Iatrogenic Bile Duct Injury Following Open and Laparoscopic Cholecystectomy and Treatment Outcome

Shehla Faridoon,[1]* Ainul Hadi, [1] Farrukh Ozair Shah, [1] Nazeem Gul Afridi, [1] Saadia Muhammad,[1] Muhammad Yousaf [1]

ABSTRACT

Objective — *To find out the frequency of iatrogenic bile duct injury following open and laparoscopic cholecystectomy and their postoperative outcome.*

Study design — *Descriptive case series.*

Place & Duration of study — *Department of Surgery, Hayatabad Medical Complex (HMC) Peshawar, from April 2014 to May 2016.*

Methodology — *Twenty patients with iatrogenic bile duct injuries were admitted through OPD and emergency department. Routine baseline investigations were done. MRCP and ERCP were performed in selected cases. Postoperatively patients were monitored in surgical ward and sent home after removing their drains. Patients were followed up in the OPD for six months. Data was collected and analyzed on SPSS version 10.*

Results — *Out of 20 cases, 8 (40%) sustained injuries in our unit while 12 (60%) were referred from peripheral hospitals. Mean age of patients was 40±3 year and male to female ratio was 1:4. Presenting complaints were jaundice, abdominal pain and persistent bile discharge. Procedure performed included Roux en Y choledochojejunostomy (n=13 - 65%), choledochoduodenostomy (n=5 - 25%) and primary repair over T-tube (n=2 - 10%). Postoperative complications were bile leak (n=2 - 10%), wound infection (n=3 - 15%) and recurrent cholangitis (n=1 - 5%). Hospital stay was between 10-15 days.*

Conclusion — *Roux en Y choledochojejunostomy was the preferred surgical procedure for iatrogenic bile duct injuries with minimal postoperative complications.*

Key words — *Bile duct injury, Biliary leak, Roux en Y choledochojejunostomy.*

INTRODUCTION:

Stone formation is the most common pathology of gall bladder. About 10-15% of adult population has gallstones worldwide and is more common in females.[1] Cholecystectomy is the treatment of symptomatic gallstone disease and is associated with increased incidence of bile duct injuries.[2] Incidence of iatrogenic bile duct injuries (IBDIs) increased with increased number of bile duct interventions. For bile duct injuries end to end anastomosis and Roux-en Y biliary enteric anastomosis are performed.[3] Reported incidence of IBDIs following open cholecystectomy is 0.1-0.3%. and 2% for laparoscopic cholecystectomies.[4] This increased incidence was attributed to the lack of experience and familiarity with endoscopic interpretation of anatomy. This figure dropped down to less than 0.5% due to the increasing experience of the surgeons and availability of the advanced quality of instruments.[5,6] Other causes of iatrogenic bile duct injuries include adhesions near operating area, failure to consider the presence of aberrant duct, use of diathermy near bile duct, excessive dissection near the Calot's triangle and unexpected bleeding.[7-8] The iatrogenic bile duct injury includes complete to partial transection of bile duct leading to leak, ligation of major bile duct and both of these can lead to stricture formation later on.

[1] Department of Surgery, Hayatabad Medical Complex Peshawar

Correspondence:
Dr. Shehla Faridoon [1]*
Department of Surgery
Hayatabad Medical Complex, Peshawar
Email: virgo_1spt86@yahoo.com

Persistent drainage of bile stained fluid in the drain, increasing serum bilirubin and alkaline phosphatase level, local or generalized peritonitis and signs of septicemia indicate the possibility of iatrogenic bile duct injury.[9] Other investigations for the diagnosis and planning of definitive treatment include ultrasonography abdomen, computed tomography (CT) abdomen, magnetic resonance cholangiopancreatography (MRCP), endoscopic retrograde cholangiopancreatography (ERCP) and intraoperative cholangiography (IOC).[9,10] The aim of the current study was to assess the frequency of iatrogenic bile duct injuries following open and laparoscopic cholecystectomy and their postoperative outcome.

METHODOLOGY:

This case series was conducted from April 2014 to May 2016 in Surgical Unit of Hayatabad Medical Complex Peshawar. A total of 20 patients were included. Eight (40%) patients sustained iatrogenic bile duct injury in our unit while 12 (60%) were referred from periphery which comprised of 10 (83.3%) cases of open cholecystectomy and 2 (16.6%) of laparoscopic cholecystectomy. Out of 8 cases operated at our Unit, two were diagnosed peroperatively during open cholycystectomy and the other 4 were diagnosed within 7-14 days, while 2 cases of laparoscopic cholecystectomy were diagnosed with in first postoperative week. All the 12 referred patients presented to surgical department of HMC within one month after surgery.

