OPEN AIMJ ORIGINAL ARTICLE

Early Management of Post Laparoscopic Cholecystectomy Biliary Leakage

General Surgery

Mohamed Gamil Abdel Aziz Badr [1,*] M.B.B.Ch, Shawky Mohamed Deabes [1] MD and Mohammed Hassan El Shafey [1] MD

Corresponding Author:

Mohamed Gamil Abdel Aziz Badr

mohamedgamilbadr@gmail.com

Received *for publication January 20, 2022;* ***Accepted*** *July 30, 2022;* ***Published online*** *July 30, 2022.*

doi: *10.21608/aimj.2022.116926.1804*

Citation: *Mohamed G. , Shawky M. , Mohammed H. Early Management of Post Laparoscopic Cholecystectomy Biliary Leakage. AIMJ. 2022; Vol.3-Issue7 : 102-107.*

[1]General Surgery Department, Faculty of Medicine, Al-Azhar University Cairo, Egypt.

ABSTRACT

Background: Bile duct injuries after cholecystectomy is an iatrogenic catastrophe that is accompanying significant per-operative morbidities and mortalities, decreased longstanding survivals and quality of life (QoL), and elevated rates of successive litigation.

Aim of the work: to study the recent trend in the management of biliary leakage because of bile duct injuries during and after cholecystectomy and set up an organized protocol for managing biliary leakages.

Patients and methods: This is Retrospective research accomplished at General Surgery Department, Al-Azhar University Hospitals, Cairo between February 2020 to December 2021. This report was a case series of 1250 cases managed by LC. Twenty-five cases with biliary leakages after laparoscopy cholecystectomy have been recorded successively. Twenty-five cases with Cholecystitis (acute and chronic) who underwent LC and suffered from Postoperative biliary leakage, were enrolled in this work.

Results: In the current work cases were treated steadily, preliminary with the minimal invasive endoscopy only or with percutaneous drainage method to the more invasive operative method.

Conclusion: Endoscope treatment substituted surgical operation in all simple post-operative biliary leakages as an identical conclusive intervention. Operative intervention was the ultimate of complex post-operative biliary leakage ages, but the endoscopic method was a required complementary tool in primary management.

Keywords: *Biliary; Cholecystectomy; laparoscopic; leakage.*

Disclosure: *The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.*

Authorship: *All authors have a substantial contribution to the article.*

INTRODUCTION

Over the last decade, the introductions of laparoscope cholecystectomy have intensely altered the method of gallstone disorder. But the laparoscope method was accompanied by an elevated occurrence of biliary side-effects, predominantly in the early years of its utilization. [1]

Bile duct leakage is an uncommon but critical disease. The reason for bile duct leakage may be either iatrogenic or more infrequently, traumatically. [2]

The vast mainstream (95%) happens afterward hepato-biliary operation and the commonest reason is connected to open and laparoscope cholecystectomy. [3]

Biliary injuries happen in 0.1-0.2% and 0.3-0.8% afterward open and laparoscope cholecystectomy resp. [4]

Postoperative biliary leakage is frequently the consequence of unaware injuries to the bile ducts, unsuitable ligations of the cystic duct stump, or leak from the liver bed or the drainage location and frequently advanced with a distal block from remaining stones or strictures. [5]

Minor leaks can be stopped impulsively while major leaks can be a critical issue to the patients. [6]

Earlier treatment in a specialized clinic is the cornerstone for acceptable outcomes. Insufficient management frequently causes vital comorbidities and harder repairs, Surgical operation is the optimum way for treating but it is accompanied by vital complications and elevated death rate. [7]

Pre-operative management varied from simple drainages and earlier transfer up to lienteric anastomosis. Minimal invasive endoscope procedures with proven outcomes identical to operative outcomes became the best treatment option. [7]

Study the recent trend in the management of bile leakage because of bile duct injuries during and after cholecystectomy and set up an organized protocol for managing biliary leakages.

PATIENTS AND METHODS

This study was Retrospectively accomplished at the General Surgery Department, Al-Azhar University Hospitals, Cairo between February 2020 to December 2021 on 1250 cases who experienced LC. Twenty-five cases with a biliary leakage next to laparoscopic cholecystectomy were recorded consecutively. Twenty-five cases with Cholecystitis (acute and chronic) who experienced LC and suffered from Postoperative biliary leak, were included in this study. Ages ranging from 27 to 65yrs with 930-female and 320-male.

