CASE REPORT

A Rare Complex Pleural Effusion in Post Trauma Patient: A Case Report

Ahmad A[ab], Badrin S[ab] , Yaacob LH[ab]

[a]Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia
[b]Hospital Pakar Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia

Keywords
pleural effusion, chest trauma, intrapleural fibrinolysis

Corresponding Author
Dr. Salziyan Badrin
Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia
E-mail: salziyan@usm.my

Received: 23th July 2024; Accepted: 13th January 2025

Doi: https://doi.org10.31436/imjm.v24i03/2676

ABSTRACT

Pleural effusion is common in routine medical practice and can be due to many different underlying diseases including infections, malignancy, connective tissue disease, heart failure and liver failure. However, a complex pleural effusion such as post-traumatic pleural effusion (PTPE) is an uncommon clinical entity. A precise diagnosis of PTPE can be facilitated by the efficient use of computed tomography (CT) and ultrasound. The PTPE may be successfully managed by pigtail drainage and intrapleural fibrinolysis (IPF), highlighting the significance of prompt intervention in attaining favorable results for patients with PTPE.

INTRODUCTION

Pleural effusions, defines as an accumulation of fluid within the pleural cavity, can stem from a wide array of causes, such as infections, malignancies, connective tissue disorders, heart failure, and liver disease. However, a post traumatic pleural effusion (PTPE) is a rare cause of pleural effusion. Although the exact pathophysiology of PTPE is still unknown, few studies found that there is an activation of classical complement pathway as part of the body's defence mechanism the behind PTPE. Once triggered, the pathway forms complexes that cause inflammation thus lead to the formation of pleural effusion.[1,2] Thus, understanding the PTPE is essential for clinicians navigating the complexities of pleural pathology, ensuring timely and effective management strategies for affected patients.

CASE REPORT

A 45-year-old male with no known medical illness had a motor vehicle accident (MVA) after his motorbike skidded. During the MVA, his left chest wall was hit by his motorbike's handle. Immediately after the trauma, the patient started to feel pain of his left chest wall. However, he did not seek any medical treatment as he was able to tolerate the pain. On day 3 post trauma, the patient went to Emergency Department (ED) due to worsening of left chest wall pain as well as he started to experience difficulty in breathing. Upon arrival at the ED, he appeared tachypneic with respiratory rate (RR) of 30 breath per minute. There was no chest wall deformity or skin changes and the lung examination revealed reduced air entry over left lower zone. His immediate blood investigations shown hemoglobin: 14.4g/dL, white cell counts: 13.6x10^3/L, platelet count: 346mg/L and C-reactive protein (CRP): 245mg/L. His chest radiography (CXR) showed blunted left costophrenic angle with a homogenous opacity at the left lower zone. A repeated CXR on day 5 post trauma revealed worsening of the homogenous opacity over the left hemithorax.

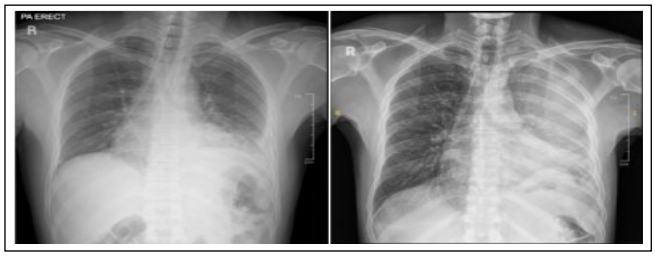

Figure 1 *:* Comparison of CXR on day 3 post trauma (left) and CXR on day 5 post trauma (right). The latter CXR showed worsening of homogenous opacity over the left hemithorax

Ultrasound thorax which was performed on day 6 post trauma shown multiloculated septation and minimal debris within the pleural effusion with a maximum thickness measuring 4.9 cm. Thus, a diagnosis of complex left pleural effusion was made. In view of complex pleural effusion, patient was sent for computed tomography (CT) of thorax which revealed left encysted pleural effusion with adjacent collapsed consolidation.

