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Commentary

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Commentary Letter: Pneumopericardium Following Blunt Trauma

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Abstract

Pneumopericardium is presence of air within the pericardial space. It is rare complication of blunt or penetrating chest trauma and may also occur iatrogenically. A case report of pneumopericardium caused by blunt chest trauma, condition was diagnosed by chest CT (Computed Tomography) scan; patient was vitally stable and managed conservatively with spontaneous resolution of pneumopericardium 10 days after admission.

Keywords: Pneumopericardium, Trauma, Electrocardiogram, Spontaneously.

Abbreviations: CT-Computed Tomography, ECG-Electrocardiogram, CKMB-Creatine Kinase-MB fraction.

A case report published on 19th November 2019 in Cirugía Cardiovascular journal about a thirty seven years old male patient with pneumopericardium following a blunt trauma. On arrival of the patient, he was vitally stable, clinical and radiological survey was done, Plain Computed Tomography (CT) chest showed pneumopericardium without evidence of pneumothorax or pneumomediastinum, Abdominal Ultrasound noticed mild to moderate intra-peritoneal collection and CT abdomen with intra venous contrast was done showing urinary bladder injury.

Echocardiogram was done to assess cardiac ejection fraction, cardiac chamber dimensions, presence of pericardial effusion, abnormal wall motion and echocardiography signs of tamponade. As the patient was fully conscious and with stable vital signs, he was diagnosed as "Simple Pneumopericardium" and he was managed by close monitoring of vital signs throughout admission, bilateral chest tube thoracostomy were done as a prophylactic maneuver and regular follow up of the patient by clinical and radiological assessment with erect chest X-ray to assess resolution of the pneumopericardium.

Ten days after the accident, complete resolution of the pneumopericardium developed and the patient was discharged. Pneumopericardium is a very rare condition that may arise spontaneously or secondary to blunt with high mortality rate 37%, as it can complicate into tension pneumopericardium causing cardiac tamponade and threatening life of the patient. Tension pneumopericardium mandates decompression by percutaneous or open drainage.

The presence of extra luminal air is a frequent complication in cases of blunt thoracic trauma, because the differing electrophysiological behaviour of air can cause the ECG (Electrocardiogram) to change frequently. The incidence of pneumothorax in this population is approximately 40%, while that of pneumomediastinum may be as high

as 10%. Pneumopericardium, however, is rare and, to the best of the authors' knowledge, no incidence rates have been recorded. Neither have any clinical trials been conducted on trauma patients in which this

pathological entity is described. This report describes a rare case of pneumopericardium after blunt chest trauma. The condition was rapidly diagnosed with early CT scanning and clinical assessment and distinguished from other possible differential diagnoses such as myocardial contusion and myocardial infarction.

That was extremely vital because of the possible development of tension pneumopericardium which is a life threatening condition that mandates rapid pericardial evacuation either percutaneous or through pericardial window. In this case, a likely differential diagnosis was myocardial contusion, which has a broad variety of presenting symptoms, the most frequent being precordial pain not relieved by analgesia. In addition to ECG changes, other findings include dyspnea, pericardial friction rub and an elevated central venous pressure.

This complex of symptoms may mimic those of acute coronary syndrome, although symptoms may also be completely absent. Myocardial contusion can be diagnosed using echocardiography, as this imaging modality visualizes the actual contusion as well as changes in cardiac chamber size, wall motion abnormalities and the presence of cardiac tamponade.

Echocardiography was performed on this patient after pneumopericardium had been diagnosed and cardiac contusion was excluded. Although cardiac contusion might easily have coexisted, none of the aforementioned abnormalities were seen. Acute coronary syndrome was unlikely to occur in this patient because he was young with no history of chronic illnesses and had no predisposing medical history, such as angina.

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However, even in young people traumatic myocardial infarctions have been reported that can result from acute thrombotic coronary occlusion, intimal tears and vessel rupture. Unfortunately, Cardiac enzyme profile with serial measurements of CK and accessory MB-fraction in addition to the level of troponins, which has been shown to be more useful in detecting myocardial injury than CK and CKMB (Creatine Kinase-MB fraction) over the past decade, were not measured.

Nonetheless, it was concluded that significant myocardial contusion or infarction was highly unlikely. According to most authors, pneumopericardium in blunt trauma is caused by alveoli rupture due to sudden rise in intrathoracic pressure, leading to air leak to the pericardium via pleural cavity in the presence of a pleuropericardial tear, if the visceral pleura is disrupted causing pneumothorax, or via lung interstitium, tracking along the perivascular planes of pulmonary vessels into the mediastinum, neck, retroperitoneum and pericardium what is known as "Macklin effect".

Another mechanism would consist in direct apposition of tracheobronchial and pericardial tears. Since our patient did not present pneumothorax upon arrival, his pneumopericardium probably resulted from the Macklin effect or from the rupture of a non-primary bronchus. However, a flexible bronchoscope could be done for definitive exclusion of tracheal or main bronchial injury.

Tracheobronchial injury is considered serious and fatal complication of thoracic blunt trauma that is, unfortunately, easily missed. "Tension Pneumopericardium" develops when a valve mechanism occurs within the air passage to the pericardium leading to an increase in the intra cardiac pressure compressing the great vessels causing impairment of the venous return and cardiac output leading to hemodynamic instability and cardiac tamponade that requires urgent evacuation of the pericardium percutaneous or through pericardial window.

As mentioned by this report, clinical and radiological assessment of the patient showed that the patient was vitally stable, also the close clinical monitoring and radiological assessment throughout the admission did not report any instability in vital signs, so the patient was in "Simple Pneumopericardium" and did not require invasive maneuver for drainage of the pneumopericardium either percutaneous or pericardial window.

Although, bilateral chest tube thoracostomy were done as a prophylactic maneuver to prevent development of tension pneumothorax. This plan of conservative management of the patient was supported by the stable condition of the patient plus the close monitoring throughout the admission duration, this conservative plan was better than other plans that suggest prophylactic pericardial decompression of simple pneumopericardium.

Both percutaneous and open drainage of the pericardial sac are invasive procedures with significant risk of morbidity and mortality. They should be reserved for patients with evidence of hemodynamic instability and cardiac tamponade "Tension Pneumopericardium".

However, the bilateral chest tube thoracostomy were of limited value as the patient was closely monitored and vitally stable with regular follow up with erect chest X-rays, any deterioration in the patient clinical status by clinical or radiological assessment could be easily detected and the proper management could be done then.

"Ten days after the accident a CT chest was done to the patient showing total resolve of the pneumopericardium" No other mentioned data about following up the patient either inpatient or after discharge from the hospital.

While dealing with "Pneumopericardium" you should be aware of the potential recurrence of pneumopericardium even if it is totally resolved or successfully drained as the pericardial drain could be obstructed or the presence of a persistent air leak, even if the patient is not under positive-pressure ventilation which reinforces the importance of intensive care support until the resolution of this condition.

To summarize we are dealing here with a report of a rare case of simple pneumopericardium after blunt chest trauma, the case was rapidly diagnosed after exclusion of other possible diagnoses, although serum cardiac enzymes (CK and accessory MB-fraction) and the level of troponin were not measured.

Conservative plan of management was successful with no need of prophylactic drainage of the pericardial sac. Bilateral chest tube thoracostomy still of low value especially when the patient was closely monitored and serial chest X-rays were done. No available data of following up the patient or definitive exclusion of recurrence of pneumopericardium [1-8].

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