Cervical emphysema and pneumomediastinum following "light strangulation" injury

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Pneumomediastinum is an uncommon radiographic finding resulting from various causes, such as trauma, infection and unknown causes. The pneumomediastinum due to minor trauma is rarely reported and treatment and diagnostic process is not established. We report on a 20-year-old female patient who initially presented with neck pain and dyspnoea following manual strangulation. Her chest X-ray and computed tomography (CT) of neck imaging showed subcutaneous emphysema and extensive pneumomediastinum, but pneumothorax was not shown. She was transferred to the thoracic surgery and admitted to the general ward. The patient’s condition improved and she was discharged on the sixth hospital day. In conclusion, patients with pneumomediastinum following a minor strangulation injury can be observed alone without invasive testing or repeated imaging. CT scans are of great value for safe observation in determined patients and for the further evaluation of pneumomediastinum. (Hong Kong j.emerg.med. 2017;24:90-92)

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Introduction

Pneumomediastinum is an uncommon radiographic finding of potential clinical significance. Spontaneous pneumomediastinum has no obvious underlying aetiology, while secondary pneumomediastinum develops as a result of a specific injury or pathologic condition. Thoracic and maxillofacial trauma, resulting in alveolar, laryngotracheal, and pharyngoesophageal rupture, or intrathoracic straining are all associated with secondary pneumomediastinum. However, the treatment and diagnostic process of pneumomediastinum due to a minor trauma is not well established and has not been reported in the literature yet. In the present case report, we report a case of pneumomediastinum after strangulation injury.

Case report

A 20-year-old woman was admitted to the hospital, reporting sudden neck pain and dyspnoea. Her boyfriend strangled her with his hands seven hours ago. She had no chest pain, no stridor or voice changes. Dyspnoea earlier on improved after resting.

Her initial vital signs revealed blood pressure 130/60 mmHg, heart rate 92 beats per minute, respiratory rate 38 breaths per minute, body temperature 36.7°C, and pulse oximetry 100% on ambient air. A tender anterior aspect of neck, with abrasion and crepitus was found on physical examination. There was no petechia on face or subconjunctival haemorrhage. The lungs were clear on auscultation, with good air entry.
The arterial blood gas analysis showed pH 7.49, PCO₂ 29 mmHg, pO₂ 110 mmHg, HCO₃ 24.3 mmol/L, and SaO₂ 98.8%. Laboratory data, including blood chemistry profile and complete blood cell count, were unremarkable with an exception of an elevated white blood cell count of 12,070/mm³. The initial neck and chest radiograph showed subcutaneous emphysema in the cervical and thoracic region (Figure 1). Laryngoscopy performed in the emergency department was normal. The computed tomography (CT) scan of the neck with intravenous contrast agent demonstrated an extensive pneumomediastinum and subcutaneous emphysema. However, no pneumothorax was demonstrated (Figure 2). The patient was transferred to the thoracic surgery department for further observation and admitted to the general ward. To prevent mediastinitis antibiotic therapy was administered. During the following days in the ward, the patient’s clinical condition notably improved with progressive decrease in neck pain. On the third day, bronchoscopy was performed without abnormal findings. On the sixth hospital day, the patient was discharged home.

Discussion

Cervicofacial subcutaneous emphysema and pneumomediastinum occurred due to blunt trauma may cause potentially life-threatening conditions. But the majority of cases are self-limiting and benign. The plain radiograph has a low sensitivity for the diagnosis of pneumomediastinum, whereas CT scans of chest and neck are the gold standard for diagnosis.²⁻⁴ Hence multiple diagnostic procedures are recommended (such as microlaryngoscopy, bronchoscopy, or esophagoscopy) and often performed for evaluation of pneumomediastinum patients to exclude major aerodigestive tract injury. However, the efficacy of such test procedures in otherwise stable patients with pneumomediastinum is controversial. The clinical significance of isolated pneumomediastinum in stable blunt trauma patients remains unclear.

A case of a pneumomediastinum due to blunt neck and chest trauma has been reported as well as cases about oral injuries or dental surgical extractions. But reports about pneumomediastinum due to strangulation and especially minor strangulation trauma are rare.⁵⁻⁶ Plattner et al categorised different gradations of strangulation based on physical examination findings and symptomatology adapted from victims of manual strangulation on day one or two following the incident.⁷ They divided strangulation into three types: "light", "moderate" and "severe,
life-threatening”. "Light strangulation” refers to skin abrasions and/or reddening of the skin of the neck. "Moderate strangulation" is bruising to and/or bleeding from the neck and/or damage to deeper soft tissues or larynx with complaints of sore throat, difficulty swallowing and hoarseness. "Severe, life-threatening strangulation" involves petechial bleeding with or without loss of consciousness. Although Plattner et al reported these physical findings, the presenting authors believe that the categories cannot be distinctly categorised based on external injuries alone. Pathophysiologically, there are some mechanisms of an injury on strangulation. An obstruction of carotid arteries or jugular veins prevents blood flow to or from the brain or compresses the larynx. Thereby a preclusion of the airflow to the lungs can occur. The low-pressure constriction on the neck causes venous obstruction and loss of consciousness with a subsequent clinically described decreased neck muscle tone. An increased pressure on the neck may lead to arterial occlusion or airway closure resulting in death.

In the present case, the patient was injured with a "light strangulation" according to the classification of Plattner et al. There was no clinical evidence of an aerodigestive injury (e.g., severe dyspnoea, chest pain or shortness of breath). In this case, pathophysiologic mechanism hypothesis of pneumomediastinum may be related to the rupture of marginal pulmonary alveoli which led to an increased intrathoracic pressure for the exhalation against a closed glottis.

In conclusion, as illustrated in this case, a haemodynamically stable patient with pneumomediastinum following a "light strangulation" and without any other identifiable injuries can be observed without invasive testing or repeated imaging. The aim of such management would be to prevent unnecessary tests, while ensuring that significant aerodigestive injuries are not overlooked. CT scan is of great value in determining patients who can be safely observed.

References