

Case Report

Management of Intraoperative Hemorrhage with Fulguration of Pulmonary Abscess

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Received: September 06, 2025

Accepted: September 17, 2025

Published: September 22, 2025

Introduction

Management of lung abscess is typically with antibiotics or with percutaneous or endoscopic drainage. Surgical management is indicated for patients who fail these strategies or develop bronchopleural fistulas (Hadid et al). Empyema is associated with lung abscess in 1/3 cases and may be associated with bronchopleural fistula. Resection is typically parenchymal sparing to control and remove the abscess (Egyud and Suzuki). We present here the case of a lung abscess and associated empyema that could not be treated with traditional parenchymal resection and instead required treatment with fulguration.

Case Presentation

Patient is a 53-year-old woman with a complex medical history including smoking and a surgical history of an ascending aortic replacement who was found to be in cardiogenic shock from aortic insufficiency. She was then placed on venous-arterial extracorporeal membrane oxygenation (VA-ECMO), with an Impella 5.5 (abimed) as an LV vent. She then underwent re operative sternotomy, explant of her ascending aortic graft, ascending hemi arch replacement under deep hypothermic circulatory arrest, removal of the Impella 5.5, mitral valve, aortic valve, tricuspid valve replacement. Her post operative course was immediately complicated by bleeding *Enterobacter cloacae* pneumonia, subdural hematoma, renal insufficiency, and respiratory insufficiency. On post operative day (POD) 11, the patient was converted from VA-ECMO to veno-venous ECMO (VV-ECMO) and ultimately received tracheostomy and underwent mediastinal washout. developed a right sided pneumothorax. A 20 French thoracostomy tube was placed and an air leak was present. Subsequent bronchoscopies continued to grow *E. Cloacae*. The patient was managed conservatively with antibiotics; however, the air leak persisted, and the lung appeared trapped on imaging (Figure 1).

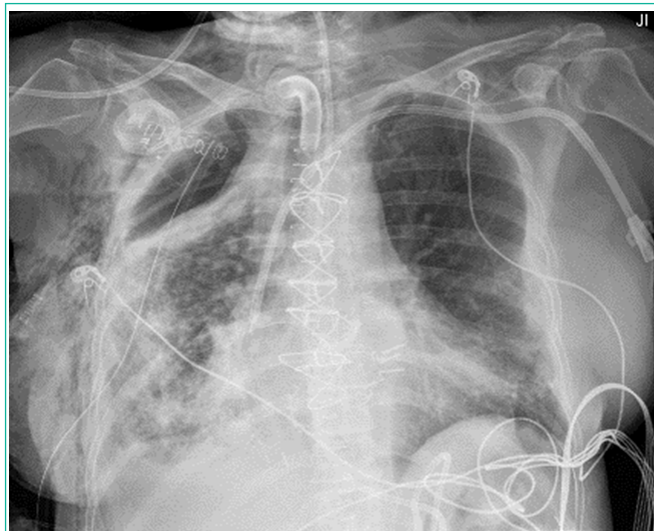


Figure 1: Preoperative CXR with large apical space.

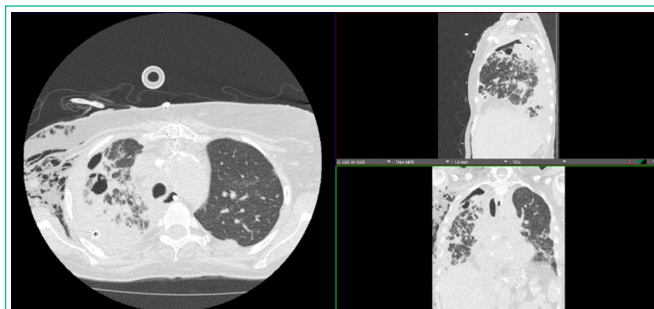


Figure 2: Initial pre-operative CT.

