

Biliary Leakage Following Cholecystectomy: A Prospective Population Study

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ABSTRACT

Background: Biliary leakage is the most common and serious complication following cholecystectomy. Because bile duct 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 experience in hepatobiliary surgery. Early diagnosis and treatment is the cornerstone for pleasant outcome. Unrecognized or late diagnosis of bile duct injury can lead to serious consequences such as hepatic failure or death. The objectives of this study were to determine the incidence of biliary leakage following cholecystectomy and to evaluate its outcome following this procedure.

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Patient and Methods: A prospective study was conducted among 968 patients in Al – Kadhmain medical city from January 2019 to February 2020. The data were obtained from the patients getting admitted with biliary leakage after cholecystectomy or developed biliary leakage after cholecystectomy at the surgical department in our hospital. The patients were assessed by thorough history, clinical examination and postoperative investigations including abdominal ultrasound, CT abdomen and MRCP to determine the site of bile leakage and the modalities of management that can be used and those patients were followed adequately.

Results: A total of 968 cholecystectomies were carried out in this study, out of which 311 were open cholecystectomies and the rest 657 were laparoscopic cholecystectomies. The overall incidence of biliary leak following cholecystectomy was 1.75%. The incidence of major bile duct injury was 0.61% while the incidence of leakage from gallbladder bed, duct of Luschka or minor bile duct injury was 1.13%. 70.58% of bile leak resolve spontaneously with conservative treatment and controlled external fistula but interventions in the form of primary suturing of bile duct and hepaticojejunostomy were done in 29.41% of patients. Two patients (11.76%) died due to delayed presentation.

Conclusion: Major bile duct injury following cholecystectomy can be devastating to the patient and needs prompt diagnosis and timely surgical intervention but leakage from gallbladder bed, duct of Luschka or accessory bile duct needs only conservative treatment and careful observation and mostly leads to disappearance of leak without any residual effect.

Key words: Biliary leakage, Cholecystectomy, Hepatobiliary surgery

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INTRODUCTION

Cholecystectomy is the only effective treatment of symptomatic gallstones and other gallbladder conditions. The board two types are laparoscopic cholecystectomy and open cholecystectomy [1]. Carl Langenbuch performed the first well-documented excision of the gallbladder or “cholecystectomy” in 1882 [2]. Open cholecystectomy allows direct visualisation and palpation of the gallbladder, CBD, cystic duct and blood vessels are possible and allow safe dissection and removal of gallbladder [3]. Laparoscopic cholecystectomy is said to be associated with minimal morbidity, shorter hospital stay, earlier return to the work and better cosmetic results [4].

The 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 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 experience in hepatobiliary surgery [1].

The 1st iatrogenic bile duct injury was described by Sprengel in 1891 [5]. Since cholecystectomy whether opens or laparoscopic is the most commonly performed hepatobiliary surgery, postoperative biliary leakage is also more common following cholecystectomy [5].

Despite several advantages over the open approach, laparoscopy, particularly in cases of urgent

cholecystectomy, provides a limited view of the biliary tract anatomy and can result in a higher rate of biliary leaking [6]. Iatrogenic bile duct injury is on higher side in laparoscopic cholecystectomy than in open variety and may be because of the long learning curve of laparoscopic procedure [7].

Bile duct injuries take place in about 0.1%-0.2% in open cholecystectomy and 0.3%-0.8% at laparoscopic one [8]. The biliary leak is commonly the end result of direct injuries to the bile duct, unsecure or slipped ligature or clip of the stump of cystic duct, or bile leak from the liver bed and commonly induced with blockage of the distal part of the duct from residual stone or stricture [9]. A minor biliary leak can disappear spontaneously whilst a major leak can result in drastic effect on patient [10]. Patients with internal or external bile leak usually present with localized or generalized biliary peritonitis [11]. About 10% - 24% of bile duct injuries are identified during surgery whilst the remaining injuries are recognized after surgery or after discharge [12]. Early diagnosis and treatment is the cornerstone for pleasant outcome [13]. Unrecognized or late diagnosis of bile duct injury can lead to serious consequences such as hepatic failure or death [7,14].

PATIENTS AND METHODS

A prospective study was conducted among 968 patients in Al-Kadhmain medical city from January 2019 to

February 2020. The data were obtained from the patients getting admitted with biliary leakage after cholecystectomy or developed biliary leakage after cholecystectomy at the surgical department in our hospital. The patients who developed biliary leakage following cholecystectomy were assessed by thorough history, clinical examination and postoperative investigations including abdominal ultrasound, CT abdomen and MRCP to delineate bile duct anatomy and determine the site of bile leakage and the modalities of management that can be used. The outcomes of these modalities of management were noted and assessed.

RESULTS

A total of 968 cholecystectomies were carried out in this study, out of which 311 were open cholecystectomies and the rest 657 were laparoscopic cholecystectomies. 23 laparoscopic cholecystectomies were converted to open cholecystectomies which are included in open cholecystectomy category.

In this study, 17 patients developed biliary leakage following cholecystectomy. The overall incidence of biliary leak following cholecystectomy was 1.75%. Among those 17 patients with biliary leakage, 29.41% (5) were done by open cholecystectomies and 70.58% (12) were done laparoscopically (Table 1).

Table 1: Overall incidence of bile leak following cholecystectomy.

Type of cholecystectomy	Number of cases	Percentage %
Open cholecystectomy	5	0.51
Laparoscopic cholecystectomy	12	1.23
Total	17	1.75

Among those 17 patients who developed biliary leakage following cholecystectomies, 6 patients were diagnosed

as major bile duct injury (5 following laparoscopic approach and 1 following open approach). The incidence of major bile duct injury was 0.61% (Table 2).

