ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
Index Copernicus Value: 68 . 16
PubMed - National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 5, Issue – 1, February - 2020, Page No. : 13 - 17

A rare case of common bile duct avulsion secondary to blunt abdominal trauma.

[1]Dr.Kasturi Lakshmi Naga Sindhuja, Post graduate ,Department of Radiology, Narayana medical college, Nellore, Andhra Pradesh.

[2]Dr.Vakamudi Udaya Bhaskarini, Assistant Professor, Department of Radiology, Narayana medical college, Nellore, Andhra Pradesh.

[3]Dr.PentyalaSuneetha, Professor, Department of Radiology, Narayana medical college, Nellore, Andhra Pradesh.

[4]Dr Voodi Madhavi, Senior resident, Department of Radiology ,Narayana medical college, Nellore, Andhra Pradesh.

[5]Dr S Thirunavukkarasu, Head of Department, Department of Surgical Gastroenterology, Narayana medical college, Nellore, Andhra Pradesh.

[6]Supreeth Kumar Reddy. K, Post graduate, Department of Surgical Gastroenterology, Narayana medical college, Nellore, Andhra Pradesh.

Corresponding Author: Dr. Kasturi Lakshmi Naga Sindhuja, Post graduate ,Department of Radiology, Narayana medical college, Nellore, Andhra Pradesh.

Citation this Article: Dr.Kasturi Lakshmi Naga Sindhuja, Dr.Vakamudi Udaya Bhaskarini, Dr.Pentyala Suneetha, Dr Voodi Madhavi, Dr S Thirunavukkarasu, Supreeth Kumar Reddy. K, "A rare case of common bile duct avulsion secondary to blunt abdominal trauma", IJMSIR- February - 2020, Vol – 5, Issue -1, P. No. 13 - 17.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Avulsion to the extrahepatic biliary ductal system due to blunt force trauma is an uncommon injury. This is associated with wide variability in prognosis. The main pathogenic mechanisms remain obscure but include shear and/or compression forces on the biliary system. These cases are often difficult to identify, as they are primarily complicated by trauma and patients exhibiting more immediate, obviously life-threatening injuries. Extrahepatic bile duct injury is commonly associated with hepatic, duodenal, or pan¬creatic injuries, and isolated extrahepatic bile duct injury is rare .This case demonstrates a 20-year-old female involved in a head on motor vehicle collision sustaining blunt force trauma to the abdomen. Patient was apparently normal on the day of trauma but progressively deteriorated, developing abdominal pain, mild abdominal distension and biliary vomiting on day 5. On imaging, abdominal CT revealed complete transection of distal portion of extra hepatic CBD, perforation of 3rdpart of duodenum, AAST Grade-III liver laceration and pancreatic head contusion.This is a rare case of CBD transection discovered on CECT abdomen.Later the patient underwent exploratory laparotomy, where there was complete transection of CBD, biliary peritonitis, and sloughing off of 3rd and 4th parts of duodenum.

Keywords : Traumatic transection of extrahepatic CBD, avulsion, blunt abdominal trauma, biliary peritonitis, sloughed off duodenum.

Introduction :

Avulsion of the biliary tree secondary to blunt force trauma is a rare cause of extrahepatic bile duct injury[1]. Extrahepatic bile duct injury is commonly associated with hepatic, duodenal, or pancreatic injuries, and isolated extrahepatic bile duct injury is rare[2]The incidence of extrahepatic bile duct injury is known to be 1-5%.

A mechanism of crushing or shear injury(against areas of relative fixation is the main mode of injury in blunt trauma), to the right upper quadrant causes biliary disruption and subsequent bile-peritonitis.

The average delay until diagnosis is reportedly 9 days and ranges from few hours to 9 months. Such injuries are easily overshadowed by more overt surgical emergencies and can go undetected, potentially leading to adverse outcomes of biliary peritonitis, leading to jaundice, systemic inflammatory response syndrome(SIRS), respiratory distress[3].

This case presents an example of one such rare blunt force trauma avulsion injury to the extrahepatic common bile duct in the setting of a motor vehicle collision.