Approval was taken from the local ethical committee and a knowledgeably written agreement was collected from all cases who agreed to contribute to this work.

We excluded cases with: Biliary leaks post-Laparoscopically transformed to open cholecystectomy, bile leakage because of other operations, and Biliary damages detected and ultimately treated intra-operatively and cases with biliary leakage from traumas, ruptures, accompanied biliary malignancy, or vascular injuries.

In the current work, clinical presentation subsequent bile leakage, timing of detections (< 24 hours or > 24 hours), acute or chronic cholecystitis at the surgical time, biliary leakage quantity, period of biliary leakage, postoperative investigations (MRCP, CT abdominal, USG) for biliary leakage, several managements and its outcomes, site of biliary leakages are detected.

Patient's evaluation: Biliary leakage was clinical diagnosing (abdominal pains, fever, distensions, tenderness, nausea, jaundice) and radiological (US and/or CT scans) and was reconfirmed by Cholangiogram: Complete history taking, physical examinations, laboratory examinations (CBC, liver functions, coagulation profile), magnetic resonance cholangiopancreatography (MRCP), Endoscopic retrograde CP (ERCP) was performed in some selected cases and this study, the period for follow up was 3 months.

Cases were sorted simply in accordance to cholangiography and operative results into 2 groups: Simple biliary leakage which includes liver bed leakage, cystic ducts leakage or slipped clip, accessory ducts leakage, and Complex biliary leakage which comprise whole duct transactions.

Cases were treated steadily, starting with the minimal invasive endoscope method only or with the percutaneous method to the more invasive operative method.

Some cases experienced combinations of these operations. In patients with prearranged ERCP, when a substantial localized collection has been described, radiologically guided drainage was performed, while when the collection was large and diffuse, open or laparoscope drainages were performed, either pre or post-operation.

For simple biliary leakage, cases experienced joint endoscope sphincterotomy (ES) in addition to the plastic stent (10F, 9-12 cm), spanning the location of the leakage. For cases with biliary leakage and reserved stones, a sphincterotomy, stones elimination, and stent insertions were performed.

Recurrence ERCP for evaluation and stent elimination was done 2-3 mths post improvements. Cholangiography has been done to settle healing and nonappearance of stricture or remaining stones and they were treated consequently.

The percutaneous interventions were performed in patients of unsuccessful ERCP either in the form of percutaneous transhepatic drainages (PTC) pre-operation or a share of mixed operations (Rendezvous method). The operation was performed either urgently with large and diffuses collections non-suitable for percutaneous drainages or selectively after unsuccessful or unsuitable non-surgical tools treatments.

Following up: 3rd generation cephalosporin anti-biotics (cefoperazone), metronidazole infusions have been given for all cases. Cases have been discharged from the hospital with improvements and they were followed up in the outpatient clinics. Major outcomes measurements: Successful treatment was measured by clinical and investigatory improvements and ordinary ERCP with stent elimination with no more complications.

Statistical methods: SPSS version 15 was used to analyze the collected data (SPSS Inc., Chicago, IL, USA). Statistics such as mean±SD were used for quantitative information, and percentages were used for qualitative information. For quantitative variables, the independent student test has been utilized to find out the significance of the difference, while the Chi-square or Fisher's exact testing has been utilized to find out the significance of the difference. At P-values ≤0.05 the result was judged significant.

RESULTS

		Studied patients (N = 25)
Age(years)	**Mean ±SD**	39.7± 12.3
	Min - Max	27 – 63

Table 1: Description of age in all studied patients

This table shows the description of age in all studied patients. The ages mean of all studied cases was 39.7±12.3 yrs with ages ranging between 27 yrs and 63 yrs.

		Studied patients (N = 25)	
Sex	**Male**	10	40%
	Female	15	60%

Table 2: Description of sex all studied patients

This table shows the description of sex in all studied patients. There were 10 males (40%) and 15 females (60%) in the studied patients.

			Studied patients (N = 25)
Indication	**Acute Cholecystitis**	18	72%
	Chronic calcular Cholecystitis	7	28%

Table 3: Description of indication all studied patients
This table shows the description of indications in all studied patients. There were 18 patients (72%) with Acute Cholecystitis and 7 patients (28%) with chronic calcular Cholecystitisin in the studied patients.

