Case report

Biliopleural fistula after penetrating thoracoabdominal injury: A case report

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ABSTRACT

Introduction: Biliopleural fistula is a rare complication of thoraco-abdominal injury. Due to its rarity, the experience of any one surgeon is minimal, there is a paucity of literature regarding optimal treatment. This case report can be an addition to the existing reports to guide surgeons in better understanding and management of such cases.

Case presentation: A 30 yrs old male patient presented 2 weeks after he sustained gunshot injury over the right posterior chest. He was referred to our hospital because there was bilious chest tube output. Thoracotomy was done and finding was 10 cm right diaphragmatic defect with lacerated liver oozing bile and subcapsular hematoma that herniated into chest. Clotted blood had trapped the lung with pleural peel. Clot evacuation, decortication, biliary leak and liver laceration repair was done. The diaphragmatic defect was then closed. Patient had smooth postoperative course.

Discussion: Patients with BPF after thoracoabdominal injury can present with shortness of breath, bile output through chest tube and pleural effusion. Since bile has corrosive effect on the lung with subsequent complications like empyema and bronchobiliary fistula, early diagnosis and treatment are imperative. BPF after thoracoabdominal injury can be effectively managed with thoracotomy, decortication and closure of diaphragmatic defect.

Conclusion: Biliopleural fistula is uncommon after penetrating thoraco-abdominal injury and high index of suspicion and early diagnosis are of paramount importance to prevent complication. Surgery is best treatment option to stop biliary leak, close the diaphragmatic defect, manage further injuries in the chest and release trapped lung.

1. Introduction

Biliopleural fistula (BPF) is a communication between biliary tree and pleural cavity. BPF has been reported as a complication of inflammatory or neoplastic conditions affecting the liver, secondary to subphrenic collection, iatrogenic following cholecystectomy, liver biopsy, and percutaneous transhepatic biliary drainage, and rarely as a complication of thoracoabdominal trauma [1,2]. Bile has a corrosive effect on the lung which could result in subsequent formation of an often fatal, biliobronchial fistula. Bile is also a good culture medium for bacteria, which can be complicated by formation of bilious empyema [3]. There is a paucity of scientific papers on BPF in general and traumatic biliopleural fistula in specific, this could be due to its rare incidence [3]. Therefore, we present this case of biliopleural fistula resulted from penetrating thoracoabdominal injury treated surgically with good outcome at Tikur Anbessa Specialized Hospital, which is a teaching hospital of Addis Ababa University. We report a case of traumatic biliopleural fistula in a 30 years old according to SCARE 2020 guideline [4].

2. Case presentation

A 30 yrs. old male patient referred to our hospital after he sustained gunshot over the right posterior chest of 2 weeks prior to presentation. He was referred from other hospital after right chest tube was inserted and there was bilious output. There was also gunshot to the right hand and corrective digital amputation was done at the referring hospital. He was having shortness of breath and fever but no yellowish discoloration of the eye and expectoration of bile. The patient is an otherwise apparently healthy young man who has no relevant previous medical or surgical history. The patient has also no relevant drug history, family history, genetic and psychosocial history.

Abbreviations: BPF, Biliopleural Fistula.

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On physical examination he was acutely sick looking with blood Pressure of 130/80 mmHg, pulse rate of 110 beat per minute, respiratory rate of 22 breath per minute, temperature of 37.8°C and oxygen saturation of 93% on room air. There was 0.5 × 0.5 cm entry wound at the right posterior chest below the tip of scapula and 4X5cm exit wound over right anterior mid clavicular line below the nipple. Chest tube was in place having biliious output. The right little finger was amputated at metacarpophalangeal joint with compound metacarpal fracture of right hand and soft tissue loss.

Blood work showed hemoglobin of 9.7 g/dL while liver function and renal function tests were in the normal range. CT scan of chest and abdomen showed right clotted haemothorax with trapped lung (see Fig. 1) and segment VIII liver injury with sub capsular hematoma (see Fig. 2).

Right posterolateral thoracotomy was done and there was clotted hemothorax and trapped lung with fibrin peels. The bullet tract was in the lower lobe of right lung. There was a 10 cm diaphragmatic laceration through which liver was herniated into right hemi chest. The segment VIII of liver had 3 cm laceration with sub capsular hematoma. Bile was oozing from the laceration. After chest was entered, the clot was evacuated, decortication was done, the bullet tract in the right lower lobe of the lung was debrided. Then the herniated liver was examined. Injured branch of intrahepatic bile duct was sutured, hemostasis was secured and liver laceration was repaired with absorbable sutures. The liver was then returned to the abdomen and diaphragm was closed with horizontal mattress nonabsorbable suture (Figs. 3, 4). Chest tube and subhepatic drains were left. Furthermore, debridement of the wound over the hand was done and gutter was applied. The procedure was done by a senior Cardiothoracic fellow and senior Cardiothoracic Surgeon, both surgeons are also experienced general surgeons.

