

Immediate post operative management of Bile leak following laparoscopic or open cholecystectomy – Tertiary care centre in South India

Villalan Ramasamy¹, Rajasekaran karuppiyah², Amarjothi JMV³,
Srinivasan muthukrishnan⁴, Prabhakaran.R⁵, Rajendran .S⁶,
NaganathBabu.O.L⁷.

1. Assistant Professor, Department of Surgical Gastroenterology, MGMGH, Govt. KAPV Medical college, Trichy, Tamilnadu, India. (Former senior Resident, Madras Medical College, Chennai- 3, Tamilnadu, India.)

2. Senior Assistant Professor, Department of Surgical Gastroenterology, MGMGH, Govt. KAPV Medical college, Trichy, Tamilnadu, India. (Former senior Resident, Madras Medical College, Chennai- 3, Tamilnadu, India.)

3. Assistant Professor, Department of Surgical Gastroenterology, Saveetha Medical college, Thanadalam, Chennai, Tamilnadu, India. (Former senior Resident, Madras Medical College, Chennai- 3, Tamilnadu, India.)

4. Senior Resident Assistant, Institute of Surgical Gastroenterology, Rajiv Gandhi Govt. General Hospital, Madras Medical College, Chennai

5. Senior Assistant Professor, Institute of Surgical Gastroenterology, Rajiv Gandhi Govt. General Hospital, Madras Medical College, Chennai.

6. Professor, Institute of Surgical Gastroenterology, Rajiv Gandhi Govt. General Hospital, Madras Medical College, Chennai.

7. Professor, Institute of Surgical Gastroenterology, Rajiv Gandhi Govt. General Hospital, Madras Medical College, Chennai

Abstract

Introduction:

The most common cause of bile duct injuries are Iatrogenic. Cholecystectomy related bile duct injuries are disastrous both healthwise and monetarily. There is no clear algorithm for early management of bile duct injuries using various percutaneous, endoscopic and surgical approaches.

Aim, Materials and Methods:

The aim of the study was to define the role of various approaches i.e percutaneous, endoscopic, laparoscopic and open surgical drainages in the early management of bile duct injuries. We retrospectively analysed 104 patients with bile duct injuries following cholecystectomies referred to and treated in our Institute between July 2012 and January 2017. Patients underwent drainage of the biliary collections by various means including percutaneous (n=47), endoscopic (n=26), laparoscopic and open surgical approaches (n=22) depending upon their clinical condition. Analysis of the outcomes of the various approaches for the early management of bile duct injuries was done using simple descriptive statistics.

Results:

Most of the biliary injuries occurred following laparoscopic cholecystectomy (66.4%). There was a female (58.65%) predominance and most of the patients were in the age group of 20 to 49 (n=65; 62.8%).

The most common type of biliary injuries were cystic duct stump leak (n=47; 45.2%) followed by type E1 (n=23; 22.1%), type E2 (n=13; 12.5%) and type E3 (n=10; 9.6%). Of the 104 patients, 43 (41.35%) were referred within 7 days of index surgery of which 38 (88.37%) had bilioma, 3 (6.97%) presented with jaundice and 3 (6.97%) with features of sepsis. They had a hospital stay ranging between 7 to 14 days. On the other hand, 61 patients (58.65%) were referred beyond 7 days of which 57 (93.4%) had bilioma, 9 (14.8%) presented with sepsis and 8 (12.1%) patients with jaundice and this group had a hospital stay ranging from 50-90 days.

While the 9 patients who had no bilioma on imaging and no sepsis were managed conservatively, the rest underwent some form of intervention. The majority (n=47; 45.2%) underwent PCD insertion. 26 (25%) patients underwent ERCP with stenting while 22 (21.2%) underwent surgical drainage.

The overall success rate of ERCP was 52% and was specifically useful in cases with cystic duct stump leak (success rate 83.3%). ERCP was associated with complications like bleeding in two, cholangitis in three and pancreatitis in two patients.

Conclusion: Acute BDI should be managed at a tertiary care referral centre where multidisciplinary facilities including expertise in diagnostic, percutaneous radiological interventions and endoscopic and laparoscopic facilities are available. Early identification and referral is a key to reduced morbidity.

Key words – Bile duct injury, Various approaches, Early referral

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I. Introduction:

Laparoscopic cholecystectomy (LC) has become the gold standard treatment for symptomatic cholelithiasis but at the risk of increased incidence of Bile duct injuries (0.2 to 0.7 Vs 0.1-0.3).¹ The most common cause of bile duct injuries are Iatrogenic.² Cholecystectomy related bile duct injuries are disastrous both healthwise and monetarily. Repair of these bile duct injuries can run 4.5 to 26.0 times the cost of uncomplicated procedures and carries a significant mortality rate.³ Biliary peritonitis, cholangitis, biliary cirrhosis and portal hypertension are some of the potentially serious complications following BDI. Failure to recognize these injuries and inappropriate management increases the risk of complications severalfold. Subsequent diagnostic and therapeutic interventions increases the cost of medical care exponentially, alongside a considerable loss of work and vexatious litigation. It is very important to stratify the type and extent of injury so as to formulate an appropriate treatment strategy. A multidisciplinary team consisting of an experienced hepatobiliary surgeon, gastroenterologist, intervention radiologist and nutrition specialist is paramount in the acute management of biliary injury and to ensure good long term results.⁴ Sepsis control and effective management of fluid requirements and electrolytes are the mainstay of acute management of bile duct injury. There is no clear algorithm for early management of bile duct injuries using various percutaneous, endoscopic and surgical approaches.

