International Surgery Journal
Aggarwal A et al. Int Surg J. 2019 May;6(5):1817-1820
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20191918

Case Report

Choledochodudenostomy for bile duct injuries: a less demanding option, in a demanding surgical situation

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Received: 01 February 2019
Accepted: 09 March 2019

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ABSTRACT

Cholecystectomy is one of the most common surgical procedure performed worldwide and therefore a common cause for iatrogenic biliary tract injury. Bile duct injuries are associated with significant morbidity and are a potentially fatal complication. Choledochodudenostomy in patients of post cholecystectomy bile duct injury can be done safely by experienced surgeons in CBD injuries distal to the confluence of the cystic and common hepatic duct after eradication of sepsis. Choledochoduodenostomy has its own technical advantages and it maintains the normal anatomy. As compared with a routine Roux-en-Y hepaticojejunostomy, CDD is technically easier, faster, requires less manipulation of the CBD, and is more physiological. We present a case report of a patient of laparoscopic cholecystectomy with CBD injury managed with choledochoduodenostomy who did extremely well after procedure with no immediate and delayed postoperative complication.

Keywords: Bile duct injury, Choledochoduodenostomy, Cholecystectomy

INTRODUCTION

Since its introduction, laparoscopic cholecystectomy has become the gold standard treatment for gallstone disease.[1] A bile duct injury is defined as damage to biliary tree in form of a leak, stricture, ligation or transection of the ductal system. The victims of bile duct injuries often suffer from great misery, and the fatality rate can be as high as 30%.[2] Rates of bile duct injury was reported to be up to 0.4-0.6% for cases that underwent laparoscopic cholecystectomy.[3-6] Bile duct injuries are associated with significant morbidity and are a potentially fatal complication.

The most important factors associated with the success of biliary reconstruction include the complete eradication of intra-abdominal infection (drainage of all bile and fluid collections), complete characterization of the injury with cholangiography, use of the correct surgical technique, and repair performed by an experienced biliary surgeon. In an elective situation, a minimum period of 4–6 weeks between injury and repair is desirable for resolution of tissue edema and inflammation and for dilatation of the proximal ductal system. A Roux-en-Y hepatico-jejunostomy is deemed necessary for anastomoses above the level of the cystic duct (common hepatic duct or higher). Hepatico-jejunostomy is effective in 90% of cases, but bile flow into the alimentary tract is not physiological, because the duodenum and upper part of the jejunum are excluded from bile passage. The main principle of the procedure is that a side-to-side anastomosis is designed to allow free flow of bile from the common bile duct to the duodenum. It offers some advantages over choledochojejunostomy:

- A more physiologic conduit
- Relatively quick and simple, with fewer anastomotic sites

- Ease of access for future endoscopic interventions.[7]

Anastomosis to the duodenum is considered appropriate for injuries located in the common bile duct (choledochoduodenostomy), but not for those at the level of the hepatic duct (hepaticoduodenostomy). Choledochoduodenostomy is a feasible alternative in patients with bile duct injury type B2, C2, D1, D2, E1, E2 (Hannover classification).[8]

This procedure is safe, well-tolerated, requires less surgical expertise, is more physiological, and has fewer postoperative complications.

CASE REPORT

The patient with symptomatic gall stone disease was operated at a nursing home and laparoscopic cholecystectomy with placement of subhepatic drain was done. The patient was then shifted to ICU thereafter in view of difficulty in breathing. Two days later, the patient developed yellowish discoloration of eyes and skin along with increased yellowish discharge in the drain bag.

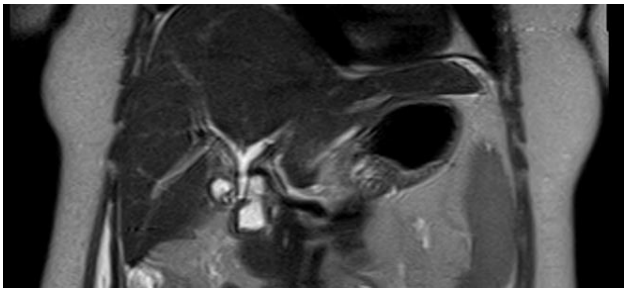

Figure 1: MRCP and MRI abdomen.

