

Case report:

Recurrent Spontaneous Pneumothorax Following Helicopter Travel In High Altitude Areas

Peter S¹, Singh N², Peter P³

Abstract

A young healthy soldier, non smoker with no previous lung disease, presented with two separate episodes of primary spontaneous pneumothorax within six months, both preceded by low level helicopter travel during high altitude postings. This diagnosis must be considered in patients with acute onset chest pain and dyspnoea even when other risk factors are seemingly absent. Recurrence is common and so this differential must be kept in mind even after complete treatment of a previous episode.

Key words: Primary spontaneous pneumothorax, helicopter travel, altitude

Introduction

Primary spontaneous pneumothorax is the spontaneous occurrence of pneumothorax in patients without apparent underlying pulmonary diseases, the most common cause being rupture of subpleural blebs or bullae¹. Precipitating factors that have been postulated vary from changes in atmosphere to even exposure to loud music, causing a specific form of air pressure change leading to pneumothorax². Catamenial pneumothorax has been reported in cases of thoracic endometriosis. The aviation community and the armed forces have been reported to be at increased risk of spontaneous pneumothorax³. A lot of debate is still going on regarding various possible mechanisms of spontaneous pneumothorax. This case report describes repeated primary spontaneous pneumothorax that occurred in a healthy young male whose only risk factor was exposure to helicopter travel at low height during posting in high altitude area.

Case Report

A 35 year old male, a healthy soldier, presented to casualty with complaints of acute onset right sided chest pain and dyspnoea. There was no associated fever, orthopnoea, radiation of pain or history of trauma. Examination revealed tachycardia, tachypnoea, hyperresonant note in the right mammary,

inframammary, interscapular and infrascapular regions with absent breath sounds in the same areas. A clinical possibility of right sided spontaneous pneumothorax was kept. This was confirmed by the chest X ray and subsequent CT scan which showed right sided pneumothorax and pneumomediastinum with right lung collapse. There were no associated blebs or bullae [Figure 1, Figure 2].



1. Soumia Peter, Assistant Professor, Department of Medicine, Christian Medical College and Hospital, Ludhiana, Punjab, India
2. Navjot Singh, Professor, Department of Medicine, Christian Medical College and Hospital, Ludhiana, Punjab, India
3. Prasant Peter, Assistant Professor, Department of Radiodiagnosis, Christian Medical College and Hospital, Ludhiana, Punjab, India

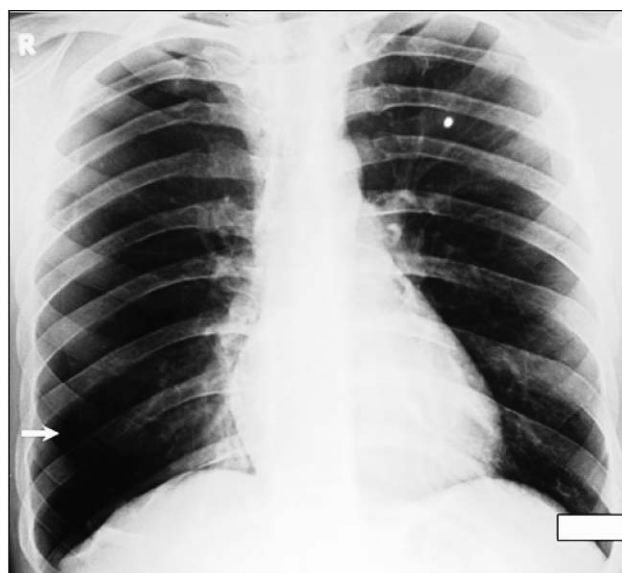
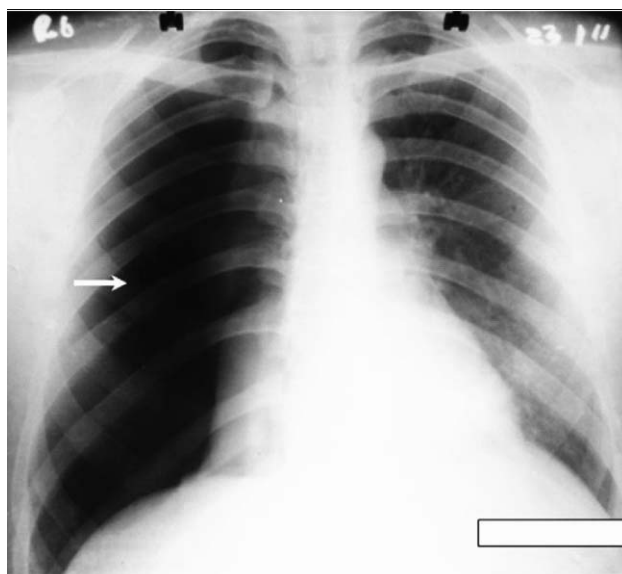
Correspond to: Dr Soumia Peter, Assistant Professor, Department of Medicine, Christian Medical College & Hospital, Ludhiana, Punjab, India. **E-mail:** soumiaanna@rediffmail.com Ph: 08054900362



Figures 1&2 : *Chest X ray shows right sided pneumothorax (long arrow) with pneumomediastinum (short arrow) at the time of admission. CT Chest shows the large pneumothorax with compression of the right lobe. Pneumomediastinum is noted posteriorly.*

The left hemithorax was normal. His arterial blood gas analysis showed hypoxia with PO₂ of 86%. The patient was a tall, well built healthy male who was not a smoker and had no history of any respiratory diseases in the past. His blood investigations showed Hemoglobin of 10.2 mg/dl, Total leucocyte count of 8500/mm³, and Erythrocyte sedimentation rate of 32. His renal and liver function tests were normal. Secondary causes of pneumothorax like chronic obstructive pulmonary disease, trauma, tuberculosis, pneumonia, lung malignancy, bronchial asthma and other infections were ruled out through history and clinical investigations.

