

## A Rare Case of Spontaneous Pneumomediastinum

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### ABSTRACT

**Introduction:** Spontaneous pneumomediastinum is a rare entity. It can occur subsequent to forceful inhalation of recreational drug like cannabis. **Case Report:** A 21 years old Caucasian male patient from Europe presented to our Emergency Ward with acute onset of chest heaviness and uneasiness during respiration. He admitted to have smoked cannabis with forceful inhalation an hour before the initiation of symptoms. He denied any history of trauma. Physical examination demonstrated palpable crepitation over the anterior chest wall and bilateral axillary region. Chest X-ray and subsequent CECT-Chest revealed pneumomediastinum with subcutaneous emphysema without pneumothorax. He was managed conservatively with high flow oxygen and analgesics. After 60 hours of observation in medical ward, he was discharged from the hospital. **Conclusion:** Spontaneous pneumomediastinum is a rare but benign entity, which can occur after forceful inhalation of cannabis. It is associated with subcutaneous emphysema and can be diagnosed with chest X-ray. CT Scan chest is required to rule out other causes. Management is mostly conservative with oxygen supplementation, pain control and observation for any complications.

**Keywords:** Cannabis, Inhalation, Spontaneous, Pneumomediastinum, Pneumothorax

### INTRODUCTION

Chest heaviness is a common presentation in the emergency. The presence of subcutaneous emphysema over the chest gives strong suspicion of trauma. But without any history of trauma or instrumentation, one should suspect spontaneous pneumomediastinum although it is a rare entity. In this case report we highlight how a young patient with acute history of chest heaviness and recent history of cannabis use in the inhaler form can have spontaneous pneumomediastinum with subcutaneous emphysema.

### CASE REPORT

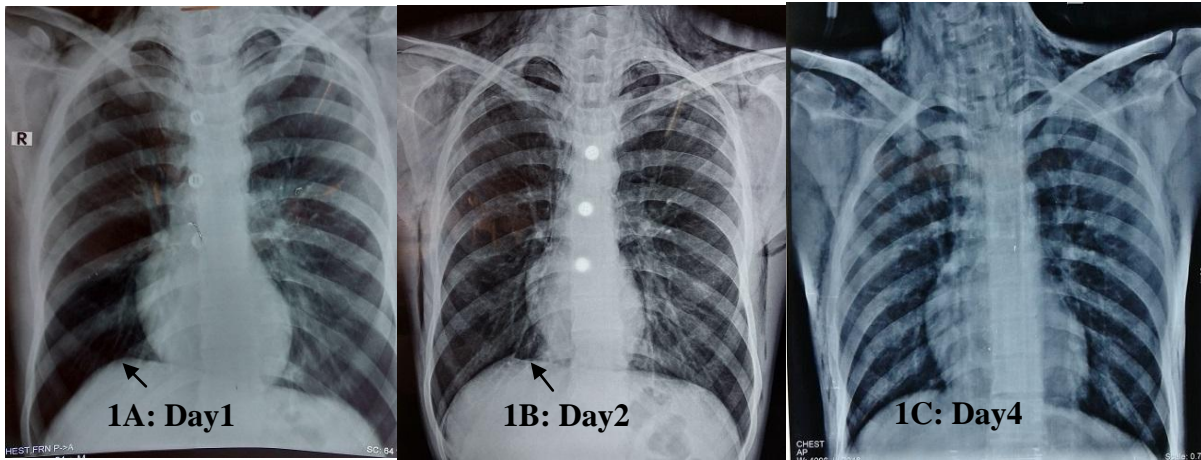
A 21 years old Caucasian male patient from Europe presented to our emergency with complaints of heaviness in the chest, uneasiness during respiration and dizziness in the head. These symptoms started

