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Abberant Right Posterior Sectoral Duct – At Risk for Injury during Laparoscopic Cholecystectomy

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Abstract: ***Bile duct injury is a recognized complication of laparoscopic cholecystectomy. Anomalous right posterior sectoral bile duct occurs in around 2–5% of patients. Its drainage can occur into the gall bladder neck, cystic duct, common hepatic duct or rarely into left hepatic duct increasing the risk of injury during laparoscopic cholecystectomy. Sectoral bile duct injury is rare often missed during surgery or diagnosed late postoperatively but contributes to significant morbidity to the patient with multiple subsequent interventions and procedures (1). Herein, we describe 5 cases of isolated right posterior sectoral ducts encountered during laparoscopic cholecystectomy. In all cases the dissection of Calot's triangle was difficult and stone impacted close to juncton of the aberrant duct with gall bladder or cystic duct. In 4 cases, the sectoral duct was joining cystic duct and was saved. In another case the sectoral duct was draining into the gallbladder neck, it was detected only after clipping and cutting of cystic duct below it was joined by sectoral duct. Patient needed conversion to open surgery and roux-en-y hepaticojejunostomy was done with the sectoral duct. Patient made uneventful recovery. This paper discusses strategies for prevention of such injuries along with the diagnostic and therapeutic challenges it offers.***

Keywords: Cholecystectomy, Bile duct injury, Sectoral bile duct, Hepaticojejunostomy, Segmental Liver Resection

1. Introduction

There is potential for aberrant anatomy in all cases. Aberrant anatomy may include a short cystic duct, aberrant hepatic ducts, or a right hepatic artery that crosses anterior to the common bile duct(9). Aberrant right biliary system occurs in about 15%-20% of the population. In appropriate clinical settings, it should be suspected in patients with persistence of bile leak early after cholecystectomy, segmental dilation of intrahepatic-bile ducts on imaging and paucity of intrahepatic filling in a segment of liver on ERCP (6).

A detailed knowledge of all possible anatomical variants and practice of Critical View of Safety (CVS) is essential to prevent injury to normal or aberrant extrahepatic biliary system during laparoscopic cholecystectomy.

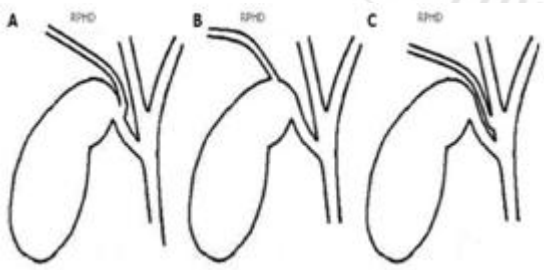

Figure 1: Abberent Right Posterior Sectoral Ducts

2. Case Reports

Cases 1-4: 4 female adult patients were undergoing laparoscopic cholecystectomy for cholelithiasis. One patient had distended gall bladder due to empyema. An aberrant sectoral duct was found joining cystic duct (type A). A stone was impacted just proximal to the junction of cystic duct and aberrant duct. The aberrant duct was detected before clipping of cystic duct. In 1 such case during dissection in Calot's triangle there was tiny hole in aberrant sectoral duct which was repaired by 4/0 vicryl suture. Clips were applied over neck of gall bladder just above the confluence of sectoral duct with cystic duct preventing a possible injury.

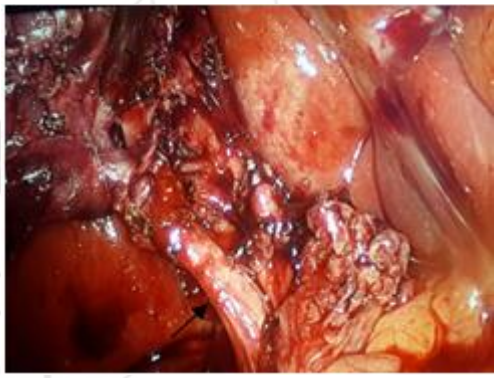

Figure 2

CASE 5: During laparoscopic cholecystectomy in a 40 yrs old female patient with chronic calculus cholecystitis. In this case also there was a stone impacted in neck of gall bladder proximal to junction of aberrant duct. Only after clipping and cutting of cystic duct, an aberrant duct was found entering gall bladder neck(Type B). It was converted into open surgery and roux-en-y anastomosis of jejunum was done with severed end of right aberrant sectoral duct. Patient was discharged on 5th POD without any complication.

