

Case Report

Spontaneous pneumothorax following air travel in a Nigerian woman: a case report

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Spontaneous pneumo-thorax is collection of air in the pleural space, between the lungs and chest wall causing lung collapse and occurs in the absence of a traumatic injury to the chest or a known lung disease. The diagnosis can be made on plain erect, decubitus chest radiographs or in high resolution computed tomography (HRCT) of the chest. This case report is to high light a case of spontaneous pneumo-thorax, incidentally diagnosed on a pre-operative radiograph of a patient who complained of chest pain and difficulty in breathing on landing at the airport ten days before, and emphasize the need for a chest radiograph in any patient who complains of chest pain and difficulty in breathing. RA 43-year-old married female, known diabetic and hypertensive made a short 1 hour 50minutes flight to Lagos by air in a small eighteen (18) seater propeller plane. On landing, patient complained of chest pain and difficulty in breathing. She was taken straight to a private hospital where she was seen, assessed and found to be stable. Electrocardiography (ECG) was also done since she gave a history of hypertension. Nothing more than the changes of hypertension were seen on the ECG. Patient was reassured and asked to go home on pain relievers. No chest radiograph was done. Ten (10) days later pneumothorax was seen on a pre-operative radiograph of this patient. This case of spontaneous pneumothorax is reported and the importance of simple plain chest radiograph in any patient complaining of chest pain and difficulty in breathing highlighted. The need for pre-operative chest radiograph is also emphasized.

Keywords: Spontaneous pneumothorax, chest pain, plain chest X-ray, air travel.

INTRODUCTION

The word pneumothorax was first used by Itard in 1803. Laennec described the clinical picture of pneumo-thorax in 1819 (Laennec 1819). This is due to air in the pleural space between the lung and the chest wall. The modern description of primary spontaneous pneumothorax seen in otherwise healthy people was provided by Klaergard (1932). Primary pneumothorax has remained a global problem occurring in healthy subjects with a reported incidence of 18-20/100,000 per year for men and 1.2-6/100,000 per year for women (Melton et al., 1979; Bense et al., 1987).

Secondary pneumothorax is associated with lung diseases like tuberculosis, blebs, bullae in the lungs and trauma to the chest. Despite absence of underlying pulmonary disease in patients with primary

pneumothorax, subpleural blebs and bullae are likely to play a role in the pathogenesis since they are found in up to 90% of cases of primary pneumothorax at thoracoscopy or thoracostomy and in up to 80% of cases on CT scanning of the thorax (Donahue et al., 1993 and Lesur et al., 1990). The cause of bullous changes in otherwise apparently healthy lungs is not clear (Henry et al 2003).

Undoubtedly smoking plays a role (Jansveld and Dijkman, 1975; Bense et al., 1987), and the lifetime risk of developing a pneumothorax in healthy smoking men may be as much as 12% compared with 0.1% in non smoking men. This is also seen though to a lesser extent in women (Bense et al., 1987).

The risk of recurrence of primary pneumothorax is 54% within the first 4 years, with isolated risk factors including smoking, height in male patients of age over 60 years (Sadikot et al., 1997; Lippert et al., 1991).

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Figure 1. Pre-operative chest radiograph done 10 days after the flight on which the diagnosis of spontaneous pneumothorax was made. Note vertical line extending from posterior end of 7th rib on the left forming an acute angle with another line extending downwards from the left hilum. The area around these converged lines is devoid of lung markings due to pneumothorax.



Figure 2. Done 17 days after. Note linear oblique line on the left cardiac bay, the position of the left atrium due to small resolving pneumothorax.

Case report

RA, a 43-year-old married female para 3, known diabetic and hypertensive was sent to radiology department for a pre-operative chest radiograph before an elective abdominal hysterectomy for menorrhagia and uterine myoma. The radiograph revealed pneumothorax on the left hemi-thorax (figure 1). On direct questioning, patient said she made a short 1 hour 50 minutes flight to Lagos by air in a small eighteen (18) seater propeller plane ten (10) days before. This aircraft does not go in to the high altitude-never goes above ten thousand feet. All through

the flight the view of the ground is seen. On landing, she had mild left sided chest pain and difficulty in breathing. She was taken to a private hospital where she was seen assessed and found to be stable. An electrocardiography (ECG) was done since she gave a history of hypertension.

Nothing more than the changes of hypertension were seen on the ECG. No chest radiograph was done. A previous routine radiograph done seven months earlier as part of annual medical evaluation was normal. The surgery was suspended and patient managed conservatively. Follow up chest radiograph (Figure 2) one

week after showed marked improvement and subsequent one done two weeks later showed complete resolution of the pneumothorax.

DISCUSSION

Spontaneous pneumothorax occurs without demonstrable underlying pathology. In the real sense there is always a lesion, be it a subpleural bleb or other organic disease. The word "Spontaneous" indicates our inability to demonstrate blebs clinically or their spontaneous development (Serementis 1970). Primary spontaneous pneumothorax (PSP) is commonly seen in otherwise healthy young people. Many of the early available reports in the literature came from military facilities (Driscoll and Aronstam, 1961; Hyde, 1962; Mills and Baish, 1965; Thomas, 1959). Noppen et al (2004) reported exposure to loud sounds as a precipitating factor in primary spontaneous pneumothorax.

