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Traumatic Common Bile Duct Injury: Primary Repair without Internal Drainage after Penetrating Abdominal Trauma. A Case Report and Literature Review

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Rezumat

Leziune traumatică a canalului biliar comun: reparare primară fără drenaj intern după traumatism abdominal penetrant. Prezentare de caz și review de literatură

Leziunile canalului biliar comun (CBC) sunt cel mai frecvent de natură iatrogenă şi rareori apar în contextul traumatismelor abdominale penetrante. Diagnosticul acestora este adesea întârziat din cauza manifestărilor clinice şi imagistice nespecifice. Prezentăm cazul unui pacient de sex masculin, în vârstă de 36 de ani, cu leziune combinată a CBC şi a ficatului, consecutivă unei plăgi înjunghiate. Evaluarea inițială a evidențiat o pacientă stabilă hemodinamic şi respirator, cu semne abdominale nespecifice. Tomografia computerizată a identificat dilacerări hepatice şi o cantitate redusă de lichid liber intraperitoneal. În timpul monitorizării clinice, simptomatologia abdominală s-a agravat, motiv pentru care s-a decis explorarea chirurgicală. Laparoscopia de urgență a evidențiat o zonă de colorație verzui-gălbuie la nivelul plăcii hilare, motiv pentru care s-a decis conversia la laparotomie, care a confirmat leziunea CBC. S-a practicat repararea primară fără montarea unui stent sau a unui tub în T, cu plasarea unui dren adiacent. Evoluția post-operatorie a fost favorabilă; colangiografia prin rezonanță magnetică (MRCP) efectuată la o lună nu a evidențiat stenoză. Acest caz subliniază fezabilitatea reparării primare fără stentare în anumite situații selecționate de leziuni traumatice ale CBC.

Cuvinte cheie: leziune a canalului biliar comun, traumatism penetrant, reparare primară, laparotomie, chirurgie biliară

Abstract

Common bile duct (CBD) injuries are most often iatrogenic and rarely caused after penetrating abdominal trauma. Their diagnosis is frequently delayed due to non-specific clinical and imaging findings. We present the case of a 36-year-old male with combined CBD and liver injury following a stab wound.

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Initial assessment revealed stable vital signs and non-specific abdominal findings. CT imaging demonstrated liver lacerations and a small volume of free fluid. During clinical observation, the abdominal signs worsened, prompting surgical exploration. Emergency laparoscopy revealed greenish discoloration in the hilar plate and the procedure was converted to an open laparotomy, which confirmed CBD laceration. Primary repair without stent or T-tube placement was performed, with an adjacent drain. Postoperative recovery was uneventful; follow-up MRCP in one month showed no stricture. This report highlights the feasibility of primary repair without stenting in select traumatic CBD injuries.

Keywords: common bile duct injury, penetrating trauma, primary repair, laparotomy, biliary surgery

Introduction

Injuries to the common bile duct (CBD) are uncommon and usually occur as iatrogenic complications of hepatobiliary surgery, most frequently laparoscopic cholecystectomy (1,2). Traumatic CBD injuries represent only 1-5% of biliary injuries, with penetrating trauma accounting for the vast majority (2,3). Diagnosis can be challenging due to subtle early findings and low sensitivity of initial imaging. Management strategies vary depending on the extent of injury, timing of diagnosis, and patient stability. Primary repair, with or without biliary decompression via a stent or a T-tube, remains a subject of ongoing debate. Here, we present a rare case of combined CBD and liver injury following abdominal knife wound, managed with primary repair without stenting or tube placement, and review the current literature. Although blunt trauma can occasionally cause bile duct injury, penetrating mechanisms - particularly knife and gunshot wounds - predominate in most published series (4,5). The CBD's retroperitoneal position offers relative protection, explaining its low incidence in abdominal trauma registries (4). When injured, it is often accompanied by hepatic or duodenal trauma, which can complicate diagnosis and treatment. CT scan and ultrasound may reveal only indirect findings such as free fluid or perihepatic collections, with direct visualization of the injury being uncommon (6). MRCP provides high-resolution, non-invasive ductal imaging but is rarely feasible in unstable trauma patients (7).

Case Presentation

A 36-year-old male presented to the emergency department after sustaining multiple stab wounds, including four to the upper abdomen and one to the left hemithorax. On arrival, he was alert with mild tachycardia (heart rate 105 bpm) and hypotension (BP 90/50 mmHg), responding to fluid resuscitation. Physical examination revealed mild abdominal tenderness without signs of peritonitis. Contrast-enhanced CT scan demonstrated Grade III liver lacerations involving segments V and III, small perihepatic fluid, and minimal pneumoperitoneum (*Fig. 1*). No bile duct injury was identified.

