Empyema thoracis caused by a foreign body inhaled 30 years previously

Kevin Schembri*, Viktor Serafimov, Stephen Montefort, Alexander Manche

St. Luke’s Hospital, Cardiothoracic Unit, Gwardamanga, Malta

Received 5 February 2003; received in revised form 11 May 2003; accepted 15 June 2003

Abstract
We present the case of a 73 year old Caucasian male who developed a left sided pneumonia and empyema secondary to a foreign body inhaled 30 years before. The foreign body, a bone fragment, was lodged at the bifurcation of the left main bronchus and could only be removed via bronchotomy. The patient experienced a swift recovery and was well at follow-up 6 months later.

Keywords: Inhaled; Foreign body; Thoracotomy

1. History
In 1970 our patient aspirated a bone while drinking soup. Bronchoscopy at that time was unsuccessful and in order to facilitate spontaneous removal of the foreign body he was nursed in hospital for a few days in the Trendelenberg position. The manoeuvre was, however, unsuccessful and the patient was discharged home without further treatment.

2. Case report
In 2001 the patient presented to the emergency department with acute onset of left sided chest pain, a productive cough and swinging pyrexia. He suffered from hypertension, non-insulin dependent diabetes mellitus, hypercholesterolemia and ischaemic heart disease. In 1997 he underwent a cervical laminectomy of C3–C6 for canal stenosis. He smoked 30 cigarettes daily since the age of 14.

Clinical examination revealed signs of a left sided pleural effusion. A plain chest X-ray (CXR) confirmed a large, encapsulated pleural collection with an underlying left lower lobe consolidation.

He was admitted and the collection was drained using a chest drain. Drainage revealed an empyema. The patient improved and a CXR showed marked resolution. The drain was removed on the 3rd day.

On the 4th day the symptoms reappeared and the third chest film confirmed the recurrence of the collection. This time he was referred to the thoracic surgeons who, by means of a computed tomography (CT) scan, confirmed the presence of a moderately large encapsulated collection with consolidation of the left lower lobe (Fig. 1). On this initial CT scan, patency of the left bronchus could not be assessed properly due to possible compression from a prominent 2 cm calcified lesion thought to be a lymph node. The radiologist suggested a repeat CT after drainage and resolution of the empyema. Percutaneous drainage under CT guidance produced 200 ml of thick pus. Further drainage continued in the ward over the next 5 days combined with I.V. antibiotics. The patient’s condition improved and he was discharged after a week.

The follow-up CT scan performed 2 months later showed the calcified lesion previously noted in the left lung hilum and erroneously ascribed to a lymph node, to be in the left main bronchus, occupying almost the entire lumen (Fig. 2). Flexible bronchoscopy revealed a left main bronchus that was almost totally occluded by a hard black mass thought to be a foreign body. The lesion could neither be biopsied nor removed. A subsequent rigid bronchoscopy confirmed the foreign body but was also unsuccessful at removal.

A left-sided thoracotomy was therefore performed that same week. The left upper lobe was mobilised and the left main bronchus was opened transversely. The bronchus was...
probed using a Dejardin forceps identifying the foreign body about a centimetre distal to the incision. The bronchotomy was extended in a T-shape fashion in order to remove the foreign body, which was a 2 cm triangular shaped long bone cortex.

The patient made an uneventful recovery and was discharged 2 days following the intervention. A repeat CT exam performed 2 months post thoracotomy showed patent tracheo-bronchial tree and normal lung parenchyma.

3. Discussion

The first extraction of an airway foreign body was described by Dr Gustav Killian in 1902. At that time Dr Killian wrote:

On March 27, 1897, whilst eating some soup, J.W aspirated a bone. This incident was followed by attacks of violent cough and dyspnoea, which however became gradually less… On direct laryngeal examination by means of Kirsten’s spatula the patient being seated with his head strongly deflected to the left, I saw in the right principal bronchus a white mass. On the following day I introduced, under cocaine anaesthesia, a straight tube 9 mm diameter and 25 cm length through the larynx and the trachea until I came near the foreign body. The curvature of the trachea was thus removed, and the foreign body could be seen distinctly. I had great difficulty in catching hold of the foreign body, using a pair of slender forceps, which had specially and quickly been made. Eventually I succeeded in catching the bone and extracting it. The patient was able to return home on the following day.

Although chronic lung infections usually lead to bronchiectasis, in our case this led to the development of an empyema. Complications of long-standing foreign body aspiration with repeated infections have been reviewed by other authors and include bronchiectasis, necrotising pneumonia and pleural effusion. Empyema following aspiration of a foreign body is rare especially if it presents many years later. A literature review confirms that bronchiectasis was the main complication. In a 15 year study of 1038 patients suffering from bronchiectasis only eight were due to a long retained foreign body and in three patients the cause was a fragment of bone retained for more than 10 years [1].

Following removal of the foreign body the lung changes have been observed by Kurklu et al. to return to normal and so the temptation to resect lung distal to the foreign body removed at bronchotomy should be resisted [2,3].

The second interesting point was that the foreign body was aspirated into the left bronchus. Although it has always been thought that an aspirated body is most likely to end up in the right side, Kane et al. [4], in their paper about missed inhaled foreign bodies, refer to two large series where aspiration into the left main bronchus was in fact not uncommon. In one series 28 out of 60 (47%) were left sided.

![Fig. 1. Initial CT scan showing a left sided empyema.](image1)

![Fig. 2. Follow-up CT scan showing foreign body in left main bronchus.](image2)
and in another approximately 80 out of 200 (40%) were in the left endobronchial tree [5,6].

From the surgical point of view our main concern was to localise the foreign body with minimal surgical trauma. Although conventional CT scan is a good guide in localisation there are always errors due to lung movements and interscan slice errors. The initial bronchotomy did not lead us exactly onto the foreign body and we had to extend the incision.

With the use of spiral CT identification and localisation of a lesion is much more accurate. Above all the importance of a good history and clinical suspicion cannot be over-emphasised even with today’s sophisticated investigative facilities.

References


Appendix A. ICVTS on-line discussion

Author: Dr. Sameh Sersar, Assistant lecturer, Cardiothoracic surgery, Mansoura University, Mansoura 123, Egypt

Date: 06-Sep-2003

Message: I do not agree with your title. Firstly, I do not believe that empyema thoracis is caused by foreign body inhalation at all. I believe that FBI is a cause of chronicity of empyema rather than a cause of empyema itself. Secondly, if I were you I would never have removed the first intercostal tube for empyema on the 3rd day. In empyema, we never remove the intercostal tube (ICT) before at least 1 week. This may have been a contributing cause for recurrence. I would advise repetition of the rigid bronchoscopy in another setting by another surgeon as long as I saw the foreign body. Lastly, how much time passed between the second intercostal tube draining empyema and thoracotomy?

Response

Author: Mr. Alexander Manche, Consultant cardiothoracic surgeon, St. Luke’s Hospital, Cardiothoracic Surgery, Gwardamangia, Malta

Date: 12-Sep-2003

Message: On investigation we did not come up with any other cause for the empyema. Since removing the foreign body, his empyema has not recurred even at 2 years follow-up. We are therefore ascribing the cause of the empyema to the foreign body.

We totally agree that removing the chest drain for empyema after 3 days is premature. We would agree that a minimum of 1 week is more likely to be successful. Unfortunately, the patient was not under our care at the time. We were persistent during the rigid bronchoscopy but failed to grasp or dislodge the foreign body. We therefore decided not to repeat this procedure.

Ten weeks elapsed between the second intercostal tube and the thoracotomy.