

## ORIGINAL ARTICLE

**Incidence, Risk Factors and Outcome of Gallbladder Perforation during Laparoscopic Cholecystectomy**ZAHOOR AHMED<sup>1</sup>, NAVEED ULLAH KHAN<sup>2</sup>, JAVED AHMAD<sup>3</sup>, SARWAT SAEED<sup>4</sup>, SYEDA FATIMA BATOOL<sup>5</sup>, ASAD SAMI<sup>6</sup>, MARIA ZAFAR<sup>7</sup>, AILIYA KHAWAR<sup>8</sup><sup>1,2</sup>Surgeon, General Surgery department, Federal Government Polyclinic Hospital, Islamabad<sup>3</sup>Consultant Surgeon General Surgery department, Federal Government Polyclinic Hospital, Islamabad<sup>4</sup>Senior Registrar General Surgery department, Federal Government Polyclinic Hospital, Islamabad<sup>5,6,7,8</sup>Medical Officer General Surgery department, Federal Government Polyclinic Hospital, IslamabadCorresponding author: Zahoor Ahmed, Email: [drzahoor76@gmail.com](mailto:drzahoor76@gmail.com)**ABSTRACT****Background and Aim:** Gallbladder perforation has been recorded in patients undergoing laparoscopic cholecystectomy and associated with the development of gallstones and bile leakage. The present study investigated the incidence, risk factors, and outcome of gallbladder perforation in patients undergoing elective laparoscopic cholecystectomy.**Patients and Methods:** This prospective study was conducted on 156 patients who underwent laparoscopic cholecystectomy in the department of General Surgery, Federal Government Polyclinic Hospital, Islamabad from January 2021 to July 2022. Gallbladder stone patients with chronic symptoms such as vomiting, recurrent episodes of epigastric, nausea, and hypochondrial pain on right side were included. Acute cholecystitis patients with single or multiple gallstone disease were also enrolled. All the patients were prepared for laparoscopic cholecystectomy and investigations such as blood sugar, liver function test, CBC, blood urea and creatinine, ultrasound of gallbladder, and ECG were done. SPSS version 26 was used for data analysis.**Results:** Of the total 156 patients, there were 126 (80.8%) females and 30 (19.2%) male. Age-wise distribution of patients were as follows: 66 (42.3%) in 20-35 years, 52 (33.3%) in 36-50 years, and 38 (24.4%) in 51-65 years. The incidence of single gall stone (SGS), multi gallstones (MGS), and acute cholecystitis was 48 (30.8%), 88 (56.4%), and 20 (12.8%) respectively. The overall mean age was 36 years. The incidence of gallbladder perforation was 26.9% (n=42) among all patients. Patients distribution based on gallbladder perforation were as follows: 17 (10.9%) in MGS, 14 (9.0%) in SGS, and 11 (7.1%) in acute cholecystitis cases.**Conclusion:** The present study found that the prevalence of gallbladder perforation was 26.9% among SGS, MGS, and acute cholecystitis. Majority of GB perforation occurred during gallbladder bed dissection. Acute cholecystitis patients are more prone to GB perforation. GB perforation can be reduced by utilization of harmonic scalpel in laparoscopic cholecystitis.**Keywords:** Elective laparoscopic cholecystectomy, Gallbladder perforation, Outcomes**INTRODUCTION**

In general surgery, cholecystectomy is the second most common abdominal operation [1]. Compared to traditional cholecystectomy, laparoscopic cholecystectomy has several advantages, including better aesthetic outcomes, a shorter hospital stay, less postoperative discomfort, and a quicker return to normal routine [2, 3]. Additionally, it can also cause hemorrhage, pancreatitis, and abscesses as well as damage to the bile ducts. The post-cholecystectomy intraoperative complication is gallbladder perforation reported with 10% to 33% occurrence rate [4, 5]. Male gender, with a prior history of previous laparotomies, an inflamed gallbladder and a difficult operation have all been associated to an increased risk of GP [6-8]. Benign gallbladder disease is treated by laparoscopic cholecystectomy rather than open surgery [9].

Females are more susceptible to gallstone diseases than male and approximately affecting 20% females and 5% males. Cholesterol contributes 75% to the development of gallstones [10]. Gallbladder: The gallbladder is made up of the body, fundus, neck, and infundibulum. The biliary duct anatomy varies widely [11]. Most gallstones are a sign of an acute cholecystitis or stone passage through the biliary system [12]. The complications of laparoscopic cholecystectomy include common bile duct injury, haemorrhage, bile leak, retained gall stone, and wound infections [13]. Gallbladder perforation can occur due to a number of factors such as during dissection, tool direct penetration, excessive retraction, and evacuation of a trocar site bloated gallbladder [14]. Harmonic scalpel during gallbladder bed dissection has improved surgical quality by lowering the GB perforation frequency and intra-operative complications [15]. After laparoscopic cholecystectomy, stones often spill into the peritoneum due to gallbladder perforations [16].

