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Incidence and Outcome of Iatrogenic Gallbladder Perforation during Laparoscopic Cholecystectomy in a Tertiary Care Hospital

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Abstract **Original Research Article**

Introduction: in developing countries, patients getting admitted into hospital is influenced by gallbladder stone. In this study, the incidence and outcome of iatrogenic gallbladder perforation during laparoscopic cholecystectomy was observed and studied for further development in this sector in a tertiary care hospital. Aim of the study: The aim of this study was to find out the incidence and outcome of iatrogenic gallbladder perforation during laparoscopic cholecystectomy. ***Methods***: This prospective observational study was conducted in Department of Surgery, Combined Military Hospital (CMH) Dhaka, Bangladesh during the period from June 2018 to November 2018. This study had institutional review board approval and informed consent for 100 patients age range 31-70 years (mean 50.3±10.6) in gallbladder perforation group and in no perforation group the range was 25 to 62 years (mean 47.9±12.3). The patients went through laparoscopic cholecystectomy through four port and gallbladder was removed through hepigastric port. The ultrasonographic report of all patients were collected. ***Result***: In the present study, majority 86 patients were found normal body weight (BMI 18.5-24.9 kg/m2) but female patients were high in number of affected list, 14(73.7%) in gallbladder perforation group and 56(69.1%) in no perforation group. A single stone is mainly found in no perforation group which is 32(39.5%). Multiple stone is found less in both of the groups respectively. Staying in the hospital was also higher in gallbladder group in comparison with no perforation group. ***Conclusion***: According to the study, perforation in gallbladder due to laparoscopic cholecystectomy is not deniable (19%). This can result in peroperative pain and more stay in hospital.

Keywords: Gall stone, perforation, laparoscopic cholecystectomy, peritoneal cavity.

INTRODUCTION

Gall stones are the most common abdominal reason for admission to hospital in developed countries and account for an important part of healthcare expenditure. Around 5.5 million people have gall stones in the United Kingdom and over 50,000 cholecystectomies are performed each year [1]. Laparoscopic cholecystectomy is the standard of care for the surgical treatment of gallbladder disease. Here patient experiences less post-operative pain, earlier hospital discharge and more rapid return to full activity with minimally invasive procedure than open cholecystectomy. In the era of microsurgery, laparoscopic cholecystectomy is the most widely used method for gall bladder disease since it was introduced in 1987 by Dubois *et al*., [2]. Following its establishment as a strong contender of its open counterpart, several published series of laparoscopic cholecystectomies have found an overall morbidity of about 5% [3, 4]. The most common confusions were retained normal bile duct stones, bile leak, superficial wound infection and the most serious, bile duct injury. One inconvenience that might be happening all the more frequently with this method is gallbladder perforation and spillage of bile and stones into the peritoneal cavity. Gall bladder perforation is accounted for in the scope of 10%-40% in different series [3-8]. The occurrence is more normal while working on an acutely inflamed gallbladder [5], in men, the old, obese person, in presence of adhesion, positive bile cultures and in those with pigment stones [6]. Spillage of items in gallbladder during cholecystectomy risks infection, intra-abdominal abscess development or adhesion, with subsequent intestinal obstruction. Intra-abdominal bile might cause peritonitis. These confusions are said to occur in 0.08%-0.3% of patients [9]. Intraoperative perforation of the gallbladder can prompt spillage of tainted bile and gallstones into the abdominal

cavity. It is questionable whether this increases the risk for SSI. Some authors report that intraoperative gallbladder perforation expands the risk for SSI [10, 11], though a randomized preliminary didn't track down an expanded risk for postoperative contamination after spillage of bile during elective cholecystectomy, and prophylactic anti-infection treatment had no impact [12]. Essentially, in a new meta-examination of [14], observational examinations, no expanded gamble for SSI after careful gallbladder perforation could be found [13]. In a review study, spillage of gallstones expanded the gamble for postoperative contamination, however anti-infection agents didn't diminish this risk [14]. A Turkish report contrasting anti-infection prophylaxis and restorative treatment in instances of unintentional gallbladder perforation during a medical procedure found no critical difference [15]. This prospective study is concerned with determination of the risk factors and probable complications of intraoperative gallbladder perforation.

Objective of the Study

- *General objective:* The aim of the study is to determine the incidence and influence of intraoperative gallbladder perforation.
- *Specific objective:* The purpose of the study is to identify the presence of predicted risk factors of intraoperative gallbladder perforation.