		Studied patients (N = 25)	
Time presented post-operative	**1st day**	17	68%
	3rd day	6	24%
	5th day	2	8%

Table 4: Description of Time presented post-operative all studied patients
This table shows the description of time presented post-operative in all studied patients. It was on the 1st day in 17 patients (68%), 3rd day in 6 patients (24%), and 5th day in 2 patients (8%).

		Studied patients (N = 25)	
Mode of presentation	**Abdominal distention**	15	60%
	Abdominal pain	10	40%
	Tachycardia	20	80%
	Fever	5	20%
	Bile in drain	20	80%

Table 4: Description of the mode of presentation all studied patients
This table shows the description of the mode of presentation in all studied patients. It was presented by abdominal distension in 15 patients (60%), abdominal pain in 10 patients (40%), tachycardia in 20 patients (80%), fever in 5 patients (20%), and bile in a drain in 20 patients (80%).

		Studied patients (N = 25)	
Investigations	**U/S**	20	80%
	CT	8	32%
	MRCP	6	24%

Table 5: Description of investigations of all studied patients.
This table shows the description of investigations in all studied patients. U/S was done in 20 patients (80%), CT was done in 8 patients (32%) and MRCP was done in 6 patients (24%).

		Studied patients (N = 25)
ALT(U/L)	**Mean ±SD**	41.45± 13.8
	Min - Max	22 – 65
AST(U/L)	**Mean ±SD**	53.3± 14.18
	Min - Max	34 – 95

Table 6: Description of liver enzymes in all studied patients
This table shows the description of liver enzymes in all studied patients. The mean ALT in all studied patients was 40.45 ± 14.3 U/L with a minimum ALT of 21 U/L and maximum ALT of 67 U/L. The mean AST in all studied patients was 52.6 ± 15.09 U/L with a minimum AST of 34 U/L and maximum AST of 95 U/L

		Studied patients (N = 25)	
Site of leak	**CBD injury**	3	**12%**
	CHD injury	2	**8%**
	CHD transection	2	**8%**
	Cystic duct leak	3	**12%**
	GB Bed, Duct of Luschk, minor accessory duct	**15**	**60%**

Table 7: Description of grade in all studied patients
This table shows the description of grades in all studied patients. It was CBD injury in 3 patients (12%), CHD injury in 2 patients (8%), CHD transaction in 2 patients (8%), cystic duct leak in 3patients (12%), GB Bed, Duct of Luschk, minor accessory duct in 15 patients (60%).

		Studied patients (N = 25)	
Intervention	**Conservative with controlled external fistula**	15	60%
	ERCP	2	8%
	ERCP and stone extraction	2	8%
	Hepatico-jejunostomy	2	8%
	Percutaneous drainage + ERCP	2	8%
	Died before any intervention	2	8%

Table 8: Description of intervention for all studied patients.
This table shows the description of intervention in all studied patients. Conservative with controlled external fistula was done in 15 patients (60%), ERCP was done in 2 patients (8%), ERCP and stone extraction was done in 2 patients (8%), Hepatico-jejunostomy was done in 2 patients (8%), Percutaneous drainage + ERCP was done in 2 patient (8%) while there was2 patient (8%) died before any intervention.

		Studied patients (N = 25)	
Discharge time	**5 days**	6	24%
	6 days	3	12%
	7 days	4	16%
	8 days	3	12%
	10 days	4	16%
	12 days	3	12%
	20 days	2	8%

Table 9: Description of discharge time for all studied patients.
This table shows the description of discharge days in all studied patients from the ICU unit to the surgery department. There were 6 patients (25%) discharged after 5 days, 3 patients (12%) discharged after 6 days, 4 patients (16%) discharged after 7 days, 3 patients (8%) discharged after 8 days, 4 patients (16%) discharged after 10 days, 3 patients (12%) discharged after 12 days and 2 patients (8%) discharged after 20 days.

