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ORIGINAL ARTICLE

Incidence of Gall Bladder Perforation During Laparoscopic Cholecystectomy in Mosul, Iraq

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ABSTRACT

Background: Gall bladder (GB) perforation is a common occurrence during laparoscopic cholecystectomy, and knowing the state of the GB before the operation, whether acute, single, or multiple gall stones (GS), can assist in directing treatment.

Objective: In our study, we clarify the causes that lead to perforation of the gall bladder, so we can avoid them if possible and the risk factors.

Setting: Al Jumhoory Teaching Hospital

Duration: From May 2020 to August 2021

Patients And Methods: Prospective study for 170 patients underwent laparoscopic cholecystectomy for symptomatic cholelithiasis and calculus cholecystitis. The patients have gall stone disease, either single or multiple GS, and complained of recurrent symptoms of right hypochondrium. Also, patients having acute cholecystitis not responding to medical treatment included. All patients were prepared electively for cholecystectomy and complete investigations and ultrasound of gall bladder and the biliary system performed and anesthesiologic consultation done.

We used the standard American method of laparoscopic cholecystectomy.

Results: Total number of patients in this study was 170 patients. All patients have undergone laparoscopic cholecystectomy in Al Jumhoory teaching hospital as elective cholecystectomy. Patients with MGS was 93 patient GB perforation occurred in 12 patients, 7 female, and 5 male patients. Patients with SGS were 59 patients, and GB perforation occurred in 11 patients. A total of 8 females and 3 males. The number of acute cholecystitis patients was 18 patients, GB perforation occurred in 8 patients.

Conclusion: Gall bladder perforation is not uncommon during the lap. Chole (laparoscopic cholecystectomy) Gall bladder perforation occurs most common during dissection of GB bed by hook cauterization. Traumatic grasper can also cause injury and rupture of GB if used without caution, and excessive traction of GB Perforation occurs in high percentage in acute cholecystitis and with thickening of GB wall. Slipped clips may cause bile leak and or bleeding, which obscure vision, and perforation occurs during dissection. Use of harmonic decreases the risk of gallbladder perforation. In acute cholecystitis and cases with a high rate of perforation, blunt dissection is preferred, and the use of harmonic may reduce the incidence of GB ruptured.

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INTRODUCTION

Gall stones form when the bile is saturated with cholesterol or bilirubin.[1] Laparoscopic cholecystectomy (LC) is the gold standard for the treatment of gall stones and many biliary diseases such as cholelithiasis and cholecystitis.[2,3] Gall stones form in females more than males. Most common age group 45–60 years, approximately 20% of women and 5% of men have gallstones. Overall, 75% of gallstones are composed of cholesterol, and the other 25% are pigmented.[4]

Gallbladder: Consists of four anatomical parts (the fundus, the body, the infundibulum, and the neck). The anatomy of the biliary ducts varies greatly.[5]

The Calot triangle is a surgical anatomical landmark formed by the cystic duct on the left, the common hepatic duct on the right, and the liver edge on the left. This triangle is surgically significant because of the placement of the cystic artery's most typical passage to the gall bladder.[6]

Most gallstones are a symptom, and symptoms occur due to infection (acute cholecystitis) or the pass of stone to the biliary system.[7]

The first descriptions of gallstones in the renaissance, perhaps because of the low incidence of gallstones in earlier times.[8]

Physician Joenisius performed the first surgical removal of a gallstone (cholecystolithotomy) in 1676, removing the stones from a naturally occurring biliary fistula.[9] Carl Langenbuch, a German surgeon, performed the first cholecystectomy in 1882.[10] Eric Muhe performed the first LC (laparoscopic cholecystectomy) in Germany.

Stough Hobbs in 1867 performed the first recorded cholecystectomy.[11]

Asymptomatic gallstones affect ten to fifteen percent of the population. Symptomatic people account for 20% of the population (biliary colic). Approximately 1% to 4% of symptomatic patients will have complications (acute cholecystitis, gallstone pancreatitis, choledocholithiasis, gallstone ileus.[12] Prophylactic antibiotics are not required, according to Chong *et al*., but should be administered in malnourished patients.[13]

Bile leak, common bile duct damage, bleeding, retained gall stone, and wound infections are all risks of laparoscopic cholecystectomy.[14] Perforation of the gallbladder can happen for a variety of causes, including excessive retraction during dissection, direct puncture with an instrument, and removal of a swollen gallbladder through a trocar site.[15]

In Laparoscopic Cholecystectomy (LC), dissection of the gallbladder bed with a harmonic scalpel has enhanced the quality of surgery by reducing the incidence of gallbladder perforation and intra-operative complications.[16] In a study in Menoufia, monopolar diathermy was found to have a considerably higher frequency of gall bladder perforation (17.5 vs. 7.5) in LC when compared to a harmonic scalpel.[17]

LC was accepted as the treatment of choice for individuals with symptomatic gallstones by a consensus statement from the National Institute of Health (NIH) conference in 1992.[18]