**METHODOLOGY**

This prospective study was carried out on 156 patients who underwent laparoscopic cholecystectomy in General Surgery

Department of Federal Government Polyclinic Hospital, Islamabad from January 2021 to July 2022. Gallbladder stone patients with chronic symptoms such as vomiting, recurrent episodes of epigastric, nausea, and hypochondrial pain on right side were included. Acute cholecystitis patients with single or multiple gallstone disease were also enrolled. All the patients were prepared for elective laparoscopic cholecystectomy and investigations such as blood sugar, liver function test, CBC, blood urea and creatinine, ultrasound of gallbladder, and ECG were done. Profiles of patients were used to gather information about potential risk factors and early results. Furthermore, demographic information about the patients, such as age, gender, and BMI, was acquired. The data was analyzed using the SPSS version 26. The results were reported as frequencies and percentages in terms of graph and tables.

**RESULTS**

Of the total 156 patients, there were 126 (80.8%) females and 30 (19.2%) male. Age-wise distribution of patients were as follows: 66 (42.3%) in 20-35 years, 52 (33.3%) in 36-50 years, and 38 (24.4%) in 51-65 years. The incidence of single gall stone (SGS), multi gallstones (MGS), and acute cholecystitis was 48 (30.8%), 88 (56.4%), and 20 (12.8%) respectively. The overall mean age was 36 years. The incidence of gallbladder perforation was 26.9% (n=42) among all patients. Patients distribution based on gallbladder perforation were as follows: 17 (10.9%) in MGS, 14 (9.0%) in SGS, and 11 (7.1%) in acute cholecystitis cases. Gender's distribution is illustrated in Figure-1. Age-wise distribution are shown in Figure-2. Table-I represent the incidence of single gallstone, multiple gallstones, and acute cholecystitis. Figure-3 demonstrate the distribution of gallbladder perforation in SGS, MGS, and acute cholecystitis cases. Table-II shows the distribution of gallbladder perforation patients based on gender differences in SGS, MGS, and acute cholecystitis.

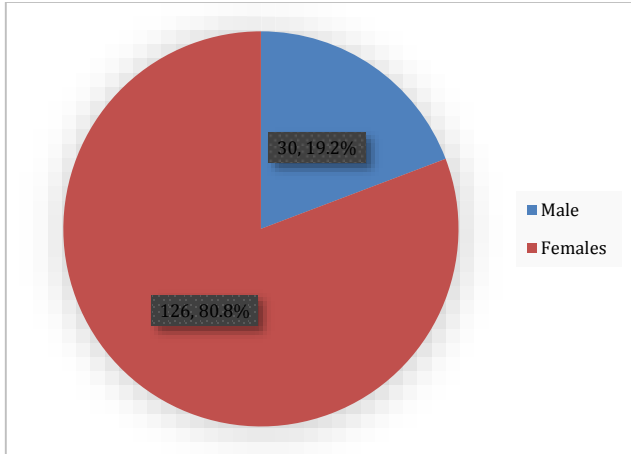


Figure-1: Gender's distribution (n=156)

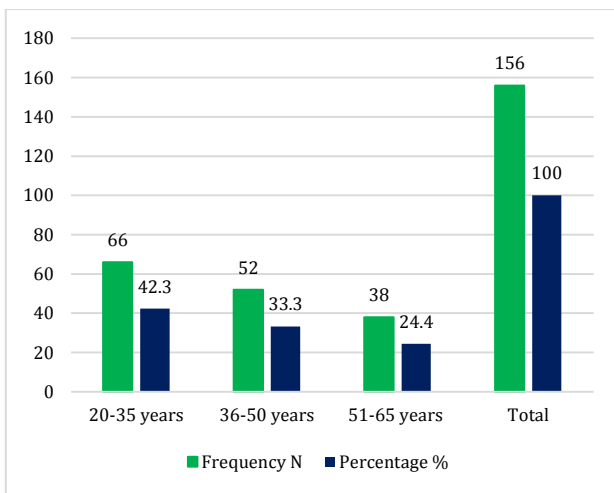


Figure-2: Age-wise distribution of patients (n=156)

Table-1: Incidence of SGS, MGS, and acute cholecystitis (n=156)

Groups	Frequency N	Percentage %
SGS	48	30.8
MGS	88	56.4
Acute cholecystitis	20	12.8
Total	156	100