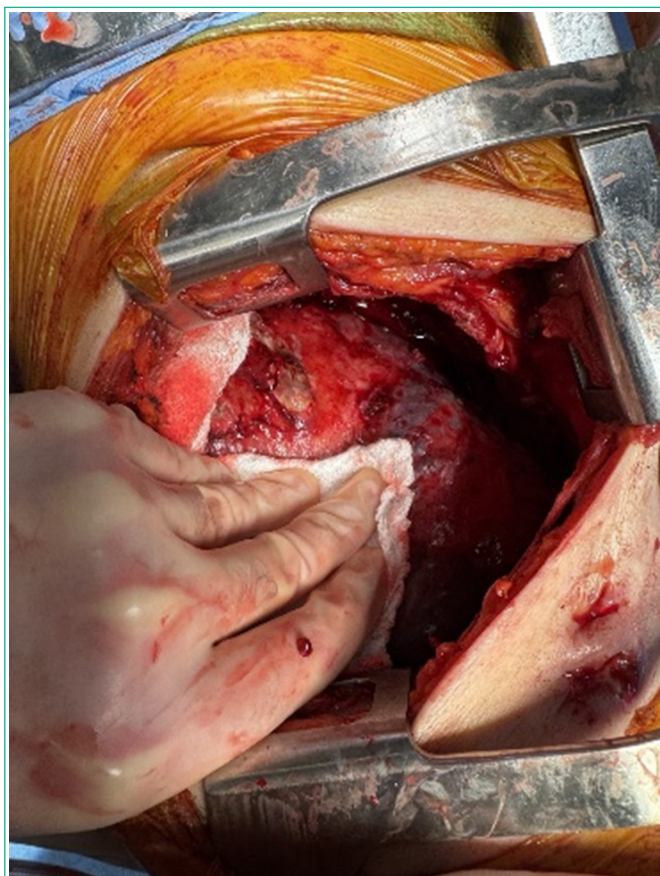


Figure 3: Abscess cavity intra-operatively.

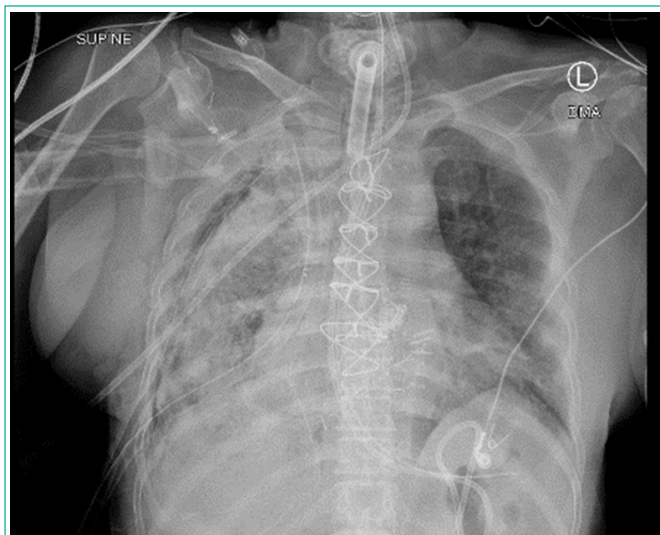


Figure 4: Post-operative CXR with total lung expansion.

Computed tomography (CT) showed empyema and pneumatoceles concerning for bronchopleural fistula and she taken to the operating room for decortication (Figure 1).

In the operating room, severe adhesions and loculated fluid collections were encountered and tissue surrounding the hilum was frozen. A large, friable abscess was encountered in the apex that was

spilling purulent fluid. Because of the presence of prosthetic material from the patient's cardiovascular surgeries, the decision was made to manage the abscess operatively (Figure 2,3). Due to the severe adhesions, a thoracotomy was made, and a wedge resection was attempted as anatomic resection was not possible. Vascular control at the hilum and intrapericardial control were impossible and attempts at cautery and suture ligation were unsuccessful. With ongoing arterial and venous bleeding and need to control parenchymal hemorrhage, fulguration of the abscess cavity was performed with electrocautery. Bleeding vessels were ligated, and the cavity was closed with a pledgeted horizontal mattress sutures and oversewn over sewn. Topical hemostatic agents were applied, and hemostasis was achieved. The lung inflated and filled the chest cavity (Figure 4). Post operatively, the patient recovered appropriately. No air leak was present. The chest tubes were sequentially removed. The patient was discharged in stable condition to a long-term acute care hospital for ongoing chronic ventilator wean and antibiotic therapy.

Discussion

In high-risk patients with prostheses, such as this patient, who had a new bioprosthetic valve and ascending graft, leaving empyema or abscess is not acceptable due to the high risk of graft infection and the associated morbidity and mortality of approximately 90% (Yokote et al.). We attempted initially to perform anatomic resection of the abscess, as it had not been effectively managed with antibiotics alone. However, because of the patient's prior cardiovascular surgeries, the hilum was inaccessible. The lung parenchyma was further not able to be stapled for non-anatomic resection without massive air leak. Fulguration of the lung was used as salvage therapy. Using electrocautery to fulgurate parenchyma has been described before, in the setting of removing non-small cell lung cancer with a good result and no local recurrence (Vincent). Fulguration in the setting of lung abscess has yet to be described.

Thus, we present this technique that successfully allowed for debridement and resection of the abscess, drainage of the empyema, and resolution of the air leak. This novel approach allowed for technical success, in an exceedingly challenging anatomic situation with poor tissue quality.

The modern thoracic surgeon sees increasingly complex patients with complex surgical histories and difficult pathologies. One must be ready to have a technique such as this in their armamentarium when traditional surgical techniques fail.

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