Postoperatively patient had uneventful course. Chest tube output was serous and removed on 3rd postoperative day. On 4th postoperative day subhepatic drain was removed after serosanguinous drainage resolved and patient was discharged. The patient was in good clinical condition at one month and three months postoperative follow up.

3. Discussion

Bilothorax is usually as a result of a biliopleural fistula due to a thoraco abdominal trauma or related with a surgical intervention [2]. In a review of the literature on traumatic thoracobiliary fistulas, about 75% percent of cases are secondary to penetrating injuries, and the remaining cases are due to blunt trauma [5].

The presence of bile in the pleural cavity is harmful and can lead to empyema, entrapped lung and even acute respiratory distress syndrome.

Hence early recognition and treatment are imperative [6]. There is often an interval from several days to weeks between the trauma and the diagnosis. Symptoms usually are fever, pleuritic chest pain and right upper quadrant pain. If the fistula communicates with a bronchus, bilioptysis (expectoration of bile) is a pathognomonic symptom. The presence of jaundice should prompt an investigation of bile duct patency [3].

Early diagnosis of a thoracobiliaryfistula is crucial in its management and rests on the clinical suspicion in the setting of a delayed or persistent pleural effusion after combined hepatic and thoracic trauma. A chest radiograph could reveal a right pleural effusion, often accompanied by elevation of the right diaphragm. A bilious effluent from pleural aspiration or chest tube with bilirubin levels usually in the range of 4–10 mg/dL is diagnostic [3,5]. Our patient presented after two weeks of gunshot wound with fever, shortness of breath and bilious chest tube output.

Endoscopic retrograde cholangiopancreatography (ERCP) is the most useful test to demonstrate the fistulous tract and to identify distal biliary obstruction. Computed tomography, although invaluable in assessing the extent of the hepatic injury when the conservative approach is proposed, is of dubious diagnostic value in confirming the
presence of a thoracobiliary fistula [7]. In our set up, ERCP is not routinely available and hence diagnosis remains to be made based on chest tube output and CT scan in combination with clinical presentation.

The optimal treatment of thoracobiliary fistula is operative, with a 97% success rate [8]. Recently, there is a trend towards a conservative management with chest tube drainage and biliary stenting to reduce ductal pressure and promote fistula closure [7]. The conservative approach of tube thoracostomy and antibiotics has been applied to pleurobiliary fistulas, but is unsuccessful in 38% of the cases. In our set up, biliary stenting is not available. When conservative treatment fails, thoracotomy is the preferred approach, as it facilitates an effective closure of the diaphragm, release of lung entrapment by the fibrinobiliary membrane, and effective drainage tube placement under direct vision [3,7,8]. Combining unavailability of endoscopic procedures and patient’s presentation with evidence of liver herniation, we opted for surgical management. The procedures should be individualized, depending on the intraoperative findings and preoperative imaging evaluation. They may include suture repair of the liver and/or leaking biliary ducts, closure of diaphragm, placement of perihepatic closed drains, lung decortication [7]. Postoperatively patients should be followed for control of bile leak and improvement of lung function.

4. Conclusion

Biliopleural fistula can present with bilious drainage from chest tube after penetrating thoracoabdominal injury with gunshot. High index of suspicion, early diagnosis and management is paramount importance to prevent complications. Surgery is the best treatment and successful option to close diaphragmatic defect, to manage leaking bile duct branch, release trapped lung and manage further injuries in the chest. Thoracotomy is preferred approach as was for our case, because lungs can be accessed, diaphragm can be repaired, herniation and hepato-biliary injuries can be managed with single incision.

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Ethical approval

Ethical clearance was obtained from the ethical review committee of the Department of Surgery, College of Health Sciences, Addis Ababa University for publication of this article with accompanying images.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Registration of research studies

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CRediT authorship contribution statement

1. Abraham Genetu, MD: conceived, wrote, and submitted the case report.
2. Samuel Tesfaye, MD: operated on the patient, conceived, wrote, and reviewed the case report.
3. Mahlet Tesfaye, MD: did a critical review of the case report, approved final version for submission, and was involved in the management of the case.
4. Dereje Gulilat, MD. Operated on the patient, conceived, wrote, and reviewed the case report.

Declaration of competing interest

All authors declare that they have no conflict of interest.

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