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Case Report

Spontaneous pneumomediastinum and subcutaneous emphysema after masturbation [☆]

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ABSTRACT

Spontaneous pneumomediastinum is a rare condition that mostly affects young men and generally follows a benign and self-limiting course. In contrast to secondary pneumomediastinum, which is caused by trauma, iatrogenic intervention or esophageal perforation, spontaneous pneumomediastinum is triggered by violent coughing, excessive vomiting, strenuous physical exercise or Valsalva maneuver. It results from an abrupt increase in intrathoracic pressure leading to alveolar rupture and air leak along the tracheobronchial tree into the mediastinal cavity. Extended spontaneous pneumomediastinum goes along with subcutaneous emphysema of the chest, neck or head. We present a case of a healthy young man who developed pneumomediastinum and profound subcutaneous emphysema with onset during masturbation. Since there is no literature on spontaneous pneumomediastinum associated with autoerotic experiences, we consider our case an unusual presentation of this entity.

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Introduction

With an incidence of 1 in 10,500 [1] to 1 in 30,000 [2] of all emergency department admissions spontaneous pneumomediastinum (SPM) is a rare condition and usually affects young men in their twenties. It can result from a variety of triggers like acute asthma exacerbation, strenuous physical exercise, excessive vomiting or violent coughing. Unlike secondary pneumomediastinum it is not a consequence of trauma, esophageal perforation or iatrogenic intervention. The pathophysiology is thought to result from a high pul-

monary pressure gradient leading to alveolar rupture and air leakage into the mediastinal cavity [3]. Extended spontaneous pneumomediastinum usually goes along with subcutaneous emphysema and typical symptoms are chest pain, dyspnea, neck pain and crepitations. Generally, the condition follows a benign and self-limiting course and no specific therapy is needed [1,4–6].

We present a case of a young man who was admitted to our emergency department with spontaneous pneumomediastinum and profound subcutaneous emphysema after an autoerotic experience. Since there is no literature on spontaneous pneumomediastinum with onset during masturba-

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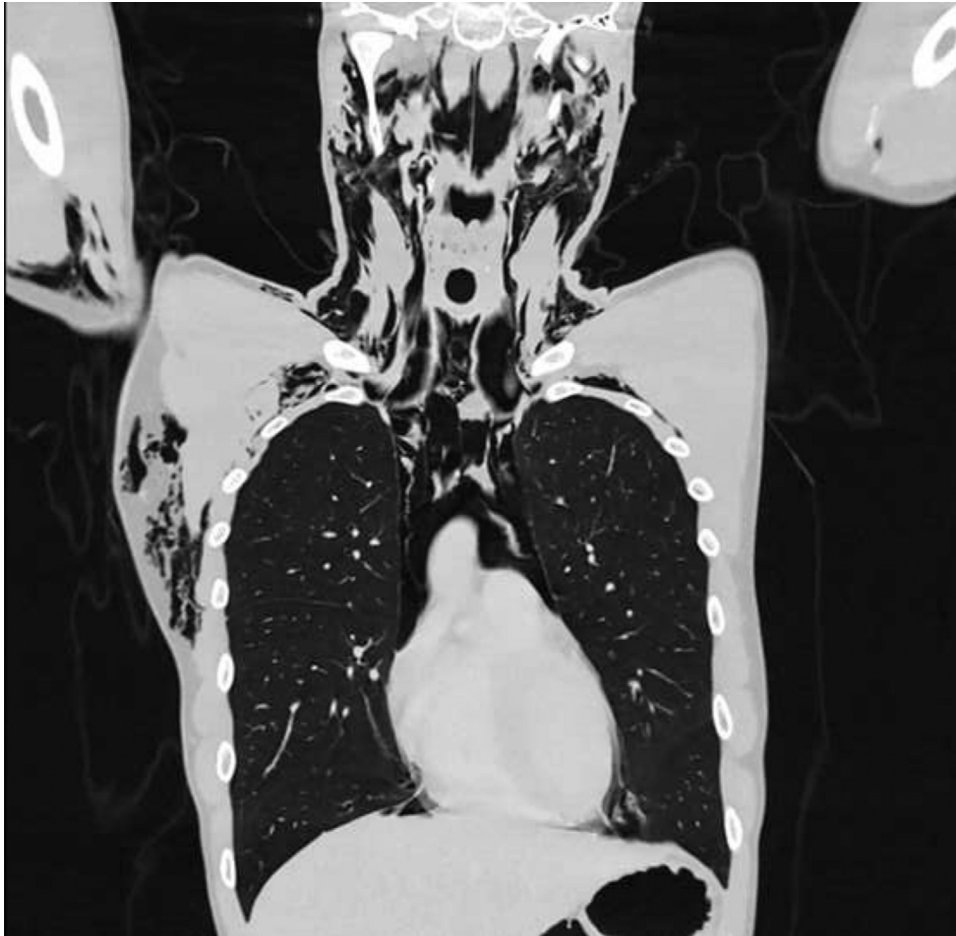


Fig. 1 – CT Chest frontal mediastinal.