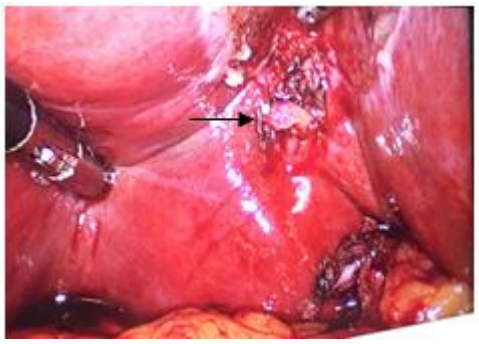

Figure 3: Stump of Abberent Sectoral Duct

3. Discussion

The operative injury can occur due to low insertion of a right sectoral hepatic duct. Incorrect intra operative interpretation of biliary anatomy appears to be the most common cause of such injuries (2) One should maintain high suspicion of sectoral duct injury in a patient with post operative bile leak and an intact common bile duct. It can result in segmental biliary cirrhosis if ligated. Furthermore, obstruction of biliary tree usually results in recurrent episodes of cholangitis in these patients [5]. For prevention of bile duct injury during laparoscopic cholecystectomy, knowledge of normal and abnormal anatomy is mandatory.

Critical View of Safety (CVS) method of identification of the cystic duct and cystic artery during laparoscopic cholecystectomy is very helpful in preventing such injuries.(4)

Three criteria are required to achieve the CVS:

1) The hepatocystic triangle is cleared of fat and fibrous tissue. The hepatocystic triangle is defined as the triangle formed by the cystic duct, the common hepatic duct, and inferior edge of the liver. The common bile duct and common hepatic duct do not have to be exposed.
2) The lower one third of the gallbladder is separated from the liver to expose the cystic plate. The cystic plate is also known as liver bed of the gallbladder and lies in the gallbladder fossa.
3) Only two structures should be seen entering the gallbladder.

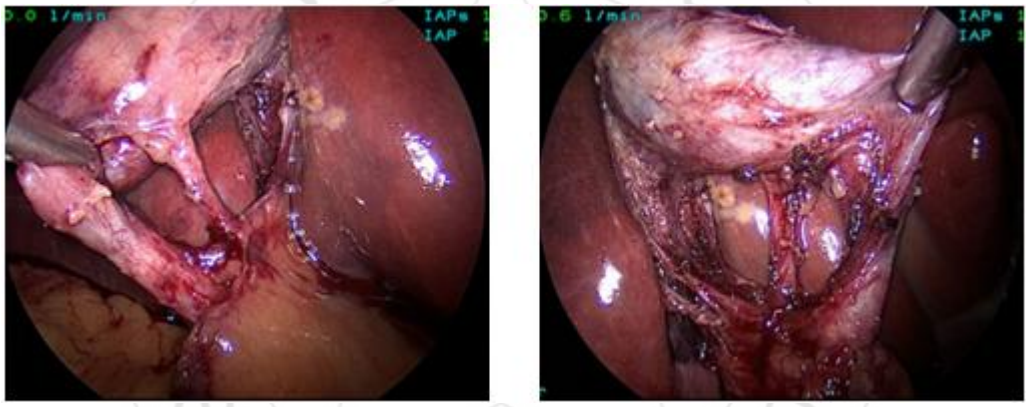

Figure 4 (a) & (b): The doublet view anterior and posterior laparoscopic images visually demonstrate the three components of the critical view of safety

Surgeon should consider an Intra-operative Time-Out, a stop point in the operation during laparoscopic cholecystectomy prior to clipping, cutting or transecting any ductal structures to confirm that the CVS has been achieved utilizing the 'Doublet View'.

Further aberrant anatomy or imapcted cystic duct stone should be suspected whenever Calot's triangle dissection is difficult because of edema, adhesions or unclear anatomy.

If aberrant duct is severed during the surgery then roux-en-y jejunostomy should be done with the sectoral duct. Intraoperative cholangioram can be done to confirm the injury. If persistent bile leak develops following laparoscopic cholecystectomy then ERCP is not very helpful except failure to opacify the duct. MRCP can be useful in most of the cases (3).

Intra operative ligation of a aberrant duct even if very thin, can lead to some kind of jaundice and or atrophy of a segment. Conservative management by adequate drainage of postoperative biliary collectionn from severed duct generally fails. On exploratry laparotomy at a later date, it may be difficult to find the injured duct or it is strictured or narrow where by any anastomosis with jejunum is either difficult or is associated with stricture at a later date. Therefore in such cases, resection of segments 6,7 with roux-en-y hepaticojejunostomy is recommended for long term good results.

4. Conclusions

During laproscopic cholecystectomy Critical View of Safety must be observed by circumferential dissection of the gall bladder neck and the cystic duct before clip placement on cystic duct in order to identify and prevent injury to any aberrant anatomy . Intra operative partial Injury to aberrant sectoral duct can be dealt by repair. Complete severance of duct needs roux-en-y jejunostomy for best long term results. Postoperatively if there is persistent biliary leak in presence of intact common bile duct on ERCP then the injury to aberrant duct should be suspected. MRCP is more helpful in diagnosis. Conservative treatment has high failure rate. Resection of segment 6,7 may be needed in persistent biliary leaks due to old injury to aberrant right posterior sectoral duct.

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