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Case report

Spontaneous pneumomediastinum: A rare complication of methamphetamine use

Jessica Albanese*, Cole Gross, Mohamed Azab, M.D, Sinziana Mahalean, M.D, Ranjit Makar, M.D.

Department of Internal Medicine, University of Nevada School of Medicine, Las Vegas, NV, USA

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ABSTRACT

Objective: To present an unusual case of spontaneous pneumomediastinum subsequent to recreational amphetamine use.

Case report: A young African American adult male was admitted to internal medicine service for treatment of rhabdomyolysis secondary to methamphetamine use. On admission, he was complaining of chest pain in addition to nausea and generalized muscle aches. By his second hospital day, chest pain had resolved yet physical exam demonstrated crepitation of the anterior chest and left axilla. Portable chest x-ray revealed subcutaneous emphysema in addition to pneumomediastinum.

Conclusion: Spontaneous pneumomediastinum is a rare complication of amphetamine use that is often associated with subcutaneous emphysema and can be diagnosed with chest x-ray. Management is conservative, with observation, pain control, and supplemental oxygen as needed.

1. Introduction

Pneumomediastinum is a benign condition usually caused by alveolar rupture with subsequent air tracking along the tracheobronchial tree. Triggering events for free air within the mediastinum include emesis and asthma flare-ups, however, in many cases, no triggering event is identified [1]. Spontaneous pneumomediastinum is a rare occurrence with an incidence estimated between 0.001 and 0.01% in all adult patients and commonly presents in young males with chest pain, shortness of breath, and subcutaneous emphysema [1]. Chest x-ray is usually diagnostic, but computed tomography can also be used to demonstrate pneumomediatstinum [2]. Illicit stimulants, such as cocaine, amphetamines, and their derivatives have been associated with a variety of respiratory complications, including pneumomediastinum [3]. The substance most commonly associated with these serious complications requiring hospital admission is crack cocaine [4]. Binge smoking and injection of methamphetamines have also been associated with pneumomediastinum and subcutaneous emphysema, along with pneumorrhachis [5].

2. Case presentation

A 27-year-old African American male presented to the emergency department with complains of nausea, chest pain, and generalized muscle aches that had been worsening over the past two days. Prior to the onset of symptoms, the patient admits smoking a cocktail of marijuana and methamphetamine during a recent party. He denied any history of trauma, trouble swallowing or breathing. At presentation, patient was diaphoretic and tachycardic at a heart rate of 110 beats per minute. Examination was mostly benign except for tenderness of his calf and quadriceps muscles bilaterally. EKG revealed evidence of diffuse ST wave elevation with PR depression consistent with acute pericarditis. Initial work-up revealed an elevated creatinine of 2.2, BUN of 34, along with a CPK greater than 40,000. Patient was managed conservatively with intravenous fluid resuscitation along with bicarbonate for acidosis and nephrology was consulted.

The subsequent day, his CPK improved to 16,000 and his symptoms of myalgias resolved. Follow-up chest examination revealed an incidental finding of crepitation over his anterior chest extending up to his cervical region and axilla bilaterally. Patient denied any shortness of breath or difficulty swallowing, and his previous complains of chest pain had resolved. Chest x-ray revealed pneumomediastinum and subcutaneous emphysema in the left axilla and base of neck (Fig. 1). There was no evidence of any

* Corresponding author.
E-mail address: jessicaalbanese@medicine.nevada.edu (J. Albanese).

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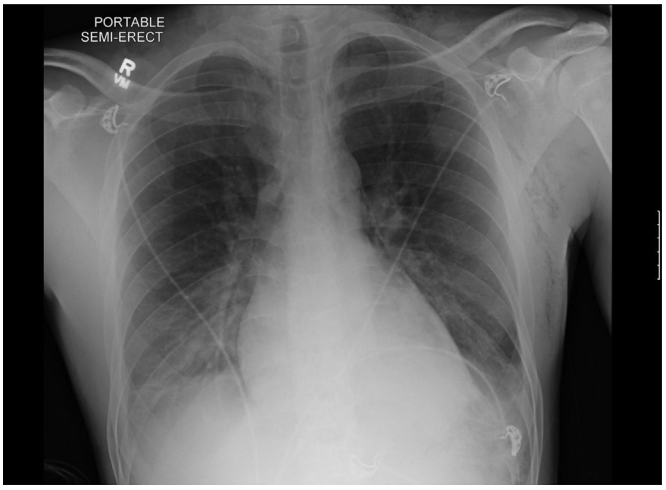

Fig. 1. Portable chest x-ray demonstrating pneumomediastinum and subcutaneous emphysema.

underlying lung parenchymal abnormalities such as emphysema. The following day his subcutaneous emphysema persisted and patient continued to deny any worsening of symptoms.

On the day of discharge, the patient's creatinine returned to baseline at 1.0. The patient refused any further workup to evaluate etiology of his pneumomediastinum. He was saturating greater than 96% on room air and denied any chest pain or dyspnea while at rest or while ambulating.

3. Discussion

Spontaneous pneumomediastinum is a rare complication of amphetamine abuse. The proposed mechanisms include rupture of pre-existing emphysematous blebs, violent coughing, and positive pressure from "shotgunning" [1]. High alveolar pressures generated by forced Valsalva maneuvers, to enhance absorption of the drug, can cause rupture of the alveoli.

In addition to amphetamine use, spontaneous pneumediastinum has been seen after the use of other, related substances. A case was reported of another young adult male presenting with painless neck and chest swelling without associated chest pain or dyspnea following ingestion of ecstasy, a street drug with 3,4-methylenedioxymethamphetamine as its active substance [7]. A similar presentation has been described in which an adolescent male complained of painful neck swelling following inhalation of mephedrone, a synthetic stimulant of the amphetamine class [8]. In both cases, the diagnosis was made with a chest x-ray clearly demonstrating pneumomediastinum with resulting subcutaneous emphysema. Both patients were successfully managed conservatively.

Rest and pain control are the main components of conservative management. Oxygen therapy has been recommended as the consumption of oxygen increases the diffusion pressure of nitrogen in the interstitium, which ultimately promotes absorption of mediastinal free air [6]. Antibiotic therapy and dietary restriction are not usually necessary [6]. There is usually no need for admission requiring further diagnostic studies in cases of spontaneous pneumomediastinum, especially in young patients, since most nontrauma patients ultimately prove to have no evidence of mediastinal organ injury [9]. Reported rates of recurrence are very low, so routine follow-up is not recommended [6].

4. Conclusion

Although spontaneous pneumomediastinum is a rare finding, it is important to elicit a thorough history including illicit drug use, particularly regarding amphetamines, cocaine and other stimulants. Diagnosis is made most often with chest x-ray and further work-up is unnecessary. Patients may usually be managed conservatively with oxygen which leads to successful treatment in many cases, as in our patient.

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