

Spontaneous Bilateral Pneumothorax in a Healthy Young Adult: A Comprehensive Case Report

Mohammad Al Diab Al Azzawi¹ , Yousef Mhaoesh¹, Mohamad Alsayed Amin¹, Mahmoud Al Zahri¹, Majd Al Diab Al Azzawi²

¹Faculty of Medicine, National Ribat University, Khartoum, Sudan

²Faculty of Medicine, International University of Africa, Khartoum, Sudan

Email: moh.fares69@gmail.com

How to cite this paper: Al Diab Al Azzawi, M., Mhaoesh, Y., Alsayed Amin, M., Al Zahri, M. and Al Diab Al Azzawi, M. (2023) Spontaneous Bilateral Pneumothorax in a Healthy Young Adult: A Comprehensive Case Report. *Open Journal of Emergency Medicine*, 11, 206-212.

<https://doi.org/10.4236/ojem.2023.114022>

Received: August 22, 2023

Accepted: December 12, 2023

Published: December 15, 2023

Copyright © 2023 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background: Spontaneous bilateral pneumothorax in healthy young adults is a rare and challenging condition that defies conventional diagnostic and etiological paradigms. This case report explores the presentation, diagnostic evaluation, management, and potential contributing factors in a 29-year-old male with no prior medical history who experienced bilateral spontaneous pneumothoraces. **Aim:** This case report aims to shed light on the complexities of managing spontaneous bilateral pneumothorax, particularly in the absence of common risk factors. It underscores the need for a thorough assessment and ongoing research to unravel the enigma surrounding this condition. **Case Presentation:** A healthy 29-year-old male presented with acute chest pain and shortness of breath, ultimately diagnosed with bilateral spontaneous pneumothoraces. Despite the absence of typical risk factors, advanced imaging techniques revealed valuable insights into the diagnosis and management of this unique presentation. **Conclusion:** Spontaneous bilateral pneumothorax in healthy individuals presents diagnostic challenges and raises questions about potential genetic predisposition, connective tissue disorders, and lifestyle-related triggers. While the acute phase was effectively managed, this case underscores the importance of interdisciplinary collaboration and ongoing research to comprehensively understand this condition.

Keywords

Spontaneous Pneumothorax, Bilateral, Healthy Young Adult, Case Report

1. Introduction

Spontaneous pneumothorax, characterized by the sudden accumulation of air in

the pleural space resulting in lung collapse and breathing difficulties [1], is a well-recognized medical condition. While often associated with tall, thin individuals with a history of smoking, the occurrence of spontaneous pneumothorax in healthy young adults remains an enigmatic and rare phenomenon. This case report delves into a captivating scenario involving a 29-year-old male with no prior medical history, who presented with bilateral spontaneous pneumothorax. By exploring the diagnostic process, treatment strategies, and potential underlying factors, this report sheds light on the complexities of managing such an atypical presentation [2].

2. Case Presentation

A 29-year-old male, leading a healthy lifestyle with no significant medical history, arrived at the emergency department with acute left-sided chest pain and increasing shortness of breath. The pain, sharp and localized to the left side, worsened with deep breaths. Strikingly, the patient had no recent illnesses, infections, or traumatic events that could explain his symptoms. Physical examination revealed decreased breath sounds on the left side of the chest, along with mild respiratory distress.

2.1. Management

Upon confirming the bilateral pneumothoraces, the medical team initiated immediate interventions to address the compromised lung function. In addition to the insertion of bilateral chest tubes to evacuate trapped air, the patient was placed on supplemental oxygen to ensure adequate oxygenation. Pain management was carefully administered to alleviate discomfort associated with chest tubes.

2.2. Follow-Up

Following the successful insertion of chest tubes, the patient's progress was closely monitored. Daily chest X-rays were performed to assess lung re-expansion and the gradual resolution of the pneumothoraces. Serial blood gas analyses were conducted to monitor oxygenation levels and ensure they remained within acceptable ranges.

2.3. Prognosis

The patient demonstrated steady improvement in lung function and symptom resolution throughout the hospitalization. The absence of any recurrence of pneumothorax during the inpatient stay was an encouraging sign. As the chest tubes were removed and lung re-expansion was confirmed bilaterally, the patient transitioned to outpatient care.

2.4. Long-Term Considerations

In the outpatient setting, the patient was advised to remain vigilant about poten-

tial recurrence, especially during the initial years following the episode. Lifestyle recommendations were provided, including cautious engagement in activities that might stress the lungs, such as scuba diving or high-altitude travel. The importance of seeking prompt medical attention for any new or unusual symptoms, such as chest pain or shortness of breath, was emphasized to mitigate the risk of future complications.