The patient was then referred to our hospital. Here, the patient was managed conservatively. She developed peri drain leakage of yellowish discharge which soaked her dressings. MRCP with MRI upper abdomen done (Figure 1) which showed mild dilatation of intra hepatic biliary radicles, right and left hepatic ducts and common hepatic ducts. CHD measured approx 0.5 cm. Lower CBD was reported not dilated. Gall bladder was not visualised (post cholecystectomy status)

Pancreatic duct was normally visualised. The yellowish discoloration of eyes and skin gradually increased and Gastroenterology consultation was taken and patient was planned for ERCP.

ERCP was tried but there was as obstruction in the path of the CBD, probably because of a clip at CBD. So, patient was planned for Open CBD Exploration.

Intra operative findings (Figure 2 A and B)

- CBD transacted at the level of cystic duct with both end clipped.
- Proximal end of CBD identified.
- Remnant of gall bladder and cystic duct were found attached to upper end.
- Dirty bilious fluid about 500 ml present in the peritoneal cavity.

The proximal end of the CBD was then anastomosed with the duodenum, (single layer tension free, stented anastomosis) after Kocherization with vicryl 3-0. The distal end of the CBD was closed with vicryl 3-0. Drains were placed in sub hepatic and pelvic locations.

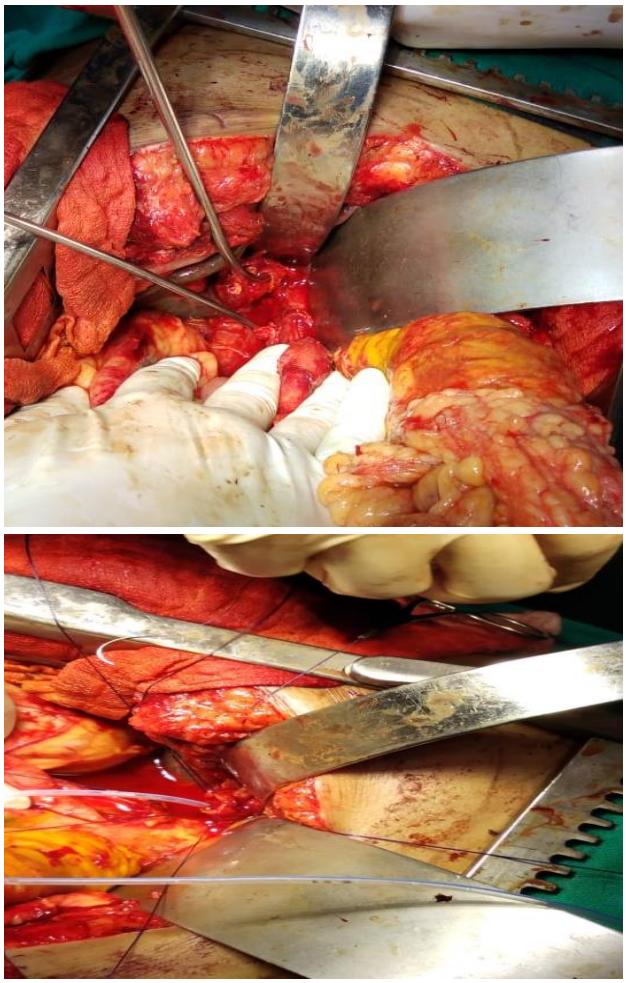

Figure 2: (A) Intraoperative picture showing two ends of CBD; (B) Intraoperative picture showing choledochotomy.

Post operatively, the patient had a stable course. Her condition gradually improved. Pelvic and subhepatic drains were removed on post op day 5. Appetite of patient improved, jaundice improved and serum bilirubin returned to normal at discharge 1 week post operatively.