During LC, perforation of the gall bladder (PGB) causes bile and gall stones to leak into the peritoneal cavity, potentially leading to infection.[19] With laparoscopic cholecystectomy, gallbladder perforation with stones spilling into the peritoneal cavity is more common.[20]

The most significant consequence is iatrogenic damage to the common bile/hepatic duct. If any of these structures are damaged, a surgical treatment to reroute the flow of bile into the intestines may be required. A properly skilled hepatobiliary surgeon is usually required for this surgery.[21]

PATIENTS AND METHODS

This study included 170 patients studied prospectively from May 2020 to August 2021 in Al Jumhoory teaching hospital In Mosul city. The analysis performed on patients presented with chronic symptoms of gall stone disease manifested as recurrent episodes of epigastric and right hypochondrial pain, nausea, and vomiting.

Also, patients presented with acute cholecystitis included in the study, including single and multiple gall stone disease.

The patients prepared before the operation and sent investigations including liver function test, INR, CXR, ECG, complete blood count, virology screen, swab for covid 19, Blood sugar, blood urea and creatinine, U/S of the gall bladder.

All patients were admitted one day before operation and checked by an anesthesiologist.

Prophylactic antibiotics were given at induction on GA, ceftriaxone1-gm IV slowly.

We adopted the American technique of LC, open insufflation through infraumbilical incision, and we check the GB for adhesions, dimensions, anomalies, distended or not, presence of pericholecystic fluid, wall thickness and the common bile duct dilated or not.

The fundus grasped, and an assistant pushed GB.

The Calot's triangle identified a critical view of safety, and the cystic artery clipped and the cystic duct double clipped.

In some cases, we needed to use aspiration of GB, irrigation with 0.9% normal saline, and subhepatic drains.

The GB is extracted through the epigastric port and sometimes extended when necessary.

Conversion from laparoscopic cholecystectomy to open cholecystectomy not included in the study.

Most patients are discharged on the same day of operation.

RESULTS

We have 170 patients, 142 female (83.52%) and 28 male patients (16.48%), F:M ratio 5:1. (Table 1)

Table 1: Distribution of cases according to age and sex

Age	*No.*	*%*	*Female*	*%*	*Male*	*%*
20–30	24	14	20	11.7	4	2.3
31–40	49	29	39	22.9	10	5.9
41–50	69	41	58	34.1	11	6.4
51-60	28	16	25	14.7	3	1.7
Total	170	100	142	83.52	28	16.48

The peak age incidence was 40–50 years in both sexes (Figure 1).

The mean age in females was 39 and for males was 33 p-value = 0.743

We have 59 patients with single gall stones 35%, 45 were females 26%, and 14 males 8%. Gall bladder perforation occurred in 11 patients 6%. Eight patients were female 4% and 3 were male 2%, p-value = 0.789 (Table 2 and Figure 2)

We have 18 patients with acute cholecystitis. 14were female and 4 male patients. G.B perforation occurred in 8 patients 5%, 2 male 1%and 6 female 4%, p-value =0.321 (Tables 3 to 5 and Figure 3).

