

Case Report Respiratory challenges in huntington's disease: The emergence of hydropneumothorax

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ARTICLE INFO

Article history: Received 27-07-2024 Accepted 12-09-2024 Available online 31-12-2024

Keywords: Hydropneumothorax Tuberculosis Respiration Huntingtons disease Sepsis

ABSTRACT

Hydropneumothorax, an abnormal collection of fluid and air in the cavity of the pleural space, typically arises by medical interventions such as fluid aspiration or intercostal tube infections. Hydropneumothorax due to tuberculosis is an unusual presentation characterized by the respiratory symptoms such as shortness of breath, cough, fever, in addition to extra pulmonary symptoms. There has been a scanty data on patients presenting with hydropneumothorax due to tuberculosis as its occurrence is relatively rare. Here we present a case of 30-year-old Asian man with Huntington's disease arrived to emergency department with complaints of severe breathing issues, discomfort in his chest, and decreased response. During chest auscultation, a distinct Hippocratic succussion splash was observed which was likely attributed to fluid movement in the right lung. A CT scan indicated considerable fluid accumulations with mediastinal shift and fibro-atelectatic bands in the right lung for which he was diagnosed with hydropneumothorax. Followed which he was put on mechanical respiration and an intercostal drainage tube. Micrococcus were detected after a microbiological investigation. Sputum analysis, tuberculin skin test and PCR analysis revealed the presence of acid-fast bacillus. He then received anti TB drugs along with intravenous piperacillin-tazobactam, inotropic support, nebulization drugs. However, the patient eventually developed sepsis due to the wide spread of the infection.

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1. Introduction

Hydropneumothorax is a rare form of pneumothorax characterized by an unusual accumulation of both fluid and air in the pleural space. On an X-ray, hydropneumothorax is typically identified by the presence of both fluid and air within the pleural space, which may manifest as an abnormal radiographic appearance. Rather than a longitudinal arrangement, it generally appears as a characteristic layered or crescent-shaped opacity. The airfluid level can be seen as a horizontal line, with the fluid settling at the bottom and the air rising to the top due to gravity. This accumulation of fluid and air

Hydropneumothorax may also be associated with infectious diseases like tuberculosis (TB), where the rupture of tuberculous cavities into the pleural space can lead to the accumulation of both air and fluid. This complicates the clinical presentation and requires prompt medical

leads to a range of cardiopulmonary symptoms, including anorexia, dyspnea, and weight loss. The presence of both fluid and air can significantly impact lung function, causing discomfort and exacerbating respiratory distress.^{1,2} The etiology of hydropneumothorax includes factors such as surgical procedures involving pleural fluid aspiration, infections due to prolonged intercostal drainage, chest trauma, sub pleural metastases, and secondary infections resulting from tumor obstruction.^{3,4}

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intervention.³ Despite advancements in medical therapies throughout the 21st century, tuberculosis (TB) remains a time-honored infectious disease that has afflicted humanity for millennia. It continues to be a leading cause of mortality among treatable illnesses.⁵ According to World Health Organization (WHO) forecasts, 10.6 million people globally were affected by tuberculosis (TB) in 2022, with 46% of these cases occurring in the South-East Asia region.⁶ Failure to eradicate tuberculosis continues to lead to unusual complications, resulting in significant detrimental sequelae for patients.⁷

The management of hydropneumothorax resulting from tuberculosis remains a significant challenge in clinical setting and effectively addressing these complications is crucial for improving patient outcomes and mitigating the global spread of tuberculosis.⁸ In this case report, we describe a unique instance of hydropneumothorax caused by tuberculosis, presenting significant challenges in patient management.

2. Case Illustration

A 30-year-old Asian male presented to the emergency department with severe dyspnea, thoracic discomfort, blepharospasm, involuntary choreiform movements, impaired concentration, and pyrexia that had progressively worsened over three days. Upon arrival, he was tachycardic, but his other vital signs were within normal limits. His Glasgow Coma Scale (GCS) score was E2V2M3, indicating significant neurological impairment. The patient appeared pallid, with a hematoma on his right upper eyelid, a depressed nasal bridge, sub-conjunctival hemorrhage in the right eye, surgical scars on the right hand, perioral fasciculations, and a kyphotic posture. In the emergency department, he was administered with an infusion of normal saline at 75 ml/hr, along with intravenous Pantoprazole 40 mg, Ondansetron 4 mg, Ceftriaxone 500 mg, and Ibuprofen.

