

Comparison Of Port Site Infection with and Without Use of Retrieval Bag for Gall Bladder Extraction in Elective Laparoscopic Cholecystectomy

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ABSTRACT

Objective: To compare the incidence of port site infection with and without use of retrieval bag for extraction of gall bladder in elective laparoscopic cholecystectomy.

Study Design: Quasi experimental study.

Place and Duration of Study: Combined Military Hospital, Bahawalpur Pakistan, from Oct 2019 to Dec 2020.

Methodology: Sixty patients were enrolled in this study after screening through inclusion and exclusion criteria. There were all planned to undergo laparoscopic cholecystectomy and were randomly allocated into two equal groups. Group A included patients in whom retrieval bags were used and Group B comprised patients in whom extraction bags were not used. All patients were followed up by clinical examination for development of infection at the port site till 10th post-operative day. Frequency of clinical development of infection at gall bladder extraction port site was noted for every group.

Result: Mean age of the patients was 41.00 ± 13.70 years with an age range of 22-85 years. Among all patients, 9(18%) were male and 51(82%) patients were females. In Group A, 2 patients developed port site infection clinically, whereas in Group B, 3 patients developed infection. The *p*-value was calculated and was found to be 0.64. These results are not statistically significant showing that use of retrieval bag in elective laparoscopic cholecystectomy does not statistically decrease the occurrence of port site infection.

Conclusion: Use of retrieval bag does not significantly affect the development of port site infection from where gall bladder is extracted.

Keywords: Laparoscopic cholecystectomy, Port site infection, Retrieval bag.

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INTRODUCTION

Laparoscopic cholecystectomy has become the surgical treatment of choice for cholelithiasis particularly as it meets expectations of the patients for being day care surgery and allows early return to work, but occasionally, complications like port site infection, especially of the gall bladder extraction port, can induce adverse outcomes and potentially diminish the reputation of the attending surgeon.^{1,2} Factors such as comorbidities of the patient, increased operation time, inflamed gall bladder, peroperative perforation of the gall bladder, empyema of the gall bladder and particularly, umbilical port extraction of the gall bladder, have been proposed as possible incriminating causes for port site infection.³ Infection of the port site typically presents as painful swelling with redness and

discharge from the wound often accompanied with fever.⁴ Although it is easily treatable by surgically opening the wound and manual evacuation of pus, if any, along with appropriate antibiotic coverage, but emerging strains of atypical nontuberculous mycobacteria have brought this issue to the forefront, as these wounds present as a non healing discharging sinus, not responding to routine antibiotics, needing high index of suspicion and long term use of antibiotics to which infecting organism is sensitive.^{5,6}

Several advancements, including retrieval bags, have been introduced to minimize or effectively eliminate the risk of port site infection, especially due to inflamed gall bladder. However, the use of these retrieval bags incurs additional cost to the procedure. Custom made glove retrieval bags are frequently used in our local Pakistani context to reduce this additional financial strain on patients.^{7,8} The use of retrieval bags has also lead to an increased operative time and is, occasionally, associated with enlargement of port site

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Gall Bladder Extraction in Elective Laparoscopic Cholecystectomy

leading to increased chances of port site hernia in long term.^{9,10}

As a result, this study was formulated to find the occurrence of port site infection from using the retrieval bag and without using the retrieval bag, where the gall bladder is extracted, so as to reduce port site infections and minimize complications in patients.

METHODOLOGY

The quasi experimental study was conducted at CMH, Bahawalpur Pakistan, from Oct 2019 to December 2020, after taking approval from Ethics Review Board of the Hospital (IRB certificate EC-04-2021). Non probability convenience sampling technique was used. Sample size was calculated using OpenEpi online software for sample size estimation. The incidence of clinical port site infection was found to be 4.7%.¹¹ Using this value as a reference, confidence level of 95% and power of 80%, sample size of 52 was calculated.

Inclusion Criteria: Patients over the age of 18 years, belonging to either sex, admitted for undergoing laparoscopic cholecystectomy as an elective procedure were included.

Exclusion Criteria: Patients who underwent laparoscopic cholecystectomy as an emergency procedure, or had an accidental perforation of the gall bladder peroperatively, were excluded.

Sixty patients who underwent laparoscopic cholecystectomy were enrolled based upon inclusion and exclusion parameters. Patients were randomly allocated in to one of two groups with the help of random numbers table. In Group A, retrieval bags were used for the extraction of gall bladder and in Group B, retrieval bags were not used. Epigastric port site was used for laproscopic extraction (Figure). Presence of acute cholecystitis, gall bladder empyema, patient comorbidities such as diabetes mellitus, were considered as separate variables.

All patients undergoing laparoscopic cholecystomies were operated by the same surgeon using proper antiseptic and sterilization techniques. An unpowdered glove was customized to be used as a retrieval bag. All patients were given 1g of ceftriaxone intravenously as preoperative antibiotic at the time of induction of anesthesia. They were followed up for clinical development of gall bladder extraction portsite infection, characterized by pain, redness or pus discharge from the wound till 10th postoperative day.

The results were recorded by the researchers in a data collection form.