Table 2: Incidence of major bile leak following cholecystectomy.

Type of cholecystectomy	Number of cases with major bile duct injury	Percentage %
Open cholecystectomy	1	0.1
Laparoscopic cholecystectomy	5	0.51
Total	6	0.61

Among those 17 patients who developed biliary leakage following cholecystectomies, 11 patients were diagnosed as bile leak from gallbladder bed, duct of Luschka or minor bile duct injury (7 following laparoscopic

approach and 4 following open approach). The incidence of leakage from gallbladder bed, duct of Luschka or minor bile duct injury was 1.13% (Table 3).

Table 3: The incidence of leakage from gallbladder bed, duct of Luschka or minor bile duct injury following cholecystectomy.

Type of cholecystectomy	Number of cases with leakage from gallbladder bed, duct of Luschka or minor bile duct injury	Percentage %
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Open cholecystectomy	4	0.41
Laparoscopic cholecystectomy	7	0.72
Total	11	1.13

The patients with bile leakage following cholecystectomy were evaluated for the site of bile duct injury by abdominal ultrasound, CT abdomen and MRCP. The site of bile duct injury was determined to be common hepatic

duct in 2 patients (11.76%), common bile duct in 3 patients (17.64%) and cystic duct in 1 patient (5.88%). Bile leak from gallbladder bed, duct of Luschka or minor bile duct injury was found in 11 patients (64.7%) (Table 4).

Table 4: The site of bile leakage following cholecystectomy.

Site	Number of cases	Percentage %
gallbladder bed, duct of Luschka or minor accessory duct	11	64.7
Cystic duct	1	5.88
Common bile duct	3	17.64
Common hepatic duct	2	11.76
Total	17	100%

Out of 17 patients with biliary leakage after cholecystectomy and depending upon the general condition of those patients, conservative treatment in the form of controlled external biliary fistula was considered 13 patients (76.47%) with biliary leakage after

cholecystectomy. Out of which 70.58% (12 patients) of bile leak resolve spontaneously with conservative treatment and controlled external fistula. Interventions in the form of primary suturing of bile duct (17.64%) and hepaticojejunostomy (11.76%) were done in 5 patients (Table 5).

Table 5: Modalities of treatment of biliary leakage following cholecystectomy.

Management	Number of cases	Percentage %
Conservative with controlled external fistula	12	70.58
Operative		
Primary suturing of bile duct	3	17.64
Hepaticojejunostomy	2	11.76
Total	17	100%

Out of 17 cases with bile leak following cholecystectomy, 15 patients (88.23%) recovered without complication.

Other 2 patients (11.76%) died due to delayed presentation (Table 6).

Table 6: The results of surgical management for bile leakage after cholecystectomy.

Results of surgical management	Number of cases	Percentage %
Uneventful recovery	15	88.23
Mortality	2	11.76
Total	17	100%

DISCUSSION

Cholecystectomy is the most commonly performed abdominal operations all over the world and biliary leakage following bile duct injury after cholecystectomy is a potentially devastating complication. The ill effect of bile duct injury can range from minor clinically insignificant bile leaks, bilomas, and bile ascities to biliary peritonitis, 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 [14].

Laparoscopic cholecystectomy has replaced the open procedure in all but complicated cases. It is said to be

associated with minimal morbidity, shorter hospital stay, earlier return to the work and better cosmetic results [4]. However, it is associated with higher incidence of biliary injury than the open approach, ranges from 0.5% to 2% [15].

In this study, we found that laparoscopic approach resulted in higher incidence of major bile duct injury (0.51%) than in the open approach (0.1%). Similar results were obtained by other studies. Adamsen et al found that the incidence of bile duct injuries is more common following laparoscopic cholecystectomies which were reported in 1.3% of cases [16]. Ali et al. [17] and Karvonen et al [9] also found higher incidence of bile duct injuries following laparoscopic approach (0.2%-0.7%) than in open approach (0.1%-0.4%).

In this study, the incidence of major bile duct injury was 0.61% and the overall incidence of biliary leak following cholecystectomy was 1.75%. Our results are comparable to the results obtained by Strasberg et al [18] who found that the incidence of major bile duct injuries was around 0.5%. Similar result was obtained by a Waage in Sweden [19] who found that the rate of bile duct injury was 0.4%.

In this study, the most common site of leakage was from gallbladder bed, duct of Luschka and minor accessory bile duct. Similar result was obtained by Strasberg et al. [18]. In this study, 70.58% of patients with bile leak resolve spontaneously with conservative treatment and controlled external fistula. Similar result was obtained by Chen et al [20] who found that 82.5% of patients with bile leak recovered after conservative management. Conservative treatment in the form of external drainage of bile has shown excellent result in the management of bile leak supposing that biliary - enteric continuity is present and there is no obstruction to bile flow distal to the origin of fistula. However, in case of major bile duct injury, operative management should be considered [18,21]. Only 29.41% of cases (5 patients) required interventions in the form of primary suturing of bile duct (17.64%) and hepaticojejunostomy (11.76%). Other 11.76% (2 patients) died because of complications following biliary leak due to delayed presentation.

CONCLUSION

The overall incidence of biliary leak following cholecystectomy was 1.75% and the incidence of major bile duct injury was 0.61%. Most cases (70.58%) managed conservatively and recovered without residual effect on expectant treatment. Most major bile duct injuries (29.41%) required intervention and repair. Mortality rate was 11.76% due to late presentation with impossible exploration 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 leakage from gallbladder bed, duct of Luschka or accessory bile duct needs only conservative treatment and mostly leads to disappearance of leak without any residual effect.

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