Case report

A 20 year old female sustained head-on motor vehicle collision with a bullock cart and was referred to our hospital. Ultrasound abdomen was performed for the suspicion of blunt abdominal injury. E-FAST ultrasound did not reveal any significant abnormality at the time of scan and was discharged. However, on day 5 of trauma, she was admitted to the emergency with complains of diffuse abdominal pain, minimal abdominal distension and one episode of non-projectile bilious vomiting.

Following admission, there was gradual increase in abdominal distension and abdominal pain. Her Hb and other blood counts were normal. Her total serum bilirubin was serially increasing. Patient was breathless, tachypnic, tachycardia, breathless with 70% saturation. Another USG abdomen was performed, which showed moderate amount of hypoechoic intraperitoneal free fluid, bilateral mild pleural effusion and liver laceration and following which CECT abdomen was advised , that was performed in 128 slice Siemens machine.

Transection of extrahepatic distal CBD, with non-visualisation for a length of 5cm, till the level of ampulla with air pockets in cystic duct and gall bladder.Intrahepatic and proximal 2/3rds of extrahepatic common bile duct is visualised. However, Ampulla and main pancreatic duct were normal.

Duodenum was visualised up to 2nd part. Two perforations are noted in the proximal 3rd part of duodenum. A large collection with air pockets was seen extending from right hypochondrium to right iliac fossa displacing duodeno-jejunal flexure antero-laterally on right side with respect to aorta. Few lacerations of AAST grade-III were seen in left lobe. Pancreatic head showed a hypoattenuating area of AAST grade I. Moderate hypodense intraperitoneal fluid was seen in the pelvis, sub-hepatic , peri-splenic region . Bilateral moderate pleural effusion was seen. Rest of the visualised abdominal organs appeared normal. Abdominal aorta, IVC, and its branches, portal vein appeared normal.

The patient was taken for emergency exploratory laporatomy. The patient underwent duodenal diverticulization with T-Tube cholangioplasty . Intraoperative findings revealed complete transection of distal 1/3rd of extrahepatic common bile duct and sloughing off of 3rd and 4th part of duodenum, with biliary peritonitis and displacing duodeno-jejunal flexure antero-laterally on right side with respect to

aorta. Intra-operative findings were slough off of duodenum, avulsion of common bile duct.

Figure

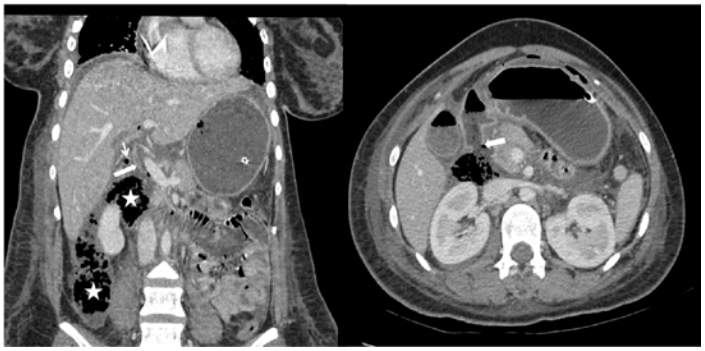

Figure 1 : A CECT abdomen of blunt trauma in the portal venous phase showing **A.** Coronal section showing avulsion of common bile duct(wide arrow), air pockets in cystic duct(thin arrow), air pockets with hemoperitoneum(asterik), displacement of duodeno-jejunal flexure, peri-hepatic fluid collection, **B.** Axial section showing perforation of duodenum (broad arrow) with adjacent air pockets.

Discussion

Isolated extrahepatic biliary tract injury after blunt trauma is exceedingly rare and often associated with injuries in adjacent organs[4,5,6] .The diagnosis of such cases is often delayed and they may be missed during the initial exploration, as it may reveal other injuries. A high index of suspicion is the only clue to prompt identification and treatment of such injuries of extrahepatic bile duct.

