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Original Research Article

"Clinical Presentation of Bile Duct Injured Patients-A Cross-Sectional Descriptive Study"

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Abstract: *Background*: Bile duct injury is severe and potentially life threatening complication of cholecystectomy. It ruins the patient physically, mentally, socially and financially. The incidence of bile duct injury is alarming in our country. Management of such patients needs to be explained. *Methods:* It is a cross-sectional descriptive study carried out in the Department of Surgery, Mymensingh Medical College Hospital, Mymensingh, Bangladesh during the period January 2018 to July 2020. A total of 70 patients diagnosed as bile duct injury were included in the study. Bile duct injury that occurs during liver or pancreases surgery or accident was excluded. Data were collected using a predesigned data collection sheet and analyzed using computer software SPSS (Statistical Package for Social Sciences) version 22. *Results:* Young and female patients suffer more 44(62.9%) than male. Occurrence was common during laparoscopic cholecystectomy 42(60%). Most of bile duct injury occur when cholecystectomy done on acute condition of gall bladder 59(84.3%). Most of bile duct injury patient came to specialized center after several week of injury with billiary stricture 54 (77.14%) with jaundice, some patients presented with abdominal pain 48(68.6%), abdominal distension 18(25.7), biliary peritonitis 16(22.9) and biliary fistula 14(20%). Patients with bile duct injury were evaluated by USG, liver function test, ERCP and MRCP. Maximum BDI patients were Bismath Type II 32(45.7%) and Bismath Type III 18(25.7%). Out of 70 cases USG performed 68 cases (2 patients repair at the time of surgery) and these investigations provided valuable information about condition of biliary tree, hepatic parenchyma and ductal system also intra-abdominal collection. 14 patients were done ERCP. Billiary stricture in different level seen among most of the patients (10). Bile leakage seen among 4 patients and all were underwent ERCP stenting. *Conclusion:* The present study showed that bile duct injury occurs mostly in young female with acute cholecystitis. Common presentation was obstructive jaundice and biliary sepsis. Bismuth Type II and III were most common form of stricture. Biliary reconstruction (Roux-en-Y hepaticojejunostomy) was the treatment for biliary stricture. Peritoneal toileting, controlled fistula and later on biliary reconstruction was the treatment of biliary sepsis.

Keywords: Laparoscopic Cholecystectomy, USG, Liver Function Test, ERCP and MRCP, Gall Bladder.

I INTRODUCTION

Bile duct injuries (BDI) take place in a wide spectrum of clinical settings. The mechanisms of injury, previous attempts of repair, surgical risk and general health status importantly influence the diagnostic and therapeutic decision-making pathway of every single case. A multidisciplinary approach including internal medicine, surgery, endoscopy and interventional radiology specialists is required to properly manage this complex disease. BDI may occur after gallbladder, pancreas and gastric surgery, with laparoscopic cholecystectomy responsible for 80%-85% of them [1-3]. Although not statistically significant, BDI during laparoscopic cholecystectomy is twice as frequent compared to injuries during an open procedure (0.3% open vs 0.6% laparoscopic)[4].The bile duct is prone to be damaged by use of diathermy and the excessive

dissection, required to delineate the anatomy of Calot's triangle, results in ischemic injury to the biliary tract. Other risk factors include difficulty in dissection due to acute or severe chronic inflammation, morbid obesity, unexpected bleeding, and presence of anomalous duct or vessel. These biliary injuries include leaks, strictures, transactions, or ligation of major bile duct. But various authors have advocated a distinction in bile leaks and bile injuries [10]. BDIs are a complex health problem and, although they usually occur in healthy young people, the effect on the patient's quality of life and overall survival is substantial [5]. The two most frequent scenarios are bile leak and bile duct obstruction. Most of BDIs after cholecystectomy are recognized transoperatively or in the immediate postoperative period [6,7]. Bile leak scenario is easily recognized during the first postoperative week. Constant bile effusion is documented through surgical drains, surgical wounds or laparoscopic ports. Patients usually complain of diffuse abdominal pain, nausea, fever and impaired intestinal motility. In addition, bile collections, peritonitis, leukocytosis and mixed hyperbilirubinaemia may be part of the clinical setting [8, 9]. An obstructive pattern in liver function tests accompanied by jaundice is frequent in the biliary obstruction scenario. Most of these patients have a complex Strasberg E injury recognized in the transoperative period. However, if not identified during the first postoperative week, patients have an insidious evolution with relapsing abdominal pain and cholangitis as well as bile collections. Jaundice is not always present immediately after bile duct injury. Some partial stenosis and isolated sectorial right duct lesions (Strasberg B and C) present with abdominal pain, pruritus, general weakness, fever and intermittent alteration of liver function tests.

