

**FREQUENCY OF PORT SITE WOUND INFECTION AFTER GALL BLADDER REMOVAL WITH AND WITHOUT RETRIEVAL BAG IN LAPAROSCOPIC CHOLECYSTECTOMY**

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**Abstract:** *Cholecystectomy is the preferred therapy for symptomatic gallstones, which involves removing the organ implicated in the development of gallstones and the difficulties that arise from them. This research was conducted to examine the incidence of port site infection between patients having laparoscopic cholecystectomy with and without retrieval bags. **Objective:** To compare the frequency of port site wound infection after gall bladder removal with and without retrieval bag in laparoscopic cholecystectomy. **Methods:** This Randomized Controlled Trial was carried out at the General Surgical Department of Allama Iqbal Teaching Hospital, Dera Ghazi Khan. The study duration was six months, from June 2022 to December 2022. One hundred patients in total were recruited and divided into two groups. In Group A, after a laparoscopic cholecystectomy, the laparoscope was inserted via the epigastric port site, and a retrieval bag was used to insert the bag through the umbilical port site. The laparoscope was moved to the epigastric port in Group B, where the gall bladder was removed without a retrieval bag. Patients in this group were monitored for a month to look for post-operative port site infections. **Results:** In the current study, 100 cases were enrolled. Of the male patients, 44 (44%) and 56 (56%) were female. The mean age of our study cases was  $31.77 \pm 2.86$  years. Of these 100 study cases, 33 (33%) had ASA grade I, and 67 (67%) had ASA grade II. Port site infection was present in 7(7%) of our study cases. Port site infection in group A was present in 4 %, while in group B was 10 %. ( $p = 0.436$ ). **Conclusion:** Laparoscopic cholecystectomy using a retrieval bag for removal of the gallbladder is "quite safe, reliable and effective procedure" as the frequency of port site infection was low in our study cases. Port site infection was more frequent in patients undergoing laparoscopic cholecystectomy without retrieval bags as compared with those with retrieval bags. However, this difference was not statistically significant.*

**Keywords:** Retrieval Bag, Laparoscopic Cholecystectomy, Infection

## Introduction

Cholecystectomy is the therapy of choice for gallstones that are causing symptoms since it involves the removal of the organ that is responsible for both the production of gallstones and the difficulties that they cause (1). Laparoscopic cholecystectomy (LC) is now the most frequent laparoscopic procedure done all over the globe. It is also considered the gold standard therapy for gallstones-causing symptoms. During the dissection and removal of the gall bladder, the most frequent problems are gall bladder perforation and spilling, accounting for 25% of all cases (2, 3). Despite this, there has been an increase in reports of infectious problems brought on by stones that were not recovered and bile that was spilt. These side effects not only obscure the benefits of minimum-access surgery but also put the patient at greater financial risk. A more significant amount of work is also placed on the personnel, and the reputation of the hospital and the attending surgeon is negatively impacted. When doing laparoscopic surgery, it is essential to remove the surgical specimen from the cavity that is located inside the abdominal cavities. Many different types of specimen retrieval systems have been employed. Still, an ideal organ-entrapment system should be simple to use, provide simple entrapment, and provide high visibility while using several ports (4). Furthermore, the bags need to have high resistance while being manipulated. Several varieties of specimen retrieval bags have been documented, such as the Nadiad bag (Nadiad, India), the condom (general

marketing use), the modified zipper bag (wide marketing use), and the unpowered bag (general surgical usage). The occurrence of postoperative wound infections may also be attributed to various other variables. Several different approaches have been tried to bring these under control. Some people, however, have the mistaken assumption that antibiotics are the remedy to all of these problems, which leads to the improper usage of antibiotics and, consequently, the development of bacteria resistant to antibiotics. A study conducted by Taj MN and his colleagues revealed that the incidence of port site wound infection after laparoscopic cholecystectomy was 7.4% when retrieval bags were used to remove the gall bladder. Still, the incidence was 74% when retrieval bags were not used (5). The prevalence of port site wound infection after gall bladder removal with a retrieval bag was determined to be zero per cent in laparoscopic cholecystectomy, according to research that was conducted by Kao et al. (6) the general population in our country has a limited amount of data that can be gathered on this subject. Furthermore, the purpose of this research is to get further data on this subject from our local people, as well as to concentrate on the technology and method of specimen extraction that is both cost-effective and efficient. In the context of laparoscopic cholecystectomy, this research aims to examine the differences in the incidence of port site wound infection after removing the gall bladder with and without the use of a retrieval bag.

