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Extraheptic Duct injury following blunt Abdominal Trauma: Case report managed with ERCP and Stenting

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Abstract: Traumatic injuries of the extrahepatic biliary tract are rare. Associated injuries are usually responsible for immediate indication for surgical treatment, the time when an injury to the extrahepatic biliary ducts may be diagnosed. However, missed injuries are often common. The primary aim of this paper is to describe the clinical features, diagnosis, treatment, and outcome of two patients with left hepatic duct injury after blunt abdominal trauma. A young male, brought by red crescent on 4th June 2017 at night as a victim of MVA, He was the driver, not wearing seat belt, stucked in the car with difficult extraction, no other victims. The patient underwent sphincterctomy and 2 transpapillary stent inserted for common hepatic duct injury. A high level of suspicion is necessary to identify injuries to the hepatic ducts. Early diagnosis that occurs during laparotomy due to associated injuries is important to reduce complications.
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1. Introduction

Blunt force trauma to the extrahepatic biliary ductal system as a cause of avulsion is an uncommon injury associated with wide variability in prognosis. These cases are often difficult to identify, primarily as they are complicated by trauma patients exhibiting more immediate and obviously life-threatening injuries (2015), Common bile duct (CBD) injuries from blunt abdominal trauma are rare [1]. In fact, extrahepatic biliary tract injuries occur in 3% to 5% of all abdominal trauma victims, with 85% resulting from penetrating wounds. Of the remaining 15%, resulting from blunt trauma, the vast majority, 85%, involve the gallbladder alone. Injury of the extrahepatic biliary system after blunt trauma is a relatively rare entity. The first report of bile duct rupture was in 1799 by Wainwright [2,3]. Bourque et al [4] in his review of the literature in 1989 found only 125 cases reported since 1806, one third of which were in the pediatric population. Dawson et al [5] reported 1 case of bile duct injury in 10,500 consecutive trauma patients. Complete CBD transection is particularly rare too [6].

We report a case of an isolated extrahepatic bile duct rupture, without any associated intra-abdominal injury. It is extremely rare, and, when it occurs, concerns mainly the CBD [7]. A summary of these cases (clearly and well-documented cases without other significant associated intra-abdominal injuries, found in the English Literature), including patient age, mechanism, location of ductal injury, is supplied in Table 1. (2012)

Case presentation

A 29 years old male, brought by red crescent on 4th June 2017 at night as a victim of MVA, He was the driver, not wearing seat belt, stocked in the car with difficult extraction, no other victims, as per paramedics. On arrival to the ER, He was lying on back-board and C-collar in place, Primary survey was performed: The patient was talking and maintaining his airway, no obstruction or bleeding, normal Bilateral A/E, tachypnea, SpO2: 88%, connected to nonbeather mask (SpO2 increased to 100%), left chest abrasion, tachycardia (116-120bpm), BP maintained, no obvious external bleeding, abdomen was rigid and tender, pelvis was stable, 2 Cannulas inserted and IV bolus started. FAST showed right hepatorenal rim of free fluid. GCS 13/15, pupils was equal and reactive, Left distal leg deformity, intact peripheral pulses and normal temperature, Log roll: Bruises over the lower back and flanks, mild midline tenderness and no gaps. PR: No blood with normal tone and sited-prostate.