III MATERIALS AND METHODS

It is a cross-sectional descriptive study carried out in the Department of Surgery, Mymensingh Medical College Hospital, Mymensingh, Bangladesh during the period January 2018 to July 2020. A total of 70 patients diagnosed as bile duct injury were included in the study. Bile duct injury that occurs during liver or pancreases surgery or accident were excluded.

SELECTION CRITERIA

Inclusion criteria

a) Clinico-pathologically & radiologically diagnosed as a case of bile duct injury following cholecystectomy.
b) Those who will give informed consent to participate.

Exclusion criteria

a) Bile duct injury due to accidental injury followed RTA.
b) Bile duct injury followed resection of liver lobe.
c) Bile duct injury due to pancreas surgery, stomach surgery.

Bile Duct Injury: The definition of Bile duct injury is injury of any part of billiary tree.
Classification: (The Bismuth classification for bile duct injury) Type I – CHD stump > 2cm:
Type II – CHD stump < 2cm:
Type III- Hilar Rt. and Lt. Duct injury with confluence intact:
Type IV- Hilar separation of Rt. and Lt. Duct:
Type V- Injury to aberrant Rt. Duct ± CBD injury:

Data collection instrument

Data were collected by using semi-structured questionnaire and check list. According to the specific objective of the study, first the variables were identified, then questionnaire and checklist were developed, adequate correction and thorough checking was done. Questionnaire was finalized following pre-testing. Data were collected by face to face interview of patients and reviewing of medical records. After taking informed written consent from each respondent, face to face interview and review of medical records were performed and individual information was recorded on a separate questionnaire and checklist. After collection of every day, the data were checked; followed by editing and cleaning to detect errors or omissions and to maintain consistency and validity of the data. Then the data were entered into the computer using Statistical Package for Social Sciences (SPSS-22 version) software (SPSS Inc, Chicago, IL, USA) and quality control of data maintained strictly, categorizing and coding done. Data were analyzed according to the objectives and variables. The results were presented in tables and figures. The statistical terms include in the study were frequency and percentage.

IV RESULTS

In this study patients were selected irrespective of age. Result showed that bile duct injury more common in 3049 years of age. Regarding age, majority i.e. 28(40%) of patients were in the age group 30-39 years followed 24(34.3%) in the age group of 40-49 years. Female 44(62.9%) were more sufferer than male 26(37.1%) shown in [Table-1].

Table-1: Age distribution of bile duct injured patients according to sex (n=70)

Sex	Age group (years)					Total
	<30	30-39	40-49	50-60	>60	
Male	0(0.0%)	9(12.9%)	14(20.0%)	3(4.3%)	0(0.0%)	26(37.1%)
Female	10(14.3%)	19(27.1%)	10(14.3%)	3(4.3%)	2(2.9%)	44(62.9%)
Total	10(14.3%)	28(40.0%)	24(34.3%)	6(8.6%)	2(2.9%)	70(100. %)

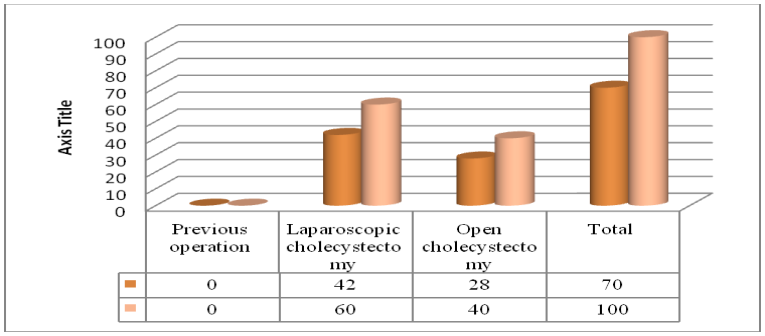

Fig-1: Previous operation history of bile duct injured patients (n=70)

Maximum patients i.e 42 (60%) had previous history of laparoscopic cholecystectomy followed by 28 (40%) had open cholecystectomy shown in [Figure-1].

