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Case report

Tubercular empyema a sequalae of emphysematous pyelonephritis with porous diaphragm syndrome and its successful management: A case report

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ABSTRACT

Introduction: Emphysematous pyelonephritis (EP) is a life-threatening renal disease requiring early and immediate therapy. EP resulting in tubercular empyema is unusual, with no reports to date.

Presentation of case: A 50-year-old female in sepsis diagnosed with diabetes mellitus on insulin presented with recurrent abdominal pain radiating to the left side of her back for one month and recurrent episodes of vomiting and fever for one week. Her contrast-enhanced computed tomography showed emphysematous pyelonephritis (EP), ruptured splenic abscess, disrupted and eventrated left diaphragmatic lining, pleuroperitoneal communication, and a left empyema. Genexpert studies for pleural pus revealed *Mycobacterium tuberculosis*. Her deteriorating condition required surgical intervention in the form of decortication, sterilization of the thoracic cavity, and composite mesh placement for the diaphragmatic porous syndrome.

Conclusion: This case report demonstrates the rare and aggressive presentation of EP, its sequelae, and successful management with composite mesh to prevent recurrent intrathoracic infection secondary to porous diaphragm syndrome.

1. Introduction

Emphysematous pyelonephritis (EP) is a life-threatening renal disease requiring early, and immediate therapy, while computed tomography (CT) is the gold standard for early diagnosis [1,2]. EP leading to a splenic abscess and further rupturing into the pleural cavity secondary to porous diaphragm syndrome (PDS), resulting in tubercular empyema, is unusual, with no reports to date, and management for PDS remains a challenge. We present a diabetes mellitus (DM) case admitted in sepsis secondary to EP and ruptured splenic abscess (RSA), resulting in tubercular empyema secondary to PDS managed with composite mesh.

2. Presentation of case

A 50-year-old female diagnosed with DM on insulin presented with recurrent abdominal pain radiating to the left side of her back for one month and recurrent episodes of vomiting and fever for one week. On examination, she appeared pale with a pulse of 92/min, blood pressure of 100/60 mmHg, a temperature of 101.4 F, respiratory rate of 26/min, and a body mass index of 19.5 kg/m^2. Chest and abdomen examination revealed decreased air entry to the left hemithorax and sluggish bowel sounds with diffuse tenderness. Her counts were 21,000 cells/mm^3, hemoglobin 9.5 g/dl, albumin 2.5 g/dl, C-reactive protein 43.5 with mildly deranged renal and liver function tests and urine culture showing growth for *Klebsiella pneumoniae* resistant to all the antibiotics. Imaging studies and Genexpert confirmed left empyema secondary to *Mycobacterium tuberculosis* and was treated with anti-tubercular therapy and a chest tube (Fig. 1a). Contrast-enhanced computed tomography (CECT) of the thorax and abdomen detected a right renal cyst measuring 5.6 × 4.6 cm, air-filled cavities in the left kidney—emphysematous pyelonephritis, ruptured splenic abscess, disrupted and eventrated left diaphragmatic lining, pleuroperitoneal communication, and a left empyema (Fig. 1b). She received intravenous Meropenem 1 g and Vancomycin 500 mg twice daily for 14 days and a second-hour ryles tube feeding with adequate hydration and antipyretic treatment.

Her deteriorating condition and recurrent empyema required a left thoracotomy, purulent debris evacuation, and a pleurectomy. Intraoperatively, the partially expanded lung and diaphragm appeared

