

CASE REPORT

Loss of consciousness during air travel: A case of lung bullae

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Abstract

A giant lung bulla occupies at least a third of the lung space. We present a middle-aged man who lost consciousness during an air flight for 30 minutes, without any respiratory symptoms. An incidental finding on chest x-ray revealed a giant bulla and a chest computed tomography imaging confirmed the diagnosis and ruled out a tension pneumothorax. A giant lung bulla is an uncommon cause of loss of consciousness and may be suspected if it occurs during air travel.

INTRODUCTION

A bulla is an air-filled space greater than 1 cm in diameter, while a giant bulla occupies at least a third of the hemithorax. They are caused by smoking and deficiency of α -1 antitrypsin but may occur due to illicit drug use and human immunodeficiency virus (HIV) infection. Apart from the mentioned risk factors above, they may be more frequent in those greater than 45 years of age [1]. We describe a 42-year-old healthy male who developed sudden loss of consciousness during an air flight, with an incidental finding of a giant lung bulla.

CASE REPORT

A 42-year-old army man presented with a sudden loss of consciousness for 30 minutes during an air flight that had ascended to 4000 meters above sea level. The loss of consciousness was associated with left arm and left truncal twitching with no eye-rolling, tongue-biting, or bowel and bladder incontinence. Before

the loss of consciousness, he experienced frontal headache and dizziness. He did not report any chest pain or difficulty in breathing. He denied a history of smoking, illicit drug use, or trauma. He had traveled by air several times before, most recently being 2 months before the current complaint; however, he never experienced any complications.

On admission, he was fully conscious with stable vitals. His neurology examination revealed facial asymmetry with reduced power of the left upper limb though the tone and reflexes were intact. There were reduced breath sounds on the upper and middle zones of the left lung. His laboratory blood workup was not significant and the serology for HIV and α -1 antitrypsin were negative. The brain computed tomography (CT) scan was normal. His chest x-ray revealed a giant left lung bulla (Figure 1). Chest CT revealed a single giant bulla in the left upper lobe, occupying nearly a third of the left hemithorax suggesting a giant apical bullous emphysema (Figure 2).

A day after his admission, the neurological symptoms had started to regress and his left upper limb weakness had subsided.

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Figure 1: Supine chest x-ray shows a large thin-walled cavity in the left upper lobe occupying more than one-third of the affected hemithorax.

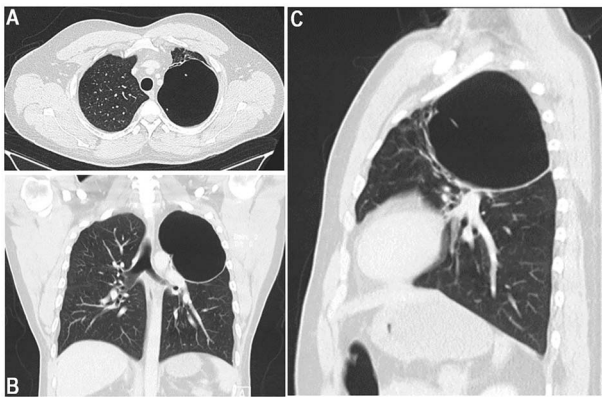


Figure 2: Axial (A), Coronal (B), and Sagittal (C) chest CT lung window shows a thin-walled cavitary lesion with thin septations in the apex of the left upper lobe measuring 11.1 cm (AP) x 9.5 cm (T) x 10.9 cm (CC) in size.

Since the patient was not having any respiratory complaint or compromise, the patient was observed for a few days without any change in his respiratory system. The patient was saturating well on room air. An option for bullectomy was brought up but the patient refused as he saw himself as fit. He was counseled on the complications of the disease and was discharged. He has been lost to follow-up.

DISCUSSION

Patients with giant lung bulla typically present with sudden onset difficulty in breathing or chest pain with suspicion of tension pneumothorax [1], but rarely loss of consciousness. Our case describes a healthy middle-aged non-smoker without prior history of lung disease presenting with loss of consciousness during an air flight. In chronic pulmonary disease, a patient may have poor lung ventilation or pulmonary hypertension which may contribute to a decline of partial pressure of arterial oxygen (PaO_2) with hypoxia-induced pulmonary vasoconstriction [2]. In healthy people, vasoconstriction redistributes pulmonary blood flow to the lung apex, which may reduce ventilation-perfusion mismatching, which could help to maintain the PaO_2 during air travel [3]. Since the left lung apex was compromised in

our case, this might have led to a hypoxic event hence loss of consciousness. However, there have been reports of ruptured giant lung bulla during air travel. In such circumstances, the air enters the blood circulation causing cerebral air embolism and neurological deficit such as loss of consciousness and stroke [4]. In our case, the patient had a facial asymmetry with left arm weakness which may have been attributed to a cerebral air embolism although the brain CT was normal. The left-arm weakness may be neuropathic through a direct pressure effect upon the brachial plexus from the expanding bulla [5].

As altitude increases, both atmospheric partial pressure of oxygen and barometric pressure decrease. At 10668 meters (35000 feet), the actual atmospheric pressure is 179 mmHg, whereas pressurization of the cabin on commercial airliners maintains cabin atmospheric pressures around 564 mmHg (2438 meters/8000 feet). There is an approximate 38% increase in the volume of air in a non-communicating body cavity upon ascent from sea level to the maintained cabin atmospheric pressure [6]. As Boyle's law states the volume of a gas is inversely proportional to the pressure to which it is exposed, therefore, as barometric pressure falls in the aircraft cabin during the ascent, the bulla will expand. The expanded bulla will stretch its wall and compress the surrounding lung causing rupture of the bulla, pneumothorax, and air embolism causing respiratory or neurological complications [7].

Lung bullae are best detected on CT imaging as it gives more description on the number, size, and position [8]. Spontaneous resolution has been reported in previous literature though it is rare [9]. Eventually, bullectomy is recommended in symptomatic patients with giant lung bulla [10].

In conclusion, giant lung bulla is a rare cause of loss of consciousness. Though an air embolus was not detected on brain CT imaging, it was likely a hypoxic event that led to the loss of consciousness in our case. This may be suspected when patients lose consciousness during air travel.

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CONFLICT OF INTEREST STATEMENT

None declared.

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None.

ETHICAL APPROVAL

The need for ethical approval was waived.

CONSENT

We obtained written informed consent from the patient for the publication of this case report and the accompanying images.

GUARANTOR

A.S. is the nominated guarantor.

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