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Spontaneous Pneumomediastinum in a 20-Year-Old Male: A Case Report Highlighting Pathogenesis and Imaging Findings

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Abstract

Spontaneous pneumomediastinum (SPM) is an uncommon and self-limiting condition characterized by the presence of air in the mediastinum without apparent trauma. While often associated with activities that increase intrathoracic pressure, such as vomiting or intense exertion, underlying respiratory infections and excessive coughing play a critical role in its pathogenesis.

This report presents a case of a 20-year-old male with a history of asthma and recent upper respiratory tract infection who developed acute chest pain and dyspnea following severe coughing after lifting weights. Physical examination revealed subcutaneous emphysema, and imaging confirmed the diagnosis. The patient was treated conservatively, with resolution of symptoms within a week. This case emphasizes the importance of recognizing SPM in patients with acute chest pain, understanding its pathogenesis, and managing it conservatively to prevent complications.

Introduction

Spontaneous pneumomediastinum (SPM) is a rare clinical entity defined by the presence of air in the mediastinum without trauma or iatrogenic cause. It typically arises from activities or conditions that increase intrathoracic pressure, such as vigorous coughing, vomiting, or intense physical exertion. SPM is often misdiagnosed due to its nonspecific symptoms, including chest pain and dyspnea, which overlap with life-threatening conditions like pulmonary embolism or myocardial infarction. Diagnostic imaging is critical for accurate identification and management.

Case Presentation

Patient History and Presentation

A 20-year-old male with a past medical history of Lyme disease presented to the emergency department with a two-day history of shortness of breath, dyspnea on exertion, and sore throat. He reported mild left-sided chest tightness that worsened with deep inspiration, moderate bilateral lower abdominal pain, and nausea without vomiting.

Vital Signs

Afebrile at 97.6 F, HR: 58, BP 127/81, Respiratory rate: 14 ,02 sat 100% on 2-3L NC

Physical Examination

- HEENT: Mild tonsillar erythema and swelling.
- Cardiac: bradycardia, normal rhythm, no murmurs, rubs, or gallops
- Pulmonary: Diffuse wheezing in all lung fields.
- GastroIntestinal: Bilateral hypogastric tenderness, firm but non-distended abdomen.
- Musculoskeletal: Subcutaneous emphysema at the neck base and supraclavicular region.

Laboratory Results

- Leukocytosis (WBC: 13.3), hemoglobin (Hb: 13.7), sodium (Na: 146), and phosphate (Phos: 5.0).

Imaging Findings

Initial Chest X-ray:

- Pneumomediastinum with right lower neck subcutaneous emphysema (Figure 4A).

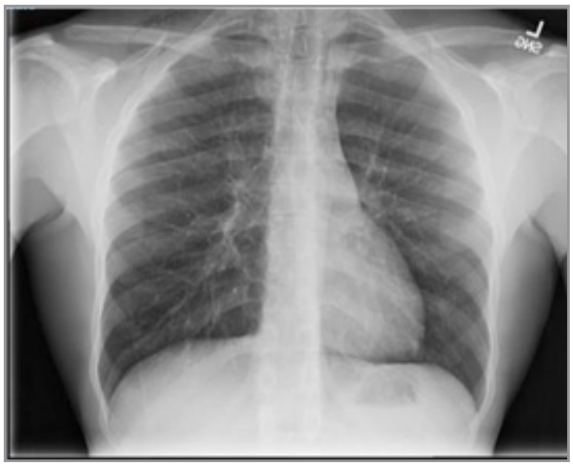


Figure 1: Axial (A/B), Coronal (C), and Sagittal (D) CT views demonstrating subcutaneous emphysema

CT Abdomen and Pelvis

- Extensive pneumomediastinum extending along the chest wall and neck.
- Bilateral ground-glass and reticulonodular opacities in the left lower lobe, suggesting an inflammatory or infectious process (Figure 1 A-D, Figure 2).