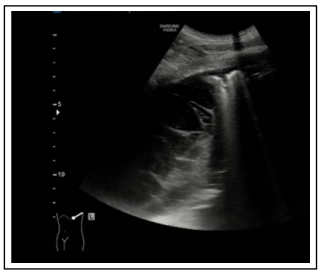

Figure 2: Ultrasound showed multiseptations and debris within effusion

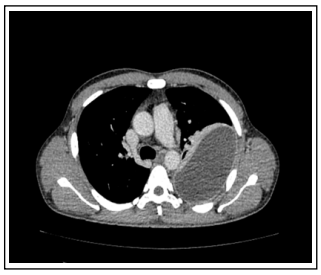

Figure 3: CT Thorax revealed left encysted pleural effusion (red arrow)

Subsequently on day 10 post trauma, an ultrasound guided pigtail drainage was inserted over the left pleural effusion area. The pleural fluid analysis result revealed that LDH: 1136 IU/L, pH: 5, protein: 49g/L, glucose: 2.9 and it was suggestive of exudative pleural effusion (pleural fluid protein: 49/serum protein: 63=0.78). Otherwise, the pleural fluid AFB/MTB was negative and the pleural culture and sensitivity shown no growth. Pleural fluid eosinophil count was not done as the service is not available in our center. In addition, the pleural fluid cytology was also not sent during this admission.

In view of minimal drainage noted after 3 days of pigtail insertion, intrapleural fibrinolysis therapy (IPFT) with streptokinase was given in 3 divided doses to break the multi-septation of the pleural effusion. A CXR done on day 3 post IPF showed improvement of pleural effusion with no evidence of hydropneumothorax. Hydropneumothorax was our concern as there was massive presence of bubbles in the drainage tube. The pigtail drainage was successfully removed on day 5 post IPF and the patient was discharged well. During the subsequent follow-up, there was no evidence of recurrence of pleural effusions.

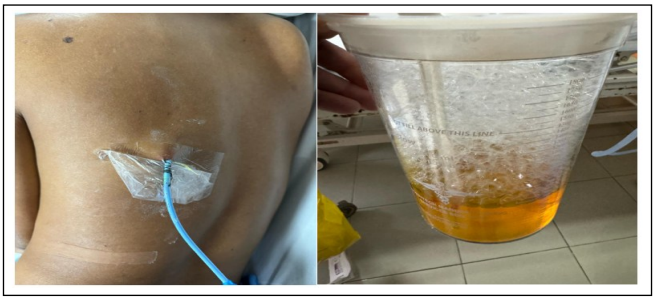

Figure 4: Pigtail drainage and serous content of the pleural fluid drained

DISCUSSION

Post traumatic pleural effusion (PTPE) is a rare cause of pleural effusion. It is postulated that the PTPE is primarily due to an immune complex reaction which triggers the classical complement pathway causing an inflammation and subsequently resulted in pleural effusion.[1,2] The typical symptoms of PTPE are pleuritic chest pain and shortness of breath and the onset of the symptom varies between an individuals. Patients with PTPE may exhibit a range of signs and symptoms, and the commonest clinical feature is delayed appearance of respiratory symptoms which usually occur around 4 to 6 weeks after the trauma.[2,3] However, there is a reported case that the PTPE patients might develop the symptoms soon after the trauma.[4] In our case report, our patient developed the symptoms of dyspnea and pleuritic chest pain after day 3 of post trauma.