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Case report

A young man at the age of 20 years (175 cm, 60 kg) was assigned to our emergency department with severe dyspnea and chest pain. He reported a sudden onset of sharp chest pain followed by shortness of breath while lying in bed masturbating. His medical history included mild asthma without medication and ADHD treated with Lisdexamfetamine. On arrival at our emergency department his vital signs were as follows: blood pressure 140/90 mm Hg, heart rate 93/min, SpO₂ 99% with 10L oxygen via non-rebreather mask, respiratory rate 22/min, temperature 36.6°C and blood glucose 5.7 mmol/L. He was alert and orientated with a Glasgow Coma Scale (GCS) of 15 and denied any smoking, drug use, violent coughing or heavy exercise. Clinical examination revealed a swollen face and crackling crepitations reaching from the mandible down the neck and chest to the elbows on both sides. Lung auscultation was found to be normal and further examination was unremarkable. His laboratory tests showed leuko-

cytosis with 13,2 G/L with all other measured parameters (hemoglobin, platelet count, sodium, potassium, creatinine, CRP) in the normal range. The patient was immunized against COVID-19 with a mRNA vaccine three times and SARS-CoV-2-Ag test was negative as well. Chest X-Ray (CXR) revealed subcutaneous emphysema and computed tomographic (CT) scan of chest and neck showed profound pneumomediastinum with subcutaneous emphysema reaching up until the base of the skull [Figures 1–4](#). Due to the high oxygen demand of 10L/min and the extensive radiological findings the patient was admitted to the ICU for further observation. Oxygen support could be reduced progressively to 2L/min via nasal cannula within a few hours. Mild chest pain was successfully treated with Paracetamol. Prophylactic antibiotic treatment with intravenous Amoxicillin/Clavulanic acid was initiated and given for a total of 3 days. After uneventful overnight monitoring, the patient was transferred to the general ward the day after. Subcutaneous emphysema was subsiding but still apparent and light chest pain remained for three more days. The further clinical course was uncomplicated, emphysema was gone four days after the initial admission and the patient was discharged home.