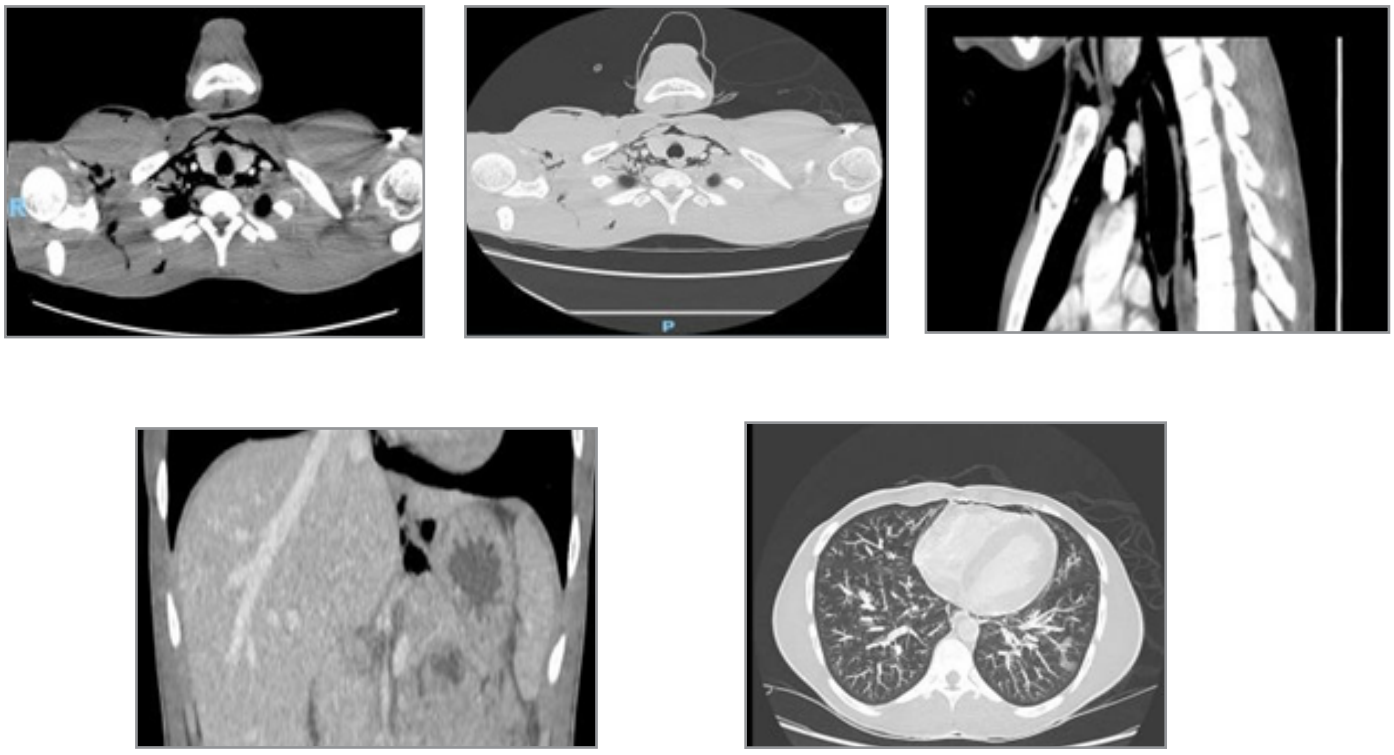


Figure 2: Axial CT showing ground-glass and reticulonodular opacities.

Fluoroscopy Esophagram

- No evidence of esophageal injury or leakage (Figure 3 A-B).

