

Delayed biloma formation in a patient with blunt liver injury after low velocity trauma

Introduction

This article presents a rare case of delayed bile leak with biloma formation presenting as a late complication of a grade IV liver laceration following blunt abdominal trauma in a 24-year-old woman. The patient subsequently experienced a prolonged hospital admission because of the difficulty controlling the bile leak through non-operative methods of endoscopic biliary stent placement and radiologically-guided drainage. The patient finally underwent an open repair of a leaking, partially transected bile duct in segment 8. This led to a full recovery with discharge from hospital 1 month after the initial admission.

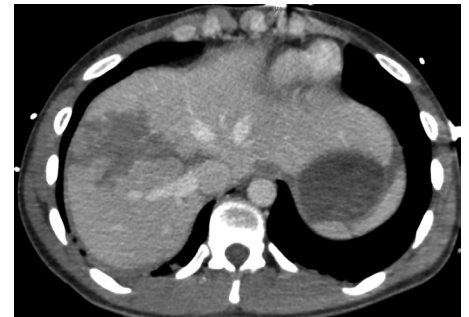
Discussion

Delayed bile leak with biloma formation is a rare complication of blunt liver trauma. Owing to an insidious onset there is often a delay in diagnosis. Biliary injury is reported to occur in 2–5% of patients with high grade blunt liver trauma (Kozar et al, 2005). The development of a biloma following blunt trauma was first reported in 1898 by Whipple (Whipple, 1898). In one case series of 404 patients with high grade blunt liver trauma, only two patients (0.5%) developed bilomas (Pachter et al, 1996). Clinical presentation of a bile leak

is often delayed, with symptoms such as abdominal pain and distension manifesting many days after injury. Diagnosis of a biloma is made by computed tomography scanning, and can be differentiated from haemorrhage by the appearance as a well-circumscribed, low density perihepatic or intraparenchymal collection (De Backer et al, 1998).

Endoscopic management with placement of a biliary stent and/or radiologically-guided drainage are the preferred initial non-surgical treatment options with the aim of allowing

Figure 1. Grade IV liver injury confined to segment 8, extending from the liver capsule to the hilum and inferior vena cava.



CASE REPORT

A 24-year-old woman sustained a motorbike accident by inadvertently accelerating into a brick wall at approximately 20 km/hr, compressing her abdomen against the handles. On arrival at hospital her systolic blood pressure was stable between 105–110 mmHg. Her abdomen was tender in the right upper quadrant with associated peritonism. A FAST (focused assessment with sonography for trauma) scan was positive for free fluid in the hepatorenal angle and vesicouterine pouch.

A computed tomography scan revealed a grade IV liver laceration confined to segment 8 extending from the capsular margin to the hilum and inferior vena cava (Figure 1). There was a moderate amount of intraperitoneal haemorrhage but no evidence of major vessel injury. Her haemoglobin level was 128 g/litre and her liver function tests were moderately deranged. She remained haemodynamically stable and a decision was made for non-operative management. The following week her pain settled and liver function tests improved. Her abdomen was soft to palpation and she was discharged 8 days after initial presentation with a plan for follow-up with a hepatobiliary surgeon with a progress computed tomography scan.

Three days post discharge she re-presented with progressive abdominal distension and right upper quadrant pain. An abdominal ultrasound revealed perihepatic fluid and a computed tomography scan showed two large subcapsular hypodense collections deforming the surface of the liver, consistent with the development of bilomas (Figure 2a). The liver laceration was

unchanged and a moderate pleural effusion was present. She underwent laparoscopic washout with evacuation of 2.5 litres of bile and subsequently a 19 French Blake drain was placed in the hepatorenal pouch. An endoscopic retrograde cholangiopancreatogram was performed and contrast extravasation was seen around the liver laceration (Figure 2b). A 7 cm, 7Fr plastic biliary stent was placed.

Despite the biliary stent and drain, bile continued to accumulate requiring further image-guided drainage. Culture of this fluid grew *Serratia marcescens* and *Candida glabrata* necessitating a prolonged course of fluconazole and ciprofloxacin. Nineteen days after the initial drainage a computed tomography cholangiogram showed an ongoing bile leak, with extravasation of contrast into the region of the hepatic laceration (Figure 2c). She underwent a laparotomy where the right liver fracture was opened using the Cavitron ultrasonic surgical aspirator and then the injured bile duct in segment 8 was repaired with a 4/0 absorbable suture. A cholecystectomy and choledochotomy were also performed with removal of the biliary stent and a retrograde lipid cholangiogram to confirm no ongoing leak. Postoperatively, she developed respiratory compromise secondary to a large right loculated pleural effusion. Despite insertion of an intercostal drain a subsequent thoracoscopy with washout and drainage of the pleural space was necessary for complete resolution of the effusion. She recovered well and was discharged 1 month after the initial admission.

