CASE REPORT

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Life threatening post decortication hemorrhage in a case of empyema associated with CML, managed with damage control thoracic packing: a case report

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Abstract

Introduction: Chronic myeloid leukemia (CML) is a myeloproliferative neoplasm characterized by the presence of Philadelphia chromosome, which is defined by BCR::ABL1 fusion oncogene. CML can be associated with pleural infections, increased risk of infection and coagulation abnormalities. Stage 3 empyema requires surgical decortication but can lead to significant hemorrhage. Thoracic packing is an established damage control technique in management of thoracic trauma cases, however there is scant literature of its role in hematologic malignancy associated empyema surgery.

Aim: We describe a 29-year-old female, who presented with fever, pleuritic chest pain and dyspnea, and was newly diagnosed with CML. Imaging revealed a large loculated organized left empyema (Stage 3), which required surgical intervention.

Case study: Thoracotomy and decortication was done. Surgery was complicated by diffuse raw surface oozing, postoperative sepsis and coagulopathy. This led to massive hemorrhage requiring re-exploration and intrathoracic packing. This was followed by recovery in surgical intensive care unit. Packs were removed after 72 h, revealing complete hemostasis. Over the next few days, patient recovered fully and was started on systemic treatment of CML.

Discussion: CML can predispose an individual to increased risk of infection and bleeding. Decortication in the setting of CML can increase the risk of bleeding furthermore. Thoracic packing significantly lowers the mortality when compared to prolonged attempts at definitive hemostasis.

Conclusions: This appears to be the first detailed report of CML-associated empyema with septic coagulopathy requiring thoracic packing after decortication. Early re-exploration and packing can be lifesaving in diffuse bleeding unresponsive to conventional hemostasis.

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1. INTRODUCTION

Chronic myeloid leukemia (CML) is a myeloproliferative neoplasm characterized by the presence of Philadelphia chromosome, which is defined by BCR::ABL1 fusion oncogene.[1] Approximately half of the patients with CML are asymptomatic and are diagnosed on routine complete blood count.[1] Others can present with anemia and splenomegaly, headaches, bone pain, fever, joint pain, bleeding, infections, and lymphadenopathy.[1] Pleural effusion in CML is poorly understood and a rare occurrence.[2] In the setting of CML, pleural effusion can get infected leading to pleural empyema.

Pleural empyema (PE) is an infectious condition of the pleural cavity.[3] According to the American Thoracic Society (ATS) PE is classified into three stages: the early exudative phase I, the intermediate fibroproliferative phase II and the late organized phase III.[3] The organizing phase is associated with presence of discrete locules on imaging with enhancing viscera pleura on computed tomography (CT).[4] Of note, pleural thickening of this phase may be associated with reduced drainage success and higher likelihood of surgical intervention being required.[3]

Lung decortication is a well-known procedure that Delorme first performed to treat empyema in 1895.[5] It is primarily indicated in cases of chronic empyema thoracis (pyogenic or tubercular), hemothorax, pleural thickening, etc.[5] It involves the excision of the restrictive layer of the thick fibrinous peel overlying the lung, chest wall, and diaphragm.[5] This can lead to significant postoperative bleeding, even more so in the setting of coagulopathy associated with CML.

Damage control techniques like thoracic packing are studied extensively in thoracic trauma patients.[6–8] But studies describing the role of thoracic packing in patients with bleeding from decortication from empyema are limited.

This report presents a unique case of CML patient with organized empyema who developed life threatening hemorrhage after decortication, managed successfully with intrathoracic packing.

2. AIM

We describe a 29-year-old lady, who presented with fever, pleuritic chest pain and dyspnea, and was newly diagnosed with CML. Imaging revealed a large loculated organized left empyema (Stage 3), which required surgical intervention.

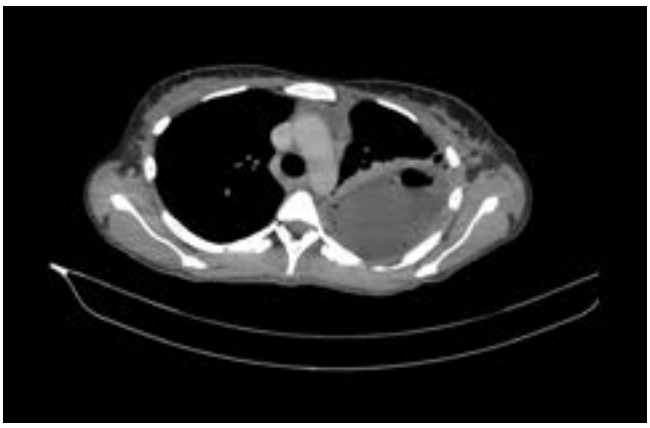

Figure 1. CT chest axial view with organized loculated left pleural effusion with a split pleura sign.