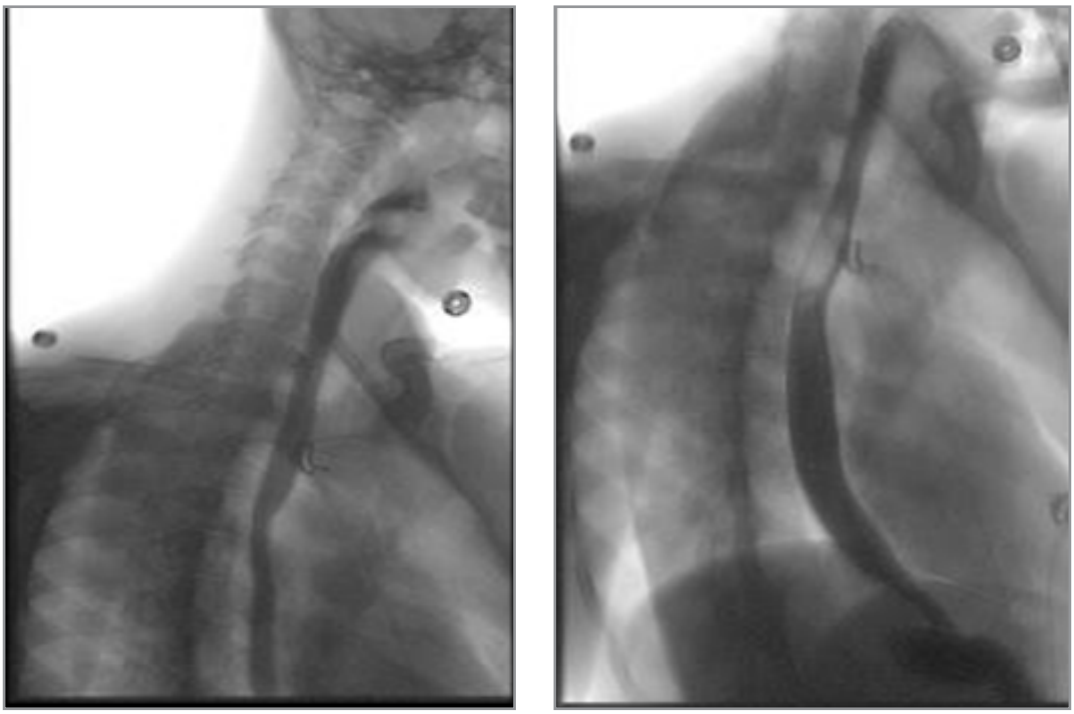


Figure 3: Fluoroscopy esophagram showing no esophageal leakage.

Follow-Up Chest X-ray:

- Improved subcutaneous emphysema prior to discharge (Figure 4B).

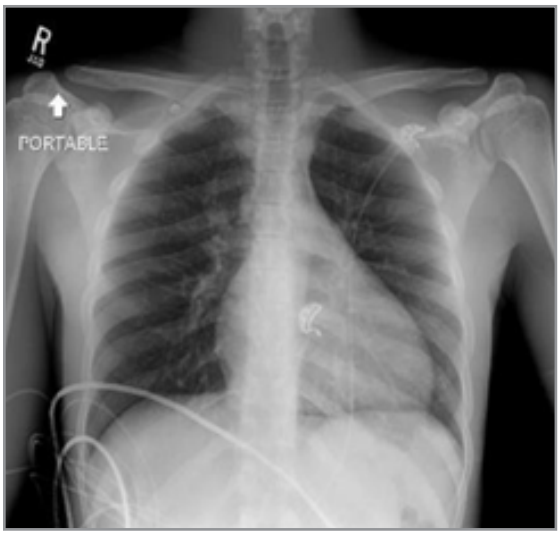


Figure 4: Chest X-ray demonstrating subcutaneous emphysema on presentation (A) and its resolution before discharge (B).

Management and Outcome

The gold standard treatment for SPM is bed rest, analgesics, supplemental oxygen, and treatment of underlying etiology (trauma, infection, or malignancy). In more severe cases, chest tube placement or surgical decompression can be used for treatment of severe SPM [1]. The patient received gold standard conservative treatment which included supplemental oxygen, analgesics, albuterol-ipratropium duo nebulizer treatments and IV 0.9 Normal saline, ceftriaxone and Flagyl as supportive care for the underlying respiratory infection and prophylaxis for possi-

ble secondary bacterial infection. Symptoms resolved within a week, and follow-up chest X-ray (CXR), confirmed complete resolution of pneumomediastinum.

Discussion

Spontaneous pneumomediastinum (SPM) is an uncommon clinical condition with an incidence estimated at 1 in 30,000 emergency department visits [2]. It is more frequently observed in young, healthy individuals, particularly males, and is often misdiagnosed due to its vague symptoms, such as chest pain and dyspnea.

Despite its benign nature, SPM can be life threatening. Life-threatening cases of SPM can be due to Lung malignancy, Colonic perforation, and blunt trauma, all resulting in extravasation of air into surrounding tissue as well as other clinical indications of decline such as hypotension, tachycardia, severe hypoxemia, shock, coma, and death. [1]. Accurate diagnosis of SPM is crucial as it can also mimic life-threatening conditions, including pneumothorax, pulmonary embolism, myocardial infarction, or esophageal perforation.

Although SPM can be life-threatening, early diagnosis and intervention can prevent complications or worsening of SPM. In this patient's case, the patient was considered a mild presentation due to a well appearing patient, who was ambulating and conversing with the healthcare team, along with normal vital signs. This is as opposed to other conditions such as spontaneous pneumothorax, pulmonary embolism, or acute chest syndrome which also present with cough, shortness of breath (SOB), tachycardia, and chest pain.