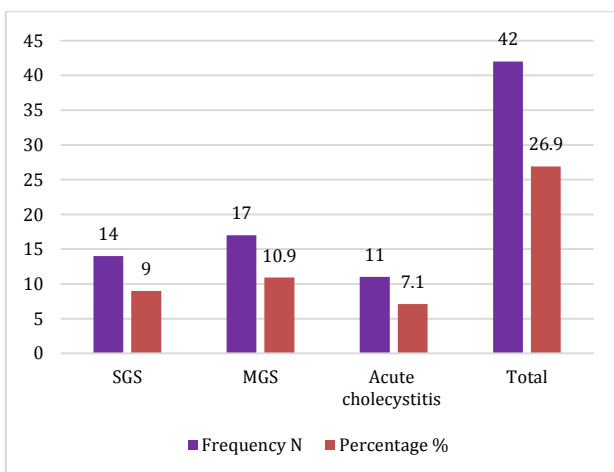


Figure-3: distribution of gallbladder perforation in SGS, MGS, and acute cholecystitis cases (n=26)

Table-2: distribution of gallbladder perforation patients based on gender differences in SGS, MGS, and acute cholecystitis.

Group	Male N (%)	Female N (%)
SGS	6 (3.8)	8 (5.1)
MGS	7 (4.5)	10 (6.4)
Acute cholecystitis	6 (3.8)	5 (2.6)
Total	19 (12.1)	23 (14.1)

**DISCUSSION**

Gallbladder perforation is commonly treated with laparoscopic cholecystectomy (GP). Aside from preventing the risks associated with open surgery and the high cost of hospitalization, this procedure can reduce the complications associated with open surgery. Laparoscopic cholecystectomy can induce GP, despite being the first-choice treatment for GP [17]. Furthermore, it has been demonstrated that gallbladder perforations morbidity may be minimized safely and affordably with laparoscopic cholecystectomy [18]. El Mallaha et al [19] revealed that diabetic individuals are frequently identified with clinically silent gallbladder problems, which can result in unexpected catastrophic consequences requiring emergency surgery.

An inadvertent gallbladder perforation happens during LC, leading in a lengthy surgery and hospital stay. Male gender, acute cholecystitis, and surgeon experience were all risk factors for perforated gallbladder [20]. As surgeons' familiarity with this approach has expanded, instrumentation and dissection issues constrained the gallbladder tearing and GB acute friability [21]. Bed dissection for gall bladder mostly contributes to GB perforation.

Numerous studies have observed the gallbladder perforation possible risk factors during laparoscopic cholecystectomy. In a multivariable logistic regression study, various risk factors for GB perforation were male gender, acute cholecystitis prior history, and the severely inflamed gallbladder presence [22]. The prevalence of GB perforation in the present study was 26.9%. Prior laparotomy, age, pigment stones, preoperative anomalies such as hydrops and GB wall thickening, and surgeon expertise affect the incidence of GB perforation [23].

A previous study investigated 131 patients and found that 69 gall bladder perforations (52.7%) occurred during dissecting the gallbladder from the hepatic fossa [24]. Khan et al., [25] the occurrence was 16%, which is lower than our findings. The frequency was 36% in a research conducted by Hu et al [26]. The current study's findings showed that approximately 95% of individuals with stones were found via ultrasonography tests. Similarly, Gregori, et al., [27] discovered in an Iraqi research that iatrogenic gallbladder perforation and gallstone leakage are associated, and this relationship may result in abdominal infections, which can lead to a variety of gastrointestinal disorders. As a result, the presence of any type of stone increases the likelihood of other abdominal infections and difficulties.

Another study done in Iraq by Hanashe et al [28] showed that accurately recognizing the presence of any type of stone can reduce the risk of gallbladder perforation. The majority of spilled stones are clinically asymptomatic, however adverse effects occur in 0.04% to 19% of cases. When there is any type of stone, the most common consequence is intra-abdominal abscess development.

Similarly, Evans et al [29] reported that GB perforation mostly caused by various risk factors such as increased obesity, male gender, advancement of age, upper right abdomen adhesion, preoperative palpable GB, acute cholecystitis, and pain lasted for more than 96 hours. Of these parameters, an individual's age is the most critical factor that contributed to GB perforation. Sahil et al [30] found that GB perforation was mostly caused by two significant factors which were female gender and individual's age.

**CONCLUSION**

The present study found that the prevalence of gallbladder perforation was 26.9% among SGS, MGS, and acute cholecystitis. Majority of GB perforation occurred during gallbladder bed

dissection. Acute cholecystitis patients are more prone to GB perforation. GB perforation can be reduced by utilization of harmonic scalpel in laparoscopic cholecystitis.

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