Table-2: Status of the disease condition at the time of primary surgery (n=70)

Indications	Frequency	Percentage (%)
Acute attack	59	84.3
Acute cholecystitis	32	45.7
Empyema gallbladder	16	22.9
Acute cholecystitis with jaundice	6	8.6
Mucocele gallbladder	3	4.3
Acute cholecystitis with pancreatitis	2	2.9
Chronic attack	11	15.7
Chronic cholecystitis (Contacted/fibrosed gallbladder)	7	10.0
Large impacted stone in neck	3	4.3
Asymptomatic gallbladder/incidental findings – cholelethiasis	1	1.4

Status of the disease at the time of primary surgery shown in [Table 2]. Out of the 70 patients, 59(84.3%) were done cholecystectomy in acute condition and 11(15.7%) were done cholecystectomy in chronic or asymptomatic condition. During cholecystectomy with acute attack, 32(45.7%) patients had acute cholecystitis and 16(22.9%) patients had empyema gallbladder. During cholecystectomy with acute cholecystitis with jaundice, 6(8.6%) patients developed bile duct injury.

Table-3: Time of identification as BDI after primary surgery (n=70)

Time of presentation	Frequency	Percentage (%)
At the time of surgery	2	2.9
First week	18	25.7
2nd week	4	5.7
3rd week	8	11.4
4th week	12	17.1
4th week to 1 year	24	34.3
> 1 year	2	2.9

In this series only two (2.9%) patients bile duct injury were detected at the time of primary surgery. Majority of the patients were undetected at the time of injury and presented variable period of time after primary surgery shown in [Table 3].

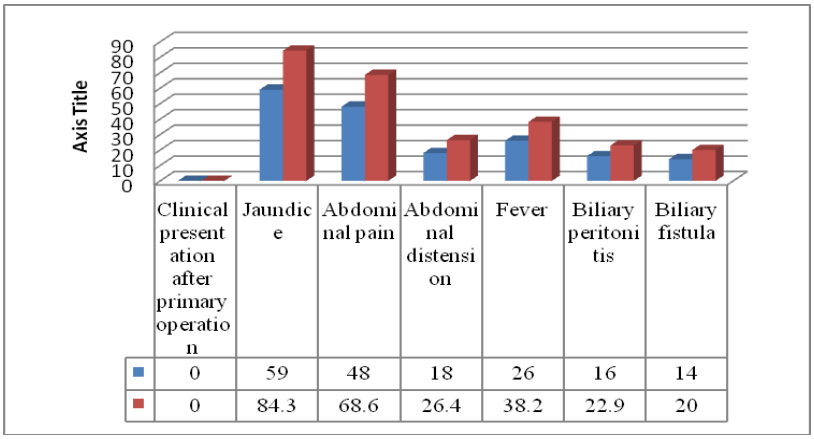

Fig-2: Clinical presentation of BDI patients when admitted in hospital (n=68)

All patients who presented after their primary operation were assessed by complete history taking and physical examination. In this study jaundice is the most common presentation 59(84%). Patients are also presented with abdominal pain 48(68.6%), fever 26(38.2%), abdominal distention 18(26.4%), biliary peritonitis 16(22.9%) and billiary fistula 14(20%) shown in [Figure-2].

