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Case Report

Spontaneous Mediastinal and Retropharyngeal Emphysema Involving the Danger Space

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Abstract

Spontaneous retropharyngeal (SRE) and mediastinal emphysema (SME) are characterised by the presence of air within retropharyngeal and mediastinal spaces, respectively. We present a case of SRE and SME in a young healthy male who presented with neck pain and swelling involving the danger space and discuss its implications. SRE and SME have a benign clinical prognosis and management is mostly conservative. Treatment is with analgesics, oxygen if required and bronchodilators in case of obstructive respiratory diseases. This case highlights the importance of involvement of the danger space in SRE and SME. Even with the involvement of the danger space, the patient can be safely managed on a medical ward with a close input from cardio-thoracic team.

Keywords: *Spontaneous Mediastinal; Retropharyngeal Emphysema*

Introduction

Spontaneous retropharyngeal (SRE) and mediastinal emphysema (SME) are characterised by the presence of air within retropharyngeal and mediastinal spaces, respectively. Although self-limiting conditions, they can rarely lead to severe complications including airway compromise and mediastinitis, thus resulting in poor patient outcomes [1]. We present a case of SRE and SME in a young healthy male who presented with neck pain and swelling involving the danger space and discuss its implications.

Case Presentation

A 24 year old caucasian male presented to the emergency department with 2 days history of worsening bilateral neck pain and swelling. This came on suddenly during sexual intercourse. He denied any chest pain, breathlessness, cough, fever or any history of trauma. He had no significant past medical or family history and was not on any regular medications. He did admit to have taken amphetamines orally and smoked cannabis regularly. His observations showed a respiratory rate of 22 beats per minute, oxygen saturations of 97% on room air, pulse rate of 90 beats per minute, blood pressure of 128/75 mm Hg and was apyrexial. Clinical examination revealed palpable subcutaneous crepitations around his neck and chest wall both anteriorly and posteriorly, with palpation tenderness at the neck area. All baseline blood results were unremarkable and electrocardiogram showed normal sinus rhythm. A single projection anterior-posterior chest radiograph showed marked pneumopericardium, pneumomediastinum and a tiny left apical pneumothorax with florid subcutaneous emphysema in the supraclavicular fossae bilaterally (Figure 1). Computed tomography (CT) with intravenous contrast of his neck and

chest was performed which confirmed the above radiographic findings and also revealed the involvement of the anatomical danger space (Figure 2 to 4). The underlying lung parenchyma on CT thorax with lung windows did not reveal any underlying parenchymal or interstitial pulmonary or pleural abnormality, including emphysematous bullous disease. Further computed tomography with oral contrast of his neck and chest was performed to rule out any oesophageal perforation which was negative. Following this, he was admitted to the medical admissions unit and subsequently transferred under the care of the respiratory team with input regarding onward management from the regional cardio-thoracic surgical team. He was managed conservatively with analgesics and prophylactic antibiotics. Subcutaneous emphysema gradually improved after 72 hours and he was discharged home with short interval plain film follow-up.

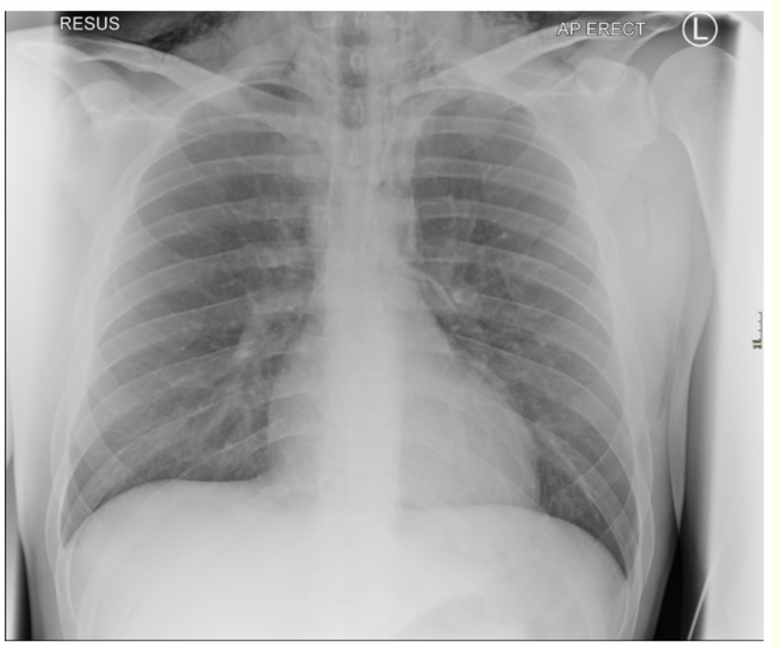

Figure 1: *AP erect chest radiograph demonstrates linear and curvilinear lucencies outlining the left heart border and mediastinum consistent with pneumopericardium and pneumomediastinum, respectively. Further assessment also shows a tiny subcentimetre left apical pneumothorax with extensive subcutaneous emphysema in the supraclavicular fossae bilaterally. The background lung appears grossly unremarkable. No radiopaque foreign bodies or acute osseous injury.*

