

Case report

Pneumopericardium, pneumomediastinum and air travel: A case report in a patient with Gardner syndrome

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ABSTRACT

Onboard aircraft medical emergencies are on the rise as commercial air traffic is increasing. However, thoracic injury secondary to air travel is extremely rare and, most reported injuries are cases of pneumothoraces. Spontaneous pneumomediastinum and pneumopericardium have been barely reported in the medical literature as a complication of air travel. We are reporting a case of spontaneous pneumopericardium and pneumomediastinum in a patient with Gardner's Syndrome after a flight from Central America to New York City. The patient presented with chest discomfort. He was managed conservatively with oxygen therapy as he was hemodynamically stable throughout his stay in the hospital. A thorough work up in hospital including and esophagogram and a CT scan of the chest were none revealing of the cause. However, the patient was noted to have metastatic rectal cancer with lung involvement. The patient was discharged with instructions to avoid air travel.

1. Introduction

In-Flight medical emergencies are infrequent and in-flight deaths are even rarer [1,2]. However, with older, sicker, and more travelers flying around, aviation emergencies are increasing in number. Pneumothorax is the more common thoracic emergency encountered during air travel [2]. Etiologies of pneumomediastinum and pneumopericardium are diverse and include trauma, post-procedural, elevated intra-thoracic pressures, pulmonary pathologies and occasionally unknown [3,4]. After reviewing the medical literature, two case reports of air travel causing air leaks around the heart or in the mediastinum have been reported to date. The first was a case of a spontaneous pneumomediastinum after a commercial flight reported by Morgan et al. [5]. The second was a case of a spontaneous pneumopericardium and pneumomediastinum also after air travel reported by Nicol et al. [6]. We would like to report another case of a spontaneous pneumopericardium and pneumomediastinum in a patient with Gardner's syndrome after a commercial flight.

2. Case report

A 52-year-old non-smoker male with Gardner's syndrome presented to the emergency department with a one day history of worsening retrosternal chest pain and dyspnea at rest. Both symptoms started shortly after a 6-h commercial flight from Central America to New York City. His pain was sharp in nature, 5/10 in severity, exacerbated by inspiration, and relieved by leaning forward. The patient had a diverting ileostomy due to a history of colon cancer and recently he had been having a high fecal output and occasionally painless fresh blood per rectum. He also reported a 15 pounds weight loss and oliguria over the last few weeks. He had no fever, cough, sputum production, exposure to sick contacts, and did not sustain any trauma. He had a subtotal colectomy with a diverting ileostomy secondary to colon cancer and abdominal desmoid tumors debulking around 1 year before presentation. Upon further questioning, he reported having a subtotal colectomy and not a total colectomy after being diagnosed with colon cancer because of intra-operative hypotension requiring early surgical termination of the procedure. He lost follow-up with his physicians after the surgery. He reported no known history of cardiac or pulmonary diseases and no

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previous similar events.

On physical examination, the patient was not in acute distress, was hemodynamically stable but appeared cachectic. His blood pressure on presentation to the emergency room was 113/64 mmHg, his pulse was 109 per minute, his respiratory rate was 15 per minute, and his oxygen saturation was 100% on room air. He had good bilateral breath sounds, no evidence of trauma, tenderness or deformity of the chest. No subcutaneous crepitus was heard or felt with palpation of the chest. He had regular fast heart sounds but no audible murmurs or rubs. The ileostomy stoma was non-erythematous, non-edematous, non-tender, and no discharge was noted on palpation. A digital rectal exam was positive for fresh blood per rectum but there was no evidence of profuse active bleeding.

A complete blood count with differential showed mild normocytic anemia with a hemoglobin level of 11.0 g/dL. A complete metabolic profile revealed an elevated BUN of 97 mg/dL, a creatinine level of 13.94 mg/dL, mild hyponatremia with a Sodium (Na) level of 132 mmol/dL and hypochloremia with a Chloride (Cl) level of 73 mEq/dL. An electrocardiogram (ECG) showed sinus tachycardia with no ischemic changes, no alterans, and low voltage. Serial sets of cardiac enzymes were within normal limits. A chest radiograph (CXR) showed evidence of subcutaneous emphysema over the neck base and was suspicious for air outlining the bronchial walls along with a continuous diaphragm sign (Fig. 1).

A non-contrast CT scan of the chest revealed air in the pericardial sac, around aortic branches, and bronchial walls consistent with pneumomediastinum and pneumopericardium (Fig. 2, Fig. 3). In addition, a 1.7cm right lower lobe and a 4 mm left lower lobe nodules were noted.

The patient was admitted to the general medical ward for further treatment. He was treated with 100% supplemental oxygen as he was hemodynamically stable. His chest pain and dyspnea resolved by day 2 and a CT scan of the chest on day 4 documented resolution of his pneumomediastinum and pneumopericardium. He underwent an esophagogram that did not reveal any abnormality. For his hematochezia, he underwent a colonoscopy that showed a 6.5 × 1.5 cm rectal mass diagnosed as rectal adenocarcinoma on pathology. MRI rectal and liver protocol revealed metastatic rectal adenocarcinoma. The patient was seen by oncology and chemotherapy and radiation were scheduled. Genetic counseling and testing were offered to the patient's children. He was also advised to avoid air travel.

