CASE REPORT

Case series of thoracic actinomycosis presenting as a diagnostic challenge

Ahmed Fahim*, Richard Teoh, Jack Kastelik, Anne Campbell, Damian McGivern

Castle Hill Hospital, Castle Road, Cottingham HU16 5JQ, UK

Received 1 July 2008; accepted 1 August 2008

KEYWORDS
Actinomycosis; Biopsy Lung; Lung cancer; Pleural effusion

Summary
We report two patients who presented with dyspnoea, lethargy and weight loss. In both cases chest radiographs and computed tomography (CT) scans of the thorax were suggestive of bronchogenic carcinoma. However, thoracic actinomycosis was confirmed in both cases based on findings of the surgical biopsy and cultures from chest wall wound. The patients were successfully treated with penicillin. Thoracic actinomycosis is a very rare condition, which can pose a diagnostic challenge. These cases highlight the importance of considering the possibility of rare infections such as actinomycosis in apparently malignant looking lung lesions. Moreover this report emphasizes the importance of promptly diagnosing this highly treatable disease with excellent prognosis.

© 2008 Elsevier Ltd. All rights reserved.

doi:10.1016/j.rmedc.2008.08.003

Introduction

Actinomycosis is a granulomatous infection of the cervicofacial, thoracic, abdomino pelvic area and mixed organs including skin, brain, pericardium and extremities. Over the last three decades, the incidence of actinomycosis has declined markedly.1 Thoracic actinomycosis has been reported more frequently in patients with underlying lung disorders such as bronchiectasis or emphysema as well as on the background of chronic alcohol abuse.2 It remains a diagnostic challenge as clinically it may be difficult to distinguish from more common conditions such as lung neoplasm and pulmonary tuberculosis. We report two cases of thoracic actinomycosis with different modes of presentation. Written consent has been obtained from both patients presented in the case series.

Case 1

A 51-year-old previously fit male presented with a 3-week history of hemoptysis, left sided chest pain, weight loss and exertional dyspnoea. He was a taxi driver with a 30-pack year
history of smoking. Examination was unremarkable without any evidence of pyrexia, clubbing or lymphadenopathy. The chest radiograph (Fig. 1a) showed shadowing in the right upper and left lower zones. A computed tomography (CT) scan of the thorax (Fig. 1b) revealed a parenchymal opacity with spiculated margins in the right upper lobe and a cavitating lesion in the left lower lobe (Fig. 1c). A percutaneous CT scan guided biopsy of the left lower lobe lesion was non-diagnostic. Therefore, a video-assisted thoracoscopic (VATS) biopsy of left lower lobe was performed. The histology (Fig. 1d) showed areas of patchy inflammation with formation of small abscesses containing ‘sulphur granules’; round or oval basophilic masses with radiating arrangement of eosinophilic clubs on the surface, a pathological finding suggestive

Figure 1  a. Chest radiograph with right upper lobe and left lower lobe opacities. b. Right upper lobe spiculated lesion on computed tomography. c. Left lower lobe cavitating lesion on CT scan. d. Histology from left lower lobe showing sulphur granule in case 1. e. Erythema on anterior chest wall suggesting extension to soft tissue. f. Ultrasound of chest wall confirming the clinical suspicion of extension of actinomycosis.
of actinomycosis. The presence of actinomyces was confirmed on gram stain, which revealed slender, beaded and weakly gram-positive filamentous bacteria. The patient was commenced on high dose intravenous benzylpenicillin. Subsequently he developed erythema and swelling inferior to his left breast (Fig. 1e). The thoracic ultrasound (Fig. 1f) showed area of swollen tissue (2 cm × 1.5 cm) inferior to pectoralis major indenting the chest wall. A repeat CT scan of the thorax confirmed extension of actinomycosis to the chest wall. The patient continued to receive high dose of benzylpenicillin. His condition gradually improved over a period of 4 weeks when antibiotics were changed to oral amoxicillin. The patient is currently well.

Case 2

A 68-year-old male with a background of hypertension presented with history of dyspnoea, anorexia, weight loss and lethargy for 4 months. Examination was suggestive of left sided pleural effusion and an ulcerated left anterior chest wall mass with extruding green pus. He was pyrexial and initial blood tests demonstrated raised white cell count of 13.8 (predominantly neutrophilia) and C reactive protein (CRP) of 62. The chest radiograph on admission revealed large left sided pleural effusion (Fig. 2a). Pleural fluid analysis showed acute inflammatory cells only. CT scan of the thorax (Fig. 2b) revealed large anterior pleural mass in the left lung invading the anterior chest wall with retrosternal extension. There was a moderate left pleural effusion, small pericardial effusion and mediastinal lymphadenopathy associated with the mass. He had a diagnostic pleural aspiration, pleural fluid culture and sensitivity and fine needle aspiration (FNA) from the chest wall wound which proved negative for malignant cells and organisms. A percutaneous CT guided biopsy of the mass was not conclusive so he underwent a repeat CT guided biopsy (Fig. 2c) of the mass which revealed non-specific inflammatory changes without evidence of neoplasia. Subsequently swabs from the chest wall wound were specifically examined for actinomycosis and nocardia in view of repeatedly negative biopsies. Ultimately a growth of Actinomyces israelii was confirmed on these swabs. The patient was commenced on high dose intravenous benzylpenicillin. His symptoms gradually improved and antibiotics were changed to oral amoxicillin. The drainage of pus from the chest wall ceased and the induration reduced significantly. The repeat CT scan (Fig. 2d) after 3 months showed reduction in the size of the mass and effusion. The patient is currently well.

