

Outcome of Early and Delayed Repair of Bile Duct Injuries

Sunesh Kumar 

Associate Professor, Department of Surgery, Teerthankar Mahaveer Medical College, Moradabad, Uttar Pradesh, India.

Abstract

Background: The aim is to compare outcome of early and delayed repair of bile duct injuries. **Subjects and Methodology:** Sixty- four patients of bile duct injuries of either gender were divided into group I (Early repair) and group II (Delayed repair). Operative findings such as injury classification and procedural variables, and postoperative course including 30-day readmission and 90-day mortality were recorded. **Results:** Etiology was cholecystectomy in 25 and 21, abdominal trauma in 7 and 8 and non-biliary abdominal procedures in 2 and 5 in group I and II respectively. There were 18 males and 14 females and 16 males and 16 females in group I and II respectively. Hospital length of stay was 7.1 days in group I and 8.4 days, 30 days of re- admission was seen in 3 and 4 and 90 days of mortality was seen in 2 in group I and 1 in group II. Strasburg-Bismuth classification showed A in 1 and 2, B in 3 and 4, C in 8 and 1, D in 6 and 4, E1 in 4 and 4, E2 in 3 and 5, E3 in 4 and 6, E4 in 3 and 4, E5 in 2 and 3 and X in 0 and 1 in group I and II respectively. Preoperative PTC catheter placement was seen in 0 and 18, preoperative percutaneous transabdominal drain placement was seen in 0 and 12 in group I and II respectively. **Conclusion:** Early repair found to be better as compared to delayed repair of bile duct injury.

Keywords: Bile duct injury, delayed repair, Early repair.

Corresponding Author: Sunesh Kumar, Associate Professor, Department of Surgery, Teerthankar Mahaveer Medical College, Moradabad, Uttar Pradesh, India.

E-mail: lavanyahospital@rediffmail.com

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Introduction

Injury to the extrahepatic biliary tree is a well-described complication of cholecystectomy. Though a recent publication describes a decreasing rate of CBDI associated with laparoscopic cholecystectomy, CBDI remains a serious concern for patients and surgeons.^[1,2] Despite studies identifying patient and surgeon-related factors associated with CBDI including inflammation and conversion to open cholecystectomy, approximately 30% of CBDI are not identified during the index operation and may not be recognized until several days after the initial injury.^[3]

Bile duct injuries can range from very minor accessory duct injuries to complicated hilar injuries as described. These injuries can have significant morbidity in post-op period and also can have late complications such as anastomotic bile duct strictures or secondary biliary cirrhosis resulting in lifelong disability.^[4] The optimal management of these patients require multimodality care with surgical, radiologic and endoscopic collaboration. Among hepatobiliary surgeons, debates exist regarding the optimal timing for repair of BDIs. It is generally accepted that if an injury is identified intraoperatively, then

immediate repair by a hepatobiliary surgeon is the best approach.^[5]

Both early and delayed repair of CBDI are described. Because no guideline exists to guide the timing of repair, the decision for timing of repair in a patient equally eligible for early or delayed repair should be based on the predicted success of the procedure and patient safety.^[6] If equivalent technical and morbidity outcomes can be achieved, patient quality of life and efficient healthcare resource utilization should be considered.^[7] Given the frequency with which cholecystectomy is performed worldwide, even a low rate of CBDI presents a tremendous potential healthcare burden.^[8] The present study was conducted to compare outcome of early and delayed repair of bile duct injuries.

Subjects and Methods

A total of sixty- four patients of bile duct injuries of either gender in age ranged 18-58 years were recruited for the study. All patients were made aware of the study and their written consent was obtained. Ethical approval was obtained from institutional review board.

A thorough clinical examination was carried. Patients were divided into group I (Early repair) and group II (Delayed repair). Patient demographics, time elapsed from index procedure, operative findings such as injury classification and procedural variables, and postoperative course including 30-day readmission and 90-day mortality were recorded. Frequency of radiographic and endoscopic biliary instrumentation prior to and following definitive repair was recorded. CBDI type was reported according to the Strasberg Bismuth classification system. Study findings were clubbed together and assessed statistically. P value less than 0.05 was considered significant.

Results

Etiology was cholecystectomy in 25 and 21, abdominal trauma in 7 and 8 and non-biliary abdominal procedures in 2 and 5 in group I and II respectively. There were 18 males and 14 females and 16 males and 16 females in group I and II respectively. Hospital length of stay was 7.1 days in group I and 8.4 days, 30 days of re-admission was seen in 3 and 4 and 90 days of mortality was seen in 2 in group I and 1 in group II. A significant difference was observed ($P < 0.05$) [Table 1, Figure 1].

