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(CASE REPORT)

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Asthma exacerbation complicated by pneumomediastinum: Case report

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Abstract

Spontaneous pneumomediastinum is a rare entity that can complicate an asthma attack and can occur in young adults or adolescents. The abrupt onset of pneumomediastinum is usually associated with dyspnea, cough and chest pain. We report a case of severe asthma attack complicated by spontaneous pneumomediastinum in a 25-year-old female patient. Chest X-ray and CT scan confirmed the diagnosis. Progression was favorable within 6 days of treatment

Keywords: Asthma; Pneumomediastinum; Pneumothorax; Subcutaneous emphysema

1. Introduction

Spontaneous pneumomediastinum is a rare entity defined by the presence of air in the mediastinum outside the context of trauma, iatrogenic injury or underlying lung disease [1]. We report a case of severe asthma attack complicated by spontaneous pneumomediastinum.

2. Patient and observation

2.1. Patient information

The patient was 25 years old, a student living in Marrakech, with a history of intermittent asthma and allergic rhinitis since 2013, poor compliance with treatment, exposure to passive smoking, never treated for tuberculosis and no recent tuberculosis contagion, who presented to the emergency department with symptoms that had been evolving for 5 days, including moderate-intensity right chest pain of the stabbing type, triggered by coughing efforts, associated with a dry cough and Sadoul stage II dyspnea. All this evolving in a context of apyrexia with preservation of general condition.

2.2. Clinical and paraclinical findings

Clinical examination revealed preserved general condition, apyrexia (37 °C),, polypnoea (28 cycles/minutes), blood pressure 120/70 mmHg, heart rate 78 beats/minutes, oxygen saturation in ambient air 89%. Snowy crackles were noted on palpation in the anterior wall of the right hemithorax and in the anterior cervical region, with bilateral diffuse sibilant rales on pulmonary auscultation. Peak expiratory flow was 250 litres/minute. The frontal chest X-ray showed subcutaneous emphysema of the cervicothoracic and supraclavicular soft tissues; linear hyperclarity along the bilateral mediastinal arches; thoracic distension; bilateral bronchial syndrome (Figure 1). Chest CT confirmed the presence of a large pneumomediastinum associated with a minimal right pneumothorax and subcutaneous emphysema (Figure 2). Biology showed an inflammatory syndrome with elevated C-reactive protein, predominantly neutrophilichyperleukocytosis with normal eosinophilia, total immunoglobulin E 151.52 IU/ml. Cytobacteriological examination of sputum showed mixed flora with sub-threshold polymicrobial culture. A respiratory polymerase chain

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reaction identified Streptococcus pneumoniae, Human rhinovirus /Enterovirus. A Covid 19 polymerase chain reaction was negative. Sputum was negative for tubercle bacilli. Electrocardiogram was normal.

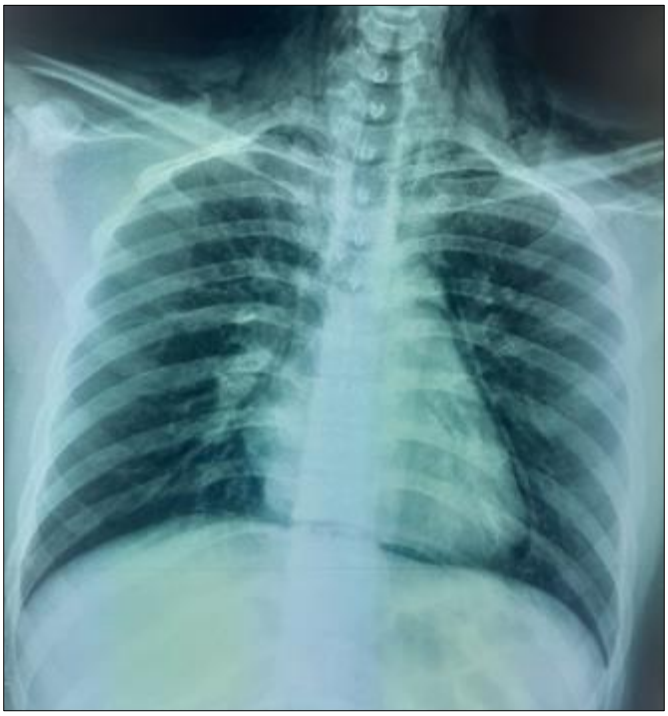

Figure 1 Subcutaneous emphysema of the cervicothoracic and supraclavicular soft tissues; linear hyperclarity along the bilateral mediastinal arches; Thoracic distension; bilateral bronchial syndrome