A detailed history was taken and physical examination performed. The clinical features included vomiting, fever, jaundice and persistent bilious discharge in the drain placed in right hypochondrium. All the patients were subjected to basic investigation like liver function tests, full blood count, blood urea / creatinine, random blood sugar, serum electrolytes, prothrombin time (PT) and activated partial thromboplastin time (APTT). Specific investigations done to diagnose iatrogenic bile duct injury, classify the type of injury and to plan the treatment strategy, were abdominal ultrasonography (USG) in 18 cases, MRCP in 16 while ERCP was done in 9 cases. Patients were started on injection ceftriaxone intravenously 1 gram twice daily, intravenous fluids 3 liters per day, infusion omeprazole 40 mg once a day, injection tramadol intravenously as required. Informed consent was taken and the type of procedure was explained to the patients and their relatives. Surgeries were performed through subcostal incision under general anesthesia. Postoperatively patients were monitored in surgical ward. Drain was removed before discharging the patients. Patients with T-tube were advised to undergo T-tube cholangiogram on 10th postoperative day. Patients were advised to attend OPD for follow up on 10th postoperative day and one month after surgery. At first follow up, wound was examined, postoperative complications noted and stitches were removed. T-tube was removed when free flow of dye into the duodenum on T-tube cholangiogram was noted. USG abdomen was performed as required for any suspicion of intra abdominal collection. Data was collected on a form and analyzed on SPSS version 10.

RESULTS:

The study group consisted of 20 patients with iatrogenic bile duct injuries following open and laparoscopic cholecystectomy. Out of 20 patients, 4 (20%) were male and 16 (80 %) females with male to female ratio was of 1:4. The mean age of the patients was 40±3 year. Out of 8 patients who sustained injury in our unit, 2 (25%) cases were recognized peroperatively and were managed accordingly in the same anesthesia, while 6 (75%) cases were diagnosed postoperatively within 7-14 days. In case of open cholecystectomy, 12 (75%) patients had type 1 injury according to Bismuth classification, 2 (12.5%) patients had type 2 injury while 2 (12.5%) patients had type 3 injury. In case of laparoscopic cholecystectomy, all the 4 (100%) patients had type 3 injury (table I). Operative procedures performed are shown in table II.

Postoperative complications were encountered in 8 (40%) cases. Postoperative leak was recorded in 2 (10%) cases, wound infection in 3 (15%) while recurrent cholangitis was noted in 1 (5%) case. There was no mortality. The hospital stay was

Table I: Site of Injury (n=20)

Procedure	Site of injury		No. of cases	Percentage
	CHD	CBD		
Laparoscopic Cholecytectomy	4	0	4	20%
Open Cholecystectomy	2	14	16	80%
Total	6	14	20	100%

Table II: Procedure Performed (n=20)		
Procedure	**No. of cases**	**Percentage**
End-end Anastomosis over T-tube	2	10%
Choledochoduodenostomy	5	25%
Roux- en Y Choledochojejunostomy	13	65%

between 10 - 15 days. Patients were followed up in OPD for 6 months.

DISCUSSION:

Iatrogenic bile duct injury is a dreadful complication of biliary surgery and is a great challenge not only for the primary surgeon but also for the experienced referral center.[3,7,9] It is associated with prolonged morbidity and increased early mortality.[11-13] Improper management of iatrogenic bile duct injury can lead to serious complications like peritonitis, sepsis, multi organ failure and cirrhosis.[14]

Shaikh R et al reported an incidence of 0.13%-0.55% of IBDIs in a local study.[15] In our study the frequency of IBDIs was 0.9% in open cholecystectomy group while 1.3% following laparoscopic cholecystectomy. Iatrogenic bile duct injury may not be diagnosed peroperatively and patient present later with symptoms like progressive jaundice due to biliary leak or stricture formation.[10,16] In the current study 18 (90%) patients presented with jaundice, and 8 (40%) with the features of peritonitis due to localized or generalized collection which is comparable with another study.[7]

In order to diagnose IBDIs, the first investigation is abdominal USG which can detect localized or generalized collection.[7,16] Many authors suggest the use of IOC for early detection of IBDI.[17,18] Iatrogenic bile duct injury can be prevented by careful surgical techniques. However if it is suspected peroperatively, the best time of the repair is during the same setting. Surgical intervention is the treatment of choice for almost all types of IBDIs. Roux en Y hepaticojejunostomy is the gold standard for iatrogenic bile duct injury.[18] In our study all the patients underwent surgical reconstruction. Wound infection was observed in 3 (15%) patients which is fairly acceptable as compared to other studies.[10,16] The patients were followed for 6 months and no stricture formation was noted.

CONCLUSIONS:

Roux en Y choledochojejunostomy was a better surgical option for bile duct injuries as it was associated with low rate of postoperative complications.