3. Diagnostic Assessment

Considering the clinical presentation and suspicion of pneumothorax, an immediate chest X-ray was performed. The X-ray revealed a complete collapse of the left lung and the presence of air in the pleural space, confirming left-sided pneumothorax. What confounded the medical team was the unexpected discovery of a right-sided pneumothorax on the X-ray, despite the absence of overt symptoms on the right side. To gain a comprehensive understanding of the pneumothoraces, a subsequent computed tomography (CT) scan of the chest was conducted **Figure 1**.

This advanced imaging not only corroborated the findings from the X-ray but also provided insights into the distribution and potential causes of the spontaneous pneumothoraces. The CT scan ruled out gross lung abnormalities, thus eliminating the possibility of congenital malformations or pre-existing lung conditions. Remarkably, blebs or bullae, commonly associated with spontaneous pneumothorax, were notably absent in this case. These radiological investigations played a pivotal role in devising an effective management strategy for this intricate presentation [3] [4].

4. Management

In light of bilateral pneumothoraces, the medical team swiftly initiated interventions to address compromised lung function. Given the risk of contralateral

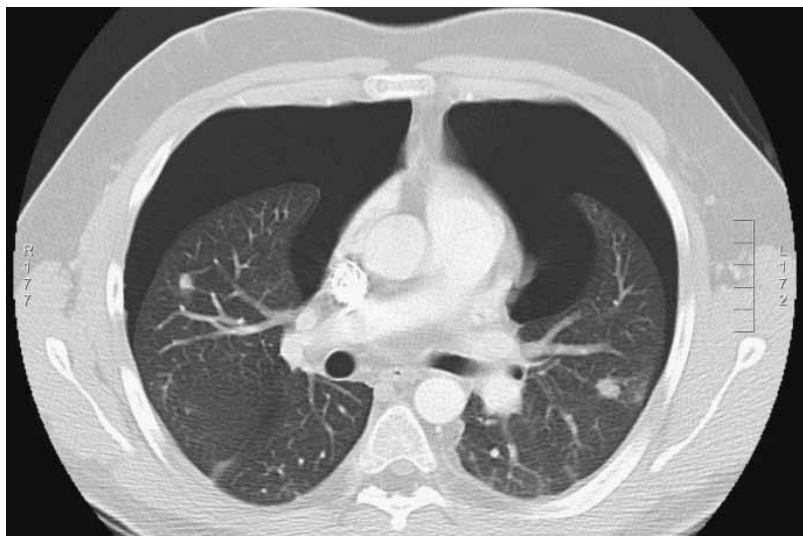


Figure 1. Show bilateral pneumothorax before chest tube insertion.

pneumothorax due to increased intrapleural pressure, bilateral chest tubes were inserted simultaneously. These chest tubes were meticulously positioned to facilitate the removal of trapped air and encourage lung re-expansion. Subsequent to chest tube insertion, the patient's respiratory distress notably improved, affirming the success of the intervention.

Close monitoring was essential in the subsequent days, with regular evaluations of lung re-expansion progress and overall clinical status. Radiographic imaging played a pivotal role in determining the optimal timing for chest tube removal. As lung re-expansion was confirmed bilaterally, the chest tubes were cautiously removed, marking the transition to the recovery phase. Throughout this phase, the patient's lung function was vigilantly observed to ensure complete restoration (**Figure 2**).

5. Discussion

The occurrence of spontaneous bilateral pneumothorax in a young, healthy individual presents a range of diagnostic considerations and raises intriguing questions about potential contributing factors. While spontaneous pneumothorax typically affects tall, thin males with a smoking history, this case defies these expectations.

Genetic predisposition, connective tissue disorders, or subclinical lung abnormalities are among the potential factors that might underlie this unique occurrence. Genetic elements, including alterations in collagen or elastin fibers, could compromise the structural integrity of lung tissue, rendering it more susceptible to sudden ruptures and air leakage. Connective tissue disorders such as Marfan syndrome [5] or Ehlers-Danlos syndrome might weaken lung tissue, making individuals prone to spontaneous pneumothorax. However, obtaining a comprehensive genetic and familial history was challenging due to the patient's lack of prior medical conditions.



Figure 2. Show complete resolution of the pneumothorax after chest tube insertion.

Moreover, an in-depth evaluation of the patient's lifestyle, activities, and hobbies might unveil unforeseen triggers. Although the patient denied recent trauma, recreational activities, intense physical exertion, or changes in altitude could potentially contribute to pneumothorax development. In the absence of a conventional etiological explanation, these factors warrant thorough consideration.

The value of advanced imaging techniques, such as computed tomography (CT) scans, in this case cannot be overstated. While conventional diagnostic tools like chest X-rays provided a diagnosis, it was the CT scan that offered a comprehensive understanding of the pneumothoraces. It ruled out gross lung abnormalities and the presence of blebs or bullae, which are commonly associated with spontaneous pneumothorax. These radiological investigations played a pivotal role in devising an effective management strategy for this intricate presentation.

