

Spontaneous pneumomediastinum in acute severe asthma

Aleemuddin N. M., Farah Bahmed

Abstract

Spontaneous mediastinal emphysema, as a complication of acute severe asthma, is an uncommon entity. It usually runs a benign course and resolves spontaneously without any surgical intervention. Recognition of this complication is critical, as it has to be differentiated from other life threatening ones including oesophageal rupture, Boerhaave's syndrome, acute coronary syndrome and pulmonary embolism. This case is being presented to emphasize its recognition in the differential diagnosis of complications arising from acute severe asthma and to present its management strategy in detail.

Keywords: Spontaneous pneumomediastinum, cervical mediastinotomy, tracheostomy, 100% oxygen, Hamman's sign

DOI: 10.4103/0972-5229.68224

Introduction

Substernal chest pain during an asthma attack, subcutaneous emphysema in the neck and over the chest and the Hamman's sign on auscultation should raise the suspicion of a spontaneous pneumomediastinum.^[1-4] Air lucency in the soft tissues of the neck, along the cardiac silhouette on CXRPA view and in front of the heart on lateral view confirms the diagnosis.^[5-6] This condition usually gets resolved spontaneously and requires only close observation and management of the asthma. 100% oxygen, cervical mediastinotomy and tracheotomy are required only in cases of cardiopulmonary distress. Spontaneous pneumomediastinum is defined as the presence of free air in the mediastinal structures without an apparent precipitating cause. Its occurrence ratio is approximately one case per 10,000 hospital admissions,^[7] and thus, it may not be very familiar to most of the physicians. Asthma alone accounts for 22-50% spontaneous pneumomediastinum cases, as mentioned in

various studies.^[8-9] There are several studies published recently about pneumomediastinum in acute severe asthma.^[10-13] Asthma is very commonly encountered in clinical practice but mediastinal emphysema as its complication is an infrequent problem. Review of literature reveals that less than 100 cases have been published till now. We report a case of spontaneous pneumomediastinum complicating acute severe asthma in an adult male.

Case Report

A 37-year-old known asthmatic male patient presented with sudden onset of retrosternal chest pain of two hours duration. He was asymptomatic two days back, and then developed productive cough, breathlessness and wheezes, which was not associated with fever or chest pain. Two hours prior to presentation, he developed sudden onset of chest pain while driving, which was not associated with trauma, vomiting or sweating. Chest pain was severe, pleuritic, nonradiating and piercing type with no relieving or aggravating factors. There was no associated dysphagia suggesting any oesophageal perforation. Physical examination revealed subcutaneous emphysema over the neck and the anterior chest wall. He was febrile with his blood pressure being 120/80 mm Hg, pulse 100/min, RR 18/minute regular and ECG within normal limits. Auscultation

From:

Department of Respiratory Medicine, Deccan College of Medical Sciences, Kanchan Bagh, Santoshnagar, Hyderabad, India

Correspondence:

Dr. Md. Aleemuddin Naveed, Assistant Professor, Department of Respiratory Medicine, Deccan College of Medical Sciences, Kanchan Bagh, Santoshnagar Hyderabad-500058, Andhra Pradesh, India. E-mail: aleem95@yahoo.com

Free full text available from www.ijccm.org

revealed bilateral expiratory wheeze with prolonged expiration and no adventitious heart sounds were heard. CXR [Figure 1] revealed pneumomediastinum without pneumothorax or obvious rib fractures. CT scan chest [Figures 2-4] revealed pneumomediastinum without any other abnormality. He was managed with oxygen, nebulisation, hydrocortisone, oral bronchodilators and pain medication. Patient improved symptomatically and the chest pain disappeared after 48 hours. CXR and CT scan after seven days showed no abnormality.

Discussion

The case described above highlights an unusual complication of acute severe asthma. In asthma, spontaneous pneumomediastinum occurs due to the existence of a decreasing pressure gradient between the alveoli and the lung interstitium that can result in alveolar rupture. This pressure gradient can be produced by decreasing pleural pressure, which occurs when the Mueller's maneuver is performed in bronchial asthma

or by decreasing interstitial pressure which occurs in intense work of breathing and vasoconstriction or by increasing intraalveolar pressure. In acute severe asthma, explosive rise of intra alveolar pressure arising from partial or complete obstruction of airways causes rupture of the alveoli and seeping of air into the interstitium centripetally (Macklin effect).^[14] Air travels along the perivascular sheaths and further dissects into the mediastinum producing mediastinal emphysema. Cardiopulmonary distress may complicate the situation if air compresses large veins in the mediastinum. No intervention is necessary in most cases; severe cases with hemodynamic or respiratory instability could require intervention.^[2-5] In case of cardiopulmonary distress, treatment options include 100% oxygen to increase the diffusion pressure of nitrogen in subcutaneous tissues that results in an increased rate of reabsorption, thereby relieving pressure symptoms. In life threatening situations cervical mediastinotomy can be performed by making incisions in the supraclavicular fosse posterior to



