Bile Duct Injury: Management and Outcome

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ABSTRACT

Objective — *To describe the management and outcome of bile duct injury.*

Study design — *Descriptive case series.*

Place & Duration of study — *Surgical Unit II Civil Hospital, Dow University of Health Sciences Karachi, from July 2008 to June 2011.*

Methodology — *Patients who sustained bile duct injury were included in this study. Mode of admission, type of injury, procedures for reconstruction and outcome were recorded.*

Results — *There were sixteen patients with bile duct injury. Twelve (75%) patients were females and four (25%) males. Mean age was 40 year. In six (37.5%) patients injury occurred in our unit during surgery while four (25%) patients were referred from other tertiary care hospitals. Three (18.75%) patients were sent from district hospitals, one (6.25%) patient from taluka hospital and two (12.5%) from other private hospitals. Nine (56.25%) patients sustained injury during open cholecystectomy and in five (31.25%) during laparoscopic cholecystectomy. Ten patients (62.5%) underwent end to end repair over T-Tube. Two patients (12.5%) underwent hepaticojejunostomy. Morbidity noted in 37.5% (n=6) and mortality was 18.75% (n=3).*

Conclusions — *Bile duct injury occurred more with open cholecystectomy and end to end repair over T tube was most frequently used procedure. Mortality remained significant.*

Key words — *Cholecystectomy, T-tube, Bile duct injury, Hepaticojejunostomy.*

INTRODUCTION:

Common bile duct (CBD) injuries remain one of the most devastating complications of both open and laparoscopic cholecystectomy.[1] Cholecystectomy is one of the most commonly performed operations.[2] In laparoscopic cholecystectomy there is two fold increased risk of bile duct injury as compared to open cholecystectomy. Between 34% to 49% of surgeons are expected to cause such an injury during their career.[3] Dahl performed Roux-en-Y hepaticojejunostomy for surgical treatment of bile duct injury.[4] The mechanisms responsible for bile duct injury are inappropriate traction, failure to identify the anatomy of Callot's triangle, excessive use of diathermy and anatomical anomalies of biliary tract.

Avoidance of injury can be achieved by optimum exposure of Callot's triangle, judicious use of diathermy and safe clip application. Per-operative cholangiography helps in prevention of the common bile duct injury. Ultrasonography and computed tomography play important role in initial evaluation of patients with bile duct injury. Repair of transection type of injuries by an end to end anastomosis and covering T-tube have been advocated.[5] This study was conducted to document our experience of management of patients with bile duct injury.

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METHODOLOGY:

This descriptive case series was conducted at Surgical Unit II, Civil Hospital Karachi. The study duration was from July 2008 to June 2011. Demographic profile was noted. Mode of admission, clinical presentation, place of surgery etc were recorded. Investigations performed included CBC, liver function tests, coagulation profile including prothrombin time, international normalized ratio, and ultrasound. ERCP was done after optimization. Case notes were reviewed for possible mechanism that lead to bile duct injury. All patients were resuscitated and optimized before intervention.

RESULTS:

Total number of patients was 16; four (25%) males and twelve (75%) females. Age ranged between 30 to 70 year with the mean age of 40 year. Six (37.5%) patients were from our surgical unit while ten (62.5%) referred from other hospitals, both public and private sector facilities from Karachi and other parts of province of Sindh. This include ten (62.5%) patients from tertiary care hospitals, three (18.75%) from district hospitals, one (6.25%) from taluka hospital and two (12.5%) patients from the private hospitals. Mode of common bile duct injury is mentioned in table I.

Ten patients (62.5%) were vitally stable, six patients (37.5%) presented with the signs of peritonitis, in 5 patients (31.25%) drain was placed, in four patients (25 %) WBC count was more than 12000 cu/mm, two patients (12.5%) developed abnormal coagulopathy and 50% of the patients underwent ERCP. Iatrogenic bile duct injury was found in five (31.25%) patients during laparoscopic cholecystectomy, nine (56.25%) patients had open cholecystectomy and in one (6.25%) patient each cause was right hemicolectomy and trauma due to firearm. Open surgery, findings and outcome are mentioned in table II. In two patients attempts for repair were made before referral. One (6.25%) patient was explored twice in our unit. Ten patients (62.5%) underwent primary end to end repair over T-tube. Outcome was good. One (6.25%) patient developed common bile duct stricture at follow up. Two patients (12.5%) underwent hepaticojejunostomy, one of them had satisfactory outcome and other patient developed anastomotic leakage and revision hepaticojejunostomy was attempted. This patient developed sepsis and multi organ failure that lead to death. One (6.25%) patient had stent placement. The patient improved and discharged but after six months developed obstructive jaundice with cholangitis and was submitted for ERCP but endoscopist was unable to remove the stent. This patient later developed sepsis, multiple organ failure and died.

