AMERICAN JOURNAL OF DIAGNOSTIC IMAGING, 2023
VOL 9, NO. 4
10.5455/ajdi.20230617103348

CASE REPORT

Open Access

Giant biloma following a blunt abdominal trauma: A rare case report and review of literature

Douaa Kamal[1], Omar Kacimi[1], Houria Tabakh[1], Najwa Touil[1], Abdellatif Siwane[1], Nabil Chikhaoui[1], Khalid Elhattabi[2], Fatimazahra Bensardi[2], Abdessamad Majd[2], Khadija Kamal[2], Mounir Bouali[2], Abdelilah El Bakouri[2], Aziz Fadil[2]

[1]Emergency Department of Radiology, Ibn Rochd University Hospital, Casablanca, Morocco

[2]Emergency Department of Visceral Surgery, Ibn Rochd University Hospital, Casablanca, Morocco

ABSTRACT

Post-traumatic biloma is a rare complication of closed trauma of the abdomen. It is characterized by an abnormal intra- or extrahepatic bile collection occurring spontaneously or secondary to traumatic or iatrogenic injury to the biliary system. It can lead to significant morbidity and mortality if not diagnosed promptly and properly managed. We report the case of a 22-year-old male, brought to the emergency department following a high-speed motorbike accident. He underwent an urgent laparotomy for a Grade 4 liver injury. On day 28 post injury the patient presented with progressive dyspnea, abdominal pain, nausea, and vomiting. A biloma was diagnosed with computed tomography scan. The patient underwent conservative management by percutaneous drainage under ultrasound guidance. Following this procedure, the patient made satisfactory postoperative progress. The drains were removed 2 weeks later, with practically no drainage. Ultrasound examination were performed for 2 weeks and then at 1 month following his discharge, showing a significant resolution of the biloma.

ARTICLE HISTORY

Received June 17, 2023
Accepted July 21, 2023
Published July 31, 2023

KEYWORDS

Biloma; liver injury; trauma; percutaneous drainage

Introduction

The term biloma refers to a collection of liquid bile outside the biliary tract, intra- or extrahepatic location, which may or may not be encapsulated [1]. The condition is generally associated with rupture of the biliary tract due to trauma or abdominal surgery. Morbidity and mortality are high in cases of superinfection, continuous bile leakage, or compression on surrounding structures [2]. Following blunt hepatic trauma, biliary complications have been reported in 2.8% to 7.4% of patients [3,4]. Their formation has been recognized at intervals ranging from a few days to several weeks after injury. The clinical signs and symptoms are usually complicated and often delayed. The presentation varies from abdominal pain distended abdomen, jaundice, and fever to even peritonitis [2]. A 22-year-old male presented with a large biloma developed over 1 month following a grade IV hepatic injury. The patient made a satisfactory improvement after undergoing percutaneous drainage under ultrasound guidance.

Case Report

A 22-year-old male brought to the emergency department following a high-speed motorbike accident. He presented with right hypochondrium abdominal pain. Focused Assessment with Sonography in Trauma scan upon admission showed free fluid in the abdomen. Since the patient was hemodynamically stable, a computed tomography (CT) scan was performed. It showed hypodense lesions in the right liver lobe associated with grade IV laceration of the liver, extending from the hilum to periphery, as well as a moderate amount of generalized hemoperitoneum (Fig. 1). There was no evidence of injury to the splenic, hepatic, or portal vessels, and no extravasation of contrast. Solid and hollow visceras were of normal appearance. The patient was then transported to the operating room where an urgent

Contact Kamal Douaa ✉ Douaalkamal18@hotmail.fr Emergency Department of Radiology, Ibn Rochd University Hospital, Casablanca, Morocco.

© 2023 The Authors. This is an open access article under the terms of the Creative Commons Attribution NonCommercial ShareAlike 4.0 (https://creativecommons.org/licenses/by-nc-sa/4.0/).

laparotomy through a midline abdominal incision was then performed. Gauze packing was used for rapid hemorrhage control. Spleen, pancreas, and kidneys were all intact. No frank bile leak was identified. Pack removal was done 48 hours after. No frank bile leak was identified. The patient kept a hemodynamically stable state in his post operative period and was discharged on the 15th day.