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a day before, nearly half an hour after he had smoked cannabis. He denies any history of trauma or bronchial asthma. He has no fever or cough symptoms. At triage, he was anxious and tachycardic with heart rate of 110/min, blood pressure of 130/80 mm Hg, respiratory rate of 20/min, axillary temperature of 98 °F and SpO2 of 94% in room air. On systemic examination, he had subcutaneous emphysema over the anterior chest

bilaterally. Chest X-ray revealed subcutaneous emphysema with pneumomediastinum (Figure 1A and 1B). CT Scan of the chest showed pneumo-mediastinum with subcutaneous emphysema without pneumothorax (Figure 2). On lab investigations, he had neutrophilic leukocytosis (total leukocyte count=12700/mm<sup>3</sup>, 75% neutrophils) and normal level of serum electrolytes. His renal and hepatic functions were within normal limits. He was kept under high flow oxygen via facemask and transferred to pulmonology unit of medical ward. Repeat chest X-ray after 48 hours showed decreasing emphysema (Figure 1C). His hospital stay was uneventful with no complications and was discharged after 60 hours of hospital stay.



**Figure 1: Serial chest X-rays of the patient. Note the pneumomediastinum in 1A and 1B (shown as arrow) which has resolved in 1C**



**Figure 2: Computed Tomography of the chest. Note the pneumomediastinum (Arrow A) and subcutaneous emphysema (Arrow B)**

## **DISCUSSION**

Pneumomediastinum is a clinical condition in which there is accumulation of air in the anatomical space of mediastinum. It is generally secondary to trauma (either blunt or penetrating) or iatrogenic (complications of central venous catheterization, upper GI endoscopy, endotracheal intubation or tracheostomy) [1,2]. On rare instances, it can be spontaneous. Spontaneous pneumomediastinum (SPM) is also referred to as “Hamman’s syndrome” as Louis Hamman was the first to report case series of this entity. SPM can occur in presence of some predisposing factors such as COPD, asthma, interstitial lung disease, and tobacco smoking. The precipitating factors are vigorous coughing, sneezing or deep inhalation such as tobacco smoking and illegal drug inhalation [3-5]. Other precipitating factors are straining during labor and constipation [6]. Incidence of SPM is reported to be 0.001–0.01% of all adult population and is said to be more common in young males [7,8].

Pathophysiology is based in the “Macklin effect” which was first described by Macklin in 1939. It states that sudden change in intrathoracic cavity pressure causes alveolar rupture which leads to air dissection along the bronchovascular sheath, and eventually into the mediastinum. Air can also dissect through other serous structures and subcutaneous tissue [9]. Common features include chest pain, shortness of breath, subcutaneous emphysema and anxiety [2,8,10]. Other features include throat discomfort, neck pain, dysphagia and even rhinolalia [8,10].

### **Differential diagnosis**

It is important to distinguish pneumomediastinum from conditions with similar clinical findings that require immediate treatment, such as cardiac tamponade, angina pectoris, pericarditis, dissecting aortic aneurysm, mediastinitis, and pulmonary embolism or even pneumothorax. In extreme circumstances, usually with severe vomiting, a ruptured esophagus can result in pneumomediastinum (Boerhaave syndrome) [7,8,11]. Esophagogram is required only if the patient’s symptoms are severe with signs of inflammation [2,8].

### **Treatment**

Treatment of SPM is usually conservative with rest, high flow oxygen and analgesia. At least 48 hours in hospital observation is mandatory for early identification and prompt treatment of the complications [2,4,7,8].

### **Complications**

Usually SPM is benign and resolves on its own. In rare instances, tension pneumomediastinum develops which may lead to cardiac or great vessel compression. Thoracotomy should be done in such cases [4,12,13], other complications are pneumopericardium where air leaks into the pericardial sac which may require drainage using a pericardial tube [2,14]. Airflow movement may occur through pleural structures causing pneumothorax or even tension pneumothorax, which can be drained by intercostal chest tube drainage [4,14]. Free air in the spinal canal, also called pneumorrhachis results from the communication between the posterior mediastinum and epidural space. Pneumorrhachis is managed conservatively [15].