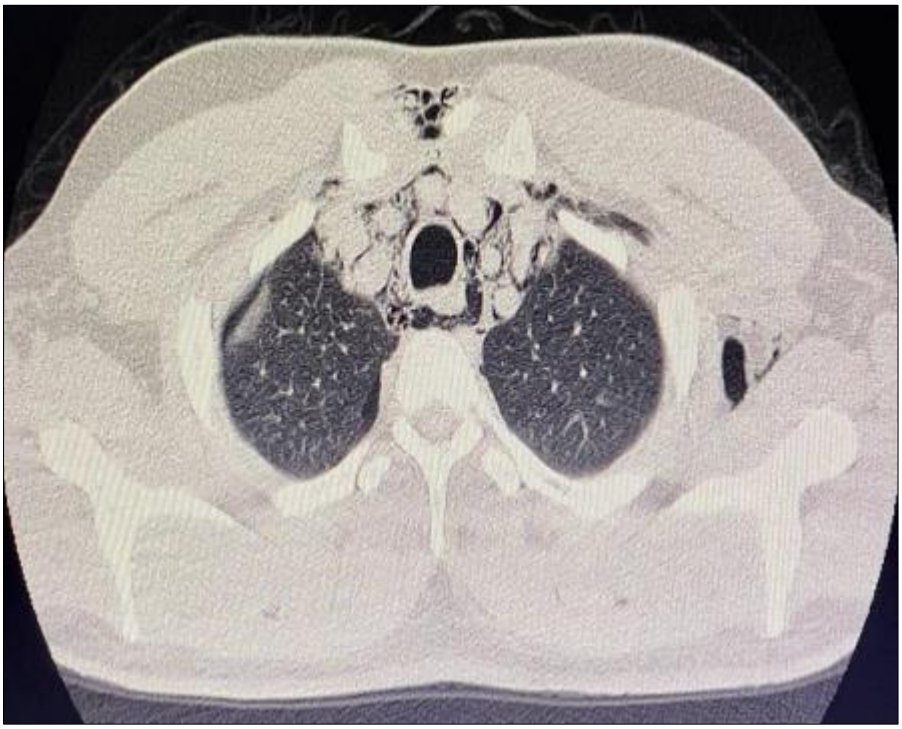

Figure 2 Pneumomediastinum of great abundance; Minimal right pneumothorax; Subcutaneous emphysema

2.3. Therapeutic intervention

The patient was admitted to hospital, with medical management consisting of : strict rest; oxygen therapy at 3 litres/minute; alternating nebulization with Salbutamol/ Ipatropium bromide; corticosteroid therapy (80 mg methylprednisolone); analgesia ; antibiotic therapy (Amoxcicillinclavulanic acid 1gram every 8 hours); background treatment of asthma (long-acting bronchodilators + inhaled corticosteroids); treatment of allergic rhinitis (antihistamines + nasal corticosteroids).

2.3.1. Evolution

The clinical course was favourable, marked by the disappearance of cough and chest pain, the absence of snowy crepitations in the anterior wall of the right hemithorax and the absence of sibilant rales. Radiological evolution was marked by complete regression of pneumomediastinum, right pneumothorax and subcutaneous emphysema (Figure 3). The hospital stay lasted 6 days.