DISCUSSION

Laparoscopic cholecystectomy is presently the best treatment for symptomatically gallstones. It has advanced from an innovative, but slow, novelty to a repetitive day-case operation over the last two decades. Correspondingly, the management of biliary leakages after this operation has altered. But the basic principles behind this haven't, i.e. successful drainages of biliary leakages is serious. If drainage is insufficient, sepsis and bile peritonitis advance, and this is still a clear sign for operative interventions. [8]

The introductions of both ERCP and re-laparoscopy as opposite to laparotomy are the 2 main variances in managements being lately recognized in various specialized centers. ERCP has both diagnosing and therapy roles.[9]

It permits recognition of both the location of the leakage in addition to any remaining stone within the bile duct that can be contributed to it. Like stones may be eliminated and many approaches are utilized to decrease the gradient of pressure among the bile duct and the duodenum formed by contractions of the sphincter of Oddi. [10]

In our case series, we identified 25 cases, 15-female and 10-male with ages ranging between 14 and 63 years.

In our case series, 18 cases of LC were performed for acute Cholecystitis, while the indication in 7 patients was for Chronic Calcular Cholecystits accomplished as a routine operation.

Soderlund et al., [11] though observational reports have proposed a larger number of bile duct damages with earlier surgeries, this wasn't obvious from the randomized trials. In a Metanalysis of RCTs on the safety and efficiency of earlier vs. late LC for acute cholecystitis performed by Gurusamyl k et al., [12] they observed into 5 trials with 451 cases. There was a nonsignificant change among the 2 groups regarding bile duct injuries. The trials stated that bile duct injuries need reoperations. There was nonsignificant variance among the study groups regarding complications. The bile duct injuries rate was 0.5% (1 out of 222) in the early group vs. 1.4 % (3 out of 216) in the late patients.

In our case series, 17 cases were detected in the 1st 24 hours of surgery by the presence of bile in the drains, 6 cases were detected on the 3rd day of surgery by abdominal distention, and tachycardia and bile in the drain and two patients were detected at the 5th day of surgery by abdominal pain, distention, fever, and tachycardia.

Perini et al., [13] But some have existed as delayed as Postoperative 731-day Bergman et al., [14] the symptoms of delayed presentations are typically non-specific, with abdomen pains being the commonest.

Mercado et al., [15] other shared presentations comprise general malaise, liver functions levels indicating cholestasis, fever, jaundice, and sepsis. The clinical picture nature is connected to the pathologic disorder usually at the time of presentations, i.e. biliary leakage or stasis and obstructions.

Kaffes et al., [16] showed in their retrospective study on 100 patients presented with biliary leakage post LC, ERCP was accomplished and a cholangiogram was gotten in 96 cases. In 4 cases, cholangiography couldn't be gotten for technical difficulties.

ERCP confirmed a leakage in 83% of cases. Of the 16 in whom a leakage wasn't recognized, 3 had main

bile-duct injuries, 2 had whole duct obstructions owing to a surgery clip, and 1 had a full transection of the right liverwort duct. The commonest location of the leakage was the stump of the cystic duct, after that Luschka duct. Stent insertions were the commonest treatment (accomplished in 72 cases). A 10 Fr stent has been located in 57 cases, and a 7 Fr stent has been located in 15 cases, the latter chiefly those in whom a sphincterotomy wasn't accomplished. In 6 cases, no leakage was recognized and no interventions were done. [16]

They revealed that optimum endoscopic management for a simple bile-duct leakage is insertions of a straight plastic stent of diameter at more than 7 Fr. The stent must be detached thereafter 4 wks, and, in the mainstream of patients, following-up cholangiography will not be needed, predominantly for non-complicated cystic-ducts stump or peripheral ducts of Luschka leakages. But cholangiography must be attained if there are recognized or possible stricture formations, for instance, if the outflow had risen straightly from the bile ducts or the right hepatic ducts. The decisions for a following-up ERCP, as against stent elimination only, have both ethical insinuations and economical concerns. From the view of endoscopists, biliary injuries throughout LC may cause biliary leakages, biliary stricture formations, or both. Biliary leakages are sorted into 1) low grade (LG), where the leakage may only be detected after comprehensive opacifications of the intrahepatic biliary system and 2) high grade (HG), where the leakage may be detected earlier intra-hepatic opacifications. [16]

Mavrogiannis et al matched biliary stenting only versus EBS with biliary stenting in a prospective randomized report restricted to cases with endoscopic-proven post laparoscopic cholecystectomy biliary leakages (PCBL). They settled that both approaches were similarly effective to resolve low-grade leakages and didn't vary significantly in their complications. [17]

