
**SUBCUTANEOUS EMPHYSEMA AND PNEUMOMEDIASTINUM DUE TO FOREIGN BODY ASPIRATION:
A REPORT OF 3 CASES****Abdulsalam Y Taha**

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Correspondence to: Abdulsalam Y Taha, Professor and Head of Department of Cardiothoracic Surgery, University of Sulaimania.**E mail:** salamy_1963@hotmail.com**Introduction**

Foreign body aspiration is a common and serious occurrence in children. The diagnosis is made on the basis of clinical and radiographic features. Common symptoms include shortness of breath and cough preceded by choking. Subcutaneous emphysema and pneumomediastinum are rare presentation of aspirated foreign bodies reported only sporadically. Herein, we report on 3 children with bronchial foreign bodies presented as subcutaneous emphysema and pneumomediastinum. A high index of suspicion for tracheobronchial foreign body is required in atypical presentations of acute pediatric respiratory distress.

Case 1:

A 6 year old girl presented with SOB and repetitive cough 1 day after choking while playing. On examination, she was slightly dyspnoic with bouts of cough. The neck was slightly swollen. Palpation revealed mild sc emphysema. CXR showed mild sc emphysema and pneumomediastinum but no visible FB (Fig 1 A). She was admitted to the hospital and given antibiotics & steroids. No significant improvement was achieved after 24 hours. Rigid bronchoscopy under GA was then performed. A big plastic FB was seen in RMB and extracted by forceps (Fig 1 B).



Case 2:

A 20 months old infant referred to the Thoracic Surgery Department because of shortness of breath of 3 days duration. The condition started with an episode of choking during eating followed by bouts of cough. The family noticed swelling of face, neck and anterior chest developing over the last 24 hours. On examination, the child had low-grade fever, mild shortness of breath and moderate swelling of face and neck. The swelling was compressible with palpable crepitus. Chest auscultation revealed reduced air entry on left side. The chest radiograph

showed surgical emphysema of neck and pneumomediastinum. There was hyperinflation of left lung but no underlying pneumothorax. The patient was admitted to the hospital, given injectable antibiotics and hydrocortisone. The next day, rigid bronchoscopy was done under GA. There was a sunflower seed in left main bronchus; extracted by forceps followed by slight bleeding from congested mucosa; irrigated by normal saline. The child had a smooth recovery.

**Case 3:**

A 10 months old girl presented with shortness of breath following choking during eating 3 hours earlier. Physical examination revealed moderate dyspnea, reduced air entry and localized wheeze to the right chest. The chest radiograph (Fig 3-A) revealed hyper-inflated right lung, pneumomediastinum, shift of mediastinum to the left with left lung collapse. We decided to do emergency rigid bronchoscopy as the clinical and radiographic findings were highly

suggestive of foreign body aspiration. On entering the trachea, thick secretions were seen and aspirated. At completion of bronchoscopy, the child had significantly improved with good air entry bilaterally and the wheeze on right side decreased. Chest X-ray (Fig 3-B) done shortly after bronchoscopy showed good aeration of left lung, almost central mediastinum and resolved emphysema of right lung, though pneumomediastinum persisted.



Discussion

Subcutaneous emphysema and pneumomediastinum occur frequently in critically ill patients in association with blunt or penetrating trauma, soft-tissue infections, or any condition that creates a gradient between intra-alveolar and perivascular interstitial pressures. A continuum of fascial planes connects cervical soft tissues with the mediastinum and retroperitoneum, permitting aberrant air arising in any one of these areas to spread elsewhere¹. While the presence of air in subcutaneous or mediastinal tissue is not dangerous in itself, prompt recognition of the underlying cause is essential¹.

Subcutaneous emphysema occurs secondary to foreign body aspiration because of an excessive pressure gradient at the alveolar level, facilitating extra alveolar migration of air in the subcutaneous tissue²⁻⁴. The foreign body works as a valve permitting air to enter but not to leave again. Increasing air pressure in the pulmonary alveoli causing their rupture, and air escapes along the large pulmonary vessels to the mediastinum. From there, the emphysema extends to the chest, neck and head through the subcutaneous tissue²⁻⁴.

Surgical emphysema and pneumothorax may occur following bronchoscopy due to airway injury and

may necessitate intercostal intubation or surgical intervention⁵. However, the routine use of chest tube in all cases of surgical emphysema is not recommended¹.

Literature review revealed only few case reports of children with foreign body aspiration presenting as subcutaneous emphysema and pneumomediastinum²⁻⁹.

E. M. Burton et al retrospectively reviewed 155 children with tracheobronchial foreign body aspiration and found 10 patients with pneumomediastinum on initial chest radiograph². Jhamb U et al reported on a girl of 11 who had a tragic story due to failure to recognize foreign body aspiration as a cause of surgical emphysema⁷.

The Department of Thoracic Surgery of Sulaimania Teaching Hospital is a tertiary centre receiving patients with suspected foreign body aspiration from Sulaimania and the nearby areas. Children with suspected foreign body aspiration are managed by rigid bronchoscopy under GA for FB removal. The average number of patients is 200 per year. The usual presenting symptoms are choking, gagging followed by wheezing and respiratory distress. Herein, 3 children aged 10 months, 20 months and 6 yrs presenting with subcutaneous

emphysema and pneumomediastinum due to foreign body inhalation are reported in more than 6 years which indicates the rarity of this condition. The children had no history of trauma. Foreign body aspiration was highly probable in all of them due to the presenting symptoms, however, subcutaneous emphysema was strange. There was no pneumothorax on chest radiographs. Rigid bronchoscopy revealed foreign bodies in cases 1 and 2 and thick secretions in case 3. All of them had a dramatic clinical and radiographic recovery following bronchoscopic removal of foreign bodies. We believe that the most likely mechanism of surgical emphysema and pneumomediastinum following foreign body inhalation is the check valve effect of intra-bronchial foreign body that entraps air in pulmonary alveoli resulting in their rupture and escape of air into the lung interstitium along the

bronchovascular planes towards the lung roots. Two of our patients had obstructive emphysema which supports this mechanism. We do not agree with authors who described placement of chest tubes^{4,7}.

Conclusion

A high index of suspicion for tracheobronchial foreign body is required in atypical presentation of subcutaneous emphysema.

Routine insertion of chest tube for patients with surgical emphysema is to be avoided.

Pleural rupture due to mediastinal emphysema may result in pneumothorax which then necessitates chest tube placement.

Removal of the foreign body is sufficient for resolution of subcutaneous air and improvement of respiration.

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