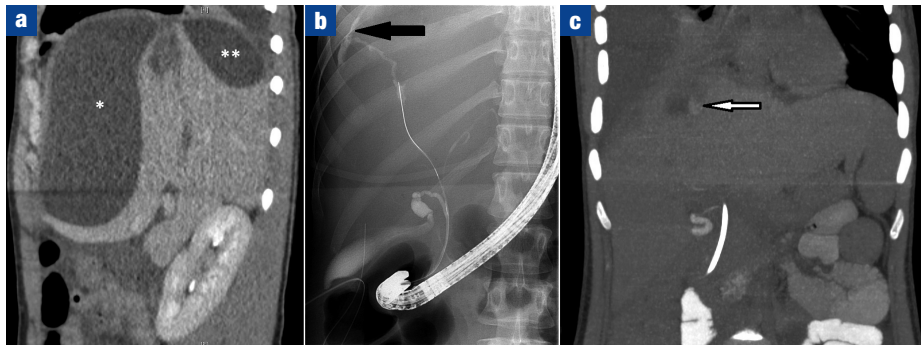
Dr Jonathan Kam, Senior Resident Medical Officer, Royal North Shore Hospital, St Leonards, NSW, Australia, and Conjoint Fellow, Faculty of Medicine, University of Newcastle, Australia

Professor Thomas J Hugh, Head of Department, Upper Gastrointestinal Surgical Unit, Royal North Shore Hospital, St Leonards, NSW, Australia, and Discipline of Surgery, University of Sydney, Australia

Associate Professor Anthony Joseph, Head of Department, Trauma Unit, Royal North Shore Hospital, St Leonards, NSW, 2065, Australia, and Discipline of Emergency Medicine, University of Sydney, 2006, Australia

Correspondence to: Professor A Joseph (Tony.Joseph@health.nsw.gov.au)

Figure 2. Delayed biloma from a bile duct injury following blunt liver trauma and persisting despite endoscopic, radiological and laparoscopic drainage. a. Two large subcapsular hypodense collections deforming the surface of the liver. The larger anterosuperior collection (*) was 15x6.3x1.5 cm in size while the smaller posterosuperior collection (***) measured 8.8x5x1 cm. **b.** Endoscopic retrograde cholangiopancreatogram demonstrating contrast extravasation into the peritoneum (black arrow). **c.** Computed tomography cholangiogram showing evidence of persistent bile leak with contrast extravasation into the superior collection (white arrow).



bile leaks to heal without further operative intervention (Pachter et al, 1996; Kozar et al, 2005; Sharma et al, 2009; Al-Hassani et al, 2015). Early endoscopic retrograde cholangiopancreatography with bile duct stenting results in effective bile drainage with a success rate between 80 and 90% (Bajaj et al, 2006; Sharma et al, 2009). Most reported cases of bilomas have had successful resolution following a combination of these non-operative modalities. The current case is unusual in that the biloma continued to accumulate despite both biliary stenting and drainage. The authors postulate that in a thin woman the magnitude of the impact and the sheer forces generated resulted in an isolated segmental side branch injury to the biliary

tree and this was the cause of the failure of both radiological and endoscopic drainage. This case highlights the need to consider early operative intervention in the context of a non-resolving biliary injury following blunt trauma. **BJHM**

Al-Hassani A, Jabbar G, Ellabib M, Kanbar A, El-Menyar A, Al-Thani H (2015) 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* 14: 156–159. <https://doi.org/10.1016/j.ijscr.2015.08.002>

Bajaj JS, Spinelli KS, Dua KS (2006) Postoperative management of noniatrogenic traumatic bile duct injuries: role of endoscopic retrograde cholangiopancreatography. *Surg Endosc* 20(6): 974–977. <https://doi.org/10.1007/s00464-005-0472-3>

De Backer A, Fierens H, De Schepper A, Pelckmans P,

LEARNING POINTS

- Biloma formation from bile leak is a rare, delayed complication of liver trauma.
- Symptom onset is usually insidious and there is often a delay in diagnosis.
- Non-operative management via endoscopic placement of a biliary stent or radiologically-guided drainage is usually successful in managing bile leaks and these are the preferred initial non-surgical treatment options.
- Early operative intervention needs to be considered for managing non-resolving bile leaks.

Jorens PG, Vancerdeweg W (1998) Diagnosis and nonsurgical management of bile leak complicated by biloma after blunt liver injury: report of two cases. *Eur Radiol* 8(9): 1619–1622. <https://doi.org/10.1007/s003300050598>

Kozar RA, Moore JB, Niles SE et al (2005) Complications of nonoperative management of high-grade blunt hepatic injuries. *J Trauma* 59(5): 1066–1071. <https://doi.org/10.1097/101.ta.0000188937.75879.ab>

Pachter HL, Knudson MM, Esrig B et al (1996) Status of nonoperative management of blunt hepatic injuries in 1995: a multicenter experience with 404 patients. *J Trauma* 40(1): 31–38. <https://doi.org/10.1097/00005373-199601000-00007>

Sharma BC, Mishra SR, Kumar R, Sarin SK (2009) Endoscopic management of bile leaks after blunt abdominal trauma. *J Gastroenterol Hepatol* 24(5): 757–761. <https://doi.org/10.1111/j.1440-1746.2008.05703.x>

Whipple C (1898) Rupture of the liver; formation of cystic swelling containing bile-stained fluid. *Lancet* 151(3902): 1616. [https://doi.org/10.1016/S0140-6736\(01\)78252-9](https://doi.org/10.1016/S0140-6736(01)78252-9)

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British Journal of Hospital Medicine, February 2017, Vol 78, No 1