

## Ptosis of the lung

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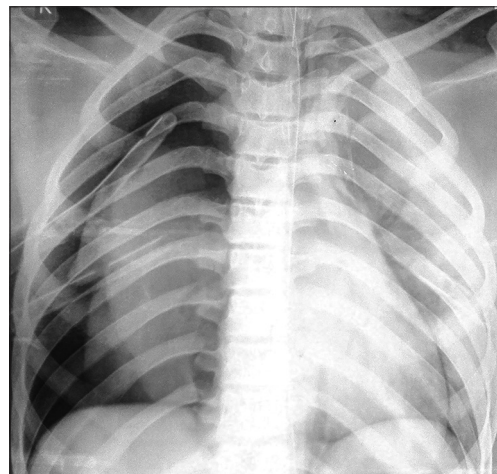
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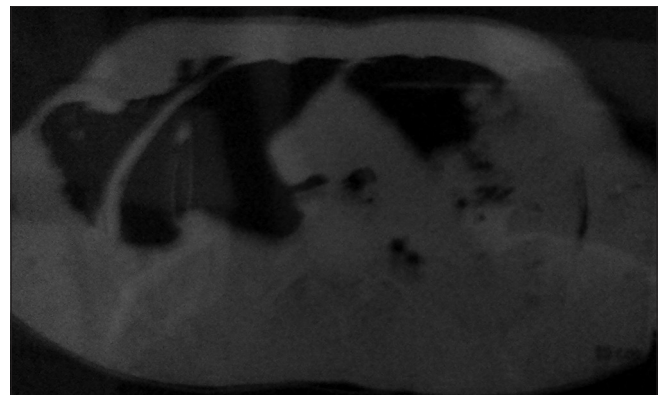
A young male patient of 17 years presented to the Emergency after sustaining blunt trauma to the chest as result of a road traffic accident. At the Emergency he was found to have severe hypoxemia. The chest examination was suggestive of right-sided tension pneumothorax, for which an intercostal drainage (ICD) catheter was inserted and the patient was intubated and ventilated. There were large air-leaks noted in the ICD bag and the pneumothorax persisted even after ICD placement. A chest x-ray (CXR) was done, which is shown in Figure 1.

### QUESTIONS

- Q1: What is the sign present in the CXR and what does it suggest regarding the etiology of the patient's present condition?
- Q2: A computed tomography (CT) thorax, which was subsequently done is shown in Figure 2. What is the sign present in the CT thorax that further exemplifies the CXR finding?
- Q3: How does blunt injury lead to the above condition and how should the above condition be managed?



**Figure 1:** Chest X-ray of the patient showing ICD catheters *in situ* with pneumothorax on the right side



**Figure 2:** CT thorax of the patient showing pneumothorax on the right side with lung contusion on the left side

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## ANSWERS

**Answer 1:** The sign referred to is the ‘fallen lung sign’ or the ‘ptotic lung sign’. It refers to the drooping or inferior displacement of the collapsed lung to a more dependent position rather than the central position at the hilum in a case of pneumothorax.

It is a highly specific sign for the presence of bronchial transection or fracture.<sup>[1]</sup>

**Answer 2:** The corresponding sign present in the CT thorax is called the ‘CT fallen lung sign’.<sup>[1]</sup> Normally in case of pneumothorax the lung collapses centrally toward the hilum, due to tethering by the bronchial attachments. However, in the case of bronchial transection the collapsed lung falls to a more dependent position — giving rise to the fallen lung sign.

**Answer 3:** In case of a non-penetrating trauma to the chest, giving rise to bronchial rupture, the following hypotheses have been proposed.<sup>[2]</sup>

Owing to trauma to the chest when the patient’s glottis is closed, there is a sudden and massive increase in pressure in the airway causing a blow-out around the region of the carina (which has the largest diameter, leading to maximum injury, as per Laplace’s law).

Due to anteroposterior compression by the trauma there

is a corresponding increase in the transverse diameter of the chest, as a result of which the lungs are pulled out laterally causing disruption at around the region of the carina.

A carina is a relatively fixed structure, the shearing stress caused due to blunt trauma to the chest leads to disruption in the region of main bronchus.

Bronchial rupture can lead to pneumothorax and significant ongoing air-leak, which persists despite ICD insertion<sup>[3]</sup>In such cases after stabilization of the patient, definitive therapy consists of repair of the bronchial disruption by cardiothoracic surgeons. After thoracotomy or sternotomy (approach depends on the site of leak) the site of rupture is explored and sutured to seal the rent.

## REFERENCES

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