METHODOLOGY & MATERIALS

This prospective observational study was conducted in Department of Surgery, Combined Military Hospital (CMH) Dhaka, Bangladesh during June 2018 to November 2018. In this study period, 100 patients participated age range 31-70 years (mean 50.3±10.6) in gallbladder perforation group and in no perforation group with range from 25 to 62 years (mean 47.9±12.3).

- *Inclusive criteria:* Patients of cholelithiasis wish to undergo laparoscopic cholecystectomy were included in this study.
- *Exclusion criteria:* The study did not include any individuals who have Cholelithiasis with other biliary disease like carcinoma gallbladder or other site of biliary tract or have diabetes (as it increases the chance of infection). Patients with severe concomitant conditions such as immunocompromised state like HIV infection, on long steroid therapy, on chemotherapy, history of implant (cardiac stenting) or transplant (kidney, liver) these patients are more prone to develop infection were also excluded.

Enrolled patients with cholelithiasis conceded in department of Surgery of CMH Dhaka, Bangladesh were enlisted into the study. Patients were selected into the concentrate solely after informed consent. The ultrasonographic findings were recorded who went through laparoscopic cholecystectomy. All patients were gone through laparoscopic cholecystectomy through four port and gallbladder was removed through hepigastric port. The postoperative findings of the resected gallbladder and the nature of the stone was recorded. The bile was sent for culture and sensitivity. Postoperative ultrasonogram was done following 48 hours of operation. All patients were followed up post operatively for a specific timeframe (fourteen days). The ultrasonographic report of all patients were gathered from them as needed. Every information with respect to patient's state of being was gathered from the patient by preformed poll and postoperative ultra-ultrasound image following 48 hours of operation. Statistical analysis was carried out by using the Statistical Package for Social Sciences version 23.0 for Windows (SPSS Inc., Chicago, Illinois, USA). Ethical clearance was taken from the Combined Military Hospital (CMH), Dhaka, Bangladesh ethical committee.

RESULT

Table-1 shows out of 100 patients undergoing operation during the study period, 19 patients were found to have iatrogenic gallbladder perforation and their incidence rate was 19.0% in the department of surgery of Combined Military Hospital. The participants of the study had mean age of 50.3±10.6 years with the range of 31-70. In no perforation group, mean age was 47.9±12.3 years with range from 25 to 62 years. In current study, female were predominant in both groups, out of which 14(73.7%) in gallbladder perforation group and 56(69.1%) in no perforation group. Majority 86 patients were found normal body weight (BMI 18.5-24.9 kg/m2), out of which 16(84.2%) in gallbladder perforation group and 70(86.4%) in no perforation group (Table-2). Table-3 shows that normal preoperative sonological findings were found 65 patients, out of which 11 (57.9%) in gallbladder perforation group and 54 (66.7%) in no perforation group. Thickness of the wall >4 mm was found 9(42.1%) in gallbladder perforation and 27(33.3%) in no perforation group. Distended was found 1(5.3%) and 4(4.9%) in perforation group and in no perforation group respectively. Fibrosed was found 3(15.8%) in perforation and 10(12.3%) in no perforation group. According to Table-4, single stone was found 7(36.8%) in gallbladder perforation group and 32(39.5%) in no perforation group. Multiple stone was 12(63.3%) and 49(60.5%) in perforation and no perforation group respectively. The epigastric port infection was found 2(100.0%) in gallbladder perforation group and 5(100.0%) in no perforation group (Table-5). Table-6 shows that mean duration of hospital stay was 5.9±1.3 days ranging from 5 to 9 days in gallbladder perforation group and 4.2±1.1 days with range of 3 to 6 days in no perforation group. Figure-1 shows that 10 (52.6%) patients had perforation during dissection, 7(36.9%) had perforation during grasper traction and 2(10.5%) had perforation during adhesiolysis which approached the callot's triangle. Regarding postoperative complications, pain persisting for >6 days was found 5(26.3%) in gallbladder perforation group and

8(9.9%) in no perforation group. Wound infection was found 2(10.5%) in perforation group and 5(6.2%) in no perforation group. Pyrexia was found 3(15.8%) and 3(3.7%) in perforation and no perforation group respectively (Figure-2).

