

A Study on Biliary Leakage after Cholecystectomy

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ABSTRACT

Introduction: Biliary leakage is the most serious and dreaded complication after cholecystectomy. The early and accurate diagnosis of bile duct injury is very important for surgeons, because unrecognized bile duct injury leads to serious complications such as biliary peritonitis, hepatic failure and death and also plays a vital role in management of biliary leak after cholecystectomy. Study aimed to evaluate the various modalities of treatment and their outcome in biliary leakage following cholecystectomy.

Material and methods: Prospective study. The data were obtained from the patients getting admitted with biliary leakage after cholecystectomy or developed biliary leakage after cholecystectomy at the Department of General surgery, Assam Medical College from July 2014 to June 2015 who were properly examined, investigated, treated and followed up for one month.

Results: A total of 1190 Cholecystectomies were carried out in this study period in my institution, out of which 785 were open cholecystectomies and rest 405 were laparoscopic cholecystectomies. In this study, 20 bile leak cases were registered, out of which 6 were diagnosed as major bile duct injury and another 4 cases of bile leak were diagnosed as originated either from GB bed, duct of luschka or minor bile duct injury. In the rest 10 cases, bile leak was presumed to be either from GB bed, duct of luschka or minor bile duct injury as they resolve spontaneously after conservative management. In this study the incidence of major bile duct injury after cholecystectomy is 0.50 whereas the overall incidence of bile leak after cholecystectomy is 1.68.

Conclusion: Biliary leakage after cholecystectomy caused by major bile duct injury is infrequent though not usual. In majority of cases bile leak occurs either from unsuspected accessory bile duct, duct of Luschka, GB bed or from minor bile duct injury, which needs only conservative management and careful observation. Only bile leak from major bile duct injury should be managed promptly and requires skilled surgical intervention.

Keywords: Iatrogenic Bile Duct Injury (IBDI), Common Bile Duct (CBD), Common Hepatic Duct (CHD)

injury can lead to lifelong disability or even death, iatrogenic bile duct injury therefore should promptly be identified and repaired or the patient should be referred to the specialist who has expertise in hepatobiliary surgery.¹

The first iatrogenic bile duct injury was described by Sprengel in 1891.² Cholecystectomy whether laparoscopic or open is the most commonly performed hepatobiliary surgery. Therefore post operative biliary leakage is also more common following cholecystectomy.² And also because of long learning curve of laparoscopic procedure, IBDI is on higher side in laparoscopic cholecystectomy than in open variety.³ Unrecognised or late diagnosis of bile duct injury can lead to serious consequences such as hepatic failure or death.^{3,4}

Study aimed to evaluate the various modalities of treatment and their outcome in biliary leakage following cholecystectomy.

MATERIAL AND METHODS

This was a Prospective study conducted in Assam Medical College over July 2014 to June 2015. The data were obtained from the patients getting admitted with biliary leakage after cholecystectomy or developed biliary leakage after cholecystectomy at the Department of General surgery, Assam Medical College and were properly examined, investigated, treated and followed up for one month.

Inclusion criteria

All cases admitted to surgical wards with biliary leakage after cholecystectomy above 12 years of age.

Exclusion criteria

Patient underwent cholecystectomy as a part of some primary operation like Whipple's operation, biliary-enteric anastomosis were excluded from this study.

Method of collection of data

The case papers, referral letters, operative and postoperative records were scrutinized and data collected. In this study, clinical presentations following biliary leak, timing of detection of bile leak post operatively (< 24 hour or > 24 hour), acute or chronic cholecystitis at the time of operation, amount of bile leak, duration of bile leak, postoperative investigation (MRCP, CT abdomen, USG) for bile leak, various modalities of management and its outcome, site of bile leak are noted.

STATISTICAL ANALYSIS

Microsoft office 2007 was used for the statistical analysis. Mean

INTRODUCTION

Cholecystectomy is the only effective treatment of symptomatic gallstones and other gallbladder conditions. The broad two types are laparoscopic cholecystectomy, and the open cholecystectomy. In 1882, Karl Langenbunch, a noted German surgeon performed the first successful cholecystectomy.¹

The main function of biliary tract is to collect, storage and delivery of bile to gastrointestinal tract. The bile is produced in the liver which is then secreted in to small bile ducts which combine to form the common hepatic duct. The cystic duct which drains collected bile in gallbladder combines with common hepatic duct to form common bile duct which ultimately drains the bile in to GIT. However this anatomy of the biliary system is very much complex and there are lots of variations in it. Therefore utmost care should be taken during any operative procedure of hepatobiliary system to avoid bile duct injury. Because bile duct

