

TENSION PNEUMOPERICARDIUM IN CHEST TRAUMA WITH GUNSHOT WOUND*Osman Tansel DARÇIN, MD¹, Hasan ÖZDEMİR, MD², Birol YAMAK, MD³**ABSTRACT**

Tension pneumopericardium is a rare complication of gunshot wounds. A 28 year-old male patient with tension pneumopericardium after chest trauma by gunshot bullet injury was reported. On initial examination, hemopneumothorax and fracture of the clavicle were found on the right side. Interestingly, there was no image of additional pneumopericardium on telecardiogram at the admission to the hospital. Following right tube thoracostomy, 900 ml of blood and some air were drained. Due to additional 400 ml blood drainage on the second day, right thoracotomy was performed. Laceration of the right lung and the bleeding from the right innominate vein were sutured. There was no visible pathology on pericardium. Tension pneumopericardium occurred on the second day of admission and a tube was inserted in to the pericardial space through subxyphoid incision. No blood but some air was drained from pericardial space. After removing the pericardial and right thorax tubes on the fifth and sixth days respectively, the patient was discharged with complete recovery.

Key words: Tension pneumopericardium, hemopneumothorax, gunshot wound

INTRODUCTION

Tension pneumopericardium is an unusual complication of gunshot wounds.¹⁻⁴ Review of literature disclosed eight cases of symptomatic pneumopericardium after penetrating injury.^{1,3,4} In this report, we present an additional experience with a patient suffering from tension pneumopericardium after gunshot bullet injury.

CASE

A 28 year-old male was brought to emergency room of Şanlıurfa State Hospital with a history of multiple gunshot injuries, occurred one hour ago. He was fully conscious, but hemodynamically unstable. Two bullet entries were noted: the first at anterior of right shoulder and the second at upper side of right nipple. There were also three additional minor lacerations on the neck. He was tachypneic and breath sounds was diminished at the right side of thorax on auscultation. The cardiac examination was normal. There was no evidence of pneumomediastinum. Chest X-ray revealed a right hemopneumothorax and a fracture of right clavicle. No complication was observed in the neck area.

A chest tube was placed in the right hemithorax and 900 ml blood and some air were drained within the first 24 hours. Due to additional 400 ml blood drainage from the chest tube within a few hours on the second day, right thoracotomy was performed under endotracheal general anesthesia.

Laceration of the apex of the right lung and the bleeding from the right innominate vein were sutured. There was no visible pathology on pericardium. However, the patient suddenly developed orthopnea, neck vein distension, low blood pressure and tachycardia the on next day of the operation. A control X-ray confirmed pneumopericardium (Picture 1). Computed



Picture 1. Chest X-ray showing pneumopericardium. Right pneumothorax and fracture of right clavicle are also seen.

tomography (CT) of the thorax thereafter was also revealed well-defined pneumopericardium and right

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pneumothorax (Picture 2). The pericardiocentesis was performed and some air was aspirated. Although patient's hemodynamic condition improved temporarily, after a few hours, he got worse than he was before this procedure. Appearance of a more distended pericardium on control X-ray referred to emergent surgical treatment. A pericardial tube was inserted to the oblique sinus via subxyphoid incision under local anesthesia. Then, symptoms of the patient were revealed. No blood but some air was evacuated from the pericardial tube. The pericardial tube was removed on the fifth day of insertion and the right thorax tube on the sixth. The patient was discharged with complete recovery.



Picture 2. Computed tomography scan of the chest revealing well - defined pneumopericardium.

DISCUSSION

Although traumatic pneumopericardium has been extensively reviewed, it still remains poorly recognized because of hemodynamic compromise in the injured patients.¹⁻⁷ Demetriades et al.³ reported 20 patients who developed pneumopericardium following penetrating chest injuries. Only one of them progressed to develop tension pneumopericardium 36 hours after injury, requiring a decompressive pericardiectomy. The

patient of the present report had right hemopneumothorax but he had no cardiac symptom at admittance. His cardiac symptoms such as ortopnea and hypotension were developed on the second day. He was treated with the same way, by pericardial tube insertion.

To understand the mechanism of pneumopericardium it is sufficient to review the pericardial anatomy. Pericardial collagenous tissue is not continuous at reflection of parietal onto visceral pericardium near the ostia of the pulmonary hilus. Considering this anatomy, two mechanisms were proposed to explain the traumatic pneumopericardium in the absence of any penetrating pericardial wound. One of these is related to an associated disruption of the tracheobronchial tree and is explained by persistence or re-establishment of perivascular, pleuropericardial communication. It allows tracking of pulmonary interstitial air along the pulmonary perivascular sheets from ruptured alveoli to the pericardium. This is the most frequently encountered cause. The other one is the presence of a direct congenital pleuropericardial connection.^{1,6} Endotracheal intubation and positive mechanical ventilation might have worsen an occult laceration on tracheobronchial tree and contributed development of the pneumopericardium in our patient.

It might also be thought that the existence of a one-way valve mechanism within the pleuropericardial communication, exposed to the increased pleural pressures due to mechanical ventilation or cough, allows the transmission into the pericardial sac in spite of effective pleural drainage with chest tube. In our experience, pneumopericardium was the cause of hemodynamic compromise. Although this condition may be seen in a stable patient with chest injury, it may also rapidly progress to tension pneumopericardium. In this case, early diagnosis is crucial. We suggest that a thoracic surgeon must always consider this pathology in an injured patient with hemodynamic compromise and decompress it immediately.

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