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**Methodology**

This Randomized Controlled Trial was conducted at the General Surgical Department of *Allama Iqbal Teaching Hospital, Dera Ghazi Khan*. The study duration was six months, from June 2022 to December 2022. A total of 100 patients were enrolled in the current research, and they were divided into two groups. Fifty patients were in the retrieval bag group or Group A, while fifty patients were in the group without retrieval bag or Group B.

The study includes individuals aged 25-35 of both genders with up to 5 gallstones (each < 2cm) confirmed by ultrasound for over six months, necessitating laparoscopic cholecystectomy. Participants must be ASA grades I or II. Exclusion criteria comprise a history of upper abdominal surgery, cholecystitis or pancreatitis on ultrasound, and conversion from laparoscopic to open surgery. These criteria ensure a homogeneous cohort for a more precise analysis of laparoscopic cholecystectomy outcomes in this age group.

Patients from the general surgery ward of *Allama Iqbal Teaching Hospital, Dera Ghazi Khan*, who met the inclusion criteria were allowed to participate in the study after receiving clearance from the research department and the ethics committee of *Allama Iqbal Teaching Hospital, Dera Ghazi Khan*. The patient was provided with a comprehensive explanation of their involvement in the trial, and a signed informed consent was acquired after the patient was told of the potential risks and benefits associated with the study. An experienced consultant surgeon who had a minimum of five years of experience and was well-versed in laparoscopic cholecystectomy performed the surgery on every one of the patients while they were under general anaesthesia. The randomisation was carried out using a block design, and the ratio of patients in Group A and Group B was 1:1. Every patient scheduled to have laparoscopic cholecystectomy was randomly assigned to the next group. In group A, there were fifty patients; in group B, there were also fifty patients. At the time of induction, one gram of ceftriaxone was given by injection to each patient. Subsequently, two doses were administered, each with a 12-hour gap. Following the completion of the laparoscopic cholecystectomy procedure in Group A, the laparoscope was inserted via the epigastric port site, and the retrieval bag (ENDOPOUCH® Ethicon) was inserted through the umbilical port site. The retrieval bag was used to extract the gallbladder, and it was then taken out via the umbilical incision on the patient. In Group B, the laparoscope was transferred to the epigastric port, and a large-tooth grasping forceps was introduced via the umbilical port to grab the gallbladder at the location of the cystic duct. This procedure

was performed to remove the gallbladder without the need for a retrieval bag. Once the gallbladder was located, it was collected and extracted via the umbilical port to the greatest extent feasible. This was done under direct observation. If the gallbladder is sufficiently tiny, it is inserted directly into the trocar sleeve, and the trocar that is accompanied by it may subsequently be withdrawn. After surgery, the first dressing was replaced on the fourth day after the procedure. After eight days following surgery, the stitches were removed entirely. After four weeks, the patients were evaluated for port site wound infection by the operational definition, and the final result was recorded on a proforma prepared explicitly for this purpose.

Software for statistical analysis, namely IBM-SPSS version 20, was used to examine the data. The percentage of outcomes achieved by these two groups was compared via analysis. To determine the frequency and rate of qualitative factors such as age groups, gender, ASA grade, and port site wound infection. Mean ± standard deviation was reported for quantitative variables such as age, duration of complaint, and body mass index (BMI).

**Results**

This research contained a total of 100 study cases that satisfied the inclusion criteria of our investigation. In this research, there were 100 instances, and 44 (44%) of them were male patients, while 56 (56%) were female patients. The research cases had an average age of  $31.77 \pm 2.86$  years, with a minimum age of 26 and a maximum age of 35. The average age of the male and female patients was  $32.68 \pm 2.63$  and  $31.05 \pm 2.89$  years, respectively. ( $p = 0.004$ ). According to the findings of our investigation, the bulk of the 69 (69%) study patients were older than 30. Thirty-six per cent came from low-income households, and sixty-four per cent came from middle-class families out of the one hundred research cases; 41 (41%) and 59 (59%) were rural and urban, respectively. The mean no. of stones was  $2.87 \pm 1.13$ , and 55 (55%) had up to 3 stones, while the mean size was  $1.25 \pm 43$  centimetres, and 68 (68%) had more than 1 cm sized rocks.