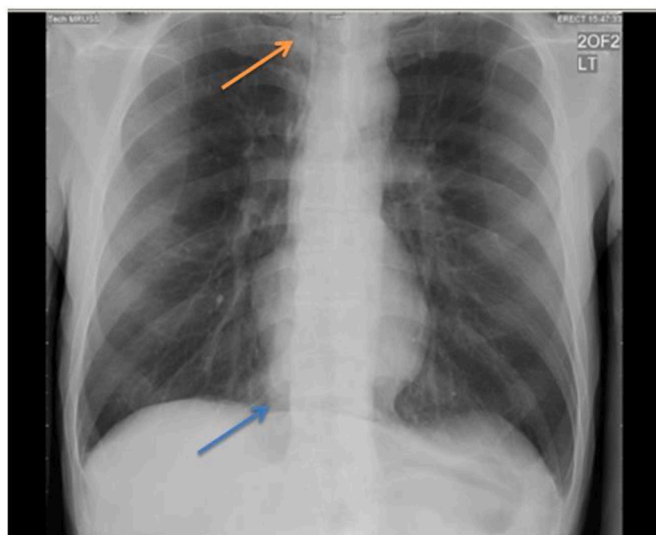


Fig. 1. Chest X-ray PA film showing subcutaneous emphysema (orange arrow) and a continuous diaphragm sign (blue arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)



Fig. 2. CT scan of the chest showing pneumopericardium (green arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

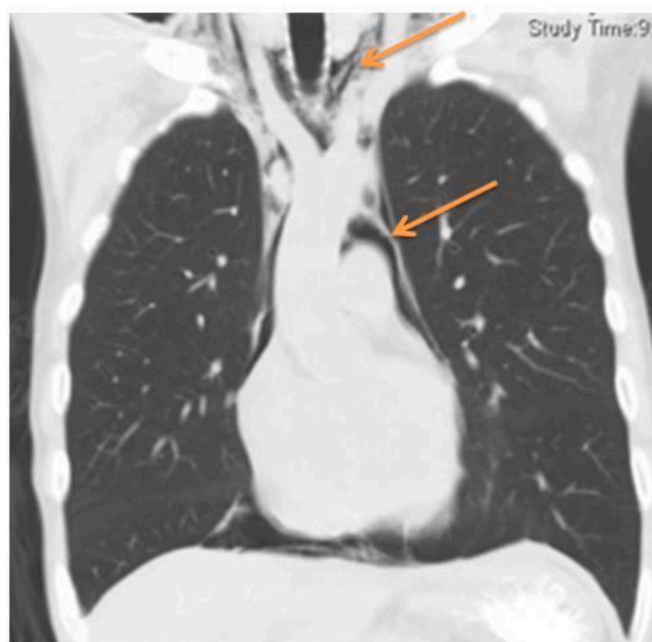


Fig. 3. CT of the chest showing extensive pneumomediastinum (orange arrows). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

3. Discussion

Pneumomediastinum and pneumopericardium are rare etiologies of chest pain and shortness of breath. Patients with these entities are usually asymptomatic. They might report mild chest discomfort or dysphagia but they can progress to tension, respiratory failure, and eventually death [7,8]. Pneumopericardium and pneumomediastinum can be iatrogenic due to surgical procedures, penetrating or blunt trauma, barotrauma, secondary to lung diseases, or due to illicit drugs or chemicals [3,4]. In most cases, the air leak is self-limited and the treatment is directed toward the cause [6,9]. Oxygen therapy has been reported to improve symptoms in most cases and accelerate the resolution of both conditions [3,6]. In rare cases where the patient becomes hemodynamically unstable, needle pericardiocentesis, and sometimes surgical interventions are required [6,9,10].

A thorough review of the literature did not reveal any cases of pneumopericardium or pneumomediastinum previously reported in

patients with Gardner's syndrome. It is not known that Gardner's syndrome predispose or increases the risk of the previously mentioned pathologies as well. Our patient is the first to be reported in the medical literature.

According to Boyle's law, as the cabin pressure decreases with altitude, the volume of gas inside the lung increases and might lead to lung injury. However, we were unable to definitively pinpoint the exact cause of pneumomediastinum and pneumopericardium in our patient. We hypothesize that patient might have micro-metastasis to the pleura and pericardium from his rectal or desmoids tumors. With weaker and maybe disrupted organ barriers, a change in altitude during the flight might have led to air leaks. A similar explanation of microscopic communications causing pneumopericardium and pneumomediastinum in a patient with a trachea-bronchial tumor had been reported in the literature but it was related to aviation [11]. A PET-CT scan might have given a more definitive answer but chemotherapy was already started. Another simpler explanation is that the air leak could have been due to an alveolar bleb that ruptured with the change of intra-thoracic pressures with altitude.

4. Conclusion

In conclusion, this case is the third reported case of pneumomediastinum and pneumopericardium due to aviation. With the increasing number of travelers with lung pathologies, we might encounter more. The management focuses on treating the underlying etiology and addressing any hemodynamic instability if encountered.

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Authors contributions

Ahel El Haj Chehade MD participated in reviewing the case, collecting data, drafting the manuscript, reviewing the literature. George Debal MD participated in reviewing the literature and drafting the manuscript. Wissam Mansour MD and Akshay Avula MD participated in

manuscript revision and editing. Michel Chalhoub MD participated in manuscript editing and supervision.

Declaration of competing interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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