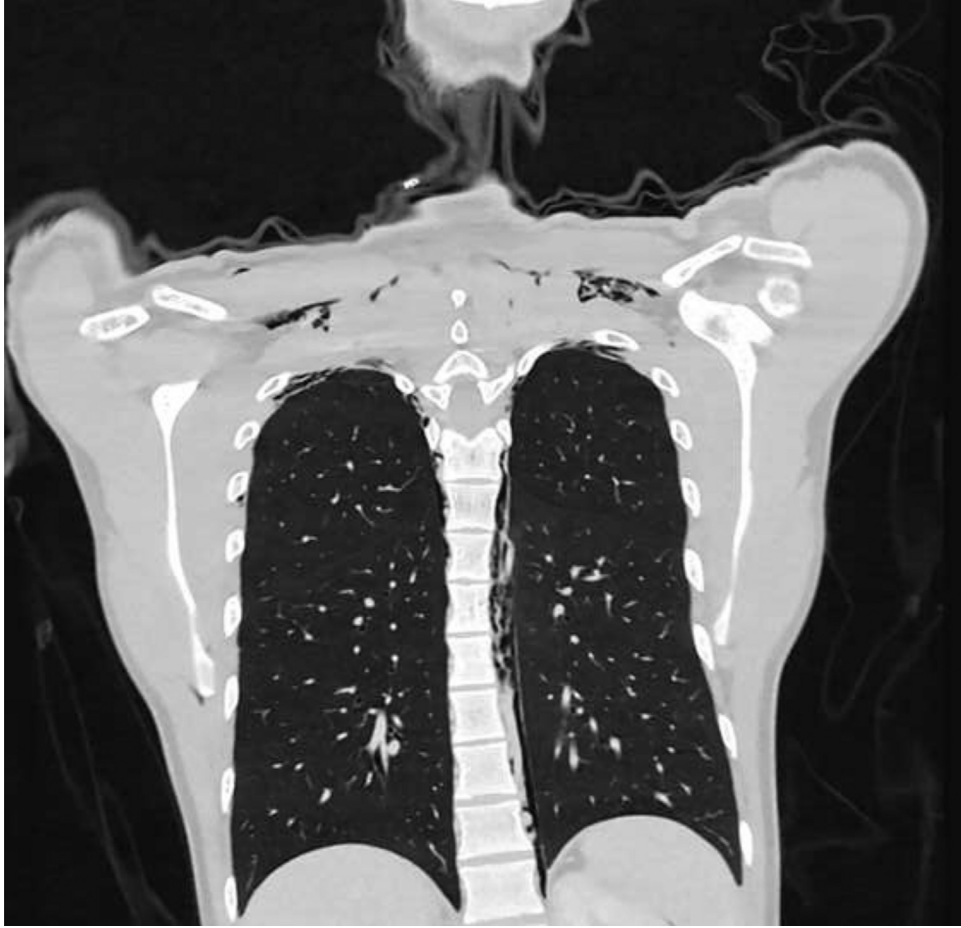


Fig. 2 - CT Chest frontal paravertebral.

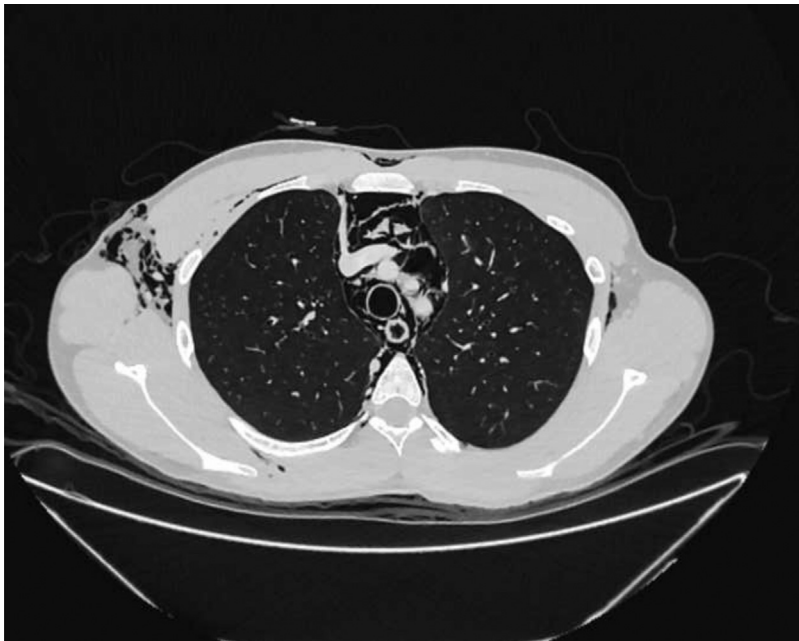


Fig. 3 - CT Chest axial mediastinal.

