



ORIGINAL RESEARCH PAPER

General Surgery

A RETROSPECTIVE STUDY ON IATROGENIC BILE DUCT INJURY OF 16 PATIENTS AT TERTIARY CARE CENTRE

KEY WORDS: Iatrogenic bile duct injury, Laparoscopic cholecystectomy, early recognition, management challenge, endoscopic treatment, surgical repair

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ABSTRACT Iatrogenic bile duct injuries are less common complication of hepatobiliary surgery specially after laparoscopic cholecystectomy but when occurs commonly due to misinterpretation of surgical anatomy, it requires early diagnosis and management, which decreases morbidity and mortality and improve patient's quality of life. Different classification of bile duct injuries according to site and extent are discussed as well as early diagnosis and appropriate intervention like endoscopic, radiologic, and surgical approaches. Our aim of this study is to review the management challenges depending on the time of recognition of the injury and extent of injury.

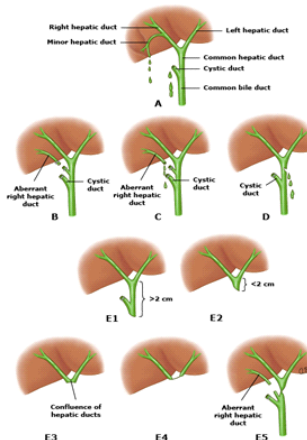
INTRODUCTION

The most dreaded complication of hepatobiliary surgery is injury to the extrahepatic bile duct system. Common causes of biliary tract injury are complete transection at or below the hepatic duct bifurcation, occlusion of the duct with a clip, thermal injury, avulsion of cystic duct, partial laceration, divided accessory duct, cystic duct stump leak and rarely injury to intestine. Cholecystectomy accounts for most postoperative biliary injuries and strictures. The rate of major bile duct injury after laparoscopic cholecystectomy (LC) ranges from 0.4% to 0.7%, as opposed to 0.2% after open cholecystectomy. The incidence of iatrogenic bile duct injury (IBDI) has significantly gone up since LC became the "gold standard" in the treatment of symptomatic cholelithiasis. [1] It has been demonstrated that the primary cause of BDI is the misinterpretation of biliary anatomy in 71%–97% of all cases. [2] Other common factors which increases risk of IBDI are acute cholecystitis, a foreshortened cystic duct, anomalies of the biliary tree, haemorrhage from injury to the cystic or hepatic artery and dissection with thermal instruments in triangle of calot. Different classification of bile duct injury described. (1) Bismuth classification (according to the level of biliary injury [3]), (2) Strasberg classification (stratified form type A to type E, as summarized Table 1), (3) McMohan classification (major and minor bile duct injury), (4) Stewart-Way classification (involved four classes based on the mechanism and anatomy of biliary injury). We have chosen commonly utilized Strasberg classification in this study as shown in Table 1 and Image 1.

| | | |
|---|--------|----|
| Stricture to an aberrant RHD and to CHD | Type V | E5 |
|---|--------|----|

Abbreviations: –RHD, right hepatic duct; CBD, common bile duct; CHD, common hepatic duct.

Image 1- Strasberg classification



Manifestation of biliary tract injury are bilioma, biliary ascites and biliary strictures. Early recognition of BDI is of paramount importance. The optimal treatment is influenced by the timing of recognition of the injury, the extent of BDI, the patient's clinical condition, and the availability of experienced hepatobiliary surgeons. [1]

Table 1 - Bismuth and Strasberg classification

| Bile duct injury | Bismuth | Strasberg |
|---|----------|-----------|
| Cystic duct leak or leaks from small ducts in liver bed | – | A |
| Occlusion of an aberrant RHD | – | B |
| Leak from an aberrant RHD | – | C |
| Lateral injury to CBD (<50% circumference) | – | D |
| CHD stricture, stump >2 cm | Type I | E1 |
| CHD stricture, stump 2 cm | Type II | E2 |
| Hilar stricture with preserved biliary confluence | Type III | E3 |
| Hilar stricture with involvement of confluence | Type IV | E4 |

STUDY

Our aim and objective of this study is compilation and comparison of various presenting scenarios of patient with IBDI and utilization of different modalities of investigation and management plans. In our retrospective study we included 16 patients admitted in tertiary care centre and operated for cholecystectomy within or from outside of tertiary care centre over a period of one year.