Our study cases' mean body mass index was  $25.43 \pm 2.81$  kg/m<sup>2</sup>, and obesity was present in 25 (25%) of our study cases. The mean duration of complaints was  $16.55 \pm 10.28$  months, and 60 (60%) of our study cases had more than 12 months of complaints. Of these 100 study cases, 33 (33%) had ASA grade I, and 67 (67%) had ASA grade II. (Table 1) In our study, port site infection was present in 7(7%) cases. Port site infection in group A was present in 4 %, while in group B was 10 %. ( $p = 0.436$ ). (Table 2).

**Table 1: Socio-demographic and clinical characteristics of the patients**

Parameter	Sub-category	Group A	Group B
Gender	Male	21 (42%)	23(46%)
	Female	29 (58%)	27(54%)
Age (Years)	Up to 30	16(32%)	15(30%)
	More than 30	34(68%)	35(70%)
Residential status	Rural	<b>21(42%)</b>	20 (40%)
	Urban	29(58%)	30 (60%)
Socioeconomic status	Poor	17(34%)	19 (38%)
	Middle income	33 (66%)	31 (62%)
No of stones	Up to 3	28 (56%)	27 (54%)

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	More than 3	22 (44%)	23 (46%)
Size of stone	Up to 1 cm	15 (30%)	17 (34%)
	More than 1 cm	35 (70%)	33 (66%)
Obesity	Yes	13 (26%)	12 (24%)
	No	37 (74%)	38 (76%)
Duration of complaints	Less than 12 months	19 (38%)	21 (42%)
	More than 12 months	31 (62%)	29 (58%)
ASA grades	Grade I	16 (32%)	17 (34%)
	Grade II	34 (68%)	33 (66%)

**Table 2: Distribution of Port site infection among study cases**

Port site infection	Group A Frequency (%)	Group B Frequency (%)
Yes	02 (4%)	05 (10%)
No	48 (96%)	45 (90%)

**Discussion**

A paradigm change in current medical treatment approaches has been brought about by laparoscopic surgery (LS), often known as minimum access surgery. The advantages of this procedure include quicker recovery after surgery, less discomfort, better aesthetic results, and a quicker return to work for both patients and doctors. From cholecystectomies to appendectomies, its use has expanded into several other specialities, including gynaecology, oncosurgery, urology, and gastrointestinal surgery (7). But LS comes with a unique set of challenges. While rare, port site infection (PSI) is one of the annoying side effects that negate the advantages of minimally invasive surgery. It increases the patient's morbidity and damages the surgeon's reputation. PSIs continue to be prevalent even with advancements in antimicrobial agents, sterilisation, surgery, and operating room ventilation. The situation has been made worse by the multidrug-resistant atypical mycobacteria that are rapidly expanding and are typically the causal organism in most instances (8). If the proper precautions are followed before, during, and after surgery, PSIs may be avoided. PSIs may typically be corrected without surgery when diagnosed early and treated appropriately. Antibiotics such as macrolides, quinolones, and aminoglycosides show encouraging results when used against atypical mycobacteria (9).

An infection may develop in any surgical site. PSIs continue to be common despite advancements in antibacterial agents, sterilising methods, surgical procedures, and operating room ventilation. Due to the reduced incisional length, the incidence of surgical site infections (SSI) after elective laparoscopic cholecystectomy is lower than that following open cholecystectomy. The umbilical PSIs of patients having laparoscopic cholecystectomy do not alter based on the primary port entrance strategy used in the peritoneum. According to reports, the umbilical PSI rate in LS is 8%, and 89% of infections happen after laparoscopic cholecystectomy, while 11% occur following laparoscopic appendectomy. The variables indicating 30-day readmission after laparoscopic colorectal cancer surgery were investigated by Francis et al. Within their research, 48 patients (18%) who had undergone laparoscopic colorectal surgery were readmitted due to surgical site infections (SSIs) (9).