On reviewing his history, it was noticed that about six months back, he had a similar episode of right sided chest pain and dyspnoea. At that time, he was diagnosed to have a right sided spontaneous pneumothorax that had recovered with closed thoracostomy [Figure 3, Figure 4]. Prior to this previous incident, he gave history of going on a low level aerial survey in a helicopter, as a part of his military training. He had been posted at a station at an altitude of approximately 2,700 m above sea level.



Figures 3&4 : *Chest X ray taken six months back had shown right sided pneumothorax (arrow). Reduction in the right sided pneumothorax was noted (arrow) after closed thorocostomy, which then resolved completely in subsequent Chest X rays*

The present second episode of spontaneous pneumothorax had also been preceded by another exposure to low level helicopter flying, but he had been asymptomatic between the two episodes.

Following admission in our hospital, the patient gradually recovered with conservative treatment including high flow oxygen and bed rest. No surgical intervention was required as his lungs expanded to normal within six weeks. He was then advised to avoid any further flying, including hel-

icopter travel, and to avoid postings at high altitude.

Discussion

Spontaneous pneumothorax can be divided into two types. Primary spontaneous pneumothorax is the idiopathic variety which occurs in otherwise healthy persons. In secondary spontaneous pneumothorax, an underlying disease state responsible for the pneumothorax can be identified⁴. Primary spontaneous pneumothorax typically occurs in tall, thin males and smoking increases its incidence⁵. In tall thin males, morphology and physiology is such that they have an inherent defect in their structure which is manifested by a lengthened chest cavity and lung. This structure makes the lung apex more vulnerable to gravitational and other stresses which may cause bleb formation and a subsequent spontaneous pneumothorax with collapse of the lung⁶. Our patient was a young, non smoker healthy male who never had any pre existing lung diseases. The above explained hypothesis may be applicable in him although no evidence of bullae could be demonstrated on the CT scan.

Spontaneous pneumothorax is a concern in the aviation community and the armed forces which com-

prises mostly of young healthy males who are exposed to positive pressure breathing which may also make the lung more susceptible to spontaneous pneumothorax⁶.

Recurrence of spontaneous pneumothorax is common with majority of cases occurring within the first year itself⁶.

The temporal relationship between the occurrence of the disease and the precipitating factor of helicopter travel during high altitude posting in our patient suggests that this may have been the precipitating cause. However, there is no adequate data proving increased occurrence of primary spontaneous pneumothorax in people following helicopter flight. Although it is not possible to prove, some studies have also postulated that spontaneous pneumothorax may actually play a role in aircraft accidents which have so far been attributed to pilot errors⁶.

We conclude that history of air travel, even low height flight in helicopter, and exposure to high altitude should be considered as a possible risk factor for primary spontaneous pneumothorax. For clinicians, this should be a part of history taking so that prompt diagnosis is made and future recurrence of the disease is prevented.

References

1. Bense L, Lewander R, Eklund G, G Hedenstierna, L G Wimanet. Non-smoking, non alpha -1-antitrypsin deficiency induced emphysema in non smokers with healed spontaneous pneumothorax identified by computed tomography of the lungs. *Chest* 1993; **103**:433-8. <http://dx.doi.org/10.1378/chest.103.2.433> PMID:8432133
2. Noppen M, Verbanck S, Harvey J, Van Herre Weghe R, Meysman M, Vincken W et al. Music: a new cause of primary spontaneous pneumothorax. *Thorax* 2004; **59**:722-4. <http://dx.doi.org/10.1136/thx.2003.007385> PMID:15282396 PMID:1747103
3. Hickman, J.R., Tolan, G.D., Gray, G.W., & Hull, D.H. (1996). Clinical aerospace cardiovascular and pulmonary medicine. In *R.L. DeHart (Ed.), Fundamentals of Aerospace Medicine* (pp. 463-518). Baltimore: Williams & Wilkins.
4. Gupta D, Hansell A, Nichols T, Duong T, Ayres JG, Strachan D. Epidemiology of pneumothorax in England. *Thorax*. 2000; **55**:666-71. <http://dx.doi.org/10.1136/thorax.55.8.666> PMID:10899243 PMID:1745823
5. Baumann MH, Noppen M. Pneumothorax. *Respirology*. 2004; **9**:157-64. <http://dx.doi.org/10.1111/j.1440-1843.2004.00577.x> PMID:15182264
6. Voge V.M., Anthracite, R. Spontaneous pneumothorax in the USAF aircrew population: A retrospective study. *Aviat Space Environ Med* 1986; **57**, 939-49. PMID:377839