3. CASE PRESENTATION

A 29-year-old lady presented with fever of 10 days duration, along with left inframammary pleuritic chest pain and exertional shortness of breath. Complete blood picture revealed leukocytosis and thrombocytosis. Peripheral smear revealed blast cells. Reverse-transcription polymerase chain reaction (RT PCR) confirmed BCR-ABL positivity. She was started on imatinib. In view of persistent and increasing symptoms and ultrasound revealing left pleural effusion, she was referred to thoracic surgery department.

CT chest performed revealed gross loculated left pleural effusion with pleural thickening, collapsed lower lobe and subpleural septations with split pleura sign, consistent with organized empyema (Figure 1). Pleural fluid analysis demonstrated Gram positive cocci; culture grew *Staphylococcus aureus*. Sensitive antibiotics started and patient was planned for surgical intervention.

Bi-portal VATS was attempted but converted to thoracotomy in view of diffuse ooze from raw surfaces making surgery difficult. Intraoperative findings included thickened pleura with pus in the pleural cavity. There was 2-L blood loss during the procedure and 4 packed red blood cells units (PRBC), 3 fresh frozen plasma units (FFP), 4 random donor platelets unit (RDP), and 3 cryoprecipitate units were transfused.

Postoperatively patient went into shock with high bloody drain output (400 mL/h). The patient developed secondary fibrinolysis and disseminated intravascular coagulation (DIC), reflected in abnormal thromboelastography, low fibrinogen, and elevated procalcitonin. She was taken for re-exploration. Clots removed and packing done. This damage control thoracic packing successfully achieved tamponade.

Over the next 72 h, patient resuscitated in surgical intensive care unit, her condition improved. Packs removed after 72 h. There was no active bleeding. There-

after, patient steadily improved and was discharged. She was started on treatment for CML.

4. Discussion

This case highlights a unique interplay between CML, empyema, sepsis and surgical bleeding. Despite thrombocytosis, CML is associated with abnormal platelet function, leading to coagulopathy.[9] Pleural effusion can occur in CML patients. The possible mechanisms of pleural effusion in CML patients include leukemic infiltration into the pleura, extra-medullary hematopoiesis, non-malignant causes and drugs etc.[10] Infection of this pleural fluid can lead to empyema.

Our patient had CML with organized empyema, indicating long standing nature and presentation delay, which necessitated surgical intervention.[11] Initially bi-portal VATS attempted, as VATS has potential advantages in terms of decreased operation time, fewer days with tube drainage, shorter postoperative hospital stay, reduced postoperative pain, increased patient satisfaction with the procedure, and wound appearance.[12] But in view of diffuse ooze from raw surfaces, thoracotomy with decortication was done.

Decortication is inherently associated with increased clotting risk. In this case with CML, infection, sepsis, coagulopathy coming together further increased the bleeding risk.

This selective packing technique is simple, feasible and highly effective in managing uncontrollable post-traumatic or even post-operative chest wall hemorrhages when the life of patients is in danger.[7]

Most literature pertaining to thoracic packing is in trauma setting. There is one study by, Ali Akil etal,[13] 2021, describing the role of thoracic packing (n = 10) for bleeding in post decortication patients. Theirs was a subset of patients of postoperative pleural infection after VAD implantation. Pack was removed in a mean of 3 days (3–7 days).

5. Conclusions

CML patients undergoing decortication for empyema are at high risk of severe hemorrhage due to hematologic dysregulation and sepsis-induced coagulopathy. Thoracic packing is a safe, rapid, and potentially life-saving technique in cases of uncontrollable intrathoracic bleeding. Early recognition, aggressive coagulation correction, and timely re-exploration with packing are critical to improving outcomes.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest relevant to this manuscript.

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ETHICS

This case report was conducted in accordance with the principles of the Declaration of Helsinki.

As this is a single-patient case report with no identifiable information, formal institutional ethics committee approval was not required, in accordance with institutional policy.

Written informed consent was obtained from the patient for publication of this case report and the accompanying images.

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