This research contained a total of 100 study cases that satisfied the inclusion criteria of our investigation. In our study, 44 (44%) and 56 (56%) of the 100 research cases were male and female, respectively. Similar to our study's

findings, Ozkardeş et al. (10) showed that 66% of laparoscopic cholecystectomy patients were female. Similar to our research's results, a Saudi Arabian study found a 4.5:1 female gender preponderance. The results of our research are consistent with a survey by Saeed et al. (12) from Abbottabad that likewise noted a high percentage of female patients (90%). The 73% female gender preponderance reported by Soomro et al. (13) from Larkana is comparable to the findings of our investigation. The female gender preponderance reported by Muhammad et al. (14) had a 4:1 ratio, equivalent to our investigation's findings. Our study's findings are similar to Memon et al. (15) from Sukkur, who found that 70% of female patients had acute cholecystitis. The research cases had an average age of 31.77 ± 2.86 years, with a minimum age of 26 and a maximum age of 35. The average age of the male and female patients was 32.68 ± 2.63 and 31.05 ± 2.89 years, respectively. (p = 0.004). According to the findings of our investigation, the majority of the 69 (69%) study patients were older than 30. The mean age of patients who had laparoscopic cholecystectomy was reported by Ozkardeş et al. 10 to be 58.03 ± 10.44 years, which is much older than the findings of our research. Our inclusion criteria, which limited our sample size to patients between 25 and 35, are responsible for this discrepancy. Our study's findings are in close agreement with Al-Salamah et al. (11) assessment of the patient's mean age of 43.7 years. Saeed et al. (12) from Abbottabad have shown comparable outcomes. The mean age of the patients, as reported by Muhammad et al. (14) from Larkana, was 45.75 years, which is similar to the findings of our investigation. In line with the findings of our investigation, Memon et al. (15) also observed that the average age of patients with acute cholecystitis was 45 years.

In the current study, 41 (41%) patients were from rural areas, 59 (59%) were from urban, 36 % were from low-income families, and 64 (64%) were from middle-income families. The mean no. of stones was 2.87 ± 1.13, and 55 (55%) had up to 3 stones, while the mean size was 1.25 ± 43 centimetres, and 68 (68%) had more than 1 cm sized rocks. The mean BMI in our study cases was 25.43 ± 2.81 kg/m<sup>2</sup>, and obesity was present in 25 (25%) of our study cases. The mean duration of complaints was 16.55 ± 10.28 months, and 60 (60%) of our study cases had more than 12 months of complaints. Of these 100 study cases, 33 (33%) had ASA grade I, and 67 (67%) had ASA grade II. Port site infection was present in 7(7%) of our study cases. Port site infection in group A was present in 4 %, while in group B was 10 %. (p = 0.436). Discharge from the port site with

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retrieval bag was 6.9 %, while without bag was noted to be 82.3%. Taj MN et al. found in a study that the frequency of port site wound infection was 5.48 %, which is similar to our findings. In comparison, discharge from the port site after gall bladder removal with retrieval bag was 7.4% and 74% without retrieval bag in laparoscopic cholecystectomy (5). Mashhadi MTR et al. reported a frequency of 3.4 % port site infections in their study (16) which is similar with our results.

## Conclusion

Laparoscopic cholecystectomy using a retrieval bag for removal of the gallbladder is quite a “safe, reliable and effective procedure” as the frequency of port site infection was low in our study cases. Port site infection was more frequent in patients undergoing laparoscopic cholecystectomy without retrieval bag as compared with those with retrieval bag. However, this difference was not statistically significant.

## 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. (AITH/DGK/NO-55/2021)

### Consent for publication

Approved

### Funding

Not applicable

## Conflict of interest

The authors declared the absence of a conflict of interest.

## Author Contribution

**MUHAMMAD RIZWAN ANWAR** (Assistant professor)  
Study Design, Review of Literature.

Conception of Study, Development of Research Methodology Design, Study Design, manuscript Review, and final approval of manuscript.

**MUHAMMAD ALI LUND** (Senior Registrar)

Conception of Study, Final approval of manuscript. Manuscript revisions, critical input.

**MUHAMMAD ASIM BHATTI** (Senior Registrar)

Data entry and data analysis, as well as drafting the article. Coordination of collaborative efforts.

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