On day 28 post injury, the patient complained of progressive dyspnea, abdominal pain, nausea, and vomiting. CT scan demonstrated a large subcapsular low attenuation fluid collection, with important mass effect on the right hepatic lobe as well as the right lung and mediastinum, measuring 23 × 13 × 30 cm (Fig. 2). Percutaneous ultrasound guided drainage was carried out to allow the insertion of a pigtail catheter. About 4,000 ml of bilious fluid drained on the first day. This was correlated with significant improvement in the patient's symptoms. Two days later, a CT scan was repeated which showed a significant resolution of biloma, measuring 12 × 7 × 5.6 cm (Fig. 3). The patient was treated conservatively for 15 days and the drainage of fluid was monitored. On the16th day, no drainage was noticed and the pigtail catheter was removed. He was discharged home on oral antibiotics. Ultrasound exams were requested two weeks then 1 month following his discharge. The ultrasound check 1month following his discharge showed a small collection measuring only 5 × 4.4 × 2.4 cm (Fig. 4). The last ultrasound check was recently performed (3 months following his discharge) showed a significant regression of the subcapsular collection.

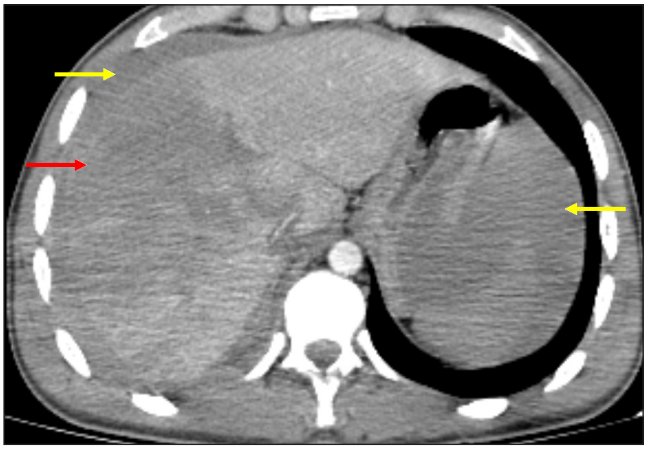


Figure 1. Grade IV liver injury. CT scan shows a large laceration in the right liver lobe extending from the hilum to periphery (red arrow), as well as a moderate amount of generalized hemoperitoneum (yellow arrow).

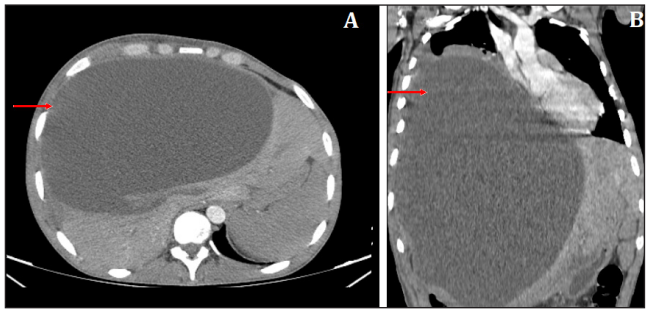


Figure 2. (A-B): axial (A) and coronal (B) CT scan images demonstrating a large subcapsular low attenuation fluid collection (red arrow), with important mass effect on the right hepatic lobe as well as the right lung and mediastinum compatible with a large biloma.

Discussion

The biloma is a well-circumscribed collection of intra-abdominal bile, whether encapsulated or not, outside the biliary tree [2] Clinical presentation of bile leaks is often insidious and symptoms vary from abdominal pain in the right hypochondrium, nausea, vomiting, and sometimes fever in case of an infected biloma. Jaundice might appear in the case of extrinsic compression of the bile duct. The risk of a bile leak increases as the severity of liver injury increases. In low grade liver injury, it has been reported as low as 0% [3,5], whereas in high grade

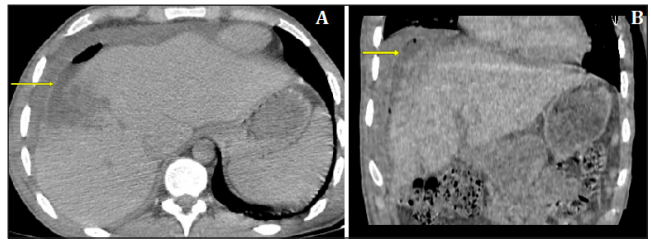


Figure 3. Axial (A) and coronal (B) CT scan images showing a small subcapsular collection (yellow arrow) 2 days after ultrasound guided percutaneous drainage.