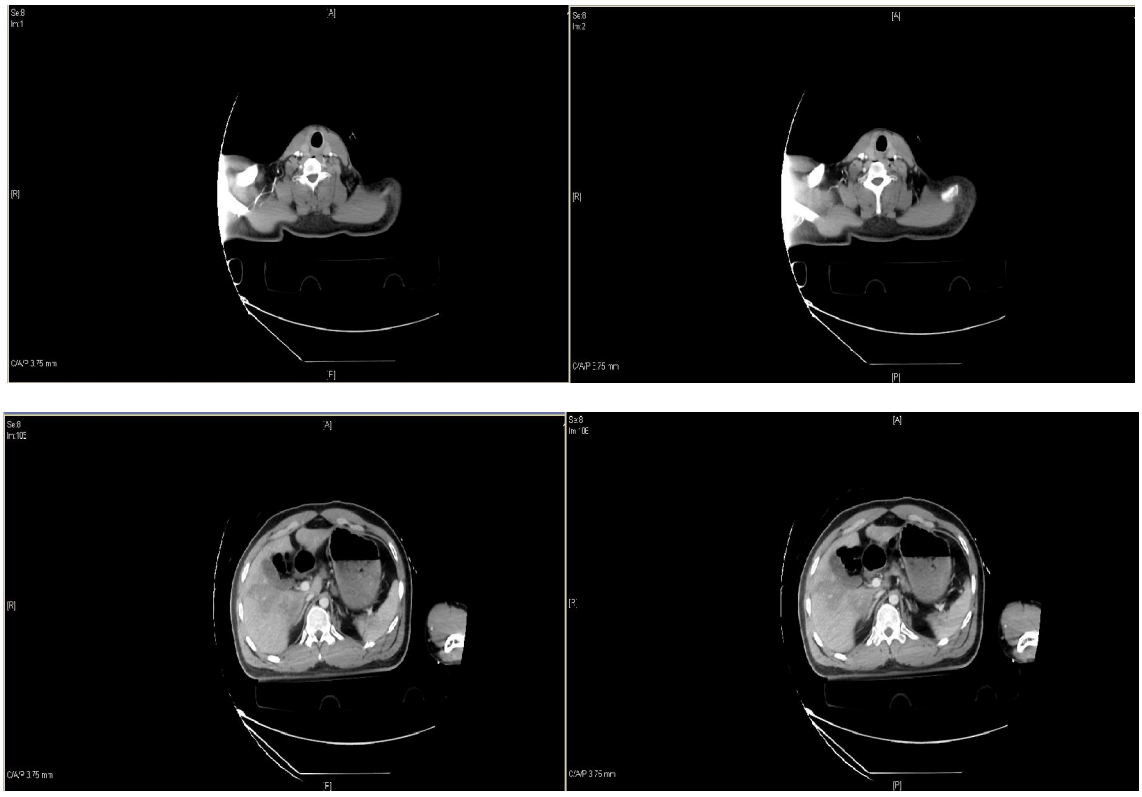
Secondary survey was: Head & Neck: No fracture, hematoma, laceration and centralized trachea and JVP not raised, Chest: equal bilateral A/E, vesicular and no added sound, pain while palpating/percussing, S1+S2+0. Abdomen: diffuse rigidity and tenderness. Pelvis: stable, no hematoma, laceration or genital injury. Foley's catheter inserted and urine came out. Chest x-ray showed bilateral contusion with right 1st rib fracture and all left ribs fractures. Pelvic x-ray showed fractured right superior

anterior rami and right iliac bone. ECG showed normal sinus rhythm. Ambulance history was Unremarkable, event unclear. Patient was started on IVF bolus, morphine and fentanyl and empiric antibiotics started and I/O chart.

His labs was: **PG**: Ph:7.2 O2: 157 Co2:46 Hco3:16, **CBC**: Wbc:20.5 Hb:11.8 Plt:302, **Coa**: Pt:15.20 INR:1.14 Aptt:39, **CMP**: Alt:644, Ast:146, Alb:36.3, **AlkPo**: N, **Amylase** & **Lipase**: N, **Bili**: N, **Glu**:7.9, **K & Na**: N, **Osml**: 297, **LA**:4.1 **Mg**:0.6, **Cardiac**: Ck: 2,529 **Trop I**:0.02, **Urine** tox.:-ve, **Hep**: HpBcoreAb: reactive HpB Ab:824 HepBsag: reactive -> reactive.

PAN CT trauma survey showed:

Abdomen and pelvis Liver shows intraparenchymal hematoma measuring 9 cm on its maximum diameter as well as subcapsular hematoma measuring 8 mm in thickness. No obvious contrast extravasation in the liver to suggest vascular injury. Splenic laceration is noted with its anterior end close to the splenic hilum, the splenic laceration is measuring 2.6 cm. No obvious vascular blush. Large right staghorn stone in the right kidney. Gas bubbles are noted in the lumen of the urinary bladder, likely post Foley's catheter insertion. Delayed images showed no extravasation of the urinary bladder contrast, however, clinical correlation and urine analysis for hematuria are recommended.4 No obvious renal injury. Unremarkable pancreas and adrenal glands. Fracture left transverse processes of L1 to L5. Right iliac bone fracture extending to the right SI joint. Fracture right superior and inferior pubic rami. Left leg: There are comminuted fractures involving the shaft of left tibia and left fibula with surrounding soft tissue swelling. No obvious contrast extravasation in arterial images. A small non-displaced fracture in the lateral aspect of the patella. Conclusion: 1. Tiny hyperdensity on the left side of the medulla oblongata and a similar one anterior to the left cerebellar hemisphere, on the background of trauma, could represent tiny contusions, however, clinical correlation and follow up are recommended. 2. Fractures of the left ribs from 1-12 except 11, and fractures right 1st and 2nd ribs with subsequent adjacent lung tissue contusion, tiny pockets of pneumothorax and bilateral neck surgical emphysema extending to the upper mediastinum. 3. Liver contusion and parenchymal hematoma with subcapsular hematoma. No definite blush. 4. Splenic laceration extending close to the hilum. No definite blush. 5. Right iliac bone fracture extending to the right SI joint. 6. Fracture right superior and inferior pubic rami. 7. Left leg comminuted fractures with no definite vascular injury.



Patient went for exploratory laparotomy. Seen by thoracic regarding finding, left chest tube at low suction Inserted. Seen by orthopedic advised for left back slab above the knee and pelvic binder. Seen by neurosurgery, no need for intervention. Then patient was taken to the OR for exploratory laparatomy and they found: 1- Liver laceration 10cm on anterior surface and packing done. 2-Active spleen bleeding didn't stop with packing managed with splenectomy. 3- Pancreatic hematoma managed conservatively. 4- small anterior pelvic hematoma not extending managed conservatively. Drains inserted at perihepatic, splenic and pelvic. Then shifted to S-ICU for further management. Day 3 in SICU the subhepatic drain start to be bilesh with an output of 300 cc. A gastroenterologist was consulted for ERCP.

On 6 June, he went IM nailing of the left tibia. On 8 June, ERCP done for query CBD leakage after found to have bile came from abdominal drain, sphincterctomy performed and 2 transpapillary stent inserted for a major common hepatic duct leakage as shown in cholagiogram images. On 11 June, went for repair of pelvic fracture done by the reduction and fixation with 2 plates (3holes) and lag screw. Superior pubic rami fracture was not displaced so percutanous screw fixation was done. On 12 June, patient was jaundiced, febrile, with minimal greenish secretion through NGT and chest tube and dark/brown urine, and have direct hyperbilirubinemia 143, urgent ERCP done under GA for removal of the 2 previously inserted stent and new long 10cm plastic stent inserted with plan to put another one But procedure was stopped as patient was desaturated.

There are multiple branching hypoechoic lesions in the right lobe of the liver likely representing the previously known hepatic lacerations. There is a large mixed echogenicity lesion in the right subhepatic region measuring approximately 9.2 x 4.7 cm probably representing a hematoma (? subcapsular).

The gallbladder is normal in shape with mild diffuse wall thickening but no evident stone.

The CBD stent is noted. No gross biliary dilatation. Clinical correlation and further workup is recommended accordingly.

On 14 CT AP showed large subhepatic collection.

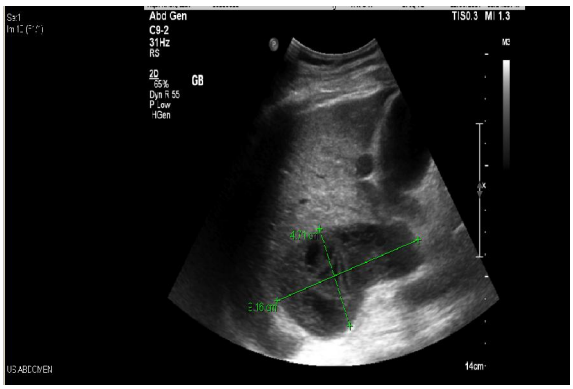
Impression:

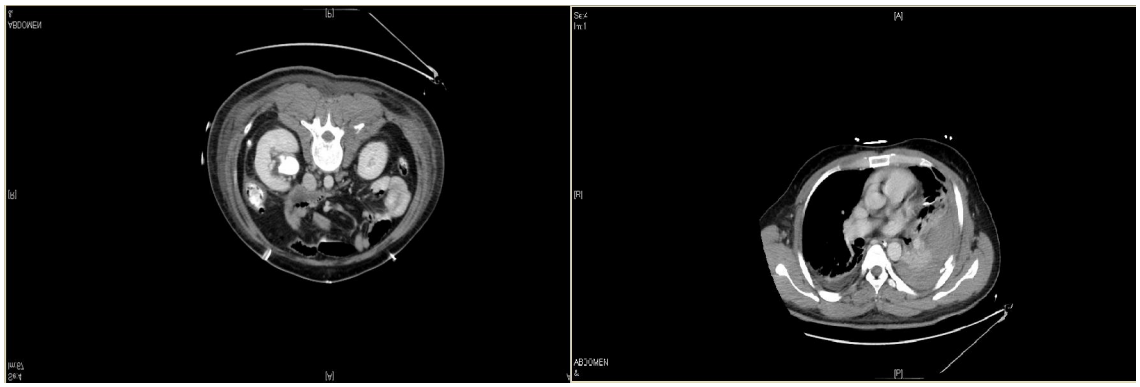
1. Liver showing a large hypodense fluid collection with density about 25HU as described above could represent chronic subcapsular hematoma for follow up, along with multiple branching hypodense lesions in the right lobe of the liver representing the previously known hepatic lacerations - No localized intra-abdominal collection.

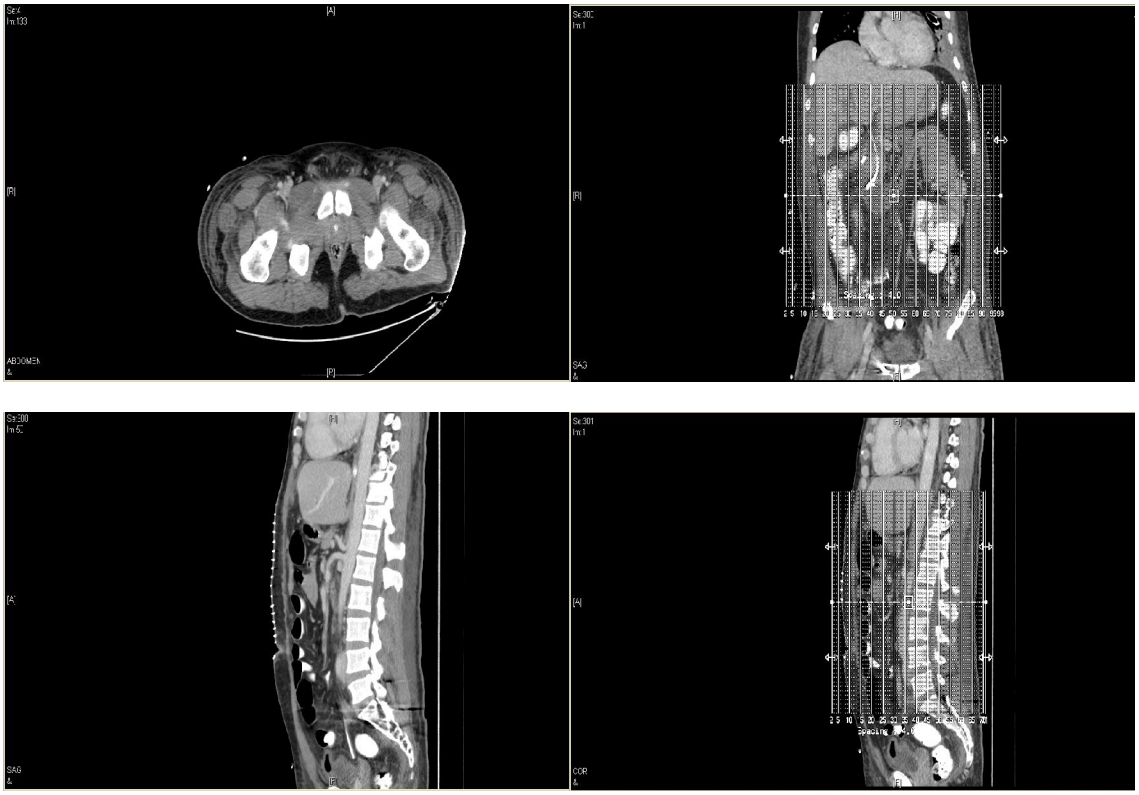
2. Fluid collections / hematoma within the right iliacus, quadratus lumborum, and gluteus muscles with scattered hyperdense foci / hemorrhage for clinical correlation.

3. The right kidney shows a stable large staghorn stone, associated with a dilated ureter with enhancing ureteric wall as well as thickened urinary bladder wall, for clinical correlation to exclude underlying UTI.

4. Left lung is showing a high density fluid filling up the left pleural space which is likely representing a hemothorax and causing adjacent compressive atelectasis, along with small pneumothorax.







On 15 June, IR US guided of subhepatic collection drained with placement of drain. After 15 days in S-ICU, patient transferred to the word in a stable condition. On 22 June, IR US guided done with no more collection and pigtail removed. Patient was discharged in a satisfactory condition and follow-up with general surgery, thoracic and orthopedic and for ERCP regarding stent removal.

Ultrasound on 25 June.

US ABDOMEN of 25-JUN-2017: There is interval minimal regression in size of the hepatic collection seen. It measures 3.3 X 2.2cm, previously was 4.3 x 3 cm.

Intervention: IR US guided Abcess/collecion Drainage on 15 June.

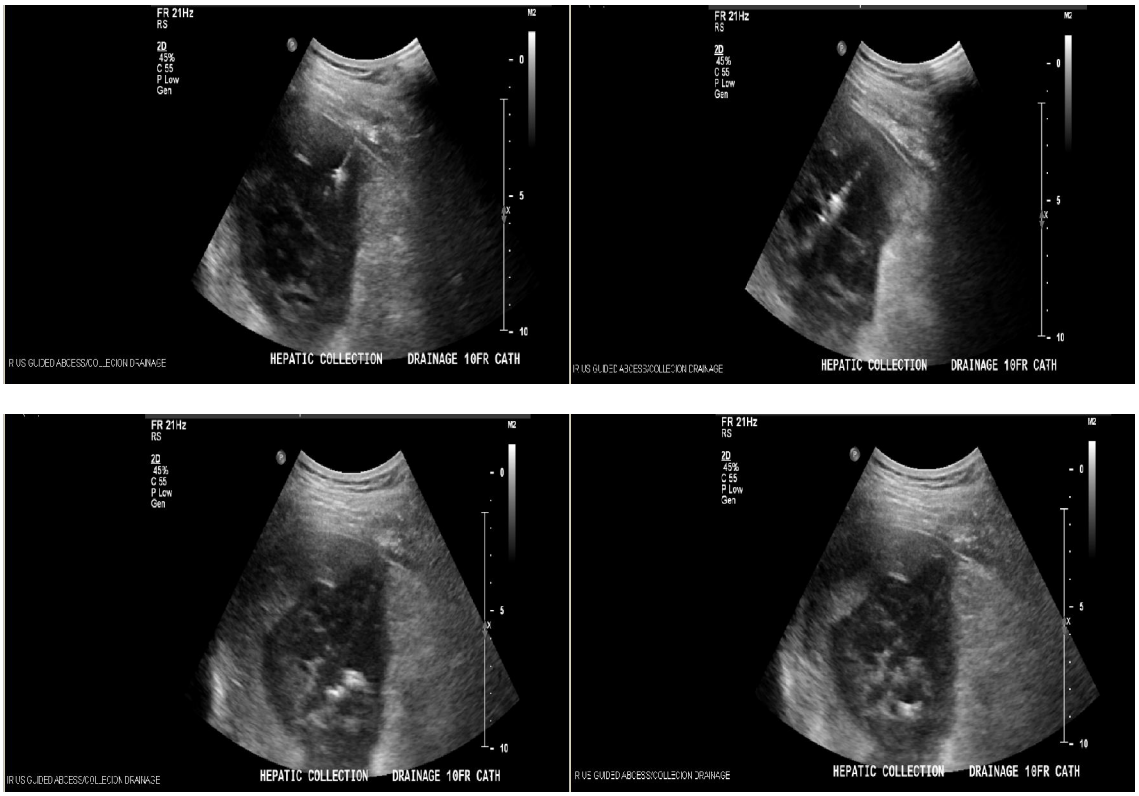
IR US GUIDED ABCESS DRAIN of 15-JUN-2017: FINDINGS: Subcapsular hepatic collection drain by 10 French pigtail drainage catheter under ultrasound guidance. For drainage purpose. This collection seems infected and sent for culture analysis. No post procedure immediate complication encounter.

Discussion

Traumatic injuries of the extrahepatic biliary tract are uncommon, with incidence ranging from 2 to 5 % in abdominal trauma, mainly affecting the gallbladder [2, 3, 5, 10]. Most lesions of extrahepatic bile ducts are caused by penetrating trauma [2, 3, 13–17].

The exact mechanism of injury to the bile duct after blunt trauma is not well known, but a number of factors are identified as responsible for it: (1) a shear force or stretch or avulsion that intersects the duct at its point of attachment to the pancreas or liver; (2) a short cystic duct, causing rapid emptying of the bladder when force is applied, with a sudden increase in intraductal and subsequent predisposition to injury; (3) a shear force applied to the common duct where it is already strained; (4) a compression of the ductal system against the spinal column [1, 3, 4, 15, 18, 19]. Perhaps a combination of these factors promotes injury of the extrahepatic biliary system. The most frequent sites of injury to the extrahepatic bile ducts in blunt abdominal trauma are at the upper edge of the

pancreas, the hepatic duct bifurcation, and in the origin of the left hepatic duct [5, 10, 19].



The clinical presentation virtually divides patients with injuries in the extrahepatic bile ducts into two groups: one with early diagnosis, where laparotomy is indicated because of the presence of hypovolemic shock and signs of peritoneal irritation or associated injuries. The second group is composed of patients with a delayed diagnosis, which are often presented with nausea, vomiting, jaundice, and abdominal pain. [3, 11, 14, 18].

Ultrasonography and computed tomography can result in false negative [18]. The computed tomography common findings in bile duct injury are swelling in the hepatoduodenal ligament, free fluid in the peritoneal cavity, and associated injuries to the liver and duodenum [20].

We learned that a high index of suspicion is necessary during surgery. Delayed diagnosis can be catastrophic and the presence of intra-abdominal free fluid with no solid organ injury after trauma may be a strong indication for an exploratory laparotomy. More common associated injuries appear in the liver, great vessels, duodenum, and pancreas [2, 4, 5, 12, 17].

The presence of bile in the hepatoduodenal ligament, retroperitoneum, or abdominal cavity, which in fact can be hidden by hemoperitoneum, is an indicator of bile duct injury [4, 13–15]. The presence of hematoma in the hepatoduodenal ligament and injury to the liver, duodenum, or gallbladder may also be associated with bile duct injury. This justifies the Kocher maneuver and mobilization of hepatic flexure of the colon, beyond the exploration of the portahepatis, after obtaining control of any bleeding [11, 16]. If the dissection does not identify the lesion, the diagnosis is not made and an intraoperative cholangiography through the gallbladder or cystic duct should be performed [11–13].

If there is no indication for early surgical treatment, the diagnosis of injuries to the extrahepatic bile duct may be delayed [3–5]. Patients not operated on, early in time, and with a biliary fistula may remain asymptomatic for days, because the bile is a sterile component and can be well tolerated. Patients may present few symptoms including abdominal discomfort, nausea, vomiting, jaundice, ascites, and fever [10, 18]. The presence of jaundice after blunt abdominal trauma is suggestive of a missed bile duct injury, but other common diagnoses should be also considered such as massive blood transfusion, liver disease, hepatic trauma, hematoma absorption, or cholecystitis [14].

The most specific diagnostic methods are colangiotransparietohepatography (CTPH), cintilography, and endoscopic retrograde cholangiography. The CTPH can diagnose and locate

the injury but it can be difficult to perform when the intrahepatic duct is thin and should not be done in patients with complex associated liver injury. Endoscopic retrograde cholangiopancreatography (ERCP) can diagnose and eventually treat bile duct injury with stent even if surgical procedures have been conducted before [7, 21, 22]. In our case presented herein, the ERCP was performed and revealed a complete section of the common hepatic duct.

The surgical treatment of injuries to the bile ducts should be individualized, based upon hemodynamic stability, associated injuries, and upon the location and extent of the injury [1, 6, 17, 18]. To our knowledge, there is no management algorithm available in literature.

In hemodynamically unstable patients, or when the injury is extensive, exteriorization of the bile through a terminal drain or through a "T" tube, when possible, creates a controlled external fistula and permits rapid identification of the lesion in an eventual reoperation [13, 16, 17]. Another option is a simple external drainage, which indeed is not recommended in literature, due to high morbidity and mortality [2]. Bile drainage using a T tube has also been described as a unique and definitive treatment of partial injuries to the left hepatic duct, with good outcome in these cases [1]. There is a controversy regarding the ligation of the left hepatic duct or right hepatic duct when injured, and the proponents of this practice say that this is well tolerated, as long as 30 to 50 % of bile flow is preserved, and that the evolution to hepatocellular degeneration is more frequent than to cholangitis [11]. Other authors do not advocate the ligation of the hepatic ducts due to a possible atrophy of the liver lobe, limited experience, and difficulty in following up these cases [1].

In hemodynamically stable patients, the surgeon should try a definitive surgical treatment, and management will depend basically on the extent of the injury, requiring a meticulous surgical technique. Lesions with less than 50 % of the circumference of the bile duct and a well-vitalized bile duct should be primarily sutured, associated or not to the placement of an indwelling stent or T tube, which generally will be used for weeks or even months. Lesions of more than 50 % of duct circumference are controversial from the treatment standpoint [23]. If the transection of the duct is simple, with irregular edges, an end-to-end anastomosis may be indicated [13]. However, it is often necessary to carefully dissect around the duct and a no tension anastomosis may be performed; otherwise, it may result in stenosis or fistulae. In a review of 20 cases of injury to the extrahepatic bile duct treated with end-to-end anastomosis, Ivatury et al. found 11 cases (55 %) of stenosis with reoperation indication ending up in a bileo-digestive derivation [2].

Still in stable patients but with greater injuries, many authors recommend entero-duct anastomosis, using an intestinal Roux-en-Y anastomosis, with an incidence of stenosis of nearly 4 % [2–4, 12, 13, 15, 16]. Associated procedures may become necessary in the treatment of complex injuries, and eventually liver resection may be necessary [2–4, 10, 11, 13, 16, 18].

Complications such as biliary fistulae, abscess, and stenosis may be reduced with early diagnosis and appropriate management during surgery. The high morbidity and mortality of these patients are related to associated injuries and their complications. [5, 10, 12, 17].

Conclusion:

Isolated injuries of extrahepatic bile duct after blunt abdominal trauma are rare and the diagnosis is usually delayed. The presence of free intraperitoneal fluid, with no solid organs injury, is a formal indication for exploratory laparotomy. Early diagnosis that more often occurs during laparotomy because of associated injuries is important to reduce complications. A higher level of suspicion is necessary to identify injuries in the hepatic ducts. Delayed diagnosis is generally related with bad prognosis.

References:

1. Brenneman FD, Rizoli SB, Boulanger BR, Hanna SS. Blunt left hepatic duct injury. Injury. 1994;25(7):465–7. doi: 10.1016/0020-1383(94)90274-7. [PubMed] [CrossRef] [Google Scholar]
2. Ivatury RR, Rohman M, Nallathambi M, Rao PM, Gunduz Y, Stahl WM. The morbidity of injuries of the extra-hepatic biliary system. J Trauma. 1985;25(10):967–73. doi: 10.1097/00005373-198510000-00007. [PubMed] [CrossRef] [Google Scholar]
3. Melton SM, McGwin G, Jr, Cross JM, et al. Common bile duct transection in blunt abdominal trauma: case report emphasizing mechanism of injury and therapeutic management. J Trauma. 2003;54(4):781–5. doi: 10.1097/01.TA.0000055219.13235.7B. [PubMed] [CrossRef] [Google Scholar]
4. Nathan M, Gates J, Ferzoco SJ. Hepatic duct confluence injury in blunt abdominal trauma: case report and synopsis on management. Surg Laparosc Endosc Percutan Tech. 2003;13(5):350–2. [PubMed] [Google Scholar]
5. Ramia JM, Gutiérrez G, Garrote D, et al. Isolated extrahepatic bile duct rupture in blunt abdominal trauma. Am J Emerg Med. 2005;23(2):231–2.

doi: 10.1016/j.ajem.2004.03.008. [PubMed] [CrossRef] [Google Scholar]
6. Lopez PP, Habib FA, Layke JC, Gonzalez P, Rodriquez E. Complete transection of the common bile duct after blunt trauma: a case report. J Trauma. 2005;59(4):1018–21. doi: 10.1097/01.ta.0000187974.29677.d2. [PubMed] [CrossRef] [Google Scholar]
7. Sharpe RP, Nance ML, Stafford PW. Nonoperative management of blunt extrahepatic biliary duct transection in the pediatric patient: case report and review of the literature. J PediatrSurg. 2002;37(11):1612–6. [PubMed] [Google Scholar]
8. Bourque MD, Spigland N, Bensoussan AL, Garel L, Blanchard H. Isolated complete transection of the common bile duct due to blunt trauma in a child, and review of the literature. J Ped Surg. 1989;24:1068–70. doi: 10.1016/S0022-3468(89)80217-9. [PubMed] [CrossRef] [Google Scholar]
9. Balzarotti R, Cimbanassi S, Chiara O, Zabbialini G, Smadja C. Isolated extrahepatic bile duct rupture: a rare consequence of blunt abdominal trauma. case report and review of the literature. World J Emerg Surg. 2012;7(1):16. doi: 10.1186/1749-7922-7-16. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
10. Busuttil RW, Kitahama A, Cerise E, et al. Management of blunt and penetrating injuries to the portahepatis. Ann Surg. 1980;191(5):641–8. doi: 10.1097/00000658-198005000-00017. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
11. Dawson DL, Jurkovich GJ. Hepatic duct disruption from blunt abdominal trauma: case report and literature review. J Trauma. 1991;31(12):1698–702. doi: 10.1097/00005373-199112000-00024. [PubMed] [CrossRef] [Google Scholar]
12. Posner MC, Moore EE. Extrahepatic biliary tract injury: operative management plan. J Trauma. 1985;25(9):833–7. doi: 10.1097/00005373-198509000-00004. [PubMed] [CrossRef] [Google Scholar]
13. Feliciano DV, Bitondo CG, Burch JM, et al. Management of traumatic injuries to the extrahepatic biliary ducts. Am J Surg. 1985;150(6):705–9. doi: 10.1016/0002-9610(85)90413-1. [PubMed] [CrossRef] [Google Scholar]
14. Jones KB, Thomas E. Traumatic rupture of the hepatic duct demonstrated by endoscopic retrograde cholangiography. J Trauma. 1985;25(5):448–9. doi: 10.1097/00005373-198505000-00015. [PubMed] [CrossRef] [Google Scholar]
15. Muin A, Leong YP, Tay SK. Laceration of the common hepatic duct bifurcation by blunt abdominal trauma. Injury. 1992;23(6):422–3. doi: 10.1016/0020-1383(92)90026-O. [PubMed] [CrossRef] [Google Scholar]
16. Sheldon GF, Lim RC, Yee ES, Petersen SR. Management of injuries to the portahepatis. Ann Surg. 1985;202(5):539–45. doi: 10.1097/00000658-198511000-00002. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
17. Bade PG, Thomson SR, Hirshberg A, Robbs JV. Surgical options in traumatic injury to the extrahepatic biliary tract. Br J Surg. 1989;76(3):256–8. doi: 10.1002/bjs.1800760314. [PubMed] [CrossRef] [Google Scholar]
18. Gerndt SJ, Seidel SP, Taheri PA, Rodriguez JL. Biliary tract injury following blunt abdominal trauma: case reports. J Trauma. 1995;39(3):612–5. doi: 10.1097/00005373-199509000-00039. [PubMed] [CrossRef] [Google Scholar]
19. Michelassi F, Ranson JH. Bile duct disruption by blunt trauma. J Trauma. 1985;25(5):454–7. doi: 10.1097/00005373-198505000-00018. [PubMed] [CrossRef] [Google Scholar]
20. Shuman WP. CT of blunt abdominal trauma in adults. Radiology. 1997;205(2):297–306. doi: 10.1148/radiology.205.2.9356606. [PubMed] [CrossRef] [Google Scholar]
21. Sharma BC, Mishra SR, Kumar R, Sarin SK. Endoscopic management of bile leaks after blunt abdominal trauma. J Gastroenterol Hepatol. 2009;24(5):757–61. [PubMed] [Google Scholar]
22. Eid A, Almogy G, Pikarsky AJ, et al. Conservative treatment of a traumatic tear of the left hepatic duct: case report. J Trauma. 1996;41(5):912–3. doi: 10.1097/00005373-199611000-00030. [PubMed] [CrossRef] [Google Scholar]
23. Leppäniemi AK, Jokelainen OS, Haapianinen RK. Accidental injuries of the hepatoduodenal ligament. Eur J Surg. 1993;159:351–3. [PubMed] [Google Scholar]

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