A comprehensive history revealed that in November 2023, the patient was evaluated for major motor and verbal tics and underwent testing for Wilson's disease, neuroacanthocytosis, and sexually transmitted infections, all of which returned negative results. An MRI showed bilateral caudate atrophy, leading to a diagnosis of secondary Parkinsonism. He was prescribed haloperidol, which induced extrapyramidal side effects that were subsequently managed with trihexyphenidyl. Additionally, the patient sustained a comminuted fracture at the base of the first metacarpal in his right hand from a vehicular accident, necessitating K-wire fixation under brachial block anesthesia. However, in February 2024, the patient exhibited persistent symptoms of rage dysregulation, frontal executive dysfunction, and prominent chorea. Given a strong family history of movement disorders, particularly in his father at age 45 and several first and second-degree relatives, a genetic evaluation for Huntington's disease was conducted.

PCR fragment analysis revealed 17 CAG repeats in one allele and 42 repeats in the other allele of the Huntington gene, confirming the diagnosis.

Due to impending respiratory distress, a chest X-ray was performed in the emergency department, revealing complete haziness in the right lung. To confirm the findings, a CT scan was conducted on the first day of his hospital admission. The CT scan confirmed a large hydropneumothorax with a mediastinal shift, fibro-atelectatic bands in the right lung, and patchy infiltrates in the lower lobe of the left lung. As a result, the patient was placed on mechanical ventilation, and an intercostal drainage (ICD) tube was inserted under aseptic conditions, draining over 2.5 liters of fluid on the second day of hospitalization. Pleural fluid analysis revealed dark brown, turbid fluid with lactate dehydrogenase (LDH) levels greater than 20,000 U/L, low glucose levels, and an adenosine deaminase (ADA) level of 130 U/L.

Microbiological examination was positive for a Micrococcus bacterium, and sputum analysis revealed the presence of acid-fast bacilli. On the third day of his admission, tuberculin skin test and PCR analysis confirmed the presence of Mycobacterium tuberculosis. The patient was then started on a standard anti-tuberculosis regimen along with intravenous midazolam, piperacillin-tazobactam, inotropic support, and nebulized medications. On the sixth day of his hospital course, due to continuous fluctuations in blood pressure, noradrenaline was administered in response to bradycardia. Despite continuous monitoring, the patient's condition deteriorated, leading to sepsis. Histopathological examination confirmed extensive burden of the organism, primarily in the lungs and mediastinal lymph nodes. Despite being informed of the grave prognosis, the patient was discharged against medical advice.



Figure 1: Chest X-ray indicating haziness in lung(R > L)

3. Discussion

In the realm of respiratory health, hydropneumothorax presents significant diagnostic, therapeutic, and prognostic challenges. Given the diverse etiologies of the condition, a high degree of clinical suspicion warrants thorough radiological investigations to confirm the diagnosis. Radiological tests, such as chest X-rays and CT scans, are indispensable for accurate identification and assessment, enabling tailored therapeutic interventions and informing prognostic evaluations.⁹ However, in our case report, the patient had no prior respiratory history and experienced hydropneumothorax for the first time. During chest auscultation, a distinct Hippocratic succussion splash was observed, likely due to fluid movement in the right lung, resulting in lung collapse and subsequent ventilationperfusion mismatch. Pleural fluid analysis revealed an exudate, indicated by elevated pleural fluid LDH and a pleural fluid protein level of less than 2.0 g/dL. The presence of low pleural fluid glucose (40 mg/dL) narrowed the differential diagnosis to rheumatic pleurisy, empyema, tumor growth, lupus pleuritis, and tuberculosis. Additionally, an increased pleural fluid ADA value of 57.5 U/L further supported the diagnosis of tuberculosis, enhancing the specificity of the diagnostic criteria.¹⁰