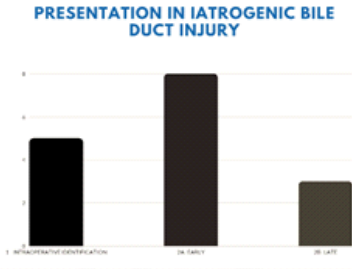
Diagnosis and Management Approach

Time of diagnosis

- 1) Group 1 - During cholecystectomy
- 2) Postoperative
 - Group 2A (Early) - Within first 48-72 hours

Group 2B (Late) - After 48-72 hours

Image 2 - Presentation in iatrogenic bile duct injury



Diagnostic Modalities

1. Vital parameters like temperature, pulse rate, blood pressure, respiratory rate and air entry.
2. Per abdomen findings like distention, tenderness or guarding, peristalsis.
3. Development of signs of obstructive jaundice like passage of clay coloured stool, icterus and pruritus.
4. Biochemical markers like hemogram and liver function tests.
5. Ultrasound was serially done according to symptom of patient or at monthly interval to monitor presence or absence of collection, biliary tree – size, level of cut off and echotexture of liver.
6. ERCP used with or without stenting.
7. MRCP can be used for plan of management.

MANAGEMENT – in Group 1 (Intraop Bile duct injury)

- Out of the five patients who were suspected to have intraoperative bile duct injury, in one patient, drain placement was done followed by ERCP stenting within 48 hours. In one patient, T – tube was placed but patient had to undergo ERCP with stenting the next day. In three patients, drain placement was done with no bile leak and drain removed after 7-14 days after constant low output of drain without bile.

MANAGEMENT – in Group 2A

One patient had bile leak from drain in situ post laparotomy for grade 4 liver injury, later managed conservatively.

One patient had bilioma formation in which drain placement and ERCP stenting was done, drain was removed later.

Two patients had bile leak from drain in which ERCP stenting was done.

Two patients had signs of biliary peritonitis in which ERCP was done and T tube placement and later ERCP was done respectively.

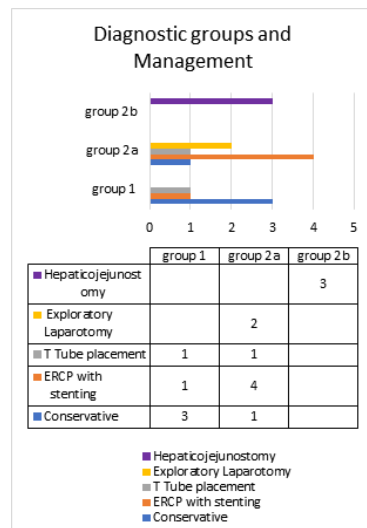
Two patients presented with biliary peritonitis and had to be explored.

- 1) One patient was explored within 48 hours – multiple drains were placed and patient could be salvaged.
- 2) Another patient presented on post op day 4 – laparotomy was done with multiple drain placement with feeding jejunostomy but could not be saved.

MANAGEMENT - in Group 2B

Patients presenting late with features of obstructive jaundice included. Out of that two male patients explored and hepaticojejunostomy done. One female patient underwent ERCP which failed followed by hepaticojejunostomy.

Graph 1 – Diagnostic groups of iatrogenic bile duct injury and management distribution



CONCLUSION

Intraoperative diagnosis is difficult in cases of IBDI but after 24-48 hours – prompt intervention in patients with developing biliary peritonitis and delayed intervention in stable patients with close follow up of their clinical course is crucial in preventing IBDI related mortality and morbidity.

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