiotic prophylaxis, particularly in identified high-risk cases (3, 5). Many authors conclude by acknowledging limitations inherent to their work, such as single-centre designs or modest sample sizes, and advocate for further large-scale, multicentre research to strengthen the evidence on technical comparisons and refine risk-stratification models (6, 7).

The complication rate in the current study was 16.3%. Infection was the leading complication at 7.6%, followed by pain at 6.4% and abscess at 2.3%. Bhavikatti et al. reported that infection was the most common presentation of port site complications, a finding similar to ours. (18) Taj et al. reported that surgeries performed using endogloves have significantly lower rates of abscess as compared to those without endogloves. (19)

The findings from this study suggest that laparoscopic cholecystectomy is associated with a low rate of port-site complications, with infection being the most common. Its unique contribution is the detailed evidence suggesting that a patient's socioeconomic status, education level, employment, or residence may not be significant independent risk factors for these complications. Future prospective multicentre studies should integrate detailed operative metrics and standardised outcome assessments to confirm these observations in this population.

Conclusion

The present study demonstrated that laparoscopic cholecystectomy is a safe procedure with minimal port-site complications, including infection (7.6%), pain (6.4%), and abscess (2.3%). Furthermore, the study did not identify any associations between port site complications and demographics.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-1982/HMC/QAD-F)

Consent for publication

Approved

Funding

Not applicable

Conflict of interest

The authors declared no conflict of interest.

Author Contribution

JA (PGR General Surgery)

Manuscript drafting, Study Design, Data Collection and analysis.

MS (Associate Professor)

Supervision, Critical Input and Final approval of draft

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the study's integrity.

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