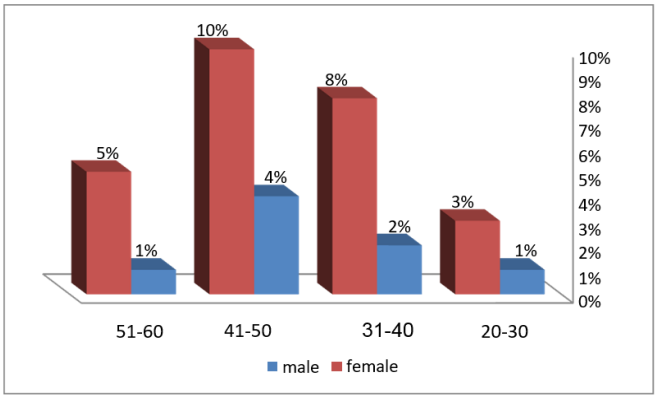

Figure 2: Percent of patients with SGS

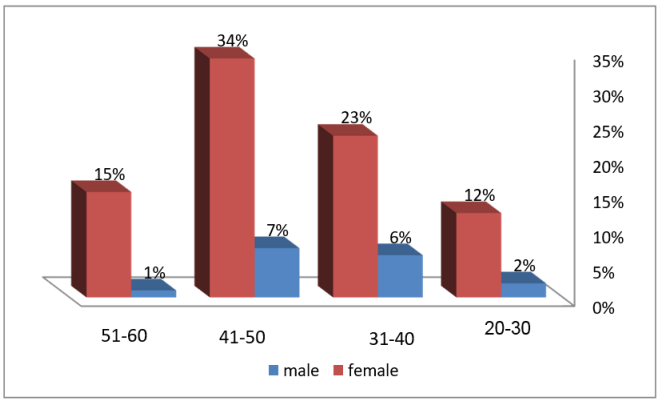

Figure 1: Distribution of cases according to age and sex

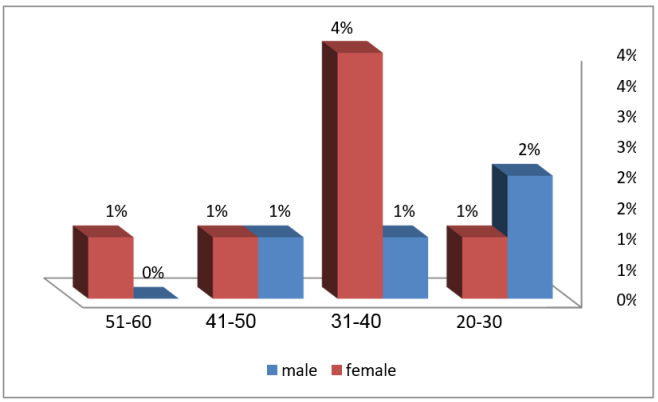

Figure 3: Show distribution of acute CC cases

Table 2: Distribution of patients with SGS

Age	*No.*	*%*	*Female*	*%*	*Male*	*%*
20–30	8	5	6	3	2	1
31–40	17	10	13	8	4	2
41–50	25	15	18	10	7	4
51–60	9	5	8	5	1	1
Total	59	35	45	26	14	8

Table 3: Cases with acute CC

Age	*No.*	*%*	*Female*	*%*	*Male*	*%*
20–30	4	2	3	1	1	2
31–40	9	5	7	4	2	1
41–50	4	2	3	1	1	1
51–60	1	15	1	1	0	0
Total	18	10	14	7	4	3

Table 4: Gall bladder perforation percent related to all patients

Group	*Total No.*	*%*	*Female No.*	*%*	*Male No.*	*%*
MGS	12	7	7	4	5	3
SGS	11	6	8	4	3	2
Acute CC	8	5	6	4	2	1

Table 5: Gall bladder perforation in each group

Group	*Total No.*	*%*	*Female No.*	*%*	*Male No.*	*%*
SGS	11	18	8	13	3	5
MGS	12	13	7	8	5	5
Acute CC	8	44	6	33	2	11

DISCUSSION

During LC, an accidental gallbladder perforation occurs, resulting in a prolonged surgical and hospital stay. Perforated gallbladder risk variables were male gender, acute cholecystitis, and surgeon experience.[22] Limited space for dissection, instrumentation concerns that induce laceration of the gallbladder wall, and a predisposition to deal with acute friable gallbladders have all contributed to this trend, as surgeons' experience with this technique has grown.[23] Most perforations occurred during dissection of gall bladder bed due to hook cautery or excessive grasping by traumatic grasper and more common in acute cases and distended gall bladder.

Several studies have evaluated the potential risk factors for perforation of gall bladder during cholecystectomy with laparoscopic surgery. Male sex, a history of acute cholecystitis, a laser, and the presence of a highly inflamed gallbladder were all individually significant risk factors for gallbladder perforation in a multivariant logistic regression analysis.[24] Other studies have found age, preoperative ultrasonography abnormalities such as a thicker gallbladder wall and hydrops, a previous laparotomy, the form of the stone (pigment stones), and the surgeon's experience all influence the frequency of gall bladder perforation.[25] In our study, GB perforation occurred in 31 patients (18%).

In Patna, India, G.B. perforation occurred in 5% of LC. Patients in a study by Kundan *et al*.[26]

In a recent study, it has been mentioned that 69 of 131 gall bladder perforations (52.7%) occurred while dissecting the gallbladder from the hepatic fossa.[27] In a study in China by Suk won Suh *et al*., the incidence was 16% similar to our study.[28] In a study performed at Al Jumhoory teaching hospital in Mosul city by Dr. Rafa'a Sami al Hayali the incidence was 36%.[29]

A recent review on 18.28 patients has revealed that the incidence of gall bladder perforation is 18.3% which is similar to our study.[30] In a recent study in Nepal, gall bladder perforation occurred in 20.8% of patients which is close to our study.[31]

In our study gall bladder perforation in male patients occurred in 10 patients, which is (36%) related to a total number of males. And occurred in 21 female patients, which is 15% related to all female patients.

The incidence of gall bladder perforation occurred in male patients, and it is highest in the acute cholecystitis male patients undergoing LC., which occurred in 2 patients of 4 males (50%).

CONCLUSION

- Gall bladder perforation is not uncommon during laparoscopic cholecystectomy.
- Gall bladder perforation occurred most commonly during dissection of gall bladder bed.
- Traumatic device can also contribute to gallbladder perforation if used without caution.
- Gall bladder perforation occurs more commonly in acute cholecystitis.
- Gall bladder perforation occurs more commonly in male patients.
- The use of a harmonic scalpel reduces the chance of gall bladder perforation.
- Blunt dissection is preferred in case of adhesion to the gallbladder.

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