Table-4: Investigation findings of bile duct injured patients (n=70)

Investigations	Frequency	Percentage (%)
USG findings	68	
Dilated biliary tree	53	75.1
Localized abdominal collection (Hepotorenal pouch)	6	8.5
Generalized abdominal collection	18	25.7
Hepatomegaly	08	11.4
ERCP	14	20.6
Biliary stricture	10	14.3
Bile leakage	4	5.7

[Table 4] shown investigations performed. Out of 70 cases USG performed 68 cases (2 patients repair at the time of surgery) and these investigations provided valuable information about condition of biliary tree, hepatic parenchyma and ductal system also intra-abdominal collection. 14 patients were done ERCP. Billiary stricture in different level seen among most of the patients (10). Bile leakage seen among 4 patients and all were underwent ERCP stenting.

V DISCUSSION

This cross sectional descriptive study was conducted in Department of Surgery, Mymensingh Medical College Hospital, Mymensingh Bangladesh during the period from January 2018 to July 2020 with a view to find out which type of bile duct injury occur in our perspective, pattern of presentation, nature of intervention and outcome of treatment of that patients with iatrogenic bile duct injury. For this purpose 70 cases of bile duct injury were selected by convenience sampling. In this study 28(40%) of patients were in the age group 30-39 years followed 24(34.3%) in the age group of 40-49 years. This indicate higher occurrence of bile duct injury in young adult group. 44(62.9%) patients with bile duct injury were female and 26(37.1%) were male. This higher occurrence of iatrogenic bile duct injury in female was probably due to the fact of gallstone disease is more common in female. In a study it was found that females were predominantly affected by iatrogenic bile duct injury than male [4]. In this study it was found that most of iatrogenic bile duct injury occurred during laparoscopic cholecystectomy 42(60.0%). This study result was consistent with the study conducted by Mercado et al.[4], that out of 30 bile duct injured 28(93.3%) were injured during laparoscopic cholecystectomy [10] This may be due to increase the number of laparoscopic cholecystectomy performed now a days, number of report mentioned that chronic inflammation with tense scaring, peroperative bleeding, misidentification of cystic duct, large stone in Hartman's pouch or tethering of the infundibulum