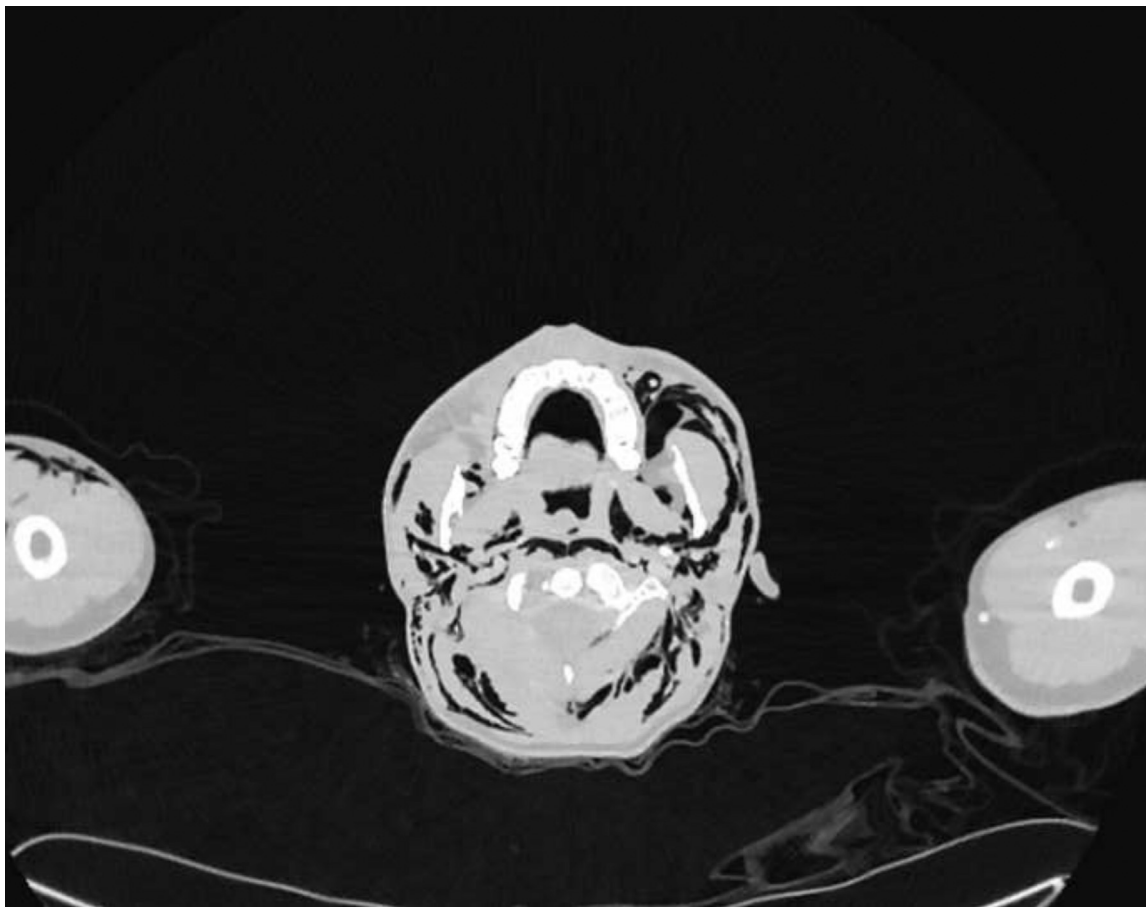


Fig. 4 – CT Head axial.

Discussion

In 1939 Hamman was first to publish a widely acknowledged case series characterizing spontaneous pneumomediastinum (SPM) and subcutaneous emphysema (SCE), with Macklin in the same year specifying the pathophysiology of this phenomenon [3,7]. Hamman also first described the crunching sound with systolic contraction on auscultation, known as “Hamman sign,” which is seen in pneumopericardium frequently [7].

Pathophysiology of SPM can be explained with an abrupt rise in intrathoracic pressure leading to overdistension and rupture of the alveolar membrane and consequently leaking of air along the sheaths of the pulmonary vessels into the mediastinal tissue. This mechanism is known as “Macklin effect” [8]. When mediastinal pressure increases over a certain point, air leaves the mediastinal cavity and travels along the deep cervical fascia to the surrounding tissues causing SCE, which is apparent in around 70% of SPM cases [9,10]. Crepitations can then be found at the chest, neck, face, head, or upper extremities.

SPM mostly occurs in young men, in a recent review of 19 case series Morgan et al. reported an average mean age of 23 years, while 72% of all patients were male [9]. Common

symptoms include chest pain, dyspnea, neck pain, crepitations and dysphagia. Pneumothorax is a frequent complication with around 10% of all cases and can be treated with chest tube placement. In contrast surgical treatment is rare, Morgan et al. identified just one out of 535 Patients with SPM who effectively underwent thoracotomy for tension pneumothorax [9].

SPM can result after violent coughing, intense physical activity, excessive vomiting, or Valsalva maneuver, while secondary pneumomediastinum is being caused by trauma, iatrogenic interventions or esophageal perforation. Predisposing factors are history of smoking, acute asthma and recreational drug use (especially cocaine and heroin) [9,11,12]. Except for history of mild, non-acute asthma no inciting factors were noticed in our patient. There are only a few reports of SPM related to sexual activity and we could not find any cases associated with autoeroticism, which makes our case unusual [13–15].

Diagnostic workup to exclude pneumothorax and secondary pneumomediastinum includes CXR and CT of chest and neck, although CT has been reported to be insufficient for diagnosis of esophageal rupture [9]. To definitely rule out esophageal lesions in highly suspicious cases fluoroscopic esophagography and CT contrast esophagogram are diagnostic tools of choice [16].

SPM is a self-limiting condition and follows a benign clinical course [5,6,9]. Specific therapy is not necessary, although supporting care and short-term observation for respiratory compromise are reasonable [4,5]. Our patient was hospitalized for four days and treated with Paracetamol, Metamizol and inhalative Budesonide/Formoterol, until his chest pain and shortness of breath completely disappeared. Chances for recurrence of SPM are about 1% of the cases and patients should be informed about that [9]. If secondary pneumomediastinum can be excluded, there is no evidence supporting antibiotic therapy [1,4]. Since we didn't exclude all secondary causes for SPM and together with the profound radiological findings, decision for antibiotic prophylaxis was made in our case.

Patient consent

Written informed consent to publish this case and use anonymized radiologic material was obtained from the patient.

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