SPM occurs due to an increase in intrathoracic pressure, leading to alveolar rupture and air escape into the mediastinum [3, 4]. Contributing factors include severe coughing, as seen in this case, which caused micro-perforations in the glottis [3, 5]. This case highlights the critical role of early recognition and the importance of managing underlying respiratory infections to prevent recurrence.

No research has been published to show Lyme disease itself is directly linked to spontaneous pneumomediastinum (SPM) [5]. SPM primarily results from rapid increases in intra-alveolar pressure, often due to trauma or severe respiratory conditions. However, Lyme disease can weaken the immune system, making individuals more vulnerable to upper respiratory infections [1]. These infections, particularly those affecting the lungs, can increase the risk of SPM by compromising respiratory function or causing significant airway pressure changes. Thus, while Lyme disease does not directly cause SPM, it may indirectly increase susceptibility through immune suppression and subsequent respiratory complications

This case emphasizes the importance of early recognition and diagnosis of SPM in clinical practice. Misdiagnosis can lead to unnecessary diagnostic tests and invasive procedures, increasing patient anxiety and healthcare costs. Educating clinicians about the benign nature of SPM and its typical management can help reduce over-treatment.

Additionally, this case highlights the need for careful evaluation of underlying risk factors, such as respiratory infections, in the pathogenesis of SPM. Early treatment of infections can prevent excessive coughing and reduce the risk of recurrence. Follow-up care is also critical to ensure complete resolution and address any residual symptoms.

Patients with suspected lung malignancy, extreme blunt force trauma, fever, severe SOB, dyspnea on exertion (DOE), severe chest pain with deep inspiration, Lightheadedness, dizziness, syncope or large subcutaneous emphysema on CXR or CT scan will require more aggressive treatment approach of SPM which include surgical decompression, as well as possible chest tube placement if SPM lead to spontaneous pneumothorax (PTX) [2, 5]. These patients will also require closer follow up due to an increased chance of recurrence of SPM.

While SPM is rare, its presentation in young, otherwise healthy individuals underscores the importance of maintaining a broad differential diagnosis for acute chest pain. This case contributes to the limited literature on SPM and reinforces the utility of conservative management for uncomplicated cases

Key Points

- Imaging plays a vital role in diagnosis, with chest CT being the gold standard.
- Conservative management is typically sufficient for uncomplicated cases.
- Awareness of SPM can prevent unnecessary invasive interventions and reassure patients about its benign nature.

Conclusion

This case underscores the importance of recognizing spontaneous pneumomediastinum in young patients presenting with acute chest pain and nonspecific symptoms. Early diagnosis through imaging, alongside conservative management, ensures a favorable outcome. Addressing underlying respiratory infections is crucial for preventing recurrence.