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Type of cholecystectomy	No of cases	percentage	Major bile duct injury	percentage
Open cholecystectomy	13	1.65	3	0.38
Laparoscopic cholecystectomy	7	1.72	3	0.74

Table-1: Table showing incidence of bile leak and incidence of major bile duct injury after cholecystectomy

Site	No of cases	percentage
GB Bed, Duct of Luschka, minor accessory duct	4	40
Cystic Duct	1	10
CHD	2	20
CBD	2	20
Abberantrt hepatic duct	1	10

Table-2: Table showing site of bile duct injury

Management	No of cases	Percentage
Conservative with controlled external fistula	16	80
Operative		
Suturing of cystic duct	1	5
Primary suturing	1	5
Hepaticojejunostomy	2	10
Total	20	

Table-3: Table showing mode of treatment of biliary leak

Results of surgical management	No. of cases	Percentage
Uneventful recovery	18	90
Mortality	2	10

Table-4 Table showing results of surgical management

and percentages were used to interpret data.

RESULTS

A total of 1190 Cholecystectomies were carried out in this study period in my institution, out of which 785 were open cholecystectomies and rest 405 were laparoscopic cholecystectomies. 10 laparoscopic cholecystectomies were converted to open cholecystectomies which are included in open cholecystectomy category. In this study, 20 bile leak cases were registered, out of which 6 were diagnosed as major bile duct injury and another 4 cases of bile leak were diagnosed as originated either from GB bed, duct of luschka or minor bile duct injury. In the rest 10 cases, bile leak was presumed to be either from GB bed, duct of luschka or minor bile duct injury as they resolve spontaneously after conservative management. In this study during one year period in our college, the incidence of major bile duct injury after cholecystectomy is 0.50 whereas the overall incidence of bile leak after cholecystectomy is 1.68. Among the 20 cases of biliary leak, 35% (7) were done laparoscopically and 65% (13) were done by open approach. One laparoscopy was converted to open. Out of the 20 cases of biliary leakage, 6 were diagnosed as major bile duct injury (0.5%) and out of 6, 3 patients with major bile duct injury were referred to our institution for further management. Out of these 3 patients one had undergone hepaticojejunostomy later and other 2 were died in our hospital prior to any surgical intervention because of late presentation to our hospital. Overall incidence of bile leak after cholecystectomy in this study during the proposed period in our college was 1.68.

In our study most of the biliary leak cases were seen in patients

undergoing cholecystectomy for chronic cholecystitis 65% (13 cases). And 85% (17) cases of biliary leak were detected within 24 hr from cholecystectomy.

Amount of bile leak in most of the cases (15 out of 20) is greater than 500 ml and the mean duration of bile leak in major bile duct injury is 7.33 days and the duration of minor bile leak is 7.14.

Majority of post cholecystectomy biliary leak patients showed clinical features of abdominal distension (65%) and tachycardia (85%) due to biloma. Clinical features of generalized biliary peritonitis with abdominal pain (30%), fever (20%), guarding (35%) are less common.

Postoperative evaluation of 20 biliary leak cases includes USG abdomen (90%) (18 patients), MRCP (45%) (9 patients), and CT abdomen (25%) (5 patients).

Depending upon the condition of patient, 10 patients out of 20 were evaluated for site of bile duct injury. The site of bile duct injury was determined to be CHD in 20% (2), CBD in 20% (2), cystic duct in 10% (1) and aberrant Right hepatic duct in 10% (1). 40% (4) cases, biliary leak was found to be from either GB bed, duct of luschka, or other minor duct injury. And in the rest 10 cases where bile leak was presumed to be from either GB bed, duct of luschka, accessory duct or other minor duct injury which resolved spontaneously after controlled external biliary fistula.

Conservative treatment in the form of controlled external biliary fistula was considered in 80% (16) of patients. Out of which 70% (14) of the biliary leak cases resolved spontaneously in a couple of days with controlled external biliary fistula. Intervention in the form of hepaticojejunostomy (10%), suturing of cystic duct (5%), and primary suturing of Rt aberrant hepatic duct (5%) were done in 4 patients. Other 2(10%) died of complications following biliary leak due to delayed referral of those patients to our institution from different peripheral hospitals.

Out of 20 cases, 18 (90%) cases recovered without any complication and followed up for one month without any complaint. Other 2 (10%) died because of biliary peritonitis who were presented late from outside our hospital.

DISCUSSION

Cholecystectomy is the most commonly performed abdominal operations all over the world. Biliary leakage following BDI after cholecystectomy is a potentially devastating complication of this otherwise safe surgical procedure. The ill effects of BDI can range from minor clinically insignificant bile leaks, bilomas, and bile ascites to biliary peritonitis, frank sepsis and even death in the acute setting and bile duct strictures, secondary biliary cirrhosis, portal hypertension and end stage liver disease necessitating liver transplantation in long term. Adequate and timely management can usually salvage the situation and save the patient from major morbidity and mortality.

