

Blunt traumatic pneumomediastinum and subcutaneous emphysema

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Section: Chest imaging

Imaging Technique: CT

Case Type: Clinical Cases

Authors: M. Wintermark, P. Schnyder

Patient: 32 years, male

Clinical History:

Fall from a height

Imaging Findings:

32-year-old male patient involved in a fall from a 7-m bridge. This deceleration mechanism justified chest CT survey and, consecutive to identifying subcutaneous emphysema and pneumothorax on the latter, bronchoscopy to rule out a tracheo-bronchial injury.

Discussion:

Pneumomediastinum relates to free air collections around mediastinal structures. It is encountered in up to 10% of blunt chest trauma. In over 95% of cases, pneumomediastinum either is associated with a subcutaneous emphysema or results from alveolar rupture. In the remaining cases, pneumomediastinum is induced by lesions of the trachea, bronchi or esophagus. Subcutaneous emphysema is most often associated with rib fractures and sometimes with a pneumothorax. It can extend far away from the chest, to the face, abdomen, scrotum, limbs, mediastinum and retroperitoneum. It may sometimes be responsible for thoracic restriction and ventilatory impairment. Alveolar rupture may result from primary lung trauma or positive-pressure mechanical ventilation. It is followed by centripetal dissection of the released alveolar air through the pulmonary interstitium and along the peribroncho-vascular sheaths into the mediastinum. This pathophysiological process is described as the "Macklin effect". In the submitted case, pneumomediastinum was associated with subcutaneous emphysema and pneumothorax, all consecutive to rib fractures. Tracheo-bronchoscopy ruled out a tracheo-bronchial injury.

Differential Diagnosis List: Blunt traumatic pneumomediastinum and subcutaneous emphysema consecutive to rib fractures

Final Diagnosis: Blunt traumatic pneumomediastinum and subcutaneous emphysema consecutive to rib fractures

References:

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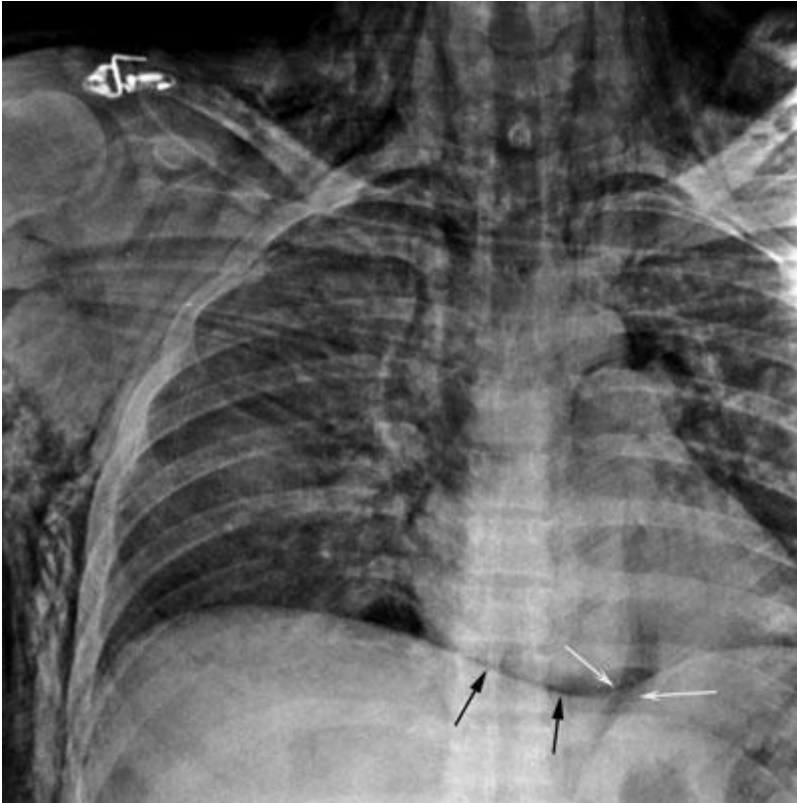
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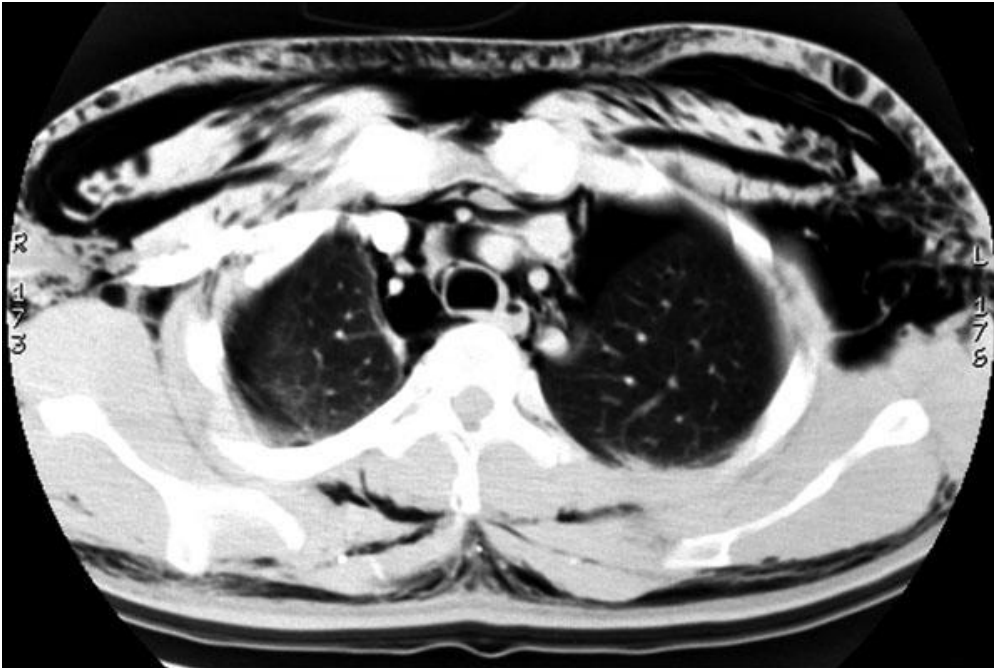
Figure 1