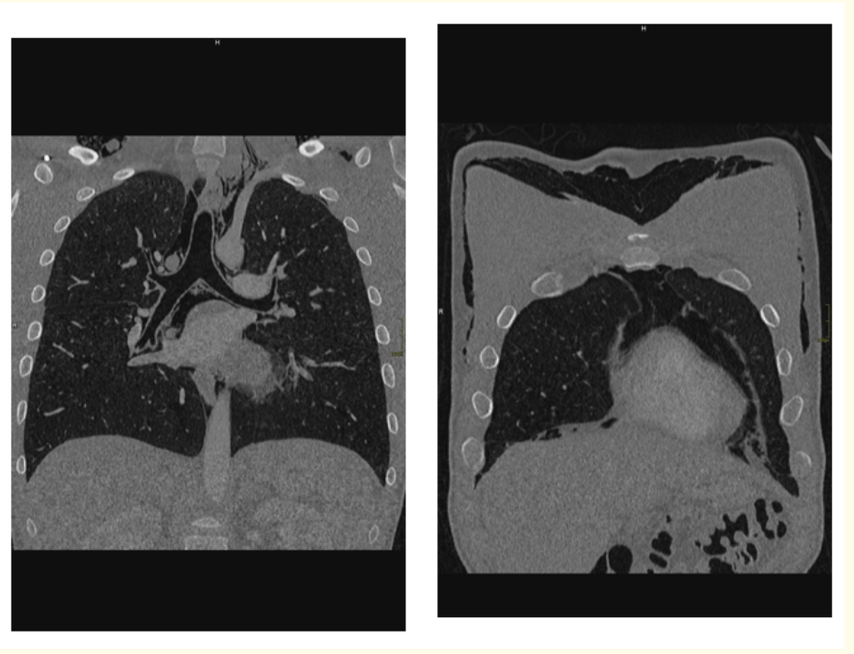

Figure 2: *Non-contrast Coronal CT Multi-planar reformats (MPRs) confirm extensive pneumomediastinum, pneumopericardium and widespread subcutaneous emphysema. The pneumomediastinum outlines the central bronchial tree as well as the major hilar vessels.*

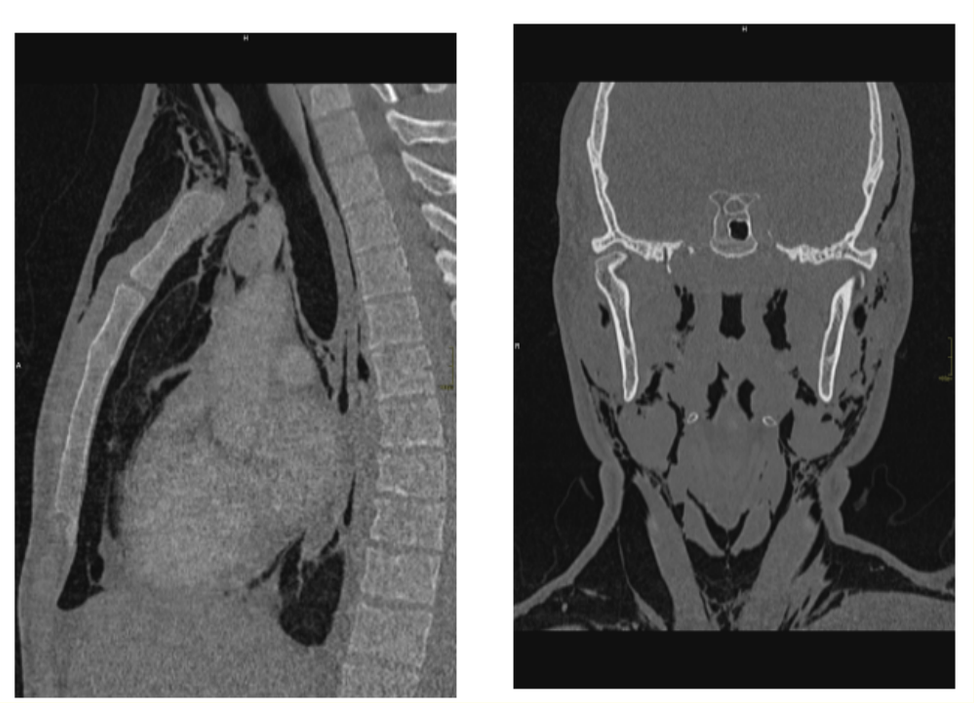

Figure 3: *Sagittal Chest CT MPR demonstrates a pneumopericardium, a small pneumothorax as well as gas tracking superiorly in the thoracic pre-vertebral space (from T10). Coronal CT Neck MPR slice demonstrates the superior extent on the retropharyngeal emphysema with gas seen to tracking along the fascial planes of the strap muscles, the muscles of mastication as well as the left temporalis.*