REFERENCES:

1. Buturovic S. Iatrogenic injury to common bile duct. Med Arch.2014;68:291-3.
2. Viste A, Horn K, OvreboB,Christensen J, Angelsen H, HoemD. Bile duct injuries following laparoscopic cholecystectomy. Scand J Surg. 2015;104:233-7.
3. Jablonska B, Pawel L. Iatrogenic bile duct injuries: Etiology, diagnosis and management. World J Gastroenterol. 2009; 15:4097-104.
4. Hussain MI, Zahid M, FazalA. Outcome of surgery for bile duct injuries following lap.chole: Lahore General Hospital experience J. Coll Physician Surg Pak. 2005;15:720-2.
5. Ali U, Ma ZH, Pan CE, Ma QY Iatrogenic Bile duct injuries from biliary tract surgery. Hepatobiliary Pancreat Dis Int. 2007;6:326-9.
6. Karvonen J, Gullichsen R, Lain S, Salminen P, Gronroos JM. Bile duct injuries during lap chole: Primary & long term results from a single institution. Surg Endosc. 2007;21:1069-73.
7. Hadi A, Aman Z, Khan SA, Zafar H, Khan M, Afridi SK, et al. Surgical management of bile duct injuries following open or laparoscopic cholecystectomy. J Pak Med Assoc. 2013;8:1008-12.
8. Malik AM, Laghari AA, Talpur AH, Khan A. Iatrogenic biliary injuries during laparoscopic cholecystectomy. A continuing threat. Int J Surg. 2008;6:392-5.
9. Gluszek S, Kot M, Balchanowski N, Matykiewicz J, Kuchinka J, Koziel D, et al. Iatrogenic bile duct injuries-Clinical

problems. Polski Przegland Chirurgiczny. 2014;86:17-25.

10. Bakhsh R, Zahid MA, Dar FS, Malik ZI, Akhtar N, Akhtar S. Iatrogenic bile duct injuries: Experience at PIMS. J Ayub Med Coll Abbottabad. 2002;14:16-8.

11. Iannelli A, Paineau J, Hamy A, Schneck AS, Schaaf C, Gugenheim J. Primary versus delayed repair for bile duct injuries sustained during chole: results of survey of the Association Francaise de chirugie. HPB. 2013;15:611-6.

12. Lee AY, Gregorius J, Kerlan RK et al: Percutaneous Transhepatic balloon dilatation of biliary enteric anastomotic stricture after surgical repair of iatrogenic bile duct injuries. Plos One. 2012;7:1-5.

13. Tornquist B, Stromberg C, Persoon G, Nilsson M. Effect of intended intraoperative cholangiography and Early detection of bile duct injuries on survival after chole: population based cohort study . BMJ. 2012;345:e6457.

14. Salama AI, Shoreem HA, Saleh MA, Saleh MS, Hegazy O, Housseni M et al. Iatrogenic bile duct injuries: Multidisciplinary management in a major tertiary referral center. HPB Surg. 2014. http://dx.doi.org/10.1155/2014/575136.

15. Shaikh R, Polani MR, Ayub M, Asghar A, Malik KA,Rehman SU. Bile duct injuries during open and laparoscopic cholecystectomy: Management and outcome. Pak J Med Sci. 2009;25:496-9.

16. Qureshi MS, Urooj R, Dawani A, Soomro I, Maher M. Post cholecytectomy injuries: diagnosis and management. Pak J Surg. 2007;23:166-8.

17. Kozicki I, Durowicz S, Tarnowski W. Czynniki sprzyjajace jatrogennym urazom dróg zólciowych podczas cholecystektomii laparoskopowej i sposoby w ich zapobieganiu. Postepy Nauk Medycznych 2011;1:42-8.

18. Luo Z, Cheng L, Ren JD, Tang LJ, Wang T, Tian FZ. Progressive balloon dilatation following hepaticojejunostomy improves outcome of bile duct stricture after iatrogenic biliary injury. BMC Gastroenterology 2013;13:70.

19. Wu JS, Peng C, Mao XH, LV P. Bile duct injuries associated with laparoscopic and open cholecystectomy: sixteen year experience. World J Gastroentrol. 2007;13:2374-8.

Received for publication: 01-02-2018

Accepted after revision: 20-03-2018

Author's Contributions:
Shehla Faridoon: Manuscript writing, references & data collection.
Ainul Hadi: Article checking & data collection.
Farrukh Ozair Shah: Statistical analysis & computer work.
Nazeem Gul Afridi: Collection of references.
Saadia Muhammad: Data collection.
Muhammad Yousaf: Data collection.

Conflict of Interest:
The authors declare that they have no conflict of interest.

Source of Funding:
None

How to cite this article:
Faridoon S, Hadi A, Shah FO, Afridi NG, Muhammad S, Yousaf M. Iatrogenic bile duct injury following open and laparoscopic cholecystectomy and treatment outcome. J Surg Pakistan. 2018;23(1):21-24. doi:http://-dx.doi.org/10.21699/jsp.23.1.6.