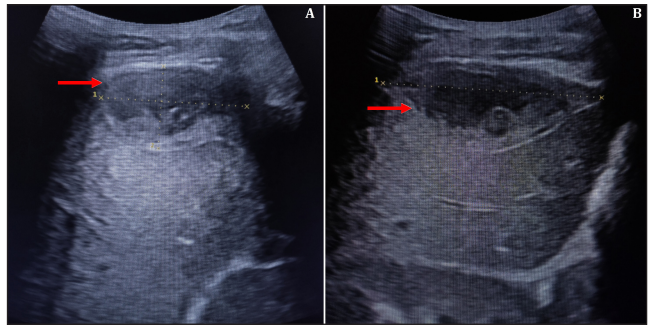


Figure 4. (A-B): Axial (A) and sagittal (B) plane ultrasound images demonstrating a small subcapsular collection proving the significant resolution of biloma.

liver injury (Grade 3 to 5) the risk of a bile leak has been reported as between 4.7% and 25%. Centrally located liver injuries are also significant risk factors for major bile duct injury. Usually post traumatic biloma might take 5 to 22 days to appear [6,7]. Imaging remains the gold standard for establishing a diagnosis of biloma. Ultrasonography is generally the first imaging method that helps detecting the presence of a biloma. However, multiphase CT demonstrates higher accuracy in terms of determining the relationship between the collection and the adjacent structures. The presence of a biloma on CT is suggested by the progressive growth of a well-circumscribed, low-attenuation intra-parenchymal, or peri-hepatic collection [8]. Differential diagnoses include cysts and pseudocysts, hepatic abscess, seromas, hematomas, and lymphoceles. In doubtful cases and/or in the presence of CT contraindications, magnetic resonance (MR) imaging is necessary to confirm the diagnosis as well as differentiating the biloma from other differential diagnoses. MR cholangiography has proven a high diagnostic accuracy in differentiating biliary from non biliary lesions as well as highlighting the source of the biliary leak [9]. The biloma can appear hypointense on T1 and hyperintense on T2. In case of reactive inflammation, a peripheral enhancement of the biloma can be seen.

There is no consensus on the treatment of traumatic bile leaks. The treatment strategy decisions are often based on the extent of injury, associated organ injuries, the size, and location of the biloma, the continuous biliary leakage, as well as biloma superinfection [2]. In asymptomatic patients with small bile collections (<4 cm), nonoperative management is the standard of care, with a reported success rate of more than 80% [10,11]. However, most cases require a therapeutic modality. For this purpose percutaneous drainage has been suggested as a first line option [12]. The management of bile leaks that are enlarging, symptomatic, or infected are less likely to be successfully managed with nonoperative management. Most bilomas can be drained percutaneously with the Seldinger technique by using a combination of US and fluoroscopy or CT for imaging guidance [13]. Fluid collections that are known or suspected to contain bile should be drained promptly; delayed drainage leads to serious complications, such as abscess formation, cholangitis, and sepsis [13]. Fixation of the underlying disruption of the biliary tree is often unnecessary. The ultrasound or CT-guided aspiration by an interventional radiologist is the preferred method [14,15].

Endoscopic retrograde cholangiopancreatography (ERCP) with sphincterotomy and stenting as well as percutaneous drainage procedures are valuable modalities in the treatment of major bile leaks in liver trauma [16,17]. It reduces intra-biliary pressure to allow defects to seal off spontaneously. With this technique, the biliary system is evaluated distal to the level of injury. Although ERCP is considered more invasive than MR cholangio pancreatography (MRCP), it allows therapeutic interventions such as the placement of biliary stents and drainage catheters. However, US or CT-guided drainage allows for precise localization and real-time visualization of the biloma, ensuring accurate needle placement and targeted fluid evacuation. This image-guided approach minimizes the risk of accidental damage to surrounding structures and enhances the success rate of the drainage procedure. Moreover, percutaneous drainage techniques are less invasive than ERCP with stent placement, which can be especially beneficial for patients who are not suitable candidates for more invasive procedures. Additionally, US- or CT-guided drainage may be the preferred option when the biloma is not directly accessible via the bile ducts, making it a versatile and effective alternative treatment for selected cases. In our case percutaneous drainage under ultrasound guidance has proved to be an effective option. The patient made a satisfactory improvement, he recovered successfully and no complications were observed on his follow up visit 3 months after his discharge.

Biloma can cause serious and life-threatening complications such as peritonitis, biliopleural fistula, and hemobilia [18]. These complications can occur in 6.4% of patients with blunt liver trauma [19].