Aim

To define the role of various approaches i.e percutaneous, endoscopic, laparoscopic and open surgical drainages in the early management of bile duct injuries

II. Methods

Bile duct injuries following cholecystectomies (N=104) referred to and treated in the Institute of Surgical Gastroenterology, Rajiv Gandhi Govt. General Hospital, Madras medical college, Southern part of India between July 2012 and January 2017 were retrospectively analysed. Leaks from the cystic duct and gall bladder bed, bile duct laceration, transection, following cholecystectomies (Both open and laparoscopic) were included. Detailed history and physical examination were recorded. Signs and symptoms of acute bile duct injury were noted. At presentation, information regarding the cholecystectomy (preoperative symptoms, indication for cholecystectomy, preoperative evaluation, operative details, intraoperative complications, and postoperative events) was gathered by reviewing the medical records, interviewing the patient, and by discussing with the surgeon who operated whenever deemed necessary. All patients in this study group submitted for Complete blood count, liver function test and Ultrasound abdomen. CECT abdomen was taken to look for site of biloma and whether it is localized and generalized in the peritoneal cavity. Patients underwent drainage of the biliary collections by various means including percutaneous, endoscopic, laparoscopic and open surgical approaches depending upon their clinical condition. MRCP was done after draining of intra abdominal collections for all patients to assess the type of bile duct injury by Strasberg classification. Follow up included clinical evaluation (jaundice, cholangitis, pruritus), liver function tests (especially Alkaline phosphatase), USG (for biliary dilatation) and MR cholangiogram. Since these patients are prone to develop biliary stricture, they will be treated surgically at a later date after 6 weeks when bile leak stops spontaneously and when patient develops jaundice. Analysis of the outcomes of the various approaches for the early management of bile duct injuries was done using simple descriptive statistics.

III. Results:

A total of 104 patients of post cholecystectomy biliary injuries were referred to our institute during the study period. Of them, 69 (66.4%) had occurred following laparoscopic cholecystectomy while 35 (33.6%) occurred following open cholecystectomy (Table 1).

Table 1 : Incidence of BDI in open and laparoscopic methods

Open cholecystectomy	Lap cholecystectomy	Total
35 (33.6%)	69 (66.4%)	104

They were slightly more common in females (n=61; 58.65%)(Table 2) and 65 (62.8%) of them occurred in the age group of 20 to 49 (Table 3).

Table 2 : Incidence of BDI in Male and female groups

Male	Female	Total
43 (41.35%)	61 (58.65%)	104

Table 3 : Percentage of BDI in Various age groups

Age group	No.	Percent
<20	1	0.9%
20-29	16	15.3%
30-39	30	29.3%
40-49	19	18.2%
50-59	19	18.2%
60-69	11	10.5%
70-79	7	6.7%
80-89	1	0.9%
Total	104	100%

The most common type of biliary injuries were cystic duct stump leak (n=47;) followed by type E1 (n=23;), type E2 (n=13;) and type E3 (n=10;). Type D constituted 9 cases () and types C and E4 constituted one case each (Table 4).

Table 4 : Type of bile duct injury based on strassberg classification

Type of bile duct injury (strassberg classification)	Number of patients
Type A	47
Type B	0
Type C	1
Type D	9
Type E1	23
Type E2	13
Type E3	10
Type E4	1
Type E5	0

Of the 104 patients, 43 (41.35%) were referred within 7 days of index surgery of which 38 (88.37%) had bilioma, 3 (6.97%) presented with jaundice and 3 (6.97%) with features of sepsis. They had a hospital stay ranging between 7 to 14 days. On the other hand, 61 patients (58.65%) were referred beyond 7 days of which 57 had bilioma, 9 presented with sepsis and 8 patients with jaundice and this group had a hospital stay ranging from 50-90 days(Table 5).

Table 5 : Various presentations based on duration

Time of referral	Referral < 7 days	Referral > 7 days
No. of patients	43	61
With sepsis	3	9
Bilioma	38	57
Jaundice	3	8
Hospital stay	7-14 days	50-90 days

While the 9 patients who had no bilioma on imaging and no sepsis were managed conservatively, the rest underwent some form of intervention. The majority (n=47; 45.19%) underwent PCD insertion. 26 patients underwent ERCP with stenting. While 22 (21.2%) underwent surgical drainage .The overall success rate of ERCP was 52%(Table 6).

