Bilateral Tension Pneumothoraces Following Coronary Artery Bypass Grafting

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INTRODUCTION
Tension pneumothorax is a life-threatening condition usually diagnosed in emergency and requires a simple needle decompression as treatment. It results when intrapleural pressure, for any reason, exceeds the atmospheric pressure. Accumulation of air under pressure within the pleural space ultimately causes the lung to collapse. Tension pneumothorax is mainly a clinical diagnosis and is now easily recognized because of more awareness of the condition and the availability of the chest X-rays in the emergency department.

The treatment of tension pneumothorax is high concentration oxygen and the insertion of a large bore needle into the pleural space of the affected side, followed by a radiological confirmation of the diagnosis with a chest X-ray and intercostals chest drain insertion.¹,² If untreated, the condition rapidly progresses to respiratory insufficiency, cardiovascular collapse and death. Prompt diagnosis and immediate treatment is necessary to improve patient's outcome. Patients at risk of developing tension pneumothorax are those with bullous lung disease who require continuous positive airway support and who have interpleural communication.

CASE REPORT
A 73-year-old gentleman was electively admitted for two vessel coronary artery revascularization procedure. A previous history of heavy smoking was noted without any chest complaints. Pre-operative chest radiograph was not remarkable. At operation, both pleura were opened whilst harvesting both internal mammary arteries for graft. The lung parenchyma was found to be very thin walled with multiple small bullae mainly in the left upper lobe. Immediate postoperative recovery was smooth. The patient was extubated eight hours following surgery and all drains removed thereafter. The gas exchange was poor due to bibasal collapse and required Continuous Positive Airway Pressure (CPAP) via a facemask.

On the first postoperative day, the patient suddenly developed extensive subcutaneous emphysema and tachypnea (respiratory rate of 26/minutes). The gas exchange deteriorated and desaturated (from 96-88% on air) after using the CPAP mask. Clinical examination revealed signs of bilateral pneumothoraces with subcutaneous emphysema. Clinical deterioration was

Tension pneumothorax developing after coronary artery bypass grafting is not uncommon but bilateral tension pneumothoraces has not been described in medical literature before. This complication has been described following heart-lung transplant and anecdotal reports in patients during jet ventilation.³,⁴ Hui et al. has also described bilateral tension pneumothorax in a 2 months old infant with respiratory failure secondary to respiratory syncytial virus bronchiolitis whilst on hand ventilation in the emergency department.⁵

We report a case of bilateral tension pneumothorax in a patient developing postoperatively following two vessel coronary artery revascularization procedures.

ABSTRACT
It is an unusual case of bilateral tension pneumothoraces developing in the postoperative period in a patient who underwent total arterial revascularization for two vessel coronary artery disease. The patient had been a previous heavy smoker and at operation had been noted to have thin walled lung parenchyma with multiple small bullae mainly in the left upper lobe. He suddenly developed bilateral pneumothoraces following intermittent continuous positive airway pressure requiring initially bilateral needle decompression followed by chest drain insertion. He recovered well and the air leak sealed after 3 days.

Key words: Tension pneumothoraces. Cardiac surgery. Arterial revascularization. Pulmonary bullae.

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very sudden with signs of impending respiratory failure. Chest X-ray confirmed the diagnosis of bilateral pneumothoraces with subcutaneous emphysema (Figure 1).

He was initially managed with bilateral needle thoracocentesis, which released a significant amount of air and was associated with dramatic relief of dyspnoea. Bilateral chest drains were inserted, following needle thoracocentesis, providing further relief of symptoms. The gas exchange improved and respiratory support in the form of CPAP was discontinued within 24 hours of chest drains insertion. He also developed an air leak from the left chest drain, which sealed after 3 days. Complete recovery followed thereafter and a repeat chest X-ray showed resolution of bilateral pneumothoraces and subcutaneous emphysema with full lungs expansion. He was discharged home on the 8th postoperative day and follow-up in the clinic was clinically satisfactory.

**DISCUSSION**

Pneumothorax is a medical emergency, which if untreated can lead to death in a very short span of time. Spontaneous pneumothorax is classified as primary (idiopathic) or secondary according to origin. The incidence of spontaneous pneumothorax is 9 per 100,000 and 1.3% of these cases have spontaneous bilateral pneumothorax. Unilateral idiopathic pneumothorax is more common and occurs in young males. Bilateral tension pneumothorax is a rare entity and usually associated with trauma, mechanical ventilation and underlying chronic chest conditions and infections. Bilateral tension pneumothorax developing after coronary artery revascularization procedure is also very rare and can lead to devastating effects if not recognized in time. Schorlemmer et al. in 1984 reported a case of bilateral pneumothorax that complicated catheterization of the subclavian vein in a patient who underwent coronary artery bypass surgery.

The exact mechanism of development of bilateral tension pneumothorax is unknown. The possible explanation of developing bilateral pneumothorax in this case could be iatrogenic trauma to the anterior pleural reflections following bilateral internal mammary artery harvesting. The resultant interpleural communication allows air to move between the pleural cavities, if there is unilateral air leak. Possibly a ruptured bulla from the left lung was the source of air leak and resulted in life-threatening tension pneumothorax on both sides. Engeler et al. in 1992 reported pneumothoraces in 33% of patients receiving heart lung transplant due to persistent interpleural communications.

Emergency treatment of bilateral tension pneumothorax is needle thoracocentesis followed by definitive treatment with bilateral chest tube drainage. In this case, bilateral chest tube drainage was sufficient to decompress the lungs. Single tube drainage is advocated in cases where the source of the air leak is known followed by close clinical and radiographic monitoring of the patient. A second chest tube then can be inserted if patient deteriorates clinically or the repeat chest radiographs show collapsed lungs.

This case is highlighted to raise awareness of this potentially life-threatening condition and to emphasize the importance of immediate diagnosis and treatment. Delaying the emergency treatment of this condition, until the chest radiographs to be obtained could prove to be fatal. We, therefore, recommend that high risk patients should have a single chest tube left in one pleural cavity for longer than normal, until their gas exchange has improved sufficiently or unless they do not require CPAP in the postoperative period.

**REFERENCES**