Conclusion

In summary, severe liver trauma can develop serious complications requiring an experienced multidisciplinary management team. In addition to a high grade injury, centrally located liver injuries are also significant risk factors for major bile duct injury. We advocate the role of multiphase CT in patients with clinical evidence of biliary complications and rebleeding, as a screening tool, before any invasive diagnostic and treatment procedures. In addition to being non invasive, MRCP provides excellent delineation of the biliary anatomy proximal and distal to the level of injury. Early diagnosis and prompt treatment can prevent life-threatening biloma complications. By optimizing patient outcomes and reducing the potential for complications, US- or CT-guided

drainage represents a valuable and increasingly favored method for managing post-traumatic bilomas as it has proved to be an effective and an affordable treatment option for biloma with excellent results in our case.

References

1. Balfour J, Ewing A. Hepatic biloma. StatPearls Publishing, Treasure Island, FL,2023. Available via http://www.ncbi.nlm.nih.gov/books/NBK574559/ (Accessed 21 July 2023).
2. Copelan A, Bahoura L, Tardy F, Kirsch M, Sokhandon F, Kapoor B. Etiology, Diagnosis, and management of bilomas: a current update. Tech Vasc Interv Radiol. 2015; 18(4):236–43.
3. Kozar RA, Moore JB, Niles SE, Holcomb JB, Moore EE, Cothren CC, et al. Complications of nonoperative management of high-grade blunt hepatic injuries. J Trauma. 2005; 59(5):1066–71.
4. Carrillo EH, Spain DA, Wohltmann CD, Schmieg RE, Boaz PW, Miller FB, et al. Interventional techniques are useful adjuncts in nonoperative management of hepatic injuries. J Trauma. 1999; 46(4):619–22; doi: 10.1097/00005373-199904000-00010.
5. Vassiliu P, Toutouzas KG, Velmahos GC. A prospective study of post-traumatic biliary and pancreatic fistuli: the role of expectant management. Injury. 2004; 35(3):223–7.
6. Bouras AF, Truant S, Pruvot FR. Management of blunt hepatic trauma. J Visc Surg. 2010; 147(6):e351–8.
7. Bala M, Gazalla SA, Faroja M, Bloom AI, Zamir G, Rivkind AI, et al. Complications of high grade liver injuries: management and outcomewith focus on bile leaks. Scand J Trauma Resusc Emerg Med. 201223; 20:20.
8. De Backer A, Fierens H, De Schepper A, Pelckmans P, Jorens PG, Vaneerdeweg W. Diagnosis and nonsurgical management of bile leak complicated by biloma after blunt liver injury: report of two cases. Eur Radiol. 1998;8(9):1619–22.
9. Lee NK, Kim S, Lee JW, Lee SH, Kang DH, Kim GH, et al. Biliary MR imaging with Gd-EOB-DTPA and its clinical applications. Radiographics. 2009;29(6):1707–24.
10. Kannan U, Parshad R, Regmi SK. An unusual presentation of biloma five years following cholecystectomy: a case report. Cases J. 2009; 2:8048.
11. David Richardson J, Franklin GA, Lukan JK, Carrillo EH, Spain DA, Miller FB, et al. Evolution in the management of hepatic trauma: a 25-year perspective. Ann Surg. 2000;232(3):324–30.
12. Hashemi SR, Ghaemian N, Abbaszadeh Marzbali N, Mohammadhasani AR. Biloma due to blunt liver trauma. Caspian J Intern Med. 2010; 1(4):159–61.
13. Lee CM, Stewart L, Way LW. Postcholecystectomy abdominal bile collections. Arch Surg. 2000; 135(5):538–42
14. Dell AJ, Krige JEJ, Jonas E, Thomson SR, Beningfield SJ, Kotze UK, et al. Incidence and management of postoperative bile leaks: a prospective cohort analysis of 467 liver resections. S Afr J Surg. 2016; 54(3):18–22.
15. Akin K, Ozturk A, Guvenc Z, Isiklar I, Haberal M. Localized fluid collections after liver transplantation. Transplant Proc. 2006; 38(2):627–30.
16. Al-Hassani A, Jabbour G, ElLabib M, Kanbar A, El-Menyar A, Al-Thani H. Delayed bile leak in a patient with grade IV blunt liver trauma: a case report and review of the literature. Int J Surg Case Rep. 2015; 14:156–9.
17. Bridges A, Wilcox CM, Varadarajulu S. Endoscopic management of traumatic bile leaks. Gastrointest Endosc. 2007; 65(7):1081–5.
18. Vujic I, Brock JG. Biloma: aspiration for diagnosis and treatment. Gastrointest Radiol. 1982; 7(3):251–4.
19. Kozar RA, Moore FA, Cothren CC, Moore EE, Sena M, Bulger EM, et al. Risk factors for hepatic morbidity following nonoperative management: multicenter study. Arch Surg. 2006; 141(5):451–8.