Table 6 : Treatment options for Acute BDI

Treatment options	No.
Conservative	9
PCD	47
Open drainage	22
ERCP	26

IV. Discussion

Laparoscopic cholecystectomy is associated with a 2 to 4 times higher risk of bile duct injury than open cholecystectomy. More over bile duct injury caused by LC is more often a complete transection.⁵ Older age and male sex increased the risk of BDI. The possible mechanism behind this could be sex dependant differences regarding the tissue around the calot triangle, or the cause could be bile duct anomalies which may affect dissection and anatomical orientation in this particular area.⁶

There is no consensus in clinical studies about patient-related risk factors on the development of biliary injuries. In most studies, patient age greater than 70, male sex, acute cholecystitis, bleeding during surgery, impacted stone in Hartmann's pouch, severe thickening of the gallbladder wall, cirrhosis, previous upper abdominal surgery and anatomical variations are considered as predictors of difficult laparoscopic surgery. Whether the risk of biliary injury is increased in these difficult cases is unclear. Misidentification of biliary structures is the leading cause of biliary injury and patient related factors may contribute to this error.⁷

The consequences of major biliary tract injury following LC include a complex operative repair resulting in a lengthy post operative stay with an increased risk of death, an excessive number of perioperative diagnostic and therapeutic studies, frequent readmissions (often as emergencies) and a life time risk of restructure with enormous cost.³ There is a limited data that addresses the issue of immediate management of a major bile duct injury. Management of biliary ductal injuries depends on timely recognition of the injury, the extent and type of injury, the patients co morbid status and the availability of an experienced surgeon. There are various classifications of BDI, including the Corlette – bismuth, Strasberg, Wu, Mcmohan, Hannover classification. Each has its own merit and can guide a surgeon to select the best appropriate repair for each injury.⁸

Early recognition of bile duct injury is of paramount importance. Several studies showed that only 8% to 33% bile duct injuries have been recognized at the time of LC. Usually, unexplained bile drainage raises the suspicion of a biliary injury.⁹⁻¹³ Immediate detection and repair leads to an improved outcome with the goal of repair being the restoration of a durable functional conduit, prevention of fistula, abscess, stricture, cholangitis and secondary biliary cirrhosis. While immediate recognition of any injury is mandatory for improved patient outcome, the timing of repair is controversial with convincing arguments on both sides of the issue. However, there seems to be more evidence to support either immediate repair in experienced hands or delayed repair beyond 6 weeks. Intermediate repair (within 3 to 14 days) is more likely to lead to failures and long term complications.¹⁴ Even a small amount of bile in the peritoneal cavity lead to severe sepsis and death. USG preferably CT guided percutaneous drainage of peritoneal bile is essential. So the first priority in BDI is to control peritoneal and biliary sepsis and to convert acute BDI to a controlled external biliary fistula –this can be achieved by endoscopic, radiologic, laparoscopic and or laparotomy.¹⁵⁻²⁰ Percutaneous drainage of large bilomas should be performed prior to endoscopic cholangiography to prevent bacterial contamination of the fluid collection. Once sepsis is controlled, a complete cholangiogram is essential to delineate the biliary anatomy and to detect the site (in relation to the ductal confluence), nature (partial or complete) and extent (loss of segment) of the injury this is best obtained by MRC.²¹ Endoscopic therapy with either a NB drain or internal stent restores normal bile flow and facilitates leak closure. Endoscopic drainage appears to reduce or eliminate the transpapillary pressure gradient maintained by the sphincter of oddi, diverting bile preferentially into the duodenum and away from the site of leakage. Biliary stenting significantly reduces the time of resolution of cystic lesions as compared to sphincterotomy in the canine model in a randomized, controlled study.²²⁻²³ Nasobiliary tube (ENBD) placement offers an alternative treatment of bile leak by diverting the bile flow into the tube. In particular, this procedure may be useful for patients with coagulopathy, such as liver cirrhosis or chronic renal failure, because it can be performed without ES.²⁴ However, anecdotally and bearing in mind that our patients have increasingly high expectations, we feel that the minimally invasive approach is preferable. This minor, but significant, change in the management of bile leaks and saving a laparotomy has a major impact on the patient's perception of the significance of the complication. Furthermore, longer-term problems such as intra-abdominal adhesions and incisional hernias may be reduced.²⁵

V. Conclusion

Acute BDI should be managed at a tertiary care referral centre where multidisciplinary facilities including expertise in diagnostic, percutaneous radiological interventions and endoscopic and laparoscopic facilities are available. The aim of management should be to eliminate sepsis and convert the uncontrolled bile leak to controlled external biliary fistula which later evolves in to BBS. The type of biliary injury and patient's general condition dictate the type of intervention in the acute setting. Early identification and referral is a key to reduced morbidity.

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