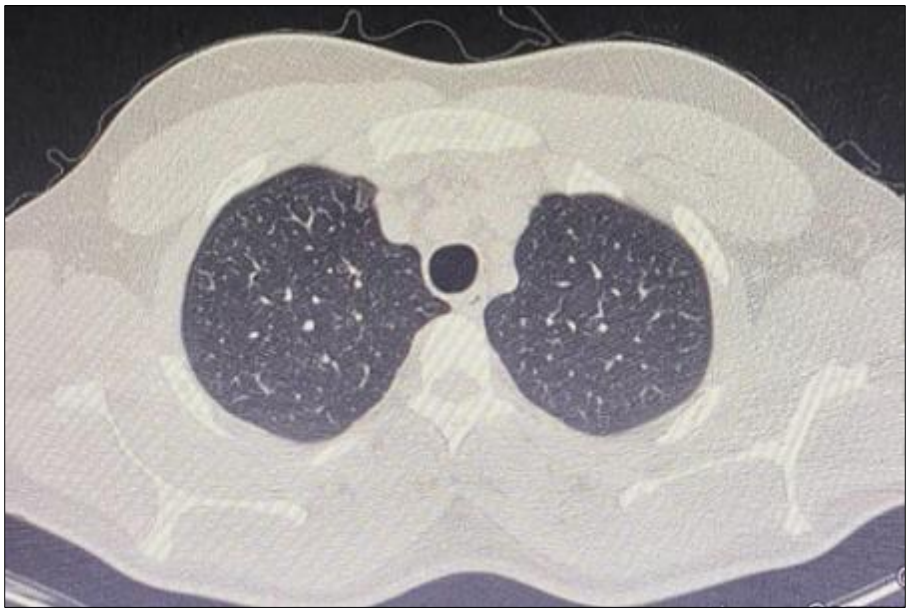

Figure 3 Complete regression of pneumomediastinum, right pneumothorax and subcutaneous emphysema

3. Discussion

Pneumomediastinum is a rare complication of acute asthma attacks, far behind pneumothorax, but with a similar mechanism of onset. In 1618, the first case of spontaneous pneumomediastinum was reported by Gordon, when Louise Bourgeois observed subcutaneous emphysema in a parturient [2]. It was subsequently described by Hamman in 1939 [2]. The mechanism of pneumomediastinum involves emphysema due to the creation of a pressure gradient during hyperpressure phenomena in the alveoli close to the vascular septa at the periphery of the lobules, known as the Macklin effect [4]. Their rupture causes interstitial emphysema along the septa, reaching the mediastinum via the hilum and/or the triangular ligament, then the cervical subcutaneous, pericardial or retroperitoneal spaces. Triggering factors include Valsalva maneuvers, coughing, parturient labor, vomiting, asthma attacks, physical exercise, cocaine inhalation, chemotherapy and diabetic ketoacidosis [1, 2, 5, 6].Spontaneous pneumomediastinum, most often sudden in onset, is often found in young, lanky, male adults [1, 4,7]. In our case, the patient was suffering from a severe asthma attack. Symptoms such as dyspnea, cough and chest pain were the cause of the pneumomediastinum. Pain is the main symptom. It often feels like a stab wound, increasing with breathing and radiating towards the neck. Clinical examination may reveal snowy crepitus, indicative of subcutaneous emphysema [1,8]. Although rare, complications of an asthma attack can include pneumothorax, pneumomediastinum and subcutaneous emphysema. Pneumothorax itself may be complicated by tension and bilateral localization. Tension pneumomediastinum will first decrease venous return, with the possibility of cardiac pump deflation and heart failure [1]. Chest X-rays demonstrate pneumomediastinum and signs of subcutaneous emphysema; their sensitivity ranges from 70 to 100%. A chest CT scan is requested either routinely or when there is any doubt about the diagnosis [9]. It confirms the presence of air in the mediastinum, as well as in subcutaneous tissues if undetected on chest X-ray, and may reveal pneumothorax, pneumoperitoneum, pneumopericardium or even, in exceptional cases, associated pneumospinal disease [10]. Therapeutic management

consists of close monitoring combining rest, analgesics, oxygen therapy with bronchodilator nebulizations, and antibiotic therapy. The hospital stay is 6 days, as described in the literature, with a variation from 3 to 7 days [10].

4. Conclusion

Spontaneous pneumomediastinum is a rare entity with a favorable outcome. It should be considered in the differential diagnosis of sudden chest pain, and is a complication that can occur during an asthma attack, legitimizing hospitalization as well as radiographic imaging at the slightest clinical doubt.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflicts of interest in relation to this article.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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