



Turning the Tide on a Relentless Air Leak: Autologous Blood Patch in Persistent Grade-4 Bronchopleural Fistula

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Abstract

Persistent air leak due to a high-grade bronchopleural fistula (BPF) is a challenging complication of spontaneous pneumothorax, often prolonging hospitalization and necessitating invasive interventions. We present the case of a 63-year-old chronic bidi smoker with no known pre-existing lung disease who developed a right-sided spontaneous pneumothorax with extensive subcutaneous emphysema. Despite appropriate intercostal drainage, the patient exhibited a persistent grade-4 air leak unresponsive to high-flow oxygen therapy. Autologous blood patch pleurodesis (ABPP) using 35 mL of the patient's blood resulted in rapid cessation of the air leak and complete radiological resolution of pneumothorax. This case highlights the efficacy and safety of ABPP as a minimally invasive therapeutic option for refractory high-grade BPF.

Keywords: NIL

Introduction

Spontaneous pneumothorax commonly presents in smokers and individuals with underlying lung pathology; however, it may also occur in patients without previously diagnosed respiratory disease. A persistent bronchopleural fistula (BPF), especially of higher grades, complicates clinical management and often prolongs the need for chest tube drainage. While surgical intervention remains a definitive solution in many cases, autologous blood patch pleurodesis (ABPP) has emerged as a simple, cost-effective, and safe alternative to achieve closure of persistent air leaks.

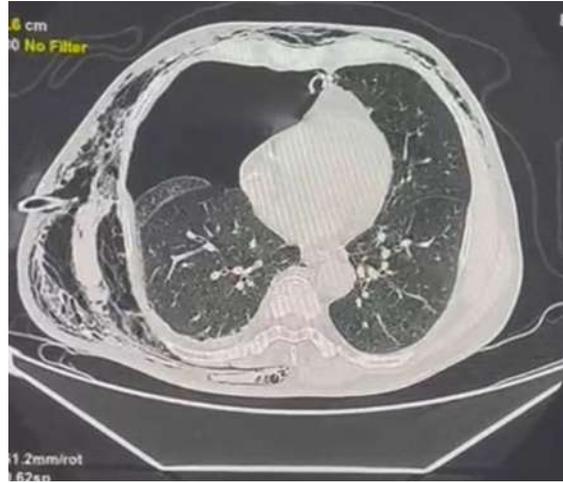
Case Presentation

A 63-year-old male farmer with a 30-year history of bidi smoking presented to the emergency department with acute onset breathlessness and facial puffiness. He had no prior chronic respiratory complaints. On examination, he was tachypneic with respiratory distress, palpable crepitus over the chest wall and neck, and diminished breath sounds over the right hemithorax. Chest X-ray revealed a large right-sided

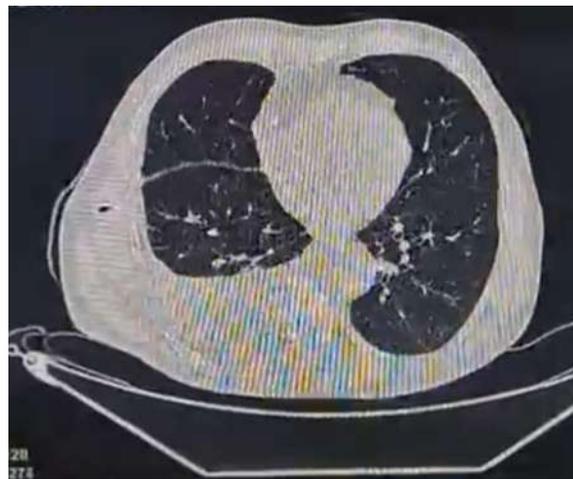
pneumothorax with diffuse subcutaneous emphysema, which was confirmed on CT thorax showing marked subcutaneous emphysema without gross bullae or structural lung disease. An immediate right-sided intercostal chest drain (ICD) was inserted, demonstrating continuous column movement with a persistent grade-4 bronchopleural fistula (BPF). High-flow oxygen therapy failed to reduce the air leak. Given the persistent high-grade BPF, autologous blood patch pleurodesis (ABPP) was performed by instilling 35 mL of autologous venous blood through the ICD into the pleural cavity under aseptic precautions, followed by temporary clamping and reconnection to underwater seal drainage. Following the procedure, the air leak ceased completely with progressive clinical improvement in subcutaneous emphysema. A repeat CT thorax at 48 hours showed complete resolution of the pneumothorax, marked regression of subcutaneous emphysema, minimal residual pleural effusion, and no evidence of ongoing BPF. With cessation of ICD column movement and no recurrence on confirmatory chest X-ray after 48 hours

of clamping, the chest drain was removed, and the patient was discharged in stable condition.

PRE AUTOLOGOUS BLOOD PATCH CT CHEST



POST AUTOLOGOUS BLOOD PATCH CT CHEST



Discussion

Persistent air leak represents a significant therapeutic challenge in spontaneous pneumothorax. High-grade BPFs often necessitate surgical management; however, not all patients are suitable candidates due to comorbidities, clinical instability, or resource limitations. ABPP provides a physiological seal by forming a fibrin clot, which subsequently promotes pleural adhesion and closure of the fistula.

In this case, ABPP resulted in rapid resolution of a grade-4 BPF, demonstrated both clinically and radiologically. Its simplicity, low cost, and high

success rate make it a valuable option, especially in settings where immediate surgical intervention is not feasible.

Conclusion

Autologous blood patch pleurodesis is an effective and minimally invasive technique for managing persistent high-grade bronchopleural fistulas. This case reinforces its utility as a rapid, safe, and accessible intervention for spontaneous pneumothorax complicated by severe air leaks.

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