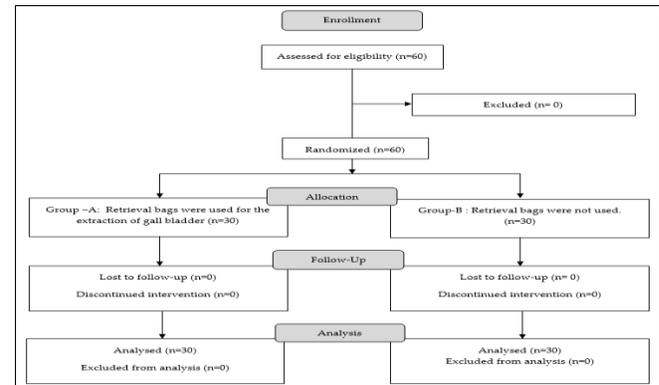


Figure: Patient Flow Diagram (n=60)

Data analysis was done using SPSS version 24.00. Continuous variables were shown as Mean±SD. Categorical variables, like clinical infection of gall bladder extraction portsite for each group, were shown as frequency and percentage. Frequency of development of clinical port site infection for both groups was measured independently and comparisons were made. Categorical variables were compared using Chi square test to find the significance of clinical port site infection in both groups. The *p*-value of ≤0.05 was considered as being statistically significant.

RESULTS

Sixty patients who underwent elective laparoscopic cholecystectomy were divided randomly into two groups with the help of random numbers table. In Group-A, retrieval bags were used for extraction of gall bladder and in Group-B retrieval bags were not used. Patients in both groups were observed for the development of clinical signs of infection till 10th day postoperatively.

Out of 60 patients 51(82%) were women and 9(18%) were men. Age range was between 22-85 years having a mean value of 41±13.7 years. In Group A clinical port site infection occurred in 2 patients and 3 patients in Group B had clinical portsite infection. Patients who developed port site infection improved with routine antibiotics and did not have any long term sequelae. The *p*-value was calculated to be 0.64, which was more than 0.05. These results were statistically not significant, indicating that routine retrieval bag use, for the extraction of gall bladder in elective laparoscopic cholecystectomy, did not

decrease the magnitude of gall bladder extraction port site infection (Table).

Table: Development of Gall Bladder Extraction Port Site Infection (n=60)

Patients	Port site infection		p-value
	Present	Absent	
Group A (n=30)	2 (6.6%)	28 (93.4%)	0.64
Group B (n=30)	3 (10%)	27 (90%)	

DISCUSSION

The study was carried out on patients who were planned to undergo elective laparoscopic cholecystectomies and were observed for the development of gall bladder extraction port site infection, which yielded non-significant results in our study.

However, evidence from literature indicates that the most common port site prone to infection is through which gall bladder is extracted.⁸ Often, it is left to the surgeon to choose the port site for extraction of gall bladder, which is usually either epigastric or umbilical.⁹ One study found that the use of retrieval bag in radiologically proven benign disease is not associated with decreasing the incidence of gall bladder extraction port site infection, and reported it as counter productive due to increases in operation time, increased chances of post operative pain and hernia formation due to fascial incision.¹⁰ This was similar to another study, with matching results, inferring that direct contact of gall bladder with the incision wound does not lead to increased incidence of infection, thus dismissing the routine use of gall bladder retrieval bag for its extraction.¹¹ While one researcher observed that epigastric port extraction of gall bladder has been associated with lesser incidence of port site infection as compared to umbilical port extraction,¹² epigastric port extraction of gall bladder has usually been associated with lesser chances of port site hernia in the long term as compared to umbilical port extraction.⁴

Spaziani *et al.*¹³ Sarkut *et al.*¹⁴ and Al-Qahtani *et al.*¹⁵ observed the efficacy of different methods to reduce the port site infection in laparoscopic procedures, including routine use of good skin antiseptics using povidone iodine solutions, prophylactic antibiotics, epigastric port extraction of gall bladder, use of retrieval bag with varying and inconclusive results. Among the patient comorbidities, diabetes has been found to be associated with most cases of port site infection.⁷ Karthik *et al.*² and Li *et al.*⁴ found that umbilical port is the most common site of

port site complications like infection and hernia of the portsite. Hajibandeh *et al.* has found that the patients who had umbilical port retrieval of gall bladder had less post operative pain and had their gall bladders removed quickly than the epigastric port,¹⁶ while Singal *et al.*¹⁷ found port site hernia not to be associated with fascial closure of the port site.

This study agrees with the findings of Majid *et al.*¹⁰ and Comajuncosas *et al.*¹¹ that use of retrieval bag does not reduce the port site infection rate of gall bladder extraction port site significantly. However, this study does not agree with the findings of Rehman *et al.*¹² and Sood *et al.*¹⁸ that use of retrieval bag significantly reduces the port site infection.

This study has its shortcoming in terms of small sample size. There is need to conduct the study with larger sample sizes with an aim to find the risk factors for port site infection in laparoscopic surgery to reduce the post operative discomfort to the patients.

CONCLUSION

This study has demonstrated that there is no statistically significant added benefit of using retrieval bag for extraction of gall bladder in elective laparoscopic cholecystectomy as far as infection of the gall bladder extraction port site is concerned.

Conflic of Interest: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

IA & MJM: Data acquisition, critical review, approval of the final version to be published.

MH & JUR: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

SA & SMH: Conception, data analysis, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Gall Bladder Extraction in Elective Laparoscopic Cholecystectomy

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