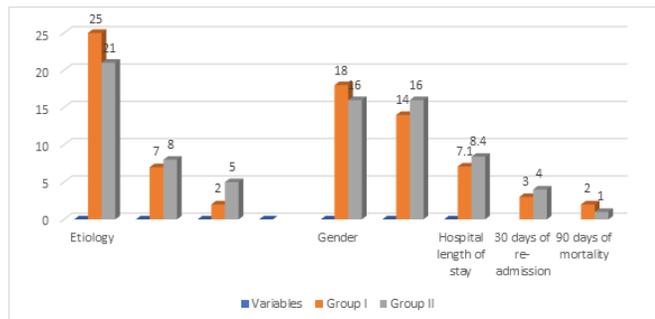


Figure 1:

Strasburg-Bismuth classification showed A in 1 and 2, B in 3 and 4, C in 8 and 1, D in 6 and 4, E1 in 4 and 4, E2 in 3 and 5, E3 in 4 and 6, E4 in 3 and 4, E5 in 2 and 3 and X in 0 and 1 in group I and II respectively. Preoperative PTC catheter placement was seen in 0 and 18, preoperative percutaneous transabdominal drain placement was seen in 0 and 12 in group I and II respectively. A significant difference was observed ($P < 0.05$) [Table 2].

Discussion

Iatrogenic bile duct injuries are a major concern for both patient and surgeon. In the present era, almost all the injuries take place during laparoscopic cholecystectomy.^[9] Although prevention would be ideal, limiting morbidity is

critical.^[10] It requires multispecialty care at a tertiary care centre with adequate armamentarium to stabilize the patient and simultaneously identify the type of injury and offer appropriate treatment.^[11,12] The present study was conducted to compare outcome of early and delayed repair of bile duct injuries.

We observed that etiology was cholecystectomy in 25 and 21, abdominal trauma in 7 and 8 and non-biliary abdominal procedures in 2 and 5 in group I and II respectively. There were 18 males and 14 females and 16 males and 16 females in group I and II respectively. Hospital length of stay was 7.1 days in group I and 8.4 days, 30 days of re-admission was seen in 3 and 4 and 90 days of mortality was seen in 2 in group I and 1 in group II. Kirks et al,^[13] conducted a study in which patients with CBDI managed surgically were retrospectively reviewed. Outcomes of patients undergoing early (<48 h from injury) and delayed (>48 h) repair were compared. In total, 61 patients underwent surgical biliary reconstruction. Between the early and delayed repair groups, no differences were found in patient demographics, injury classification subtype, vasculobiliary injury (VBI) incidence, hospital length of stay, 30-day readmission rate, or 90-day mortality rate. Patients undergoing delayed repair exhibited increased chance of readmission if VBI was present or if multiple endoscopic procedures were performed prior to repair. A predictive model was constructed with these variables (ROC 0.681).

We found that Strasburg-Bismuth classification showed A in 1 and 2, B in 3 and 4, C in 8 and 1, D in 6 and 4, E1 in 4 and 4, E2 in 3 and 5, E3 in 4 and 6, E4 in 3 and 4, E5 in 2 and 3 and X in 0 and 1 in group I and II respectively. Preoperative PTC catheter placement was seen in 0 and 18, preoperative percutaneous transabdominal drain placement was seen in 0 and 12 in group I and II respectively. Rao et al,^[14] assessed the outcome of early (up to 7 days) and delayed (after 6 weeks) definitive repair of BDIs. The patients who underwent surgical management of bile duct injuries were part of the study. A total of 50 patients were part of the study, out of which 15 underwent early and 35 underwent delayed repair. Mean follow-up of patients was 10.8 months (1–24 months). Bile duct injuries were classified as per Strasberg classification. It included 7 patients with E1, 15 patients of E2, 20 patients of E3, 5 E4 and 3 patients with type D injuries. The surgical reconstruction done was hepaticojejunostomy (HJ) in 48 and primary repair in 2 patients. The post-op complication observed were post-op bile leak in 4 patients (3 in early and 1 in delayed group, $p = 0.041$) and cholangitis in 3 patients (1 in early group and 2 in delayed group, $p = 0.897$). On comparison of stricture rate with post-op bile leak and cholangitis, both variables had significantly high stricture rate ($p = 0.014$ and $p = 0.002$, respectively). The grades of repair as per Mc Donald's grading was grade A in 30, B in 16, C in 1 and D in 3 patients. The stricture was seen in 2 patients of early group and 1 patient

Table 1: Comparison of parameters

Parameters	Variables	Group I	Group II	P value
Etiology	Cholecystectomy	25	21	<0.05
	Abdominal trauma	7	8	
	Non-biliary abdominal procedures	2	5	
Gender	Males	18	16	>0.05
	Females	14	16	
Hospital length of stay	Days	7.1	8.4	>0.05
30 days of re-admission		3	4	>0.05
90 days of mortality		2	1	<0.05

Table 2:

Parameters	Variables	Group I	Group II	P value
Strasburg-Bismuth	A	1	2	>0.05
	B	3	4	
	C	8	1	
	D	6	4	
	E1	4	4	
	E2	3	5	
	E3	4	6	
	E4	3	4	
	E5	2	3	
	X	0	1	
Preoperative PTC catheter placement		0	18	<0.05
Preoperative percutaneous transabdominal drain placement		0	12	<0.05

in delayed group (p = 0.153).

Ianneli et al,^[15] noticed that late group had higher post-operative complication, but it did not reach statistical significance. Post-operative complication in immediate (at the time of cholecystectomy) and early group (within 1–45 days) was significantly higher as compared with late group (beyond 45 days).

Conclusion

Early repair found to be better as compared to delayed repair of bile duct injury.

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