

A Case of Massive Hemothorax Leading to Obstructive Shock

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Abstract Obstructive shock is one of the rarest types of shock. It is caused by the reduction of cardiac output despite normal intravascular volume or cardiac function. In this case report, we present a case of a seventy-four-year-old female, who was sent to our emergency department (ED) for evaluation of one week history of dyspnea and abnormal chest X-ray. Initial Contrast Tomography (CT) scan of the chest showed a large necrotic left upper lobe mass with multiple pulmonary nodules, small left-sided pleural effusion and mediastinal lymphadenopathy. Few days later, she developed worsening dyspnea and hypotension, requiring intubation and vasopressors for hemodynamic support. A repeat CT scan showed large left-sided pleural effusion with rightward mediastinal shift that required thoracostomy tube insertion to immediately improve the underlying obstructive shock.

Keywords: obstructive shock, massive hemothorax, pleural effusion, non-traumatic

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1. Introduction

Obstructive shock can be a result of multiple etiologies involving the heart, lungs, major systematic vessels or pleural cavities. Examples include cardiac tamponade, mediastinal occupying lesions, tension pneumothorax, and pulmonary embolism. [1] There are very few reported cases of massive pleural effusion causing obstructive shock. Increased intrathoracic pressure by a large pleural effusion leads to a decrease in the cardiac filling and subsequently circulatory shock, impaired organ perfusion, and oxygenation. [2,3] Urgent drainage is crucial to improve the underlying shock and provide hemodynamic stability. [2,3]

2. Case Presentation

This is a case of a 74-year-old female sent to our ED from an urgent care due to one week history of dyspnea and suspicious findings on her chest X-ray (CXR) of diffuse bilateral pulmonary nodules along with a small-moderate sized pleural effusion (Figure 1). Her past medical history was relevant for chronic kidney disease (CKD) stage three, smoking, Hypertension, Hyperlipidemia and Cerebrovascular Accident (CVA). Her vital signs were all within normal limits. Contrast Tomography (CT) of the chest with contrast revealed a large necrotic mass in the left upper lobe measuring

approximately 7.4 x 6.5 x 7.0 cm associated with post-obstructive atelectasis, small left-sided pleural effusion, and multiple bilateral pulmonary and mediastinal lymph nodes, consistent with metastatic disease (Figure 2). She was empirically started on antibiotics due to concern for post-obstructive pneumonia. On day three, patient started to require Oxygen by nasal cannula. Flexible Bronchoscopy revealed almost complete occlusion of the left upper lobe bronchus with findings of poorly differentiated adenocarcinoma.



Figure 1. CXR showing multiple bilateral lung nodules a left-sided moderately sized pleural effusion

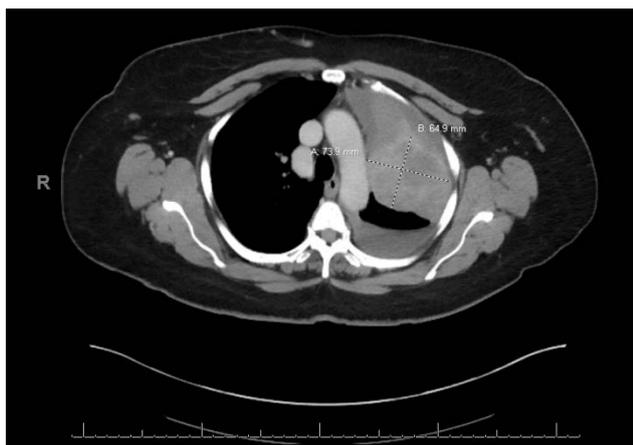


Figure 2. Contrast Tomography (CT) of the chest with contrast revealed a large necrotic mass in the left upper lobe measuring approximately 7.4 x 6.5 x 7.0 cm

Post-Bronchoscopy CXR revealed left near-complete opacification of the hemithorax which was not amenable for bronchial stenting. Palliative radiation therapy was decided. Unfortunately, patient deteriorated before undergoing her first radiotherapy session. She required non-invasive positive pressure ventilation (NIPPV) in the form of bilevel positive airway pressure (BiPAP). Repeat CXR showed a significant increase in the left pleural effusion with rightward mediastinal shift requiring immediate intervention (Figure 3). Prior to thoracentesis, she underwent cardiac arrest with a non-shockable rhythm. She was promptly intubated and return of spontaneous circulation (ROSC) was achieved nearly twelve minutes after starting the ACLS protocol.

