

## Traumatic right pericardial laceration with tension pneumopericardium associated with hemodynamic instability: A case report

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### Case Report

#### Abstract

**BACKGROUND:** Pneumopericardium is a rare complication following thoracic trauma, and urgent treatment is rendered necessary when it causes tension pneumopericardium due to cardiac tamponade.

**CASE REPORT:** The case presented here is a right pericardial laceration with tension pneumopericardium due to falling from a height, presenting to the emergency clinic of our hospital with hemodynamic instability.

**CONCLUSION:** Pneumopericardium that might develop due to blunt thoracic trauma can easily be diagnosed, may result in cardiac tamponade, and is a potentially fatal pathology without treatment.

**Keywords:** Pneumopericardium, Trauma, Cardiac Tamponade, Fall

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#### Introduction

Pneumopericardium is a collection of air in the pericardial cavity that rarely occurs. Penetrating or blunt thoracic trauma, barotrauma caused by respirators, pericardial infection by gas producing bacteria, intra-pericardial perforations of the intra-abdominal organs, and iatrogenic causes have been believed to play a role in the etiology of this disorder.<sup>1</sup> Pericardial laceration or rupture occurs extremely rarely due to blunt trauma; 50-64% of these cases are seen in the left pleuropericardial region, and 9-17% of the cases are seen in the right pleuropericardial region. Small lacerations are asymptomatic and are diagnosed incidentally during emergency thoracotomy.<sup>2</sup> Pneumopericardium, which is usually with a benign clinical picture, may cause no clinical findings when the volume of the collected air is small, while pericardial lacerations due to serious injury may cause a progressive air collection, cardiac tamponade, and deterioration of hemodynamic measures.<sup>3</sup> Auscultation of the cases with pneumopericardium reveals pericardial friction rub, deep heart sounds, metallic heart sounds, and emphysema in transverse sinus, and subcutaneous emphysema can be seen in the chest radiography.<sup>1</sup> Treatment is planned according to the complications of pneumopericardium and the

presence of cardiac compression. No intervention is necessary when the amount of intrapericardial air is small and pneumopericardium is limited with stable hemodynamics. A case of right pericardial laceration and pneumopericardium associated with hemodynamic instability developed secondary to trauma is presented here, since such a clinical picture is extremely rare.

#### Case Report

An unconscious 44-year-old male patient was brought to the emergency department of our hospital due to falling from a height. The first physical examination revealed a poor general medical condition with a blood pressure of 70/40 mmHg and pulse of 138/minute. Cardiac friction rub and deep cardiac sounds were heard upon the auscultation of the thorax. Computed tomography (CT) of the thorax revealed pneumothorax in the right hemithorax, subcutaneous emphysema (Figure 1), and massive pneumopericardium (Figure 2). The polytraumatized patient underwent an urgent operation since his hemodynamic status was deteriorating. Upon anterolateral thoracotomy through the right sixth intercostal space, a vertical laceration of 10 cm length on the pericardium, close to the superior vena cava and right atrium, and

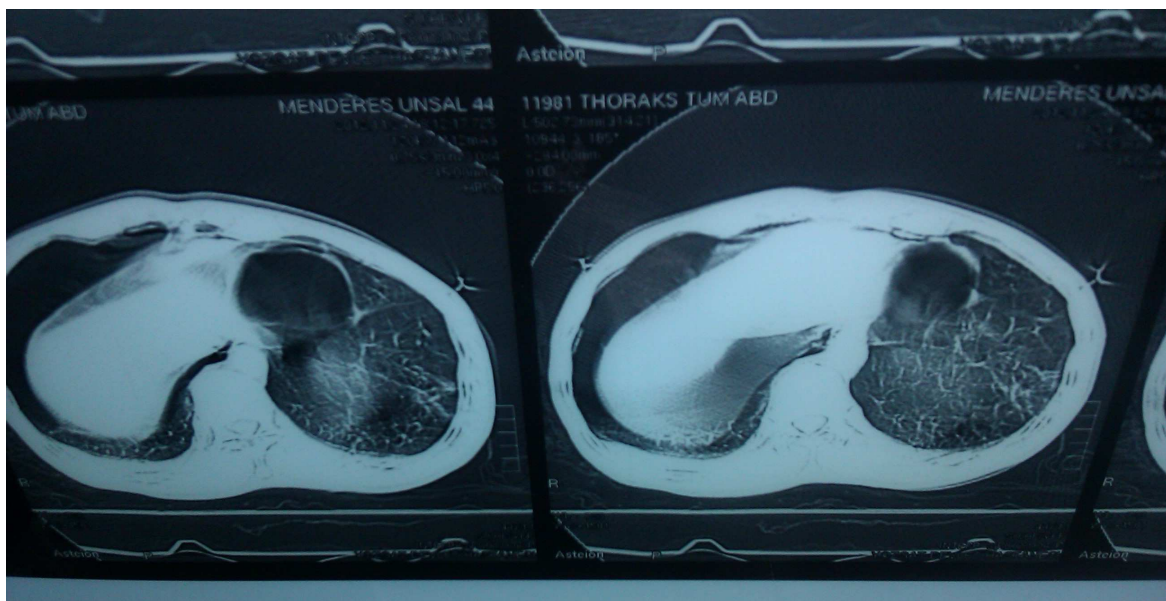
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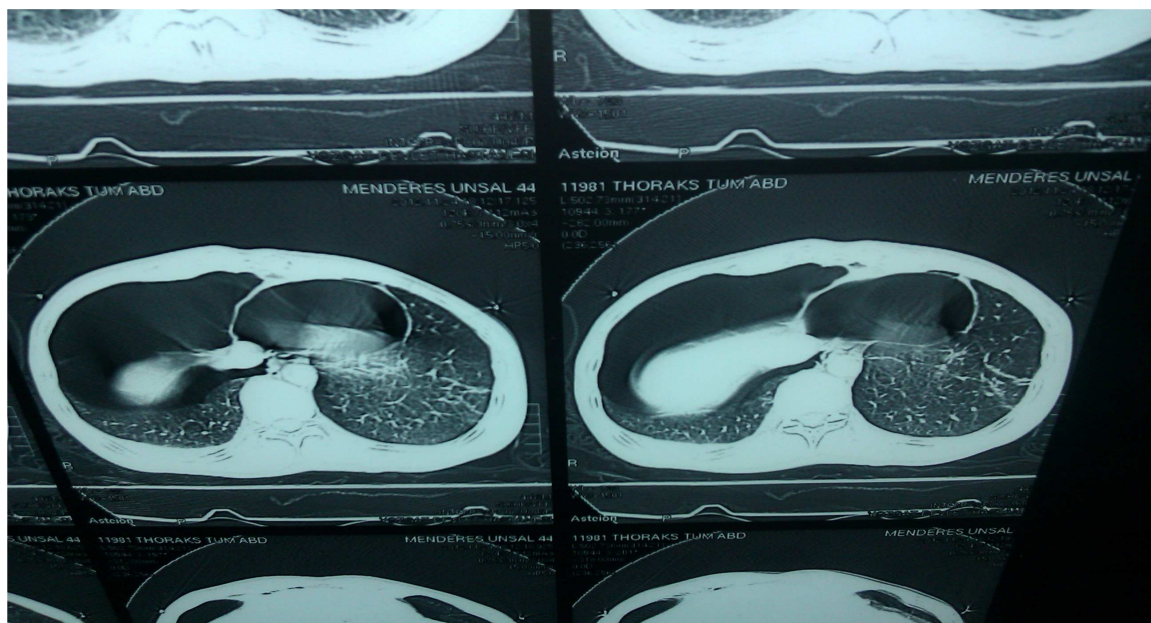
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anterior to the phrenic nerve, and a 5 cm parenchymal laceration at the right lung medium lobe lateral segment were observed. The pericardial laceration was lengthened through the apex of the heart for cardiac exploration and no cardiac rupture, contusion, hemorrhage, and additional pericardial laceration was identified. Thus, the laceration was repaired with an approximation suture, placing a 32F thorax drain. Parenchymal defect at the medium lobe of the right lung was primarily repaired by a thoracic surgeon. Tissue layers were closed appropriately with placement of a 32F thoracic drain in the right

hemithoracic space, since no bleeding, air leak, or diaphragm pathology was seen. The polytraumatized patient was operated on by orthopedic surgeons for pelvic and right femur neck fractures, and by general surgeons due to intra-abdominal bleeding with intensive blood and blood product transfusion on the same session. Blood pressure was 100/60 mmHg with a pulse rate of 90/min. In the early postoperative period under cardiac supportive therapy, disseminated intravascular coagulopathy (DIC) developed and the patient died, in spite of all supportive therapy, 40 hours after surgery.



**Figure 1.** Computed tomography image of pneumopericardium and pneumothorax in the right hemithorax and subcutaneous emphysema of the case



**Figure 2.** Computed tomography image of massive pneumopericardium of the case

### Interpretation

Pericardial laceration with pneumopericardium due to blunt trauma is an extremely rare, clinically important entity, which can easily be diagnosed and might result in cardiac tamponade. Friction rub, deep heart sounds, and metallic sound of 'bruit de moulin' were heard during auscultation of patients with pneumopericardium. Moreover, symptoms such as tachycardia, hypotension, and neck vein engorgement are seen in cases with cardiac tamponade. Pneumopericardium may resolve spontaneously in a small proportion of the adult cases without the need for intervention. The development of tension pneumopericardium, with a mortality of up to 56%, is a sign of a serious chest trauma, which may cause life-threatening complications. Hence, emergent interventional and surgical treatment options should be evaluated in cases with massive pneumopericardium with deteriorating hemodynamic variables.<sup>1</sup>

In this case, tension pneumopericardium, which is generally drained through a subxyphoidal window created by open surgery, was together with pneumothorax in the right hemithorax, and other organ injuries. Cardiac exploration and air drainage was performed via a right anterolateral thoracotomy simultaneously with surgical interventions directed to the other organ injuries.

### Conclusion

In conclusion, pneumopericardium that might develop due to blunt thoracic trauma can easily be diagnosed, may result in cardiac tamponade, and is a

potentially fatal pathology without treatment. Physicians working in emergency departments should consider this rare pathology, which still has a high rate of mortality in spite of early diagnosis and treatment due to accompanying serious organ injuries, in the differential diagnosis of thoracic trauma associated with shock, and learn the treatment options of this condition.<sup>4</sup>

### Conflict of Interests

Authors have no conflict of interests.

### References

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