A study conducted in India by Singh et al. concluded that approximately 61.5% of hydropneumothorax cases were primarily caused by tuberculosis, 26.95% were due to acute bacterial infections, and the remaining cases were attributed to malignancy.⁴ In relation to this case, a similar article was published about a 38-year-old diabetic male farmer who had been experiencing acute shortness of breath, chronic cough, and recurrent fever for the past three months. Chest radiographs revealed a significant right hydropneumothorax and a left mediastinal shift. This condition was attributed to Mycobacterium tuberculosis infection in the lung, which caused a bronchial tree-pleural cavity fistula, resulting in continuous air leakage into the pleural space.¹¹ Similarly, a report by Yildiz et al. in 2022 described a case of Mycobacterium tuberculosisinduced right-sided hydropneumothorax in a 34-year-old patient. Imaging findings revealed parenchymal intrusion, significant consolidation, and subsequent collapse of lung regions, which led to effusion in the middle and lower lobes of the right lung.¹² In a study by Kasargod et al., it was clearly noted that the most common symptom of hydropneumothorax due to tuberculosis was breathlessness, observed in 97.4% of the patients. This was followed by cough in 93%, fever in 87.7%, and chest pain, which affected 71.9% of the patients.¹³ Current recommendations suggest surgical intervention for patients with persistent pleural leaks, primarily to manage symptoms and prevent progression.^{14,15} Alongside surgical options, a standard anti-tuberculosis regimen is recommended, consisting of a 6-month course: initially 2 months of Isoniazid, Rifampin, Pyrazinamide, and Ethambutol, followed by 4 months of daily Isoniazid and Rifampin to effectively treat pleural tuberculosis.7

In this case, the patient presented with symptoms consistent with a serious infection-related condition. Mycobacterium tuberculosis likely entered the pleural space either through hematogenous dissemination or direct extension from a lung infection, leading to lung collapse, pleural inflammation, fluid accumulation, and further disease spread. However, the diagnosis of tuberculosis was not established early, resulting in multiple complications.At the time of discharge, it was crucial for the patient and their caregiver to adhere strictly to the prescribed pharmaceutical and non-pharmacological treatments. This decision poses significant risks. Non-compliance with the prescribed treatment can lead to continued disease progression, as inadequate or incomplete treatment allows the tuberculosis infection to persist or worsen. This can result in further lung damage and systemic spread of the disease. Additionally, failure to adhere to the treatment increases the likelihood of developing drug-resistant strains of Mycobacterium tuberculosis, which are more challenging to treat and can lead to more severe disease forms.

Moreover, untreated tuberculosis continues to pose a risk of transmission to others, increasing the potential for public health outbreaks. This not only affects the immediate community but also places additional strain on healthcare resources. In severe cases, the lack of proper treatment can lead to increased mortality, as the disease can cause severe respiratory failure, sepsis, and other life-threatening complications. Furthermore, noncompliance often results in more frequent hospitalizations and emergency interventions, escalating overall healthcare costs for both the individual and the healthcare system.

In conclusion, malignancy is inherently a life-threatening condition, and when compounded by tuberculosis and hydropneumothorax, the situation becomes even more critical. The complex interplay of these conditions can lead to severe respiratory distress, systemic complications, and increased mortality. In the Indian context, with its vast and diverse population, the challenges of managing such complex cases are exacerbated. Despite significant government efforts to improve healthcare facilities and provide necessary treatments, many patients continue to face severe health complications due to delays in diagnosis and treatment adherence.

This underscores the vital importance of patient education. Effective communication about the severity of these conditions, the necessity of adhering to prescribed treatments, and the benefits of early diagnosis are crucial for improving outcomes. By enhancing patient awareness and understanding, we can better manage these conditions, reduce complications, and ultimately improve the overall health outcomes in the Indian population.

4. Conclusion

Our case study highlights the critical importance of pleural fluid analysis, including microbiological and biochemical evaluations, for accurately determining the etiology of hydropneumothorax. The patient's compromised respiratory function and increased susceptibility to infections underscore the need for vigilant monitoring and prompt management of respiratory complications, especially in individuals with neurodegenerative disorders. When hydropneumothorax is associated with tuberculosis, it typically necessitates a longer hospital stay compared to cases with non-tubercular causes, often requiring an extended period of intercostal drainage (ICD) insertion. This extended duration is due to the complexity and severity of tuberculosis-related complications, as there is limited information on managing hydropneumothorax specifically. Management should be tailored to the individual, considering the underlying pathophysiology and the extent of lung involvement. Given the gaps in current literature, further research is needed to develop more effective strategies for managing and treating hydropneumothorax, particularly in the context of tuberculosis. Enhanced understanding and individualized care plans will be crucial in improving patient outcomes and addressing this challenging condition.