Discussion

The most common form, the cervicofacial actinomycosis, is reported in 50–60% of cases. The second most common form of presentation is thoracic actinomycosis, which has been reported in 15–20% of cases. Actinomyces species are higher prokaryotic bacteria belonging to the family Actinomycetaceae.\textsuperscript{4} \textit{A. israelii}, the main species responsible for human disease, was first isolated in 1891.\textsuperscript{4} These are filamentous, gram-positive, anaerobic-to-microaerophilic bacteria that are not acid fast. The usual mechanism of infection is by aspiration of oropharyngeal secretions although occasionally, it may result from the introduction of organisms via oesophageal perforation or haematogenous spread from a distant lesion. Moreover adult males with poor dental hygiene appear to be at greatest risk to develop actinomycosis and it was evidenced in one of the two patients described in this report.

As evident by the two cases described, the clinical presentation of thoracic actinomycosis may vary. Thoracic actinomycosis usually presents with dyspnoea, cough, which may either be dry or productive, hemoptysis and chest pain. These symptoms were reported in our first patient. Clinical examination may reveal sinus tract on the chest wall as evidenced in our second case. Computed tomography on its own is not diagnostic but may help in evaluating the exact location and the extent of disease and to help direct accurate biopsy as well as assist in monitoring the response to treatment. The non-specific clinical and laboratory findings in actinomycosis add to the difficulty in diagnosing this disease. Moreover the mode of presentation can vary substantially between patients. In a case series of 22 patients\textsuperscript{5} with actinomycosis the most common radiographic findings were unilateral areas of airspace consolidation. In contrast, in our first patient the chest radiograph and thoracic CT scan revealed bilateral lesions including a cavitating lesion in the left lower lobe highly suspicious of primary bronchogenic carcinoma.

To confirm thoracic actinomycosis a sample from the lung biopsy is usually required. Fiberoptic bronchoscopy is not usually diagnostic unless there is a visible endobronchial disease amenable to endobronchial biopsy.\textsuperscript{6} Endobronchial actinomycosis may have a number of manifestations. For example, it can present as an irregular granular thickening, which can mimic a sub-mucosal tumour or as a florid disease in the form of exophytic masses and purulent exudates. A CT or ultrasound guided biopsy is usually recommended prior to the surgical biopsy. However, as it was reported in our both patients, the CT guided biopsies may not be diagnostic. Thus, the gold standard for diagnosis of thoracic actinomycosis is a histological confirmation on lung biopsy, as in case 1. However, in some patients, as described in our case 2, a less invasive approach through the analysis of pus from a chest wall ulcer may be sufficient to reveal the growth of \textit{A. israelii}.

Sulfonamides were first breakthrough therapy in actinomycosis in the late 1930s. However, since 1950s penicillin has remained the drug of choice.\textsuperscript{7} The rationale for the use of penicillin is based on the successful clinical experience rather than randomised controlled trials.\textsuperscript{1} Thoracic actinomycosis generally requires longer treatment with antibiotics compared with the other forms.\textsuperscript{8} The treatment of thoracic actinomycosis requires high dose intravenous benzylpenicillin for 4–6 weeks followed by oral penicillin for a further 6–12 months depending on response. However, in a retrospective case series JaeChol Choi and colleagues\textsuperscript{9} demonstrated that if surgical resection is performed a shorter course of intravenous antibiotics can be considered. Kinnear and MacFarlane\textsuperscript{10} described 19 patients in whom thoracic actinomycosis was completely resolved with a median of 6 (range 1–24) weeks duration of antibiotic therapy including 7 patients diagnosed with actinomycosis following surgical resection. Tetracycline is an alternative form of therapy in penicillin allergic
patients. Surgery is an important adjunct to treatment if there are complications such as well-defined abscesses and empyema, or if there is life threatening hemoptysis, which is a very rare complication of thoracic actinomycosis.

The thoracic actinomycosis can pose a diagnostic challenge. The two described cases highlighted the diversity of presentation as well as providing an opportunity for increasing the clinicians’ awareness of this rare condition. Thoracic actinomycosis can mimic other more common conditions such as pulmonary neoplasm, tuberculosis or lung abscess. In fact, in our described cases the radiological findings were suggestive of bronchogenic carