

# Chronic Empyema Thoracic from Traumatic Bilothorax: Case Report and Review of Literature

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**Abstract** Bilothorax is defined as the presence of bile in the pleural space. Various aetiologies have been identified. Empyema thoracis occurring as a result of bilothorax is rare. We report a case of a 30-year old man that had blast injury to the right hypochondrion, subsequently developed right sided pleural fluid collection and jaundice. Thoracentesis yielded yellowish fluid. He had thoracotomy and decortication. Postoperative recovery was uneventful and patient was discharged.

**Keywords** Empyema, Bilothorax, Thoracotomy, Decortication

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## 1. Introduction

Bilothorax is defined as presence of bile in the pleural space. It is said to occur as a result of hepatic trauma, subphrenic abscess, parasitic liver diseases and biliary obstruction. Iatrogenic causes include hepatic surgery, liver biopsy, cholecystectomy, biliary stent migration as well as percutaneous transhepatic biliary drainage. An empyema thoracis is a collection of pus in pleural space which may be free-flowing or loculated [1-2]. Chronic empyema occurring as a result of bilothorax is not common. Our aim is to present a case of bilothorax causing chronic empyema thoracis and to review relevant literature.

## 2. Case Report

A 30-year-old man who works in an oxygen cylinder shop. His main job is to refill oxygen cylinders. He was refilling a gas cylinder which exploded, and he sustained injuries on the right hypochondrion. He was rushed to a nearby hospital where his wounds were explored and closed. He subsequently developed jaundice (see fig. 1), right hypochondrial pain and difficulty in breathing as such was

referred to our hospital. On examination on admission he was in respiratory distress, with a respiratory rate of 40 cycles/minute, febrile, dehydrated and jaundiced. He had features suggestive of right sided pleural fluid collection. There was a scar on the right hypochondrion with minimal tenderness around the same region. Thoracentesis yielded yellowish fluid and a chest drain was inserted and it drained yellowish effluent for about 2 weeks (see fig. 2). Analysis of the fluid yielded bilirubin. A diagnosis of bilothorax was made. Intravenous fluid Normal saline was used for resuscitation after which he was placed on Ringers lactate, he was also placed on intravenous cefuroxime and metronidazole. He had thoracotomy and decortication. Intraoperative findings were thick billous pleural effusion, thick cortex trapping the right lung, about 14cm tear in the right hemi-diaphragm with the right lobe of the liver herniating. There was liver injury (See fig. 3). Patient had decortication, repair of liver and diaphragmatic injuries, pleural cavity copiously irrigated with warm saline and chest was closed over a size 28F chest tube. Postoperative recovery was uneventful, drainage from chest tube gradually changed from yellowish to purulent and drain was converted to an ambulatory drain and patient was discharged home. He was followed up in the out-patient clinic until there was no drainage and significant lung re-expansion on chest X-ray. The ambulatory drain was removed.

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Published online at <http://journal.sapub.org/surgery>

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**Figure 1.** Jaundice



**Figure 2.** Billous effusion



**Figure 3.** Diaphragmatic Injury with liver Injury

### 3. Discussion

The term bilothorax was first coined by Williams in 1971 [3]. Since then other terms have been used to describe this condition which include cholethorax, bilithorax, pleurobilis and thoracobilia. Various mechanisms have been proposed in bilothorax formation which can either be direct extension of biloma through the diaphragm or through a congenital defect in the diaphragm or trauma to the diaphragm [4-5]. Spontaneous occurrence has also been reported [6-8]. Chronic empyema thoracis initially starts with sterile exudate in what is described as simple parapneumonic effusion and can gradually progress to become complicated. Majority of empyema thoracis result from extension from pulmonary infection, penetrating chest injury or postoperative surgical infection [9-10]. Transdiaphragmatic spread of abdominal infection has also been implicated [11-13]. Simple procedures in the pleural space like thoracentesis, pleural or lung biopsy can also contribute to small number of cases of empyema thoracis [14].

There is an association between the presence of billous fluid in the pleural space and development of empyema thoracis. Oparah in 1978 reported in their series twelve out of their sixteen patients developed billous empyema [15]. Organisms that have been implicated in empyematous billous effusions are gastrointestinal tract organisms like *Escherichia coli*, *Enterobacter*, *Enterococcus faecalis*, *Klebsiella oxytoca* [16-18]. Infection is said to be caused by biliary obstruction. It is also a known fact that most of these gastrointestinal organisms are commensals in the gastrointestinal tract but become pathogenic once in the pleural cavity. Our patient presented to us about 2 weeks after the injury which is enough for infection to set-in. He initially had a chest tube inserted which kept on drained billous empyema and there was failure of lung expansion. A repeat CXR and a chest CT scan revealed a trapped lung with residual empyema. Based on these findings we opted for thoracotomy and decortication. Najjar et al reported thoracotomy in 7 patients in their series. Two had decortication on account of thick pleural cortex [20]. Oparah also did thoracotomy and decortication for two of their patients after chest tube drained failed [15]. Other authors have also reported successful outcome with thoracotomy and decortication in this patients [21-24]. Our patient had persistent drainage which was managed with open drainage and the drain was subsequently removed.