Figure 1: Thin lucency of air seen along borders of heart indicated by arrows

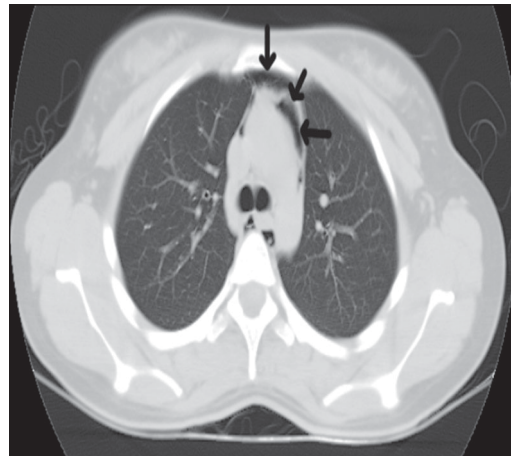


Figure 2: Rounded lucencies seen within mediastinal pleura surrounding the mediastinal structures indicated by arrows



Figure 3: Rounded lucencies seen within mediastinal pleura surrounding the mediastinal structures indicated by arrows

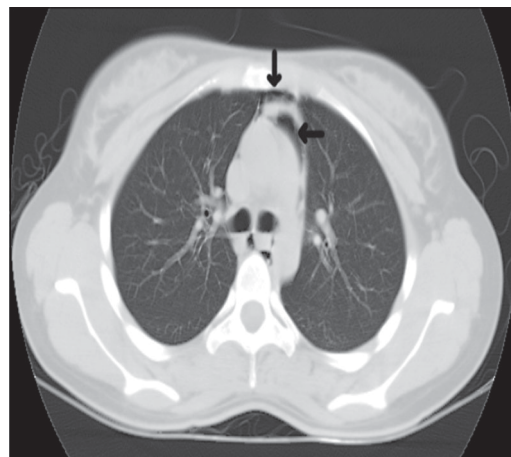


Figure 4: Rounded lucencies seen within mediastinal pleura surrounding the mediastinal structures indicated by arrows

the sternocleidomastoid muscles and in the suprasternal notch. Furthermore tracheotomy can be performed, that not only decompresses the mediastinum but also decreases the intra alveolar pressure thereby preventing further seeping of air into mediastinum.

References

1. Koullias GJ, Korkolis DP, Wang XJ, Hammond GL. Current assessment and management of spontaneous pneumomediastinum: experience in 24 adult patients. *Eur J Cardiothorac Surg* 2004; 25:852-2.
2. Newcomb AE, Clark CP. Spontaneous pneumomediastinum- a benign curiosity or a significant problem? *Chest* 2005; 128:298-302.
3. Abolnik I, Lossos IS, Breuer R. Spontaneous pneumomediastinum. A report of 25 cases. *Chest* 1991; 100:93-5.
4. Jougon JB, Ballester M, Declambre F, Macbride T, Dromer CEH, Valley JF. Spontaneous pneumomediastinum: clinical and natural history. *Ann Emerg Med* 1992; 21:67-72.
5. Ba-Ssalamah A, Schima W, Umek W, Herold CJ. Spontaneous pneumomediastinum. *Eur Radiol* 1999; 9:724-7.
6. Bejvan SM, Godwin JD. Pneumomediastinum: old signs and new signs. *AJR Am J Roentgenol* 1996; 166:1041-8.
7. Holmes KD, McQuirt WF. Spontaneous pneumomediastinum: evaluation and treatment. *J Fam Pract* 1990; 31:429.
8. Chiu CY, Wong KS, Yao TC, Huang JL. Asthmatic versus non-asthmatic spontaneous pneumomediastinum in children. *Asian Pac J Allergy Immunol* 2005; 23:19-22.
9. Macia I, Moya J, Ramos R, Morera R, Escobar I, Saumench J, *et al.* Spontaneous pneumomediastinum: 41 cases. *Eur J Cardiothorac Surg* 2007;31:1110-4.
10. Perna V, Vilà E, Guelbenzu JJ, Amat I. Pneumomediastinum: is it really a benign entity? When it can be considered as spontaneous? Our experience in 47 adult patients. *Eur J Cardiothorac Surg*; 2009.
11. Takada K, Matsumoto S, Hiramatsu T, Kojima E, Shizu M, Okachi S, *et al.* Spontaneous pneumomediastinum: an algorithm for diagnosis and management. *Ther Adv Respir Dis* 2009; 3:301-7.
12. Faruqi S, Varma R, Greenstone MA, Kastelik JA. Spontaneous pneumomediastinum: a rare complication of bronchial asthma. *J Asthma* 2009; 46:669-71.
13. Weissberg D. Spontaneous mediastinal emphysema. *Eur J Cardiothorac Surg* 2004; 26:885-8.
14. Macklin MT, Macklin CC. Malignant interstitial emphysema of the lungs and mediastinum as an important occult complication in many respiratory diseases and other conditions: interpretation of the clinical literature in the light of laboratory experiment. *Medicine* 1944; 23: 281-358.

Source of Support: Nil, **Conflict of Interest:** None declared.