Various studies have shown that the no of bile duct injury has declined over time.^{6,4} and according to some author, the referral cases of IBDI has also decreased.^{7,5} However several

contemporary reports have suggested no change in the incidence of bile duct injuries over time⁶ and the number and complexity of cases referred for repair has remained static at some specialist units.⁷ However bile duct injuries by inexperienced surgeon continue to appear.⁸

Laparoscopic cholecystectomy has replaced the open procedure in all but complicated cases. The procedure is associated with less discomfort, shorter postoperative recovery and hospital stay, and better cosmetic result. However, the laparoscopic approach has been associated with a higher incidence of biliary injury than open cholecystectomy, ranges from 0.5% to 2.0%.⁹ According to another study of Adamsen et al, 1997 and Kum et al, 1996; bile duct injuries are more common following laparoscopic cholecystectomy⁹, including fistulae, which are reported in 1.3% to 5.5% of cases.¹⁰ Ali et al, 2007; Karvonen et al, 2007 also found that bile duct injuries are seen more frequently in the laparoscopic approach (0.2% to 0.7%) than in OC (0.1% to 0.4%).^{11,12} In this study we also found that Laparoscopic approach resulted in higher major BDI 0.74% than in open cholecystectomy 0.38%.

However reviews by Strasberg and associates (2001) and Vecchio and coworkers (1998) that encompass more than 100,000 patients found the incidence of major bile duct injuries to be around 0.5%,¹³ and this incidence has reached a “steady state”.¹⁴ Swedish population-based study of more than 150,000 patients showed a similar bile duct injury rate of 0.4%.¹⁵ A large retrospective cohort analysis of nearly 1.6 million Medicare patients in the United States undergoing laparoscopic cholecystectomy from 1992-1999 confirmed the incidence rate of bile duct injury at 0.5%.¹⁶ In our study also, the incidence of major bile duct injury as we found after cholecystectomy in our college during the proposed one year study period is 0.50%. And overall incidence of biliary leak is found to be 1.68% in this study.

In this study we have found that the mean duration of bile leak is 7.33 days which is similar to the study done by Chen XP et al (9 days).¹⁷

In our institution, ultrasound and CT scan of the abdomen and pelvis are the most frequently performed investigation in post operative biliary leak cases.¹¹ MRCP was used to further delineate the bile duct anatomy and site of injury. In this study, the most common site of bile leakage is found to be from GB bed, Duct of Luschka, other minor accessory bile duct. Type A was the most common BDI encountered in this study which is similar to the study¹² by Strasberg et al, 1995.

When biliary-enteric continuity is present, and there is no obstruction to bile flow distal to the origin of the fistula, a prolonged period of conservative treatment is indicated because spontaneous closure of the fistula is usual. Nowadays conservative treatment in the form of external drainage of bile has shown excellent result in the management of bile leak. However in case of major bile duct injury, operative procedure should be considered.^{13,17} Conservative treatment in the form of controlled external biliary fistula was considered in 80% of patients in this study. Out of which 70% of the biliary leak cases resolved spontaneously in a couple of days with controlled external biliary fistula. Which is almost similar to the study of Chen XP et al. (Non-surgical treatment of bile leakage) who found 82.5% patient recovered after nonsurgical treatment.¹⁸

Only 20% cases (4 in nos) in this study needed operative intervention in the form of hepaticojejunostomy (10%), suturing of cystic duct (5%), and primary suturing of Rt aberrant hepatic duct (5%). Other 10% (2 in nos) died of complications following biliary leak due to delayed referral of those patients to our institution from different peripheral hospitals.

CONCLUSION

This study was done to determine the various modes of presentation of biliary leakage after cholecystectomy and their management in our hospital. A total of 1190 cholecystectomies done in our college during the one year period were reviewed and a major bile duct injury rate of 0.5% was noted whereas the overall incidence of biliary leakage was found to be 1.68%. Most (70% of total bile leak cases) managed conservatively and recovered without residual effect on expectant treatment. Most major bile duct injuries (20% cases) needed intervention and repair. All the fatal cases (10%) came late, were done outside the institute and exploration was not possible as they could not be optimized for a major surgical intervention.

Major bile duct injury following cholecystectomy can be devastating to the patient and needs prompt diagnosis and timely surgical intervention. But in maximum cases, as in this study, bile leak occurs mostly from minor bile duct injury, duct of Luschka, GB bed or accessory bile duct and needs only expectant conservative management, leads to disappearance of the leak without any residual effect.

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