## **CONCLUSION**

Spontaneous pneumomediastinum is a rare but a benign entity. Emergency physician should have a strong suspicion of SPM as one of the differential diagnoses in patient presenting with acute onset chest tightness and difficulty breathing more so in those with subcutaneous emphysema. Treatment is

conservative with high flow oxygen. Close observation for early identification of complications, if any and prompt management improves the outcome.

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## REFERENCES

1. Paramasivam E, Bodenham A. Air leaks, pneumothorax, and chest drains. *Continuing Education in Anaesthesia Critical Care & Pain*. 2008 Dec 1;8(6):204-9.
2. Sahni S, Verma S, Grullon J, Esquire A, Patel P, Talwar A. Spontaneous pneumomediastinum: time for consensus. *North American Journal of medical sciences*. 2013 Aug;5(8):460.
3. Albanese J, Gross C, Azab M, Mahalean S, Makar R. Spontaneous pneumomediastinum: a rare complication of methamphetamine use. *Respiratory medicine case reports*. 2017 Jan 1;21:25-6.
4. Perna V, Vilà E, Guelbenzu JJ, Amat I. Pneumomediastinum: is this really a benign entity? When it can be considered as spontaneous? Our experience in 47 adult patients. *European journal of cardio-thoracic surgery*. 2010 Mar 1;37(3):573-5.
5. Hazouard E, Koninck JC, Attucci S, Fauchier-Rolland F, Brunereau L, Diot P. Pneumorachis and pneumomediastinum caused by repeated Müller's maneuvers: complications of marijuana smoking. *Annals of emergency medicine*. 2001 Dec 1;38(6):694-7.
6. Khurram D, Patel B, Farra MW. Hamman's syndrome: a rare cause of chest pain in a postpartum patient. *Case reports in pulmonology*. 2015 Jan 21;2015.
7. Macia I, Moya J, Ramos R, Morera R, Escobar I, Saumench J, Perna V, Rivas F. Spontaneous pneumomediastinum: 41 cases. *European journal of Cardio-thoracic surgery*. 2007 Jun 1;31(6):1110-4.
8. Takada K, Matsumoto S, Hiramatsu T, Kojima E, Watanabe H, Sizu M, Okachi S, Ninomiya K. Management of spontaneous pneumomediastinum based on clinical experience of 25 cases. *Respiratory medicine*. 2008 Sep 1;102(9):1329-34.
9. Macklin MT, Macklin CC. Malignant interstitial emphysema of the lungs and mediastinum as an important occult complication in many respiratory diseases and other conditions: an interpretation of the clinical literature in the light of laboratory experiment. *Medicine*. 1944 Dec 1;23(4):281-358.
10. Breakey RW, Walker G, Oldfield W. Spontaneous pneumomediastinum presenting as rhinolalia and chest pain. *The Annals of The Royal College of Surgeons of England*. 2012 Nov;94(8):e12-4.
11. Langwieler TE, Steffani KD, Bogoevski DP, Mann O, Izbicki JR. Spontaneous pneumomediastinum. *The Annals of thoracic surgery*. 2004 Aug 1;78(2):711-3.
12. Meireles J, Neves S, Castro A, França M. Spontaneous pneumomediastinum revisited. *Respiratory Medicine CME*. 2011 Jan 1;4(4):181-3.
13. Venugopal K, Reddy MM, Bharathraj YM, Kadappa J. Non-traumatic, spontaneous subcutaneous emphysema: diagnostic and therapeutic dilemma. *International Journal of Health & Allied Sciences*. 2015 Apr 1;4(2):97.
14. Devaraj U, Ramachandran P, D'souza GA. Recurrent spontaneous pneumomediastinum in a young female: hamman's crunch revisited. *Oxford Medical Case Reports*. 2014 May 1;2014(2):18-20.
15. Martins L, Dionísio P, Moreira S, Manique A, Correia I, Bárbara C. An Unusual Association in an Uncommon Disease: Two Cases of Spontaneous Pneumomediastinum Associated with Pneumorrhachis. *Case Reports in Pulmonology*. 2016 Apr 26;2016.