

# Blunt chest trauma

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# History

- 30 months old girl G had a history of accidental fall on a concrete block 8 months ago
- She was treated conservatively for a left pneumothorax and a right lung collapse with ICD
- She presented first to our OPD in may 2012 with mild effort intolerance
- Chest X Ray done in may 2012 showed post traumatic collapse in right lung with mediastinal shift
- She was advised further evaluation with CT chest

# History

- She presented again to our OPD 2 weeks back with dyspnoea even on mild exertion
- There were no other associated complaints.
- No issues regarding oral intake
- No further hospitalisation was required for the same

# Clinical examination

- Child was comfortable at rest
- Weight 13.5kg
- HR – 110/min, RR – 25/min, BP – 100/60 mm Hg, Temp – 98.6 farenhite

## RESPIRATORY SYSTEM –

- INSPECTION:

Trachea shifted to right, mild hollowing of right infraclavicular , flattening of muscles on right side of chest, wasting of right infrascapular region, ICD insertion seen B/L in axillary region, no sinuses, decreased chest movements in the right hemithorax

# Clinical examination

- PALPATION:

Trachea confirmed deviated to the right

Decreased chest movements of the right hemithorax

Tactile fremitus reduced in the right side

- PERCUSSION:

Dull note all over right hemithorax

- AUSCULTATION

Reduced air entry in the right hemithorax, vocal fremitus reduced in the right side, no other added sounds

# Investigations

- X Ray Chest –  
Abrupt cut off at  
right main  
bronchus. Right  
lung collapse with  
mediastinal shift.  
Left lung  
compensatory  
hyperinflation

# Investigations

- CBC / PT/ PTT – within normal limits
- USG Abdomen – Liver was elevated secondary to volume loss in right hemithorax. Complete collapse of right lung with deviated bronchi noted within. Pulmonary vascular flow noted within the collapsed lung. Mediastinal shift to right side

# Management

- Child underwent flexible bronchoscopy, right thoracotomy, re implantation of right mainstem bronchus to trachea
- Post operatively she did not require any ventilatory support
- Analgesia provided via epidural cath till 3<sup>rd</sup> POD
- Pericardial and chest drain were removed on 4<sup>th</sup> and 7<sup>th</sup> POD
- She received aggressive chest physiotherapy and pneumococcal vaccine before discharge

# Blunt chest trauma

- Mainstem bronchus transection is an uncommon injury after blunt chest trauma, but it is associated with high mortality.
- Early diagnosis is difficult, a radiological sign used to describe this is 'fallen lung sign'

# Blunt chest trauma

- The “fallen lung sign” refers to the collapsed lung in a dependent position, hanging on the hilum only by its vascular attachments (1).
- It is usually a result of a complete transection of the mainstem bronchus, and the lung appears to “fall” away from the mediastinum to the base of the thoracic cavity, in contrast to the usual pneumothorax finding of the lung collapsing towards the mediastinum (2).
- Although not common, very specific sign for mainstem bronchus transection, very useful for the early diagnosis.

- 1. Recep S, Hu“daver A. Fallen lung sign: radiographic findings. *Diagn Interv Radiol* 2008;14:120-1.
- 2. Kook S, Felix F, Stanley W. Characteristic pulmonary finding intraumatic complete transection of a main-stem bronchus. *Radiology*1969;92:371-2.

# Blunt chest trauma

- Complete transection of the mainstem bronchus is an uncommon complication (found in 1% )

Various mechanisms of injury are :

- compression of tracheobronchial tree between the sternum and the vertebral column resulting in distraction of the carina
- shearing of bronchus by rapid deceleration
- rapid increase in tracheo-bronchial pressure as a result of crush injury with a closed glottis

# Blunt chest trauma

- If the rupture occurs within the pleural cavity, massive pneumothorax with continued air leak occurs.
- If the rupture occurs into the mediastinum and the parietal pleura is intact, then mediastinal air may be the only radiologic clue. Air may also dissect upward into the deep cervical tissues. The usual site of rupture is within 2.5 cm of the carina, and the right bronchus is injured more frequently than the left (3).
- (3)Harvey-Smith W, Brush W, Northrop C. Traumatic bronchial rupture. *AJR Am J Roentgenol* 1980;134:1189-93.

# Blunt chest trauma

- The clinical features even with the major disruptions can be minimal, delaying diagnosis in 25 to 68% of patients, high index of suspicion is required.
- The bronchial injury may be sealed by the peribronchial tissues and the patient survives the initial damage but absence of air leak at presentation is unusual and rare
- The possibility of bronchial repair should be entertained even in the cases recognized long after injury

# Blunt chest trauma

- The prognosis depends upon the time interval between the diagnosis and treatment, associated vessel injury and the condition of the distal transected lung.
- Expansion and deflation of the lung in OT, before repair, demonstrates compliance and elasticity of the atelectatic lung , likelihood of regaining a good lung growth in the postop period.
- When repair is impractical, resection is indicated to avoid infection and pulmonary vascular shunt.

# Literature search

- **J.K. Mahajan et al, Bronchial Transection: Delayed Diagnosis and Successful Repair,** Indian Pediatrics 2004;41:389-392 have described a similar case of a 8 year old boy with blunt trauma chest with diagnosis of transection of right main bronchus diagnosed 8 months after the incident.

# Take home message

- Significant bronchial injuries may occur in the absence of usual initial symptoms.
- Therefore, the patients of obvious chest trauma should be on follow up in the immediate post-injury period for detecting these lesions to avoid unnecessary morbidity and possible mortality.