5. Patient Consent

The authors have obtained a written informed consent form from the patient and patient's guardian by stating that the case will be used only for the scientific and educational purposes.

6. Source of Funding

This work was not funded by any source or organizations.

7. Conflicts of Interests

The authors do not have any conflicts of interest.

References

- Chawake V, Yadav V, Jain M, Lakkadsha T, Bhakaney P. Impact of Short-term Exercise Program on Functional Independence in Patient with Hydropneumothorax: A Case Study. *J Pharm Res Int.* 2021;33(60B):1490–6.
- 2. Huan NC, Sidhu C, Thomas R. Pneumothorax: classification and etiology. *Clin Chest Med.* 2021;42(4):711–7.
- Ortega C, Gonzales C, Soto-Martinez ME, Yock-Corrales A. Hydropneumothorax in Children: A Rare Complication of a Bacterial Pneumonia. *Case Rep Pediatr.* 2016;p. 8097105. doi:10.1155/2016/8097105.
- Singh SK, Yadav P, Jatav B, Tiwari KK. Clinicoradiological profile of patients with hydropneumothorax: A prospective study of a hospital population in Northern India. *Indian J Respir Care*. 2021;10(1):53–6.

- Dubey A, Bansode AS. Spontaneous Pneumothorax and Tuberculosis: An Institutional Based Study. *Int J Life Sci Biotechnol Pharma Res.* 2023;12(1):626–8.
- Tuberculosis World Health Organization. WHO. [Internet]. [Accessed on 15 June 2024]. Available from: https://www.who.int/ health-topics/tuberculosis#tab=tab_1.
- Sharan LA, Price TP, Hehn B, Manoff D, Cowan SW. A 22-year-old man with pleural tuberculosis associated hydropneumothorax: Case report and literature review. *Respir Med Case Rep.* 2016;18:27–30. doi:10.1016/j.rmcr.2016.03.010.
- Papazachariou A, Papadokostaki E, Kypraiou D, Malikides V, Papakitsou I, Filippatos TD, et al. Hydropneumothorax as a complication of necrotizing pneumonia. *Germs*. 2023;13(4):332–7.
- Staub LJ, Biscaro RR, Kaszubowski E, Maurici R. Chest ultrasonography for the emergency diagnosis of traumatic pneumothorax and haemothorax: a systematic review and metaanalysis. *Injury*. 2018;49(3):457–66.
- Sharan LA, Price TP, Hehn B, Manoff D, Cowan SW. A 22-year-old man with pleural tuberculosis associated hydropneumothorax: Case report and literature review. *Respir Med Case Rep.* 2016;18:27–30. doi:10.1016/j.rmcr.2016.03.010.
- Al-Neyadi M, Alghfeli S, Dukandar M. Hydropneumothorax With Bronchopleural Fistula Following the Activation of Mycobacterium tuberculosis: A Case Report. *Cureus*. 2023;15(6):40844. doi:10.7759/cureus.40844.
- Yildiz BP, Aksan AD, Akyüz MS, Ortaköylü G. A 34-Year-Old male admitted with pulmonary tuberculosis complicated by hydropneumothorax and mediastinal emphysema. *Int J Mycobacteriol*. 2022;11(2):199–201.
- Kasargod V, Awad NT. Clinical profile, etiology, and management of hydropneumothorax: An Indian experience. *Lung India*. 2016;33(3):278–80.
- Davies HE, Davies RJ, Davies CW. Management of pleural infection in adults: British Thoracic Society pleural disease guideline 2010. *Thorax.* 2010;65(2):41–53.
- Dugan KC, Laxmanan B, Murgu S, Hogarth DK. Management of Persistent Air Leaks. *Chest*. 2017;152(2):417–23.

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Cite this article: Meghana CS, Girish B S, Nikitha B S, Roopa K, Srinivasan R. Respiratory challenges in huntington's disease: The emergence of hydropneumothorax. *IP Indian J Immunol Respir Med* 2024;9(4):152-155.