



## Pneumopericardium

**Biplab Mishra<sup>1</sup>, Mohit Kumar Joshi<sup>2\*</sup>, Amulya Rattan<sup>2</sup>, Subodh Kumar<sup>2</sup>, Amit Gupta<sup>2</sup>, Sushma Sagar<sup>2</sup>**

<sup>1</sup>JPN Apex Trauma Center, AIIMS, New Delhi, India

<sup>2</sup>JPN Apex Trauma Center, All India Institute of Medical Sciences New Delhi, India

**\*Corresponding author: Mohit Kumar Joshi**

Address: JPN Apex Trauma Center, All India Institute of Medical Sciences, New Delhi, India

e-mail: drmohitjoshi@gmail.com

**Received:** July 13, 2016

**Revised:** September 4, 2016

**Accepted:** September 5, 2016

Please cite this paper as:

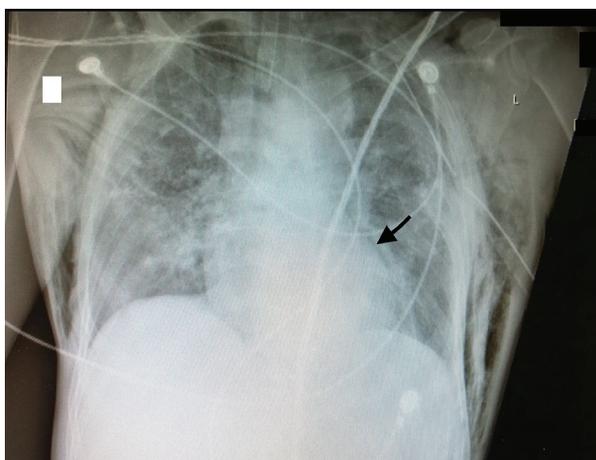
Mishra B, Joshi MK, Rattan A, Kumar S, Gupta A, Sagar S. Pneumopericardium. *Bull Emerg Trauma*. 2016;4(4):250-251.

A 40 yr-male presented to emergency department 3 hours after road traffic injury with blunt trauma to torso. At presentation he had labored breathing and poor sensorium for which he was intubated immediately and a cervical collar was applied. There was extensive surgical emphysema and reduced air entry on left hemithorax for which an intercostal drainage (ICD) tube was inserted. He was hemodynamically normal, FAST negative with a GCS score of E2VtM5.

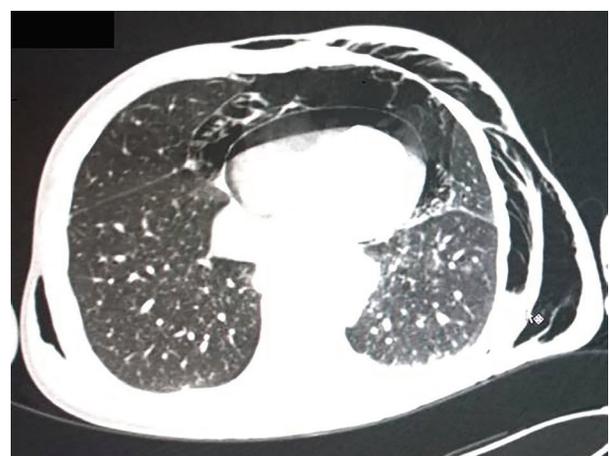
A supine chest X-Ray AP view suggested widened mediastinum, multiple rib fractures with streak of

air near the left heart border (arrow, Figure 1). Pelvic X-Ray was normal. No other injuries were identified on secondary survey. CT head was normal. CECT thorax and abdomen showed multiple rib fractures, lung contusion, significant pneumopericardium (arrow, Figure 2) and dissection in the descending thoracic aorta.

Impulse control with beta-blockers was started and a plan of aortic stenting and serial monitoring of pneumopericardium was made. The patient was stented successfully. We performed serial echocardiography for any evidence of diastolic



**Fig. 1.** Anteroposterior chest radiography of the patient demonstrating pneumopericardium (arrow).



**Fig. 2.** Axial CT-Scan of the chest demonstrating pneumopericardium in the patient.

dysfunction that would have suggested progression to tension pneumopericardium. The patient remained stable and was discharged 8 days after injury following resolution of pneumothorax, pneumopericardium and removal of ICD tube.

The commonest cause of pneumopericardium is blunt thoracic trauma. This finding on imaging denotes transfer of significant force during injury. Although numerous mechanisms are described, there is no consensus on its etiopathogenesis. Macklin in 1939 suggested that an increase in intra-alveolar pressure during thoracic injury ruptures the alveolar walls, the leaked air travels along the peribronchial and vascular sheaths to gain access into the pericardium and mediastinum [1]. Other authors have suggested the existence of congenital or traumatic pleuro-pericardial communication through which the air may access the pericardium [2,3]. A force significant enough to rupture trachea, bronchus and pericardium can also cause direct entry of air in pericardium (Ref) leading to pneumopericardium. In majority of patients pneumothorax may coexist however, if visceral pleura remains intact the patient may have

isolated pneumopericardium (the Macklin effect).

Pneumopericardium is self-limiting and does not require specific management except for a close observation of hemodynamics including ECG monitoring, a base line echocardiography and insertion of chest tube in cases of concomitant pneumothorax. In nearly one third of patients a tension pneumopericardium may develop due to formation of a one way valve that may be life threatening [3]. The patients on positive pressure ventilation following thoracic injuries are particularly susceptible to tension pneumopericardium. The patients with tension component presents with the features of cardiac tamponade without any demonstrable free fluid in pericardium. In such patients an emergent pericardial aspiration followed by creation of a subxiphoid pericardial window should be performed. All surgeons dealing with thoracic trauma should be aware of this uncommon usually self-limiting pathology that may be potential life threatening.

**Conflict of Interest:** None declared.

## References

1. Macklin CC. Transport of air along sheaths of pulmonic blood vessels from alveoli to mediastinum: clinical implications. *Archives of Internal Medicine*. 1939;**64**(5):913-26.
2. Ladurner R, Qvick LM, Hohenbleicher F, Hallfeldt KK, Mutschler W, Mussack T. Pneumopericardium in blunt chest trauma after high-speed motor vehicle accidents. *Am J Emerg Med*. 2005;**23**(1):83-6.
3. Rolim Marques AF, Lopes LH, Martins Mdos S, Carmona CV, Fraga GP, Hirano ES. Tension pneumopericardium in blunt thoracic trauma. *Int J Surg Case Rep*. 2016;**24**:188-90.