

CASE NOTE

Importance of liver drainage in biliary–bronchopleural fistula resulting from thoracoabdominal gunshot injury

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Post-traumatic, biliary–bronchopleural fistulas (BBPFs) are rare. We present a case of BBPF after a thoracoabdominal gunshot wound for which the patient required surgical management.

CASE REPORT

A 27-year-old man presented to our centre with a right-sided thoracoabdominal gunshot wound. He was hypotensive and tachycardic. His extended focused assessment by sonography for trauma confirmed a right hemothorax and intraperitoneal hemorrhage. After inserting a chest drain, we did an emergency celiotomy. His injuries included a diaphragmatic laceration, a bleeding grade 2 renal laceration, minimally hemorrhaging grade 3 liver injury and 2 colotomies. We performed a medial-visceral rotation, then did a partial nephrectomy and right hemicolectomy, packed the liver defect, carried out a double-layered suture repair of the diaphragm (after irrigating the thorax) and did a temporary silo closure.

On postoperative day 3, the patient underwent primary closure of the abdomen. All repairs were intact, and the liver injury appeared hemostatic with no evidence of a bile leak. We did not insert abdominal drains. On postoperative day 6, the patient had an increased leukocyte count ($22 \times 10^9/L$). Computed tomography (CT) identified a right-sided abdominal fluid collection with a persistent pneumothorax. We inserted an additional chest tube in the thorax. A CT-guided drain inserted into the peritoneal collection initially gave purulent fluid. The patient's leukocyte count normalized.

On postoperative day 10, the patient became febrile with an increased leukocyte count ($26 \times 10^9/L$). Blood cultures confirmed a gram-negative bacteremia, and he was noted to have biloptysis (ventilator circuit). The abdominal drain was dry. Repeat CT imaging identified large, complex right abdominal (Fig. 1) and thoracic (Fig. 2) fluid collections with separate air–fluid levels. Bronchoscopy confirmed a continuous bile leak from the right lower hepatic lobe. A contrast enema showed an intact ileocolonic anastomosis.

The following day, through a right thoracoabdominal incision, we drained 1 L of purulent bile from a cavity posterior and lateral to the kidney. We divided the fistula by separating the diaphragm from the right lower lung lobe and excised a 2-cm fistulous tract by means of a stapled pulmonary wedge resection. We also carried out lung decortication. After repairing the diaphragmatic dehiscence, we inserted 2 chest tubes and 3 peritoneal drains. Using endoscopic retrograde cholangiopancreatography (ERCP), we inserted a biliary stent. The drainage stopped within 8 days, and the patient was discharged in good condition.



Fig. 1. Computed tomography scan shows a large fluid collection with an air–fluid level in the right abdomen.

DISCUSSION

Although bronchobiliary fistulas have been reported as complications of development, biliary strictures, choledocholithiasis, pancreatitis and hepatic echinococcal disease, this report describes a rare case of BBPF resulting from penetrating trauma.^{1,2}

The importance of thorough biliary drainage has always been clear. This includes the use of closed suction drains for substantial hepatic injuries resulting from trauma.³ Use of perihepatic drains avoids the high morbidity of undrained bile collections by ensuring a controlled fistula should there be continued leakage from the liver. They also address the most common postoperative complication associated with complex hepatic trauma⁴ and are often recommended for injuries graded 3 or higher.³ Although this report outlines a standard surgical approach for patients with thoracoabdominal gunshot wounds, the omission of perihepatic closed suction drainage is ripe for discussion. In agreement with authors who debunked the traditional requirement of drainage in elective hepatectomies,⁵ some also advocate placing drains only when bile leaks are obvious in cases of trauma.^{1,3} This concept is largely based on modern nonoperative treatment of solid organ injury, as well as on the availability of adequate percutaneous drainage should a subsequent biloma occur. Unfortunately, the absence of drainage in our patient's case prevented the creation of a controlled fistula, resulting in an infected biliary abscess eroding through the diaphragmatic repair and into the lung and bronchus. Inadequate drainage of liver injuries has been identified as a risk factor for thoracobilia.¹

Although isolated percutaneous drainage and spon-



Fig. 2. Computed tomography scan shows a fluid collection with an air–fluid level in the right thorax.

taneous closure of bronchobiliary fistulas have been reported, most cases require surgery. In our patient, we used a thoracoabdominal approach because of the short interval after his previous celiotomy. Postoperative ERCP was also crucial in lowering intrabiliary pressures to arrest further leakage. Although some authors have discussed the use of nonoperative therapy for simple biliary fistulas,^{3,4} the size of the collections, the presumed dehiscence of the diaphragm repair and the airway fistula in our patient prompted us to pursue a definitive operative solution.

This case illustrates the importance of adequate closed-suction drainage adjacent to complex liver injuries, regardless of mechanism. In their absence, intra-abdominal bilomas, sepsis and uncontrolled biliary fistulas may occur. Appropriate drainage usually prevents these complications, and at worst results in a controlled biliary fistula that resolves when an endobiliary stent is inserted.

Competing interests: None declared.

References

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