There are several mechanisms for blunt injury of the extra hepatic biliary system. These can be divided into three categories: (a) crushing against the rigid spinal column, (b) shearing against areas of relative fixation, (the shearing forces lift the liver superiorly while the hepatoduodenal ligament is pulled inferiorly) and (c) rapid emptying of a distended gallbladder into the bile duct.

Incidence of extra hepatic biliary duct injury in the setting of blunt force trauma is as low as 1 in 10,500 consecutive trauma cases[7] , with the first case being reported in 1799[8] . Ductal injury often localizes at one of three anatomic sites: the origin of the left hepatic duct, the bifurcation of the hepatic ducts, or the panceaticoduodenal junction[9]. With leakage of bile into the peritoneal cavity, jaundice, bile, ascites, and acholic stools occur. The jaundice is due to the absorption of bile pigment by the peritoneum[10]. Jaundice after blunt force trauma, should raise high concerns for biliary tree injury of either perforation or transection. Nonspecific generalized symptoms such as worsening abdominal discomfort, nausea, vomiting, low-grade fever and persistent ileus without obvious thoraco-abdominal injury also raise suspicion[11].Extrahepatic bile duct injuries are usually detected at the time of laparotomy and are seldom diagnosed preoperatively.

The most sensitive and specific imaging modality for the detection and localization of post traumatic and post operative bile leaks is 99mTc-Mebrofenin hybrid single photon emission tomography-computed tomography[12] (SPECT-CT) for the hemodynamically stable patients, Percutaneous transhepatic cholangiography, Intraoperative cholangiography, Endoscopic retrograde cholangiopancreatography (ERCP), Magnetic resonance cholangiopancreatography (MRCP), HIDA (Tc99m - hepatobiliaryiminodiacetic acid) scintigraphy can be performed for better delineation of anatomy and occult diagnosis of bile duct injuries. Invasive procedure should not be adviced to the patients in the background suspicion of bile duct injury even though they are hemodynamically stable in the early stages.

For hemodynamically unstable patients with right upper quadrant abdominal pain, transabdominal sonography, abdominal CT may be helpful for demonstrating

concomitant solid organ injuries which should raise the suspicion of bile duct injuries. Sometimes diagnostic peritoneal lavage may be helpful in detecting bile and / or non-clotting blood in peritoneal fluid.

The early pre-operative diagnosis on Day 1 or Day 2 may prevent morbid complications of biliary peritonitis. Due to the delay in onset of these symptoms,morbidity rates in these cases can approach 40%, including bleeding, systemic inflammatory response syndrome, and compartment syndrome[13]However ,during laparotomy in blunt trauma cases, the surgeon must always look for bilestaining or signs of biliary perforation when surgically repairing emergent cases. The best preferred methods now-days are choledochoduodenostomy or choledochojejunostomy and temporary drain placement (in order to expedite damage control laparotomy). The early surgical management improves the prognosis of patients decreasing morbidity.

Even when managed urgently, sometimes, surgical complications may result in postoperative anastomotic leakage, recurrent cholangitis with or without stricture, biliary cirrhosis, and portal hypertension resulting in poor prognosis[14]In our case, with the suspicion of bile duct injury due to jaundice, acholic stools, hypodense fluid collection in peritoneum ;the transection of common bile duct was diagnosed pre-operatively on CECT abdomen following which patient was taken for immediate exploratory laparotomy. The surgery revealed transection of distal 1/3rd of extrahepatic common bile duct, sloughing off of 3rd and 4th parts of duodenum, displacing duodeno-jejunal flexure antero-laterally on right side with respect to aorta. The patient underwent duodenal diverticulization with T-Tube cholangioplasty. Intra-operative findings were slough off of duodenum, avulsion of common bile duct.

Conclusion

Traumatic extra hepatic biliary injury is a rare entity and is often difficult to diagnose. Therefore, it is essential to have a high index of suspicion to perform a thorough evaluation in patients presenting with hepatic, duodenal, pancreatic injuries, a high index of suspicion for extra hepatic biliary injury. This helps in early diagnosis thereby facilitating appropriate early surgical intervention to prevent complications. If diagnosed late, it will result in poor prognosis with increased morbidity.

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