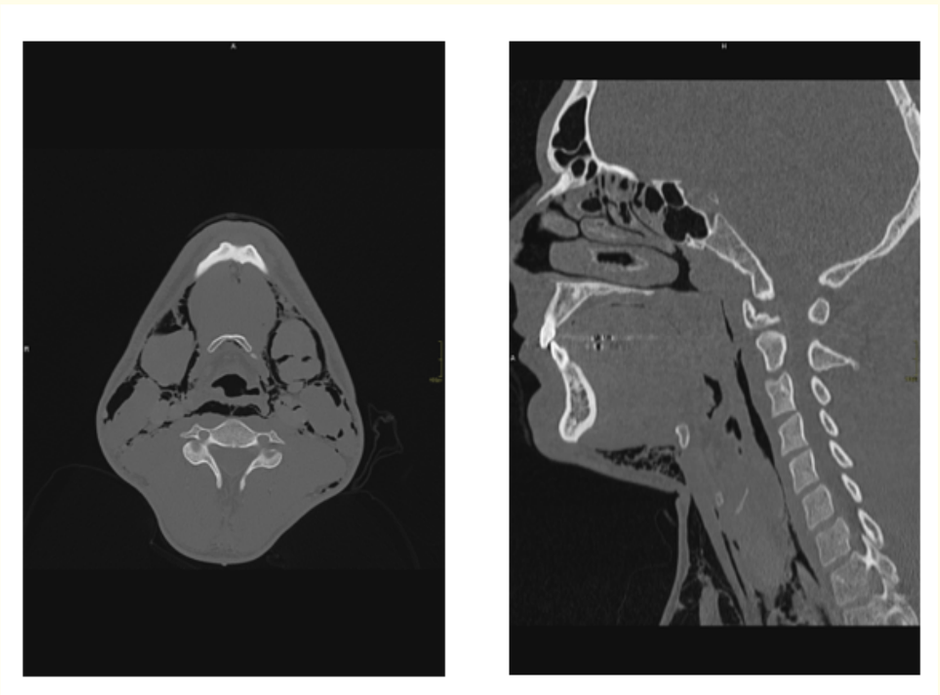

Figure 4: *Axial and sagittal CT neck MPRs shows gas involving both the retropharyngeal and danger space.*

Discussion

SRE and SME in young adults are rare phenomena [2]; the most common causes include trauma, iatrogenic injury, and obstructive respiratory disease [3]. Patients often present with neck pain, swelling, odynophagia, dysphagia, chest pain, and dyspnoea. On clinical examination, patients have palpable crepitations indicating subcutaneous emphysema, but some patients also have crunching sounds in conjunction with heart sounds on ausculatation (Hamman's sign) as described by Hamman [4]. SME usually occurs due to alveolar rupture caused by sudden increase in the intra-thoracic pressure [5]. Other aetiologies accounting for SME includes rupture of sub pleural blebs or cysts, which is more deemed more likely in this case due to the presence of a tiny apical pneumothorax. Smoking and elicit drugs may precipitate this condition [6].

Although the diagnosis is made readily using a combination of plain films and contrast-enhanced CTs, it is essential to determine the underlying aetiology and complications related to these conditions. CT helps to characterize the degree of spread of emphysema, as well as inter-compartmental spread and involvement of the danger space. The danger space is anatomically situated between the alar and prevertebral fascia [7]. It is bound superiorly by the base of the skull and laterally by the attachment of the alar fascia to the prevertebral fascia, at the respective transverse processes. Inferiorly, the danger space is in free communication with the posterior mediastinum, which extends to the diaphragm. An infection of this space can thus spread to involve the cardiothoracic organs and lead to severe complications such as mediastinitis, empyema and sepsis. Superior spread of infection along the danger space can affect the contents of the carotid sheath. Spread of infection within the danger space is rapid due to the loose areolar tissue within this region.

SRE and SME have a benign clinical prognosis and management is mostly conservative. Treatment is with analgesics, oxygen if required and bronchodilators in case of obstructive respiratory diseases. Some studies suggest use of prophylactic antibiotics to prevent mediastinitis [8]. Involvement of cardio-thoracic surgeons is only required if complications such as mediastinitis or airway obstruction occur.

In this particular case, smoking and sexual intercourse were the precipitating factors. The likely cause of SRE and SME would be rupture of sub-pleural blebs as evident by the presence of tiny left apical pneumothorax. Computed tomography with oral contrast ruled out any oesophageal rupture or tears. Due to the involvement of the danger space we treated this patient with prophylactic antibiotics to prevent infection.

Conclusion

This case highlights the importance of involvement of the danger space in SRE and SME. Even with the involvement of the danger space, the patient can be safely managed on a medical ward with a close input from cardio-thoracic team.

Conflicts of Interest

The authors have no competing interests to declare

Author Contributions

SG and JW contributed to the case description, APS and EP contributed to the discussion and acquiring the clinical images.

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