The presenting symptom in cases of spontaneous pneumothorax is pain. In a study of 155 patients by Serementis (1970), 140 presented with chest pain. Shortness of breath was seen in 33 and cough in 16. General malaise without other symptoms was seen in 5, and 10 patients experienced no symptoms at all: their pneumothorax was found during routine physical examination or unrelated diagnosis. 18% of the patients admitted having symptoms for over a week. This case being reported admitted having symptoms on landing at the airport and the diagnosis was made incidentally almost 10 days after.

Clinical history and physical examination usually suggest the presence of pneumothorax, but clinical manifestation is not a reliable indicator of the size of pneumothorax (Serementis, 1970, Vail et al 1963).

Evidence has shown that many patients with pneumothorax do not seek treatment for days about 46% waiting for more than 2 days with symptoms (O'Hara 1978).

Arterial blood gas measurements are usually abnormal in patients with pneumothorax with the arterial oxygen tension (PaO₂) being less than 10.9kPa (80mmHg) in 75% of patients (Norris et al., 1968).

Early radiological diagnosis and confirmation of this condition is very important to avoid serious complications. Simple erect postero-anterior chest radiograph and occasionally lateral are all required to make the diagnosis. Lateral decubitus view is superior to the erect or supine views and is felt to be as sensitive as computed tomography (CT) scanning in pneumothorax detection (Carr et al 1992).

Previous classification of the size of a pneumothorax tends to underestimate its volume.

The new guideline divides pneumothorax into "small" or "large" depending on the presence of a visible rim of < 2cm or ≥ 2cm between the lung margin and the chest

wall (Henry et al., 2003). The exact methods of estimating size of pneumothorax from PA chest radiographs are cumbersome and generally used only as a research tool (Collins et al., 1995). The 1993 guideline describes pneumothorax into three groups:

- a. "Small" defined as a small rim of air around the lung.
- b. "Moderate" lung collapsed half way towards the heart border.
- c. "Complete" airless lung separate from the diaphragm.

At the point of diagnosis of our patient the extent of pneumothorax was small. It may have been more than this at onset.

Acquired immune deficiency syndrome (Aids), related spontaneous pneumothorax is complicated by the refractory nature of air leaks which tend to occur with necrotizing thin walled cysts and pneumatoceles (Suster et al 1986 and Eng et al 1987).

The exact incidence of pneumothorax during air travel is not known due to non-standardized reporting requirements for in-flight medical emergencies. Anecdotal reports of in-flight pneumothorax has been published (Flux and Dille, 1969; Neidhart and Suter, 1985; Amdur 1956). In-flight pneumothorax must be exceedingly rare since it is not mentioned in most reports addressing in-flight emergencies (Commins and Schubach, 1989; Lyznicki et al., 2000). Between 1986 and 1988, the Federal Aviation Administration (FAA) required air carriers to maintain records of all medial emergencies. A total of 2322 emergencies were documented during the two (2) years. Unfortunately case descriptions were limited and the diagnoses were not necessarily confirmed medically.

Only one definite and one possible pneumothorax were reported (Hordinsky and George, 1991).

The recurrence rate of pneumothorax after first episode is high (41%) with either bed rest (49%) or tube thoracotomy (38%). Tube thoracotomy is preferred at initial attack mainly because it shortens hospitalization and it is safe. The only effective treatment to prevent further recurrence is open thoracotomy and pleurodesis best achieved by scarification of the pleura (Serementis 1970). Mills and Baish (1965) stated in their study that the recurrence rate following first episode of spontaneous pneumothorax is high, irrespective of the treatment-short or open thoracostomy. Ryu et al (2009) stated that PSP patients with complete atelectasis showed a higher incidence of persistent air leakage and ipsilateral recurrence than did PSP patients with partial atelectasis. Complete atelectasis of the lung in PSP patients is an indication for surgical intervention at their first PSP episode. Ambrogi et al (2008) introduced a new device endo-floating ball for coagulation of blebs and bullae as an alternative to endostapler resection.

Patients discharged without intervention should avoid air travel until chest radiograph has confirmed complete resolution of the pneumothorax. Commercial airlines currently arbitrarily advise 6 weeks interval between

having pneumothorax and travelling by air. Patients with current closed pneumothorax should not travel on a commercial flight.

There is no evidence that air travel precipitates recurrence of a pneumothorax but recurrence during a flight may have serious repercussion. Our patient obviously travelled by air back to her base about 3 days after, without knowing that she had a pneumothorax the diagnosis of which was not made at on set.

CONCLUSION

A case of spontaneous pneumothorax which must have happened in-flight or immediately on landing is reported. The importance of chest radiograph on any patient who complains of chest pain, difficulty in breathing is highlighted. The need for pre-operative chest radiograph as a routine is emphasized.

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