In terms of management, the decision to insert bilateral chest tubes simultaneously was critical, given the risk of contralateral pneumothorax due to increased intrapleural pressure. This approach facilitated the removal of trapped air and encouraged lung re-expansion. Close monitoring was essential in the subsequent days, with regular evaluations of lung re-expansion progress and overall clinical status.

While the acute phase was managed effectively, the medical team remained vigilant about potential recurrence. Spontaneous pneumothorax carries a recurrence risk, particularly within the initial years after the initial episode. Discussions regarding long-term management and preventive measures were initiated to mitigate this risk. The patient received guidance on approaching lung-stressing activities with caution and recognizing the significance of seeking prompt medical attention for new or unusual symptoms.

This case report underscores the complexities of clinical presentations and the significance of interdisciplinary collaboration and a willingness to explore beyond conventional explanations. While acute symptoms were effectively managed, the enigma surrounding potential triggers spurs ongoing research for a holistic understanding of spontaneous pneumothorax in its various forms.

6. Literature Review

Exploring the medical literature reveals a paucity of reported cases involving spontaneous bilateral pneumothorax in young, healthy adults [6]. Most documented cases pertain to single-sided pneumothorax, often attributed to blebs or bullae—air-filled sacs on the lung surface that can rupture and cause air leakage. Notably, these anatomical abnormalities were absent in this patient's case, rendering it an intriguing outlier.

Studies have delved into genetic predispositions and connective tissue disorders as potential contributors to spontaneous pneumothorax. Genetic variants associated with collagen and elastin synthesis have been implicated in rendering lung tissue susceptible to ruptures. Connective tissue disorders affecting lung structural integrity could also be relevant, even without overt clinical symptoms.

7. Future Directions

As medical advancements progress, novel diagnostic techniques and genetic analyses may offer deeper insights into the mechanisms of spontaneous pneumothorax [7]. Collaborations between specialties such as pulmonology, genetics, and radiology could contribute to a more comprehensive understanding of this complex condition. Longitudinal studies tracking individuals with spontaneous pneumothorax could yield valuable data on recurrence patterns, risk factors, and preventive strategies.

8. Conclusion

The case of spontaneous bilateral pneumothorax in a healthy young adult underscores the intricacies of clinical presentations. It emphasizes the significance of meticulous assessment, interdisciplinary collaboration, and a willingness to explore beyond conventional explanations. While acute symptoms were effectively managed, the enigma surrounding potential triggers spurs ongoing research for a holistic understanding of spontaneous pneumothorax in its various forms.

Acknowledgements

The author expresses profound gratitude to the medical and nursing staff who participated in the patient's care.

Informed Consent

Written informed consent was procured from the patient for the purpose of publishing this case report along with accompanying images.

Conflicts of Interest

The authors declare the absence of any conflict.

References

- [1] Savitsky, E., Oh, S.S. and Lee, J.M. (2018) The Evolving Epidemiology and Management of Spontaneous Pneumothorax. *JAMA*, **320**, 1441-1443. <https://doi.org/10.1001/jama.2018.12878>
- [2] Rodriguez, J.A.O. and Hipskind, J.E. (2023) Iatrogenic Pneumothorax. StatPearls Publishing, Treasure Island (FL).
- [3] Graf-Deuel, E. and Knoblauch, A. (1994) Simultaneous Bilateral Spontaneous Pneumothorax. *Chest*, **105**, 1142-1146. <https://doi.org/10.1378/chest.105.4.1142>
- [4] O'connor, A.R. and Morgan, W.E. (2005) Radiological Review of Pneumothorax. *The BMJ*, **330**, 1493-1497. <https://doi.org/10.1136/bmj.330.7506.1493>
- [5] Milewicz, D.M., Urbán, Z. and Boyd, C. (2000) Genetic Disorders of the Elastic Fiber System. *Matrix Biology*, **19**, 471-480. [https://doi.org/10.1016/S0945-053X\(00\)00099-8](https://doi.org/10.1016/S0945-053X(00)00099-8)
<https://www.sciencedirect.com/science/article/pii/S0945053X00000998>
- [6] Sayar, A., Turna, A., Metin, M., Kûçûkyagci, N., Solak, O. and Gürses, A. (2004) Simultaneous Bilateral Spontaneous Pneumothorax Report of 12 Cases and Review

of the Literature. *Acta Chirurgica Belgica*, **104**, 572-576.

<https://doi.org/10.1080/00015458.2004.11679617>

- [7] Boone, P.M., Scott, R.M., Marciniak, S.J., Henske, E.P. and Raby, B.A. (2019) The Genetics of Pneumothorax. *American Journal of Respiratory and Critical Care Medicine*, **199**, 1344-1357. <https://doi.org/10.1164/rccm.201807-1212CI>