a



Description: Admission chest X-ray displays extensive subcutaneous cervical and thoracic emphysema, as well as muscular emphysema casting both pectoral muscles. An air collection in the aorto-pulmonic window is extending along the inferior aspect of the aortic arch and the superior border of the left pulmonary artery. A Levin's "continuous diaphragm" sign (black arrows) and a Naclerio's "V" sign (white arrows) are also present. The Naclerio's "V" sign relates to air collections located along the descending aorta, on one hand, and between the pleura and the left hemidiaphragm, on the other hand (From Wintermark M, Wicky S, Bettex D, et al (2000) Trauma of the mediastinum. In Schnyder P, Wintermark M. Radiology of blunt trauma of the chest. Springer, Berlin Heidelberg New York, pp 71-134). **Origin:**

b



Description: Spiral CT section (3-mm) displays the extent of the subcutaneous and muscular emphysema. A left antero-medial pneumothorax and a pneumomediastinum are also depicted (From Wintermark M, Wicky S, Bettex D, et al (2000) Trauma of the mediastinum. In Schnyder P, Wintermark M. Radiology of blunt trauma of the chest. Springer, Berlin Heidelberg New York, pp 71-134)**Origin:**



Description: Air collections outline the left subclavian and carotid arteries, the right innominate vein and the right superior intercostal vein (white arrow) (From Wintermark M, Wicky S, Bettex D, et al (2000) Trauma of the mediastinum. In Schnyder P, Wintermark M. Radiology of blunt trauma of the chest. Springer, Berlin Heidelberg New York, pp 71-134) **Origin:**

d



Description: Air collections surround the thymic remnants (white arrow), as well as both aspects of the aortic arch and branching of the right superior intercostal vein. The anterior border of the innominate vein confluence is highlighted by another free air collection, which relates to the "V" sign of plain films (From Wintermark M, Wicky S, Bettex D, et al (2000) Trauma of the mediastinum. In Schnyder P, Wintermark M. Radiology of blunt trauma of the chest. Springer, Berlin Heidelberg New York, pp 71-134) **Origin:**



Description: An air collection highlights the azygos arch (From Wintermark M, Wicky S, Bettex D, et al (2000) Trauma of the mediastinum. In Schnyder P, Wintermark M. Radiology of blunt trauma of the chest. Springer, Berlin Heidelberg New York, pp 71-134) **Origin:**

f



Description: The pneumomediastinum extends along the descending thoracic aorta. It follows the course of the spinal nerve root, goes through the right T8 intervertebral foramen and dissects into the epidural space (black arrow) (From Wintermark M, Wicky S, Bettex D, et al (2000) Trauma of the mediastinum. In Schnyder P, Wintermark M. Radiology of blunt trauma of the chest. Springer, Berlin Heidelberg New York, pp 71-134) **Origin:**