Table 1: Incidence of iatrogenic gallbladder perforation during laparoscopic cholecystectomy

	Number of patients
Total admitted patients	100
Iatrogenic gallbladder perforation	19
Percentage of IGBP	19.0

Table 2: Demographic characteristics of the study patients (n=100)

		Perforation (n=19)		**No perforation (n=81)**	
		n	%	n	%
Sex	Male	5	26.3	25	30.9
	Female	14	73.7	56	69.1
Age	Mean±SD	50.3±10.6		47.9±12.3	
	Range	31-70		25-62	
BMI (kg/m^2)	Normal (18.5-24.9)	16	84.2	70	86.4
	Over weight (25.0-29.9)	2	10.5	8	9.9
	Obese (≥30)	1	5.3	3	3.7

Table 3: Distribution of the study patients according to preoperative sonological findings (n=100)

Preoperative sonological findings	**Perforation (n=19)**		**No perforation (n=81)**	
	n	**%**	**n**	**%**
Normal	11	57.9	54	66.7
Thickness of the wall >4 mm	8	42.1	27	33.3
Distended	1	5.3	4	4.9
Fibrosed	3	15.8	10	12.3

Table 4: Distribution of the study patients according to number of stone (n=100)

Number of stone	**Perforation (n=19)**		**No perforation (n=81)**	
	n	**%**	**n**	**%**
Single	7	36.8	32	39.5
Multiple	12	63.2	49	60.5

Table 5: Distribution of the study patients according to operation site infection (n=7)

Operation site infection	**Perforation (n=2)**		**No perforation (n=5)**	
	n	**%**	**n**	**%**
Epigastric port	2	100.0	5	100.0
Umbilical post	0	0.0	0	0.0

Table 6: Distribution of the study patients according to duration of hospital stay (n=19)

	Perforation (n=19)	**No perforation (n=81)**
	Mean±SD	**Mean±SD**
Duration of hospital stay (days)	5.9±1.3	4.2±1.1
Range (min-max)	5-9	3-6

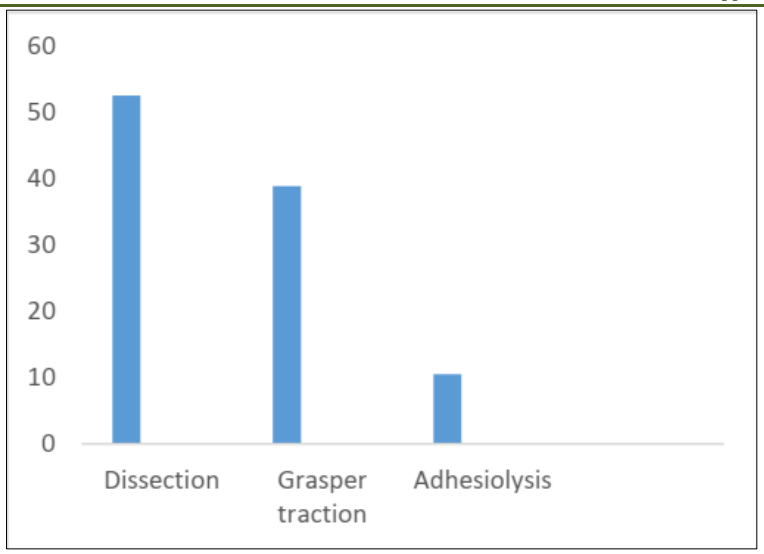

Figure 1: Cause of iatrogenic gallbladder perforation of the study patients (n=19)

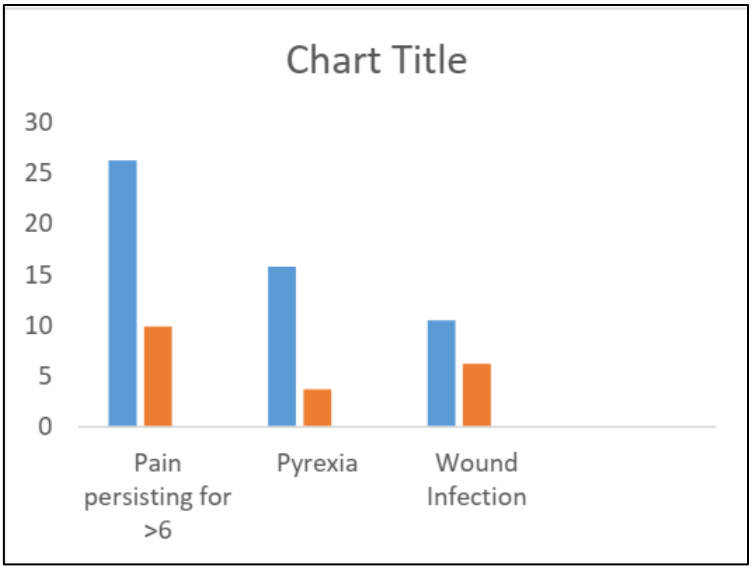

Figure 2: Postoperative complications of the study patients (n=100)

DISCUSSION

This prospective observational study consisting total of 100 patients attending laparoscopic cholecystectomy for gallstone disease was conducted in the Department of Surgery, Combined Military Hospital Dhaka, Bangladesh during the period of June 2018 to November 2018.