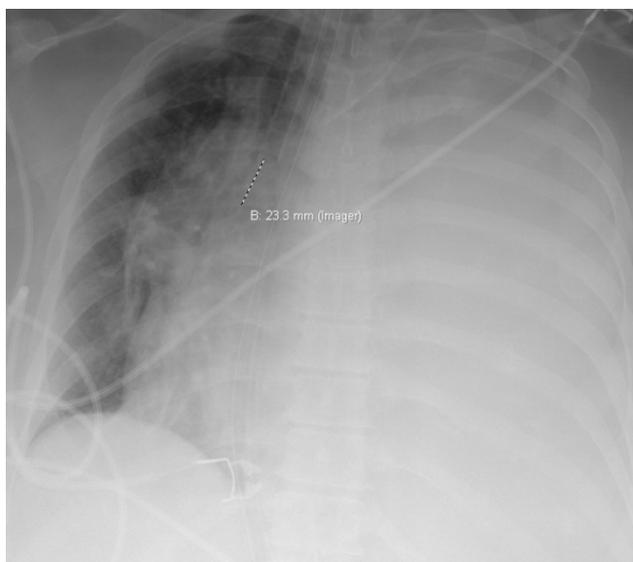


Figure 3. CXR revealing large left-sided pleural effusion creating right mediastinal shift

She was then transferred to the medical intensive care unit (MICU), where she progressively became more hypotensive with blood pressure of 90/50 and consequently required significant vasopressor support. Decision was made to evacuate her large pleural effusion with the idea of relieving the tamponade effect on the heart. A large bore thoracostomy tube was placed, with evacuation of nearly two liters of dark blood. There was

an immediate resolution of obstructive shock. A follow-up CXR revealed improvement of lung field aeration. (Figure 4). She remained hemodynamically stable without further requirement of vasopressor support. Ultimately, a decision was made by her family and ethics team to terminally wean patient given her poor prognosis. She expired the following day.



Figure 4. Follow up CXR; Improvement of large pleural effusion after chest tube placement, and resolution of right mediastinal shift causing tamponade

3. Discussion

The common feature amongst all types of shock is the mismatch between the supply and demand of oxygen. [1,3] The physical effect from the obstruction can lead to impairment in the diastolic filling of the ventricles with a significant reduction in cardiac output resulting in shock and tissue hypoxia in all organ systems. [4] The speed at which the state of this shock progresses must be kept in mind in order to proceed with an immediate life-saving intervention. [1]

Classically, obstructive shock has been known to be caused by tension pneumothoraces, cardiac tamponade and massive pulmonary emboli. Our patient demonstrates a very rare cause of obstructive shock with mediastinal shift due to a massive left-sided hemothorax. A left thoracostomy tube was put in promptly to evacuate the left hemithorax, thereby relieving the obstruction. In placing the thoracostomy tube, there was immediate and tremendous improvement of the hemodynamic status, highlighting the obstructive aspect of the shock.

Our case was a fortunate example of a situation where a thoracostomy tube was successfully able to decompress the obstruction. There have been a number of rare case reports such as obstructive shock in the setting of massive pleural effusions, acute inferior cava (IVC) obstructions due to IVC filter placement that have fortunately been able to be decompressed and subsequently have led to significant improvement hemodynamically. [2,3,4]

This case report highlights the prompt and rapid progression of hemothorax caused by large upper lobe necrotic mass, and the importance of considering an immediate life-saving intervention in a timely manner to prevent further increase in morbidity and mortality.

4. Conclusion

Massive hemothorax can be severe enough to cause an obstructive shock. Immediate intervention is required to improve morbidity and mortality.

Conflict of Interest

None of the authors have any conflicts of interest to declare.

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