SURGICAL MANAGEMENT AND OUTCOME OF COMPLEX BILE DUCT INJURY AFTER LAPAROSCOPIC CHOLECYSTECTOMY: LOCAL EXPERIENCE IN SULAYMANI CENTER

Karzan Seerwan Abdullah [a]

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ABSTRACT

Background

Iatrogenic complex bile duct injury (ICBI) is one of the most complex situations produced by a surgeon and is associated with a significant rate of morbidity and low mortality rate. It needs a multidisciplinary team approach to offer a better chance for initial diagnosis and treatment options.

Objectives

To review surgical management of ICBI, morbidity and mortality following surgical repair.

Methods

This is a retrospective study on 29 patients with ICBI who were diagnosed intra-operatively during cholecystectomy or referred post operatively to our center in Sulaymaniyah governorate from January 2013 to March 2018.

Results

In all, 59 patients of bile duct injuries have been treated through surgical repair. In this study, 29 patients were selected according to the inclusion criteria. The age was ranging from 22-65 years. There were 19(65.5%) female patients and 10 (34.48%) male patients. In only 5 (17.2%) of patients, the injury was identified during cholecystectomy. The most common type of ICBI is type III according to Strasberg Classification. 19 of them had satisfactory outcomes after surgical repair of their injuries. Six patients developed stricture within 6 months and they underwent re-do anastomosis. Three patients were referred for liver transplantation. Two patients died within 10 days of surgery because of sepsis. Both patients with porto-eneterostomy developed stricture and subsequent biliary cirrhosis.

Conclusion

Complex bile duct injury has a significant morbidity rate that may affect the quality and quantity of the patient's life. The more proximal injury has worse prognosis. Porto-enterostomy has a very bad outcome.

Keywords: *Complex biliary injury, Management, Outcome .*

[a] Department of Surgery, College of Medicine, University of Sulaimani, Kurdistan Region, Iraq.
Correspondence: karzan.abdullah@univsul.edu.iq

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INTRODUCTION

Cholecystectomy is one of the most common surgical procedures in the world, especially laparoscopic type [1]. Although the incidence of iatrogenic bile duct injury (IBDI) is decreasing due to improvement in the learning curve and standardization of the procedure, but still it remains one of the major issues that facing the surgeon [1]. According to literatures, the incidence of IBDI is varying from 0.2- 0.3% in open type surgery and 0.4-0.7 in laparoscopic Cholecystectomy (LC) [2, 3]. The incidence of recognition of IBDI intra-operatively is approximately 17-20 % [4]. There are many risk factors for IBDI including; factors related to patient's biliary anatomy such as anatomical anomalies, surgeon's experience, an error of visual perception, whether it was performed as emergency or elective surgery, adhesions, poor visibility of surgical field and many others factors [5]. Diagnosis of IBDI as early as possible accurately is the best way to have a good result after management and avoid devastated complications like biliary stricture, biliary cirrhosis, liver failure and death [6, 7,8].

The best result of management of IBDI was observed when it had been done in specialized hepato-biliary center with multidisciplinary team that have more experience in dealing with complex biliary injuries [9, 10,11].

The aim of our study is to review the surgical management of complex bile duct injury, morbidity and mortality following surgical repair.

PATIENTS AND METHODS

This retrospective study has conducted on 29 patients who diagnosed as a complex biliary injury, either intra-operatively during cholecystectomy or referred post operatively to our center in Sulaymani governorate from January 2013 to March 2018. Data were collected from patients' medical records regarding the patients' age, gender, type of injury according to Strasberg classification [12] , time between injury and referral to our center, hospital stay, surgical management and outcomes. The inclusion criteria were complex biliary injuries that defined as: 1) injuries that involve the confluence; 2) injuries in which repair attempts have failed; 3) any bile duct injury associated with vascular injury; 4) any biliary injury in association with portal hypertension or secondary biliary cirrhosis [6]. All repair procedures were performed by the same surgical team, either when the injury was diagnosed intra or post-operatively. Patients who were diagnosed post operatively, they underwent clinical assessment, biochemical investigations and imaging studies including; abdominal ultrasonography, magnetic resonance cholangio-pancreatography (MRCP), endoscopic retrograde cholangiopancreatography (ERCP) in selected patient before the surgical repair. During the surgery, we performed a careful assessment of the surgical field and visualization of injured bile ducts which was not easy to visualize according to extend of injury, after detection of the site of injury appropriate intraoperative decisions have been taken.

The following surgical procedures were done: 1) Mucosa to mucosa bilio-enteric anastomosis depending on the type and extend of bile duct injury. 2) Portoenterostomy, in patient when the anastomosis with proximal viable bile duct was not possible. An internal biliary stent at the site of biliary anastomosis was used in most of the patients especially when the duct diameter was small.