In this review, 19 patients were found to have iatrogenic gallbladder perforation and their occurrence rate was 19.0%. Ahmed *et al*., [16], reported their concentrate altogether 20% of the patients supported gallbladder perforation which is significantly less than a concentrate wherein 36% patients sustained gallbladder perforation. Zubair *et al*., [17], tracked down that a total of 200 findings of laparoscopic cholecystectomies were explored, out of which IGBP happened in 51 patients (25.5%). With the advent of laparoscopic surgery the occurrence of iatrogenic injury to gall bladder has expanded, in the scope of 10 to 40% as portrayed in different studies [18, 19], and recurrence of stone spillage is in the range of 6 to 30% [24]. One more review directed by Aytac and Cakar [20], where they showed the rate of GBP has been accounted for to be around 30%, and frequency of dropping stones in the peritoneal cavity is around 20%. It was seen that in gallbladder perforation group, 7(36.8%) patients had a place with age group 41-50 years and their mean age was 50.3±10.6 years with range from 31 to 70 years. In no perforation group, 35(43.2%) patients had a place with age group 41-50 years and their mean age was 47.9±12.3 years with range from 25 to 62 years. Altuntas *et al*., [21], comprised their review mean age was 49.7±13.8 years in perforation group and 49.8±13.2 years in no perforation group. Suh *et al*., [23], announced that mean age was found 55.5±16.85 tears in punctured group and 49.69±15.03 years in non-perforated group. A review reported by Aytac and Cakar [20], where they noticed mean age was

43.8 years, going from 18 to 74 years in gallbladder perforation group.

In this study it was seen that 10 (52.6%) patients were to have perforation during analyzation, 7(36.9%) were found to have perforation during grasper footing and 2(10.5%) were found to have perforation during adhesiolysis which drawing nearer to callot's triangle. Ahmed *et al*., [16], showed their concentrate out of the 20% patients in our review, significant reason for gallbladder perforation was electro cautery, 30.9%(n=17) that is equivalent to a review that showed 40% patients supported gallbladder perforation due to electro cautery. One more review comprised by Zubair *et al*., [17], where found in 51 patients of IGBP fundus of gall bladder was the commonest site of perforation in 21(41.18%), trailed by assemblage of gall bladder in 18(35.29%) and Hartman's pocket in 12(23.53%) patients. Diathermy snare was the most successive reason for perforation followed by getting a handle on forceps in 27(52.94%) and 24 patients (47.06%) separately. Larger part of holes happened during analyzation of gall bladder from liver bed for example in 33 patients (64.71%), perforation during adhesiolysis happened in 2 patients (3.92%) and during withdrawal moves in 16 patients (31.37%).

In this current review it was seen that epigastric port disease was viewed as 2(100.0%) in gallbladder perforation group and 5(100.0%) in no perforation group. Al-Naser [22], revealed that as per the site of port contamination, 32 patients (80%) fostered an infection at the epigastric port, 6(15%) fostered an infection at the umbilical port. It was found that mean length of medical clinic stay was 5.9±1.3 days with range from 5 to 9 days in gallbladder perforation group and 4.2±1.1 days with range from 3 to 6 days in no perforation group. Aytac and Cakar [20], comprised that he normal clinic stay was 2.3 days (2-5 days) for GBP group and 2.1 days for non-punctured group. Altuntas *et al*., [21], announced that mean emergency clinic stay was found 1.3±0.9 days in perforation group and 1.3±1.0 days in no perforation group.

Limitations of the Study

The study population was selected from a selected hospital in Dhaka city, which may affect results of the study causing less accurate reflection than the exact picture of the country. Small sample size was also a limitation of the current study. Therefore, in future further study is suggested to be under taken with large sample size.

CONCLUSION AND RECOMMENDATIONS

Perforation of gallbladder happened in 19.0% of patients during laparoscopic cholecystectomy. Iatrogenic nerve bladder hole during laparoscopic cholecystectomy affects postoperative pain. Peroperative gallbladder perforation during LC conveys no morbidity, provided a total and complete recuperation of gallstones spilled and local treatment of bile contamination with nearby irrigation and antibiotics. This complexity is connected to the specialist's expertise and experience. Endeavors should to be made to reduce this possibly unsafe entanglement, which should to be recorded and patients should to be informed regarding the event.

Declaration of the Patients' Consent:

The informed consent from the patients were obtained during data collection and sampling. We ensured permission of the Hospital Ethics Committee before starting the study.

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Conflicts of Interest: N/A

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