DISCUSSION

Shortly after the introduction of gallbladder surgery, operative procedures were extended to include the common bile duct. Choledochoduodenostomy was first

performed by Riedel, but unfortunately the patient died.[9] Sprengel, reported the first recovery following chole-dochoduodenostomy; the patient was a woman on whom he had previously performed a cholecystectomy.[10]

Mayo, reported successful treatment of stricture of the common duct following cholecystectomy and choledochotomy by suturing the end of the dilated portion of the duct to the duodenum.[11] Although done infrequently, this technique has been standardized and has yielded good results. Numerous complications specific to the procedure have been described classically including ascending cholangitis, alkaline reflux gastritis, and sump syndrome, which may be the reason of this procedure being performed less frequently over the years. Several studies on the long-term follow-up of CDD had good outcomes, with an incidence of sump syndrome and/or cholangitis of <5%. Most of these complications can be readily dealt with endoscopic treatment.[12-14] There has been a renewed interest in CDD in the last three decades, with several publications carefully evaluating the results, indications, advantages, complications, and shortcomings of CDD. The consensus is that CDD is a very satisfactory surgical procedure to treat a variety of obstructing lesions of the distal CBD. Most of these authors stipulate that the diameter of the CBD should be at least 16 mm for good outcomes of CDD.[13,15,16] Earlier studies, such as the one conducted by Degenshein, published 18-year experience with 175 consecutive CDDs, and concluded that it was a safe and effective operation for varied indications.[17] It was emphasized that ascending infection from reflux of duodenal contents into the biliary tree, causing recurrent cholangitis, was not a problem if the diameter of the CBD used to construct the CDD measured at least 16 mm. There is a thought that CDD should be avoided in younger patients who have a life expectancy of 10 or more years due to long-term complication of cholangitis and the "sump syndrome." This is a rare and late, albeit overemphasized, complication of CDD. Its prevalence has been reported widely varying from as low as 0% to as high as 10%.[12,14,18] Madden et al have suggested that descending cholangitis is a more accurate term than ascending cholangitis. They demonstrated experimentally that cholangitis did not occur, even when the bile duct was anastomosed to the colon, if: 1) an adequate stoma was created and 2) stricture did not develop.

In a collected series of 1255 patients, the incidence of cholangitis was 0.4%.[12] However, an adequate sphincteroplasty also allows reflux of duodenal contents into the biliary system with sequelae, unless a stricture develops. Therefore, it is not reflux of duodenal contents but anastomotic stricture and subsequent stasis that are responsible for cholangitis. This is equally true for sphincteroplasty, choledochoduodenostomy, and choledochojejunostomy.

An extensive literature review showed that the absence of this complication could be explained based on at least two important factors. Firstly, a wide tension-free anastomosis provides effective drainage of enteric contents that may enter the CBD through the CDD site. Secondly, the narrow part of CBD distal to the anastomosis prevents the entry and stasis of duodenal contents. Also in patients who have undergone a preoperative ERCP with papillotomy, the contents easily pass through the ampulla, preventing this complication altogether. Therefore, with the proper indications and meticulous technique, it can be performed even in younger patients.[13]

Choledochoduodenostomy has its own technical advantages; for instance, it maintains the normal anatomy. As compared with a routine Roux-en-Y hepaticojejunostomy, CDD is technically easier, faster, requires less manipulation of the CBD, and is more physiological. Subsequent endoscopic intervention is possible following CDD. It is suitable for elderly patients or patients with multiple surgeries and interventions. Roux-en-Y hepaticojejunostomy in comparison requires construction of two anastomoses, is more time consuming, is technically more demanding, and alters the normal anatomy.

Scarring of the duodenum and impending obstruction of the duodenum are contraindications for CDD; under these circumstances, hepaticojejunostomy is performed.[19] Vogt et al in the series of 153 patients in which choledochoduodenostomy, choledochojejunostomy, or sphincteroplasty for various CBD pathologies, choledochoduodenostomy was performed in 91 patients and support the view that choledochoduodenostomy is a safe and effective operative procedure.[19] Minimally invasive techniques, such as laparoscopic side-to-side CDD, have been increasingly adapted for use and have been reported to be clinically useful.[20,21]

CONCLUSION

The authors are of the opinion that in an era where laparoscopic cholecystectomy in becoming a very frequent procedure, the present day surgeons will have to deal with CBD injuries. Traditional teaching dictates that such cases should be managed by specialist centers, with surgeons who have experience in such surgery, and the procedure be performed after a suitable interval, during which sepsis should be eliminated and biliary anatomy defined. However choledochoduodenostomy, should always be considered by surgeons, as a simpler, less technically demanding and physiologically better procedure, for a number of these patients.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Aggarwal A, Mathur AV, Kaur M. Choledochodudenostomy for bile duct injuries: a less demanding option, in a demanding surgical situation. Int Surg J 2019;6:1817-20.