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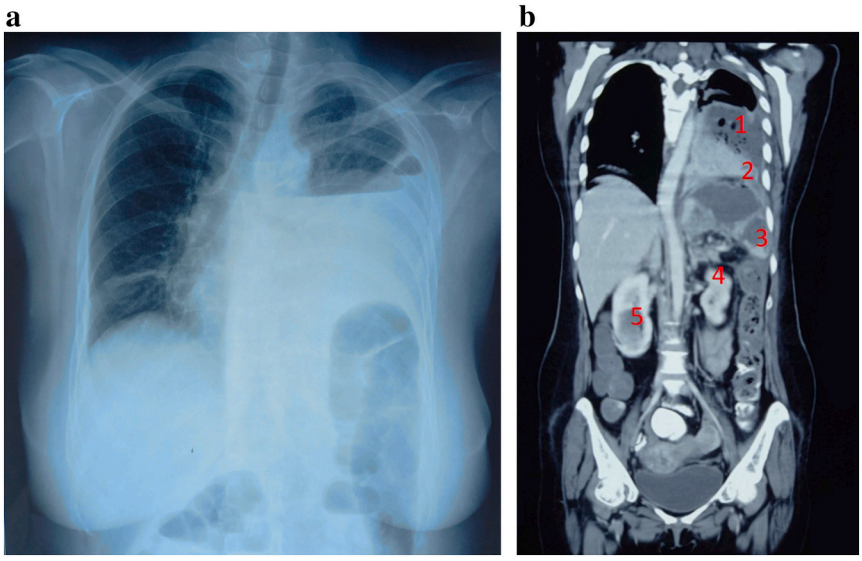

Fig. 1. a: Chest X-ray posterior anterior view showing left hydropneumothorax
b: Computed tomography imaging showing left sided empyema (1), eventrated and disrupted diaphragmatic lining (2), ruptured splenic abscess (3), emphysematous pyelonephritis (4), right renal cyst (5),

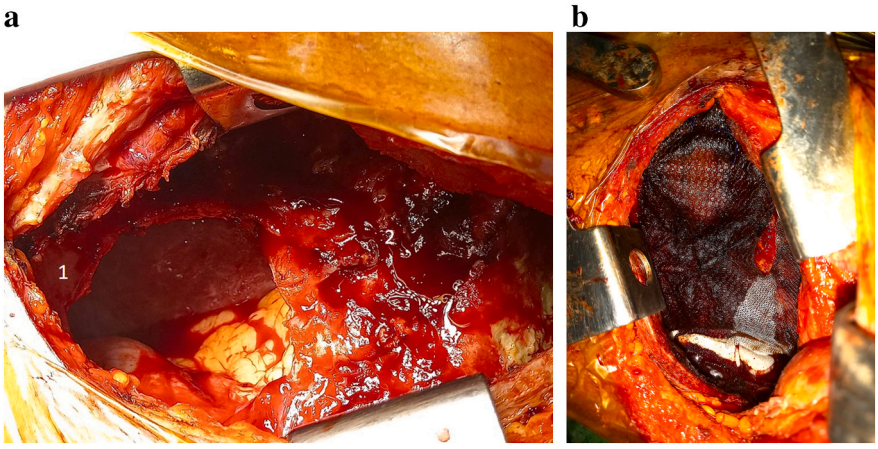

Fig. 2. a: Diseased lung with diaphragm and partially excised diaphragmatic surface with no distinguishable margins (1), and purulent nodular lesions secondary to tuberculosis on the lung parenchyma (2).
b: Diaphragmatic reconstruction with composite mesh after thoracic cavity sterilization.