The patient was admitted for close observation. After 24 hours, abdominal pain worsened with localized tenderness. Diagnostic laparoscopy revealed hemoperitoneum and greenish discoloration in the hilar plate (*Fig. 2*). Conversion to open laparotomy revealed a partial laceration of the CBD (*Fig. 3*). A primary repair with interrupted absorbable sutures was performed without stenting or T-tube placement. A drain was positioned adjacent to the repair.

The postoperative course was uneventful. The drain was removed on the 5th postoperative day (POD), and the patient was discharged on the 6th POD. An MRCP was performed a month later, which showed an intact CBD without stricture or leak.

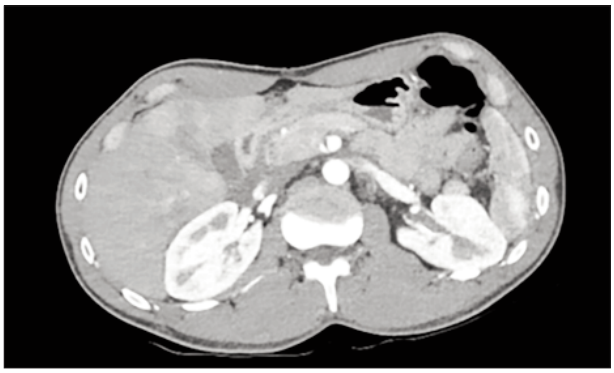

Figure 1. Axial contrast-enhanced CT of the abdomen (arterial phase) demonstrating subtle peripancreatic and perihepatic fluid collection and hepatic parenchymal lacerations.

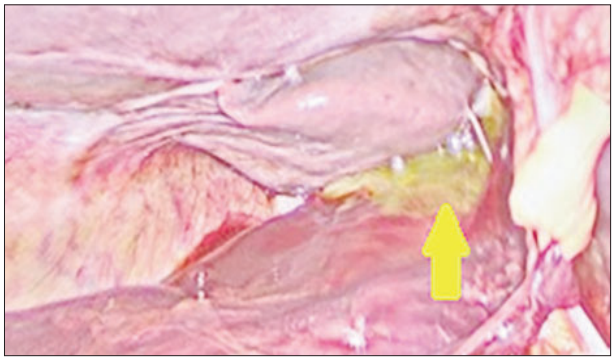

Figure 2. Intraoperative laparoscopic view of the liver hilum showing greenish discoloration of the hilar plate (arrow), indicating bile leakage from the injured area

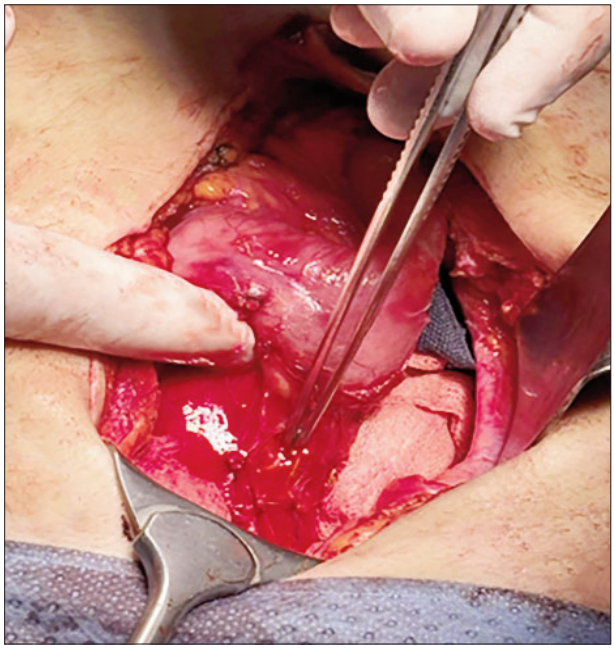

Figure 3. Open laparotomy view revealing partial laceration of the common bile duct (arrow) prior to primary repair with interrupted absorbable sutures.

Discussion

Penetrating CBD injuries are rare, with most reported cases associated with concomitant hepatic injury (2,3). Early recognition is crucial to prevent bile leakage, peritonitis, and biliary stricture formation. While biliary decompression using T-tubes or stenting has traditionally been recommended to prevent postoperative strictures (8,9); recent evidence suggests that in selected cases - particularly partial CBD lacerations with healthy tissue and tension-free repair - primary repair without stenting can yield excellent outcomes (9,10).