Few modalities can be used in diagnosing PTFE including chest x-ray (CXR), ultrasound thorax and computed tomography (CT) of thorax. CXR only can show the presence of fluid in the pleural cavity but unable to differentiate between hemothorax and pleural effusion. In ultrasound, a simple pleural effusion will appear to be anechoic without intervening echogenic findings while complex pleural effusions are likely to have debris, septations and loculations. Interestingly, in hemothorax, there is presence of "hematocrit sign' or "plankton sign" which can be seen in an ultrasound.[5] A CT thorax of hemothorax may show significant higher attenuation value and pleural fluid over aortic blood (P/A) ratios compared to pleural effusion. These findings is due to presence of iron in the hemoglobin which caused higher tissue density of blood and higher attenuation value in hemothorax.[6]

Managing complex pleural effusions presents a clinical challenge that often requires a multifaceted approach with various treatment modalities. These effusions can be complex due to factors such as multi-loculation and septation, which complicate effective drainage and resolution of the fluid accumulation. The available treatment options ranging from thoracocentesis in the form of tube placement to intrapleural fibrinolytics therapy (IPFT) and surgical interventions such as video-assisted thoracoscopy (VATS) and open thoracotomy with pleural rub.[7] In our case, the patient underwent pigtail drainage of the pleura first followed by IPFT streptokinase insertion mainly to break down fibrin clots

and fibrinous material within the pleural space in order to facilitate the drainage of the effusion. A newer agents such as alteplase demonstrate greater efficacy and a similar adverse effect profile compared to traditional agents.[8] In our case, a streptokinase was used as IPFT agent in view of no alteplase available in the centre. IPFT is reported to be safe and has a high success rate in in resolving complex pleural effusion without the need for surgery.[9] This case highlights the effectiveness of IPF as a less invasive option in managing challenging pleural effusions.

CONCLUSION

In conclusion, PTPE can manifest with variable timing of symptoms, ranging from early onset to delayed presentation. Early detection of PTPE is crucial in patient who present with dyspnea and pleuritic chest pain in which an early treatment will improve the outcomes. Management of complex pleural effusions often necessitates a tailored approach combining drainage techniques like pigtail catheter placement with interventions such as IPFT to surgical interventions such as VATS or open thoracotomy. Our case report proved that an IPFT is effective in resolving PTPE without a need for surgical intervention. Thus, our findings highlight IPFT role as a minimally invasive treatment option in challenging cases.

REFERENCES

1. De Blay F, Aykut-Baturalp A, Goetz J, et al. Post-traumatic pleural effusion: demonstration local complement consumption. Respiratory Medicine 1997, 91, 373-375
2. Pereira AEDA, Terra RM, Teixeira LR, et al. Recurrent post-traumatic non-eosinophilic pleural effusion: Report of three cases. Clinics 2008; 63:414–5.
3. Morgadinho F, Coelho S, Milton S, et al. Eosinophilic pleural effusion after trauma-A case report. Einstein 2007;5(4):375-377
4. Shrinath V, Khetan A, Ananthakrishnan R. A curious case of idiopathic eosinophilic pleural effusion post swimming pool diving. Chest Disease Reports 2024;12:12219
5. Patel KM, Ullah K, Patail H, et al. Ultrasound for pleural disease: Beyond a pocket of pleural fluid. Ann Am Thorac Soc. 2021;18(5):749–56.
6. Hassan M, Touman AA, Grabczak EM, et al. Imaging of pleural disease. Breathe 2024;20:230172
7. Skeete DA, Rutherford EJ, Schlidt SA, et al. Intrapleural tissue plasminogen activator for complicated pleural effusions. Journal of Trauma - Injury, Infection and Critical Care. 2004;57(6):1178–83.
8. Adhikari S, Marwah V, Choudhary R, et al. Intrapleural Fibrinolysis with Urokinase versus Alteplase in Complicated Pleural Effusions and Empyema: A Prospective Randomized Controlled Trial. Tuberc Respir Dis, 2024, 87(3):378–85.
9. Omar A, Elfadl AEA, Ahmed Y, et al. Using streptokinase for pleural adhesiolysis in sonographically septated pleural effusion. Egyptian Journal of Chest Diseases and Tuberculosis. 2015;64 (4):793–7.