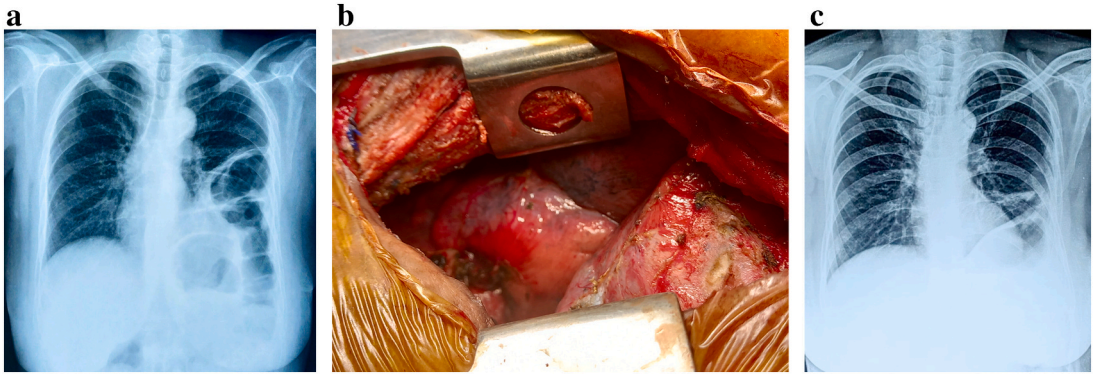

Fig. 3. a: Chest X-ray at ninth month follow-up period showing bowel within the thoracic cavity
b: Intraoperative image showing well inflated and disease free lung after addressing diaphragmatic hernia
c: Chest X-ray at one year follow-up with no recurrence or collection.

extensively diseased with indistinguishable margins (Fig. 2a). Povidone iodine 20 % and normal saline washes (1:2) was used to sterilize the pleural cavity. With no visible openings seen over the diaphragm (type 1-PDS), an excised 3 × 2 cm diseased portion and the entire diaphragmatic surface were covered with composite mesh fixed with interrupted prolene 3-0, followed by a single drain and closure (Fig. 2b). She received 350 ml of packed red blood cells for Hb-8 g/dl with a subsequent downgrading of antibiotics for subsiding sepsis. The surgical site infection on day 6 improved over a month, and the chest tube was removed on day 11 with good lung expansion in the late postoperative period, followed by a discharge at 21 days. Postoperative follow-ups at 1, 3, and 6 months were uneventful, with mildly elevated diaphragm secondary to tuberculosis that did not require intervention. However, in the ninth month, a repeat CT and chest x-ray revealed a diaphragmatic hernia of unknown etiology (Fig. 3a). Though the patient was asymptomatic, the hernia was addressed by thoracotomy through the same previous incision. Intraoperative findings showed disease-free lung and diaphragm with well-defined margins as anti-tubercular therapy alleviated the disease process. The diaphragm was repaired primarily with no recurrent empyema in the early postoperative period and at 12 months of follow-up except for an asymptomatic mildly elevated diaphragm, as seen similarly at the sixth-month follow-up (Fig. 3b, c).

3. Discussion

Managing empyema secondary to DPS is challenging due to poor debility and septicemia. The most important predisposing factors for EP are DM and UTI [2]. The compromised host-defense mechanism and associated EP leading to peritonitis explain the pathogenesis [3]. The various cascades of reactions mediated by interleukin 1,6, tumor necrosis factor, leukotrienes, platelet-activating factor, complement 3A, and 5A further led to splenic abscess formation, which on rupture resulted in pleural empyema secondary to tuberculosis through the pleuroperitoneal communication in the form of DPS [4]. The trapped lung, suboptimal pulmonary reserve, and progressive sepsis resulted from tubercular empyema despite high-grade antibiotics and anti-tubercular therapy warranted surgical intervention.

Thoracic cavity sterilization and resection of a diseased diaphragmatic portion helped alleviate the disease process, further preventing sepsis. The placement of composite surgical mesh for PDS with the continuation of anti-tubercular therapy healed the diseased lung parenchyma preventing air leaks and recurrent empyema. The asymptomatic diaphragmatic hernia at the ninth-month follow-up was not related to the disease process and was repaired primarily.

4. Conclusion

This case report demonstrates the rare and aggressive presentation of EP, its sequelae, and successful management with composite mesh to prevent recurrent intrathoracic infection secondary to porous diaphragm syndrome.

Ethical approval

Ethical approval has been exempted by our institution as this is a case report.

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Consent

Inform consent was obtained from the patient for the purpose of publication.

Author contribution

Klein Dantis: Study concept or design, original draft preparation and formal analysis.
Chandan Kumar Dey: Formal analysis and data curation.
Zijano M Kithan: Formal analysis and software.
Kalleshwara. I.T.: Data curation and validation.
Approval of final manuscript: All authors.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to research, authorship and publication of this article.

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