One patient (6.25%) had common bile duct and duodenal injury. Duodenum was repaired and T- tube placed; however patient developed duodenal blow out, sepsis and DIC, resulting in death. In this study morbidity was 37.5% (n=6) and overall mortality was 18.75% (n=3).

DISCUSSION:

Surgeons must make perceptual judgments during surgery to avoid complications. The incidence of bile duct injury after cholecystectomy varies from 0% to 1% in several studies.[6,7] Diagnostic work up and treatment of bile duct injury required multidisciplinary approach. Many centers report excellent results of reconstructive surgery. Transected common bile duct is best repaired by tension free mucosa to mucosa Roux-en-Y hepaticojejunostomy.[8] Revision hepaticojejunostomy requires further proximal dissection of bile duct in order to reach the healthy mucosa for anastomosis.[9] Endoscopic measures are being used to treat minor bile duct injuries.[10]

Bile duct injury is more common in laparoscopic cholecystectomy, but in this study CBD injury was more common during open cholecystectomy (56.25%) as compared to laparoscopic cholecystectomy (31.25%), the reason behind this is that majority of patients are referred from the

Table I: Mode of Common Bile Duct Injury

Procedure / Mode	Number of Patients	Percentage
Laparoscopic Cholecystectomy	05	31.25
Open Cholecystectomy	09	56.25
Trauma (fire arm injury)	01	6.25
Right Hemicolectomy.	01	6.25

Table II: Findings, Procedures and Outcome

S. No.	M/F	Findings	Procedure	Outcome
1	F	CBD Transection	Revision Hepaticojejunostomy	Anastomosis leak, Sepsis, Multiple organ failure - death
2	F	CBD Transection	T-tube placement	Good
3	M	CBD + Duodenal Injury	Duodenal repair + T-tube placement.	Good
4	F	CBD Rent	ERCP + Sphincterotomy	Good
5	F	CBD Transection	Primary repair over T-tube	Prolonged hospital stay
6	F	CBD Injury not found at ERCP	T- tube placement	Good
7	M	CBD Rent	Stent placment	Cholangitis/ sepsis, Multiple organ failure and death
8	F	CBD Transection	Hepaticojejunostomy	Good
9	F	CBD Stitched	Stitch removed, T-tube placed	Good
10	F	CBD Transection + Duodenal injury	Duodenal repair + T-tube placed & Pyloric exclusion	Leakage, sepsis, Coagulopathy and death
11	F	Partial Tear In CBD	Stenting during ERCP	Good
12	M	CBD Stitched	Stitch removed, T-tube placed	Good
13	M	ERCP failed	T-tube placed	Stricture
14	F	CBD Rent	Primary repair over T-tube	Wound infection
15	F	CBD Stitched	Stitch removed, T-tube placed	Good
16	F	CBD Partial tear	Sphincterotomy	Good

peripheral hospitals where still open cholecystectomy is performed. The second reason may be inexperience surgeons performing the procedures.

Currently, Roux-en-Y hepaticojejunostomy is the most frequently performed surgical procedure for bile duct injuries but in this study 62.5% of cases were treated by end to end anastomosis with T-tube placement. The advantage of this type of repair over hepaticojejunostomy is that of establishing the proper bile physiology, which allows adequate digestion, absorption and weight gain.[11] This reconstruction is not popular because of high frequency of stricture formation, but if the duodenum is properly Kocherized, then there will be tension free anastomosis.

In United States and Britain, 34 % to 49 % of surgeons have caused a major bile duct injury.[12] Bile duct injury should be managed by an experienced hepatobiliary surgeon.[13] Patients treated by the surgeons who caused injury have increased risk of mortality up to 11% at 9 years.[14] Bile duct injury should be regarded as preventable, but over 70% of surgeons regard it as unavoidable.

The most common cause of bile duct injury is misidentification of biliary anatomy in 80% of cases.[15] Troidl have proposed several techniques to prevent injuries: a 30 degree telescope, avoidance of diathermy close to common bile duct, dissection close to gallbladder – cystic duct junction, avoidance of unnecessary dissection close to cystic duct-common hepatic duct junction and when uncertain convert to an open approach.[16] In our study morbidity was 37.5% and mortality was 18.75% as compared to other studies which showed morbidity of 20-30% and mortality of 1% to 2%.[17,18] This high mortality was due to late presentation.

CONCLUSIONS:

The results of this study may be biased due to small sample size. End to end anastmosis over T-tube was employed successfully for repairing bile duct injury. Most of the patients were referred cases from other hospitals. Three patients died due to uncontrolled sepsis and multiple organ failure.

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