Data entry performed via using an excel sheet then the Statistical analysis was performed by Statistical package (SPSS program, version 21).

RESULTS

The age of the patients was ranging from 22-65 years. There were 19(65.5%) female patients and 10(34.48%) male patients. The highest percentage of patients with ICBI was reported among age group 40-49 years. The age groups distribution is shown in Figure 1. In only 5 (17.2%) of patients, the injury was identified during the primary surgery, the time of diagnosis of the injury is shown in Table 1. The results of this study clarify that the most common type of ICBI is type III according to Strasberg Classification; Figure 2 can show the types of injury among included patients.

There were 21 patients with confluence injury, 5 patients with previous attempts by general surgeons, 2 patients with vascular injury and one patient with portal hypertension. In 27 patients, we performed mucosa to mucosa anastomosis between hepatic ducts and Roux-en-Y loop of jejunum. In 2 patients we performed porto-jejunostomy as a salvage procedure. Out of 29 patients, 19 of them had satisfactory outcomes after surgical repair of their injuries; Table 2 is showing the outcomes of the patients.

Six patients were developed stricture within 6 months and they underwent re-do anastomosis. Two patients died within 10 days of surgery because of sepsis. Both patients of porto-eneterostomy developed stricture and subsequent biliary cirrhosis. The mean of hospital stay in general was 6.33 days, for those who were diagnosed intraoperatively was 4.6 days, while for patients with postoperative diagnosis was 17.2 days.

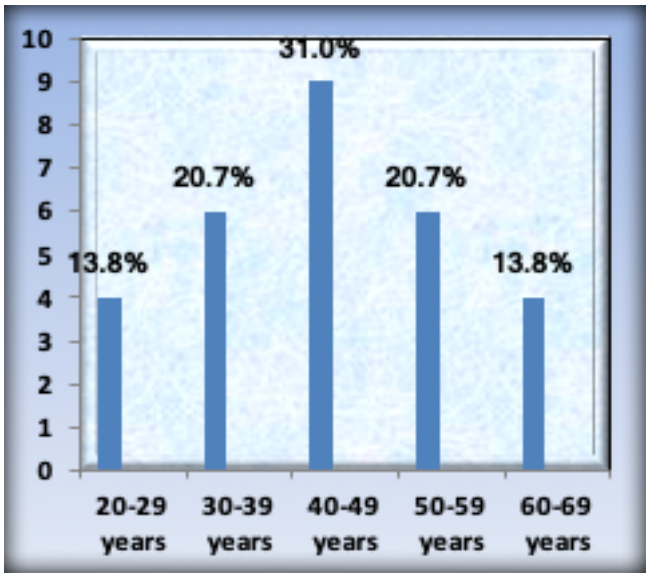

Figure 1. Distribution of patients' age groups.

Table 3. Time of diagnosis of the injury.

Time of Diagnosis	Numbers	Percentage
*Intraoperative (0 day)	5	17.2%
*Postoperative	24	82.8%
≤ 14 days	18	75.0%
>14 days	6	25.0%

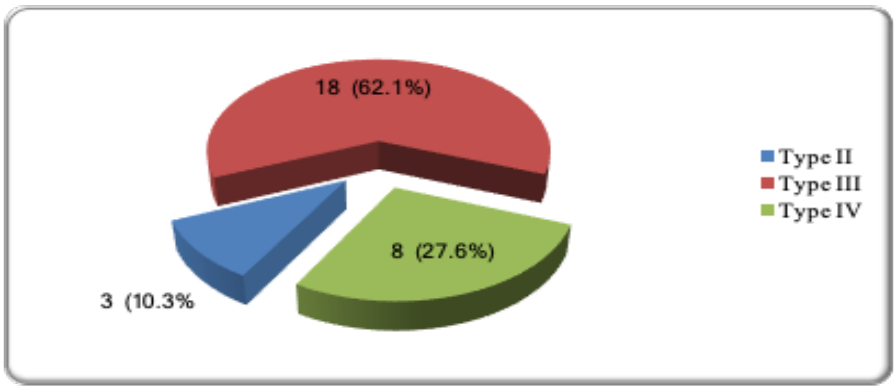

Figure 2. Types of injury according to Strasberg Classification.

Table 2. Relation of outcomes and types of injury.

Outcomes	Numbers	Percentage	Type II	Type III	Type IV
Satisfactory	19	65.5%	3 patients	12 patients	4 patients
Re-do for Stricture	6	20.7%	0	4	1
Transplant	3	10.3%	0	0	3
Death	2	7.0%	0	2	0

DISCUSSION

IBDI is a major and serious issue in surgical practice since its iatrogenic inflict with a major consequence if not dealt with in a proper way [10, 13 ,14 ,15]. Unfortunately, we couldn't assess the accurate incidence rate of bile duct injuries in this study, because of poor data registry in our country.