Sandha et al suggested an algorithm for their management of PCBL built on the grade of leakage in a nonrandomized study. They reported that endoscope biliary sphincterotomy (EBS) only with no stent assignment is feasible management for that majority of cases with LG leakages, except there is a compelling sign for stent insertions like reserved stones, biliary injuries with stricture formations, coagulopathy preventing EBS, or sepsis requiring instantaneous closures of the leakage. All high-grade lesions were effectively managed with EBS and stent assignment. The report didn't report whether EBS only had similarly favorable outcomes as biliary stent assignment in cases with low-grade leakages [18]

CONCLUSION

Endoscope treatment substituted surgical operation in all simple post-operative biliary leakages as an identical conclusive intervention. Operative intervention was the ultimate of complex post-operative biliary leakage ages, but the endoscopic method was a required complementary tool in primary management.

Conflict of interest : none

REFERENCES

1- Cushieri A, Dubois F, Mouiel J et al. The European experience with laparoscopic cholecystectomy. *Am J Sur.g* 2014; 161:385–7

2- Pioche M and Ponchon T. Management of bile duct leaks. *J Visc Surg*. 2013; 150(3):S33-8.

3- Cushieri A, Dubois F, Mouiel J et al. The European experience with laparoscopic cholecystectomy. *Am J Surg.* 2014; 161: 385–7

4- Goldberg SN, Becker JM, Connors PJ, Management of biliary leakages following laparoscopic cholecystectomy. *SurgEndosc.* 2016; 7: 292–5.

5- Halbert C, Pagkratis S, Yang J, et al. Beyound the learning curve : incidence of bile duct injuries following laparoscopic cholecystectomy normalize to open in the modern era. *Surg endosc*. 2017: 30(6):2239-43.

6- Mortensen J and Kruse A. Endoscopic management of Post operative bileleaks. *Br J Surg*. 2007; 79(12):1339-41.

7- Soukup E, Russel KW, Metzger R, et al. Treatment and outcomes of traumatic biliary injuries in children. *J Pedatric surg.* 2018; 49(2):345-8.

8- Flum DR, Koepsell T, Heagerty P, et al. Common bile duct injury during laparoscopic cholecystectomy and the use of intraoperative cholangiography: adverse outcome or preventable error? *Arch Surg.* 2001; 136: 1287–92.

9- Mergener K, Strobel JC, Suhocki P, et al. The role of ERCP in diagnosis and management of accessory bile duct leaks after cholecystectomy. *Gastrointest Endosc.* 1999; 50:527–31

10- Ramesh H. Post cholecystectomy biliary leakages and their management. *Gastrointest Endosc*. 1998; 47: 564–5.

11- Soderlund C, Frozanpor F, Linder S. Bile duct injuries at laparoscopic cholecystectomy: a single-institution prospective study. Acute cholecystitis indicates an increased risk. *World J Surg.* 2005; 29: 987–93.

12- Gurusamy K, Samraj K, Gluud C, et al. Meta-analysis of randomized controlled trials on the safety and effectiveness of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg.* 2010; 97:141–50.

13- Perini RF, Uflacker R, Cunningham JT, et al. Isolated right segmental hepatic duct injury following laparoscopic cholecystectomy. *Cardiovasc Intervent Radiol*. 2005;28:185-95

14- Bergman JJ, van den Brink GR, Rauws EA, et al. Treatment of bile duct lesions after laparoscopic cholecystectomy. *Gut.* 1996; 38:141-7.

15- Mercado MA. Early versus late repair of bile duct injuries. *Surg Endosc.* 2006; 20:1644-7.

16- Kaffes AJ, Hourigan L, De Luca N, et al. Impact of endoscopic intervention in 100 patients with suspected postcholecystectomy biliary leakage. *Gastrointestinal endoscopy*. 2005; 61(2):269-75.

17- Mavrogiannis C, Liatsos C, Papanikolaou IS, et al. Biliary stenting alone versus biliary stenting plus sphincterotomy for the treatment of post-laparoscopic cholecystectomy biliary leaks: a prospective randomized study. *Eur J Gastroenterol Hepatol.* 2006; 18:405–9.

18- Sandha GS, Bourke MJ, Haber GB, et al. Endoscopic therapy for biliary leakage based on a new classification: results in 207 patients. *Gastrointestinal endoscopy.* 2004; 60(4):567-74.