to the common bile duct by acute or chronic inflammation. In present study, it was found that iatrogenic bile duct injury occur highest number 59(84.3%) when cholecystectomy done on acute condition. Most of injury noted acute cholecystitis patients 32(45.7%) followed empyema gall bladder patients 16(22.9%), than acute cholecystitis with jaundice patients 6(8.6%). In chronic attack where higher occurrence occur cholecystectomy during chronic cholecystitis patient (contracted/ fibrosed gall bladder) 7(10%). This study result consist with the study Toruquist et al. [11], that risk of bile duct injury was doubled among patients with acute cholecystitis, whereas mild acute cholecystitis did not attack the risk of bile duct injury, a moderate attack more than doubled the risk, severe attack of cholecystitis had a close to significant eight fold increase in risk [12]. In this study, 2 patients (2.9%), with iatrogenic bile duct injury were diagnosed during the primary operation, one patient reconstructive surgery was performed at the same time and another patient primary repair of bile duct with T-tube insertion in situ was performed at the same setting. 68(97.1%) patients were presented as bile duct injury in postoperative period of their primary operation but most of the patients of bile duct injury usually presented after 2 weeks of primary surgery. In a study, it was found that more than 50% of bile duct injuries were undetected at the time of operation [13]. In the present study, out of 70, 68 patients with bile duct injury presented in postoperative period, most of the patients 59(84.3%) presented with obstructive jaundice, 48(68.6%) patients presented with abdominal pain 18(25.7%) of patients exhibited abdominal distensions, 16(22.9%) patients presented billiary peritonitis and 14(20%) patients were presented with billiary fistula. In a study found that out of 32 patients 22(68.7%) patients were presented postoperatively with pain jaundice and fever as the symptoms heralding the injury [14]. In another study, it was observed that bile duct injuries were detected in 44 patients post-operatively and mode of presentation was jaundice, biliary fistula with or without jaundice and biliary peritonitis [15]. The results of these studies were consistent with that of the present study. Patients of bile duct injury need some extra investigations, all the patients (68) presented with bile duct injury postoperatively underwent ultrasonography of whole abdomen and 53(77.9%) had dilated billiary tree, 6(8.5%) patients had localized abdominal collection and 18(25.7%) patients had generalized abdominal collection. ERCP was done in 14(20.6%) patients, 10 patients showed biliary stricture at different level and 4 patients had billiary leakage and stening was done all of 4 patients at that time. MRCP done 58 patients, most of the cases lesion seen Bismuth type II 32(45.7%) patients followed type III 18(25.7%) patients and 4(5.7%) patients were Bismath type I, 3(4.3%) patients were type IV, only one patient was Bismath type V. Management strategy of bile duct injury is a complex one, it varies from cases to case. In this study out of 70 patients, 2(2.9%) patients injury was recognized at the time of primary surgery. Roux-en-y hepatico Jejunostomy was done in one patient at same setting and another patient was managed by primary repair with T-tube insertion. Rest of 68 patients in whom injury was recognized in postoperative period, required emergency drainage of abdominal collection, percutenous ultrasound guided drainage was done in 6(8.6%) patients. Laparotomy, perotonial toileting, drainage and establishment of controlled billiary fistula were done 12(17.1%) patients. These patients were presented with either localized collection of bile (biloma) in association with leakage or fistula or presented with billary peritonitis. Definitive surgery was not done at that time. Definitive surgery was done when patient's condition improved and local inflammation was subsided. All these patients underwent Roux-en-Y hepaticojejunostomy in the same admission or some days later after discharge and following admission. Some patients 4(5.7%) were managed by USG guidance drainage of biloma and 3(4.3%) patients were managed by laparotomy and T-tube insertion in CBD. Out of 70 patients only biliary reconstruction by Roux-en-Y hepaticojejunostomy was done in 41(58.6%) patients, most of those patients presented with biliary stricture. This result was supported by a study that included 49 patients of bile duct injury and 33(67.3%) were recognized postoperatively and were treated surgically by biliary reconstructive surgery, 21(42.9%) hepaticojejunostomy and 12(24.4%) hepaticoduonostomy [17]. In this study 4(5.7%) patients were managed by ERCP and stenting. These patients had either minor biliary leakage or short segment stricture. This study result was correlated with the study that included 27 patients of bile duct injury, with surgical reconstruction in 19(70.4%) patient's, endoscopic cholangiography and stent insertion in 2(7.4%) patient's, laparotomy and drainage in 1(3.7%) patient, percutaneous drainage in 2(7.4%) patients, PTC and stenting in 3(11.1%) patients and conservative management in 2(7.4%) patients [18]. In the current study 2 (2.9%) patients were managed by ultrasonogram guided drainage of biloma, 2(2.9%) patients were managed by peritoneal toileting and drainage these patients were presented with abdominal pain or bile collection in drain tube. 3(4.2%) patients were presented with abdominal collection in early postoperative period were managed by laparotomy, peritoneal toileting and insertion of a T-Tube in common bile duct. In a study in Pakistan institute of medical science found that out of 20 cases of bile

duct injury 10(50%) were treated by roux-en-y hepaticojejunostomy, 2(10%) were treated by T-Tube repair and 2(10%) patient's by simple drainage [15]. Result of this study was consistent with that of the present study. In this study 20 patients (28.6%) developed postoperative complications. 18(25.7%) patients developed surgical site infection. 17 patients were managed by regular dressing, 12 patients needed secondary closure. 2 patients need relaparotomy, and 2 (2.9%) patients developed anastomotic stricture after six months. Both were needed revision surgery. In a study total of 175 patients underwent definitive biliary reconstruction, including 172 hepaticojejunostomies (98%) and 3 end-to-end repairs. Seventy-five patients (42.9%) sustained at least 1 postoperative complication. The most common complications were wound infection (8%), cholangitis (5.7%), and intraabdominal abscess/biloma (2.9%). Minor biliary stent complications occurred in 5.7% of patients [19].

VI CONCLUSION

The present study showed that bile duct injury occurs mostly in young female with acute cholecystitis. Common presentation was obstructive jaundice and biliary sepsis. Bismuth Type II and III were most common form of stricture. Biliary reconstruction (Roux-en-Y hepaticojejunostomy) was the treatment for biliary stricture. Peritoneal toileting, controlled fistula and later on biliary reconstruction was the treatment of biliary sepsis.

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