In this study, we have observed that 19 (65.5%) were female and the highest number of patients with ICBI was reported among age group 40-49 years which can be explained by the well known fact that symptomatic choleliathiasis is more common in female and in their fifth decade of life, thus the number of female that undergo laparoscopic cholecystectomy is higher than male, hence the possibility of bile duct injury is more in female. This result is similar to results of other literatures [12, 13, 16, 17].

In the present study, we found that in only (17.2%) of patients, the surgeon could identify the presence of biliary injury during the primary procedure, while 82.2% of patients were diagnosed postoperatively ranging from 3rd to 76th postoperative day. This result is in accordance with other international publications that recorded about 17-20% of bile duct injuries that can be recognized during laparoscopic cholecystectomy [4]. Nevertheless, there are many factors that may contribute to both ICBI and surgeon's unawareness about the injury intraoperatively, such as, biliary tree anatomical anomalies, poor visualization, bleeding that obscure the field, fatty Calot's triangle, extensive local adhesion at the plane of dissection due to advanced stage of the pathology or previous ERCP, poor surgical experience, and visual perception error that make the surgeon to go through a wrong plane of dissection [4]. Hence, intraoperative diagnosis of bile duct injury is difficult for the surgeon because of the above mentioned factors, but there is a big difference between our results and the resuts of other studies concerning the time of referral, the patient were referred to our center on day 3rd to 76th postoperatively, while other studies have reported the referral time of 12-21 days [16, 17, 18, 19]. Really, there is no data to explain this phenomenon, but the impression of gastro-intestinal surgeons dealing with this issue is that the primary surgeon tries to manage the bile duct injury conservatively to avoid further surgical intervention that leads to delay in referral, though; there is no well organized referral system in our country. Early recognition of IBDI and referral to specialized Centre associated with best post-operative results because of delay in referral associated with more inflammation making definitive surgery so difficult to conduct [1].

The results of the present study clarify that the most common type of ICBI is type III according to Strasberg Classification and 21 patients with confluence injury, 2 patients with vascular injury and one patient with portal Hypertension. According to these points, most of the surgeons might faced difficult cholecystectomy during the primary surgery because of poor visualization of the anatomical relations of structures in the area that increases the possibility of bile duct injury. ICBI is usually involves, thermal injury, bile duct laceration, division, occlusion, and bile duct resection [13].

In this study, 27 patients underwent mucosa to mucosa anastomosis between hepatic ducts and Roux-en-Y loop of jejunum, while in 2 patients we performed porto-jejunostomy as a salvage procedure, type of the procedure is depending on the type of injury. Regarding the management of IBDI, when the continuity of bile duct is still present, it can be treated by endoscopic and or percutaneous stent with good result, but when this continuity lost, it is definitely need

surgical treatment [20, 21, 22]. A Roux-en-Y Hepatico-Jejunostomy is the treatment of choice with the best results in experienced hands [22, 23] . If there is no tissue lose, direct duct to duct anastomosis is possible but with success rate approximately 50 % [24]. Roux-en-Y Hepatico-Jejunostomy is preferable than choledocho-duodenostomy because of the risk of recurrent cholangitis and if leakage occur it will lead to duodenal fistula following surgery [25, 26].

In our study, we found a high rate of complications. Out of 29 patients, 6 patients underwent re-do surgery for biliary stricture, 3 patients referred to liver transplantation and 2 patients were died because of sepsis, it means 10 (34.5%) of patients were suffered from at least one of the major complications including death. This complication rate is higher than bile duct injury in general [22, 23], which might be due to delay in referral of patients to the tertiary center.Two cases were managed by porto-enterostomy when mucosa to mucosa could not be achieved. Both of them developed stricture and biliary cirrhosis and referred them to liver transplantation. The fate of 3 cases were liver transplantation, all of them were belonged to type IV injury, thus, the more proximal injury more prone to be ended in liver transplantation. In this study, for all patients, the mean of hospital stay was 6.33 days, for patients with intraoperative diagnosis, was lower (4.6 days), while for those with postoperative diagnosis was much higher (17.2 days), it means that the early diagnosis is essential to decrease the hospital stay and low complication rate.

In conclusion, IBDI is a serious issue that needs early diagnosis with proper subsequent management in tertiary center with multidisciplinary hepatobiliary team, and delay in referral may lead to life threatening complications. Complex bile duct injury has high complications rate that may affect quality and quantity of patient's life. The more proximal injury has the worse prognosis. Porto-enterostomy has a very bad outcome.

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