### 4. Conclusions

Chronic empyema thoracis following bilothorax is rare. Right sided thoraco-abdominal trauma can cause liver and diaphragmatic injuries leading to herniation of the injured liver into the chest. This can result in bilothorax and infection in this setting may result in chronic empyema thoracis. Surgery remains the mainstay in this condition.

## REFERENCES

- [1] Turkington RC, Leggett JJ, Hurwitz J, Eatock MM. Cholethorax following percutaneous transhepatic biliary drainage. *Ulster Med J* 2007; 76:112-3.
- [2] Austin A, Fox N, Huggins JT, Chopra A. Green pleural effusion: A comprehensive review of bilothorax with case series. *Pleura*. 2017; 4:21-31.
- [3] Williams SW, Majewski PL, Norris JE, Cole BC, Doohen DJ. Biliary decompression in the treatment of bilothorax. *American journal of surgery* 1971; 122: 829-831.
- [4] Rowe PH. Bilothorax – an unusual problem. *J R Soc Med* 1989; 82: 687–8.
- [5] Basu S, Bhadani S, Shukla VK. A dangerous pleural effusion. *Ann R Coll Surg Engl* 2010; 92:1-2.
- [6] Prabhu R, Bavara C, Purandare H, Supe A. Pleurobiliary fistula – a delayed complication following open cholecystectomy. *Indian J Gastroenterol* 2005; 24: 28–9.
- [7] Frampton AE, Williams A, Wilkerson PM, Paterson IM. Thoracobilia: a rare complication of gallstone disease. *Annals of the Royal College of Surgeons of England* 2010; 92: W1-3.
- [8] Soler-Sempere M, Vicente-Ibarra N, Heredia-Oliva L. An Unusual Case of Left-Sided Massive Biliothorax. *Int J Respir Pulm Med*. 2015; 2; 034.
- [9] Molnar TF. Current surgical treatment for thoracic empyema in adults. *European Journal of Cardio-thoracic Surgery* 32 (2007) 422—430.
- [10] Shahin Y, Duffy J, Beggs D, Black E, Majewski A. Surgical management of primary empyema of pleural cavity : outcome of 81 patients. *Interactive Cardiovascular and Thoracic Surgery* 10 (2010) 565–567.
- [11] Law D.K., Murr P., Bailey W.C. Empyema. A rare presentation of perforated appendicitis. *JAMA*. 1978; 240(23): 2566–2567.
- [12] Ragheb MI, Ramadan AA, Khalil MAH. Intrathoracic presentation of amoebic liver abscess. *Ann Thorac Surg*. 1976; 22(5): 483-9.
- [13] Ramnarain IR, Murpur AK, McMohan MJ, Thorpe JAC. Pleurobiliary fistula from ruptured choledochal cyst. *Eur J Cardiol Thorac Surg* 2001; 19: 216–8.
- [14] Hussain N, Rais K, Ahmed SW, Ahmed T. Outcome of pulmonary decorations in empyema thoracis. *Pak J Surg* 2011; 27(2): 91-94.
- [15] Oparah SS, Mandal AK. Traumatic thoracobiliary (pleurobiliary and bronchobiliary) fistulas: clinical and review study. *The Journal of trauma* 1978; 18: 539-544.
- [16] Cunningham LW, Grobman M, Paz HL, Hanlon CA, Promisloff RA. Cholecystopleural fistula with cholelithiasis presenting as a right pleural effusion. *Chest* 1990; 97: 751-752.
- [17] Stockberger SM, Jr., Kesler KA, Broderick LS, Howard TJ. Bronchoperitoneal fistula secondary to chronic *Klebsiella pneumoniae* subphrenic abscess. *The Annals of thoracic surgery* 1999; 68: 1058-1059; discussion 1059-1060.
- [18] Waelbers Anke, Duval Elisabeth L. I. M., Vervloessem D. Posttraumatic cholethorax in a child: Case report and review of the literature. *Pediatric critical care medicine* 2005; 6: 355-8.
- [19] Reddy VD, Al-khateeb A, Hussain M, Patel B, Kadiri M, Patel R et al. Case report: Kryptonite – A rare case of bilothorax in a sickle cell disease patient. *Case report in pulmonology*. 2019:1-4.
- [20] Najjar AG, Maghrabi LA, Yamani IT, Sersar SI. Biliothorax: Review of 3 Centers Experience. *World J Surg Surgical Res*. 2018; 1: 1014.
- [21] Ivatury RR, OShea J, Rohman M. Post-traumatic thoracobiliary fistula. *J Trauma* 1984; 24: 438-42.
- [22] Coselli JS, Mattox KL. Traumatic bronchobiliary fistula. *J Trauma* 1983; 23:161-2.
- [23] Franklin DC, Mathai J. Biliary pleural fistula: a complication of hepatic trauma. *J Trauma* 1980; 20: 256-8.
- [24] Vink EE, Kröner A, and Spronk PE. “A secondary left-sided bilothorax after a car accident,” *Netherlands Journal of Critical Care*, vol. 24, no. 2, pp. 32-33, 2016.