References

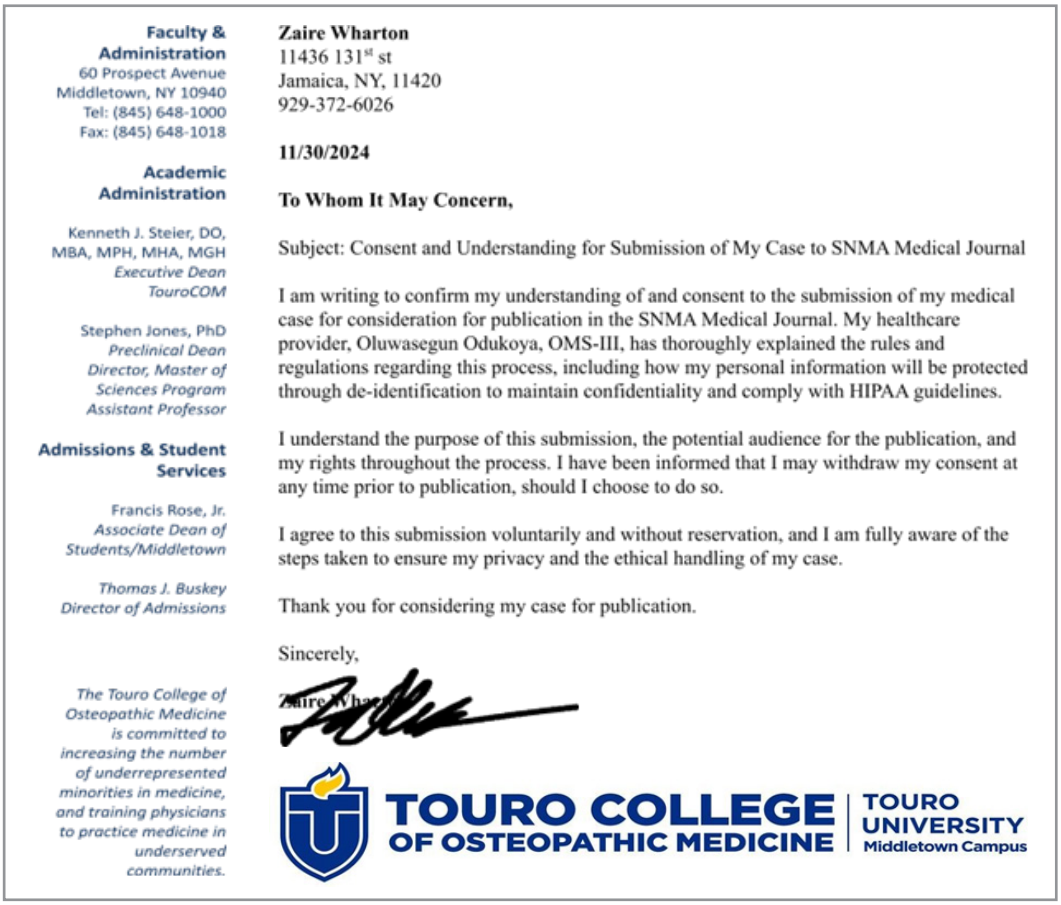
1. National Institute of Allergy and Infectious Diseases. (2020). Lyme Disease. In Bookshelf [Internet]. National Institutes of Health. https://www.ncbi.nlm.nih.gov/books/NBK557440/ (Accessed January 27, 2025)
2. Dekel, B., Paret, G., Szeinberg, A., Vardi, A., Barzilay, Z., & Katz, S. (1996). Spontaneous pneumomediastinum in children: Clinical and natural history. European Journal of Pediatrics, 155, 695.
3. Anzueto, A., Frutos-Vivar, F., Esteban, A., Alía, I., Brochard, L., Tobin, M. J., Ferguson, N. D., Raymondos, K., Nin, N., Apezteguía, C., Hurtado, J., González, M., Soto, L., Arabi, Y., & Tomicic, V. (2004). Incidence, risk factors, and outcome of barotrauma in mechanically ventilated patients. Intensive Care Medicine, 30, 612.
4. Chalumeau, M., Le Clainche, L., Sayeg, N., Sannier, N., Michel, J. L., Marianowski, R., Montout, M., Jouvet, P., & Bouyer, J. (2001). Spontaneous pneumomediastinum in children. Pediatric Pulmonology, 31(1), 67–75.
5. Chen, I., Tseng, C., Hsu, J., Wu, J., & Dai, Z. (2010). Spontaneous pneumomediastinum in adolescents and children. The Kaohsiung Journal of Medical Sciences, 26(2), 84–88.

Biography

As a proud first-generation African American, I have dedicated my life to empowering underserved communities through youth-focused initiatives and physical wellness. Growing up in a family that emphasized resilience and hard work, I've embraced the values of education, service, and health early on.

Driven by a passion for uplifting the next generation, I have spearheaded numerous programs aimed at mentoring youth and promoting physical activity as a tool for personal growth. Whether organizing community fitness events, leading workshops on self-discipline, or coaching young athletes, I've strived to inspire confidence and build essential life skills.

My commitment to service extends beyond individual programs, as they work tirelessly to address systemic barriers that hinder equitable access to resources. By fostering partnerships with local schools, non-profits, and recreational organizations, I've created opportunities for youth to thrive in safe and supportive environments. With a vision for a stronger, healthier community, I will continue to lead by example, blending my cultural heritage with a mission to leave a lasting legacy of empowerment and well-being.



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11/30/2024

To Whom It May Concern,

Subject: Consent and Understanding for Submission of My Case to SNMA Medical Journal

I am writing to confirm my understanding of and consent to the submission of my medical case for consideration for publication in the SNMA Medical Journal. My healthcare provider, Oluwasegun Odukoya, OMS-III, has thoroughly explained the rules and regulations regarding this process, including how my personal information will be protected through de-identification to maintain confidentiality and comply with HIPAA guidelines.

I understand the purpose of this submission, the potential audience for the publication, and my rights throughout the process. I have been informed that I may withdraw my consent at any time prior to publication, should I choose to do so.

I agree to this submission voluntarily and without reservation, and I am fully aware of the steps taken to ensure my privacy and the ethical handling of my case.

Thank you for considering my case for publication.

Sincerely,

Zaire Wharton

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