In our case, the decision to omit stenting was based on intraoperative assessment of a clean, partial CBD laceration with viable margins. Intraoperatively, the decision for primary repair without internal drainage was based on four criteria: (1) a partial CBD laceration involving less than 50% of the ductal circumference; (2) preserved tissue viability without devascularization; (3) the ability to achieve a tension-free, watertight suture line; and (4) absence of concomitant duodenal, pancreatic, or distal biliary obstruction that would otherwise necessitate decompression. These findings supported safe primary repair without stent or T-tube placement. The absence of post-operative complications and normal MRCP findings supported this approach. Stent omission was also supported by the absence of distal duct obstruction, minimal tissue loss, and intact ductal continuity - all recognized criteria for straightforward primary repair in trauma. A gentle intra-operative leak test confirmed a competent repair. Although the one-month MRCP demonstrated a normal ductal lumen, we acknowledge that longer radiologic follow-up (6-12 months) is recommended in the trauma literature to detect late strictures. The limited follow-up in this case represents a limitation of the present report. The literature reveals only a limited number of such cases, with reported success rates similar to repairs with stenting when performed under optimal conditions (4-6).

This case underscores the importance of individualized surgical decision-making in traumatic CBD injury management, balancing the benefits of biliary decompression against the risks of additional instrumentation. Recent multi-institutional studies indicate that primary repair without internal drainage in carefully selected patients achieves long-term ductal patency rates exceeding 90%, comparable to stented repairs (11). Advantages of omitting the stent placement include avoidance of secondary procedures, reduced infection risk and lower rates of stent-induced cholangitis (12). Successful outcomes depend on tissue viability, minimal devascularization and a tension-free anastomosis (13). Long-term follow-up, ideally with MRCP or ultrasonography at 6-12 months, is advised, as delayed strictures may occur in up to 10% of cases (14). Our patient's uneventful early course supports this selective approach.

Modern guidelines reinforce an individualized approach to hepatobiliary trauma. The World Society of Emergency Surgery (WSES) and the American Association for the Surgery of Trauma (AAST) recommend primary repair for partial extrahepatic bile duct injuries when ductal viability is preserved and tension-free anastomosis is achievable, reserving biliary-enteric reconstruction for complex, devascularized, or delayed cases. EAST practice guidelines similarly emphasize prompt identification of bile leaks, early surgical control, and selective use of internal drainage rather than routine stenting. The management strategy in our case is consistent with these contemporary recommendations.

Conclusion

Primary repair without stenting or T-tube placement is feasible in selected cases of penetrating CBD injury, with partial laceration and healthy duct tissue. Careful intraoperative assessment and postoperative monitoring are essential to ensure favorable outcomes.

Conflicts of Interest

The authors declare no conflicts of interest.

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Informed Consent

The patient included in this study have provided informed consent.

References

1. Seeras K, Nandipati KR. Bile Duct Repair. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2023.
2. 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.
3. Huang ZQ, Huang XQ. Changing patterns of traumatic bile duct injuries: a review of forty years experience. World J Gastroenterol. 2002;8(1):5-12.
4. Feliciano DV, Bitondo CG, Burch JM, Mattox KL, Beall AC Jr, Jordan GL Jr. Management of traumatic injuries to the extrahepatic biliary ducts. Am J Surg. 1985;150(6):705-9
5. Thomson BN, Nardino B, Gumm K, Robertson AJ, Knowles BP, Collier NA, et al. Management of blunt and penetrating biliary tract trauma. J Trauma Acute Care Surg. 2012;72(6):1620-5
6. Iswariah H, Cox MR. Traumatic injury to the biliary tree. ANZ J Surg. 2015;85(7-8):499-503.
7. Yeh BM, Breiman RS, Taouli B, Qayyum A, Roberts JP, Coakley FV. Biliary tract depiction in living potential liver donors: comparison of conventional MR, mangafodipir trisodium-enhanced excretory MR, and multi-detector row CT cholangiography--initial experience. Radiology. 2004;230(3):645-51.
9. Khalaf AM. Management of bile duct injuries: comparative study between Roux-en-Y hepaticojejunostomy and primary repair with stent placement. J Arab Soc Med Res. 2013;8(2):89–95.
10. Sikić N, Tutek Z, Strikić N. Primary suture vs. T-tube after common bile duct exploration (our 25 years of experience). Przegl Lek. 2000;57 Suppl 5:143-5.
11. Zantut LF, Machado MA, Volpe P, Poggetti RS, Birolini D. Extrahepatic bile ducts injury: a report on 14 cases. Sao Paulo Med J. 1996;114(6):1309-11.
12. Thomson BN, Parks RW, Madhavan KK, Wigmore SJ, Garden OJ. Early repair of extrahepatic bile duct injuries. Br J Surg. 2006;93(2):216-20.
13. Shamim M, Jaffary SA, Shamim S. Repair of extrahepatic biliary duct over T-tube. J Pak Med Assoc. 2007;57(1):5-7.
14. Jablonska B, Lampe P. Iatrogenic bile duct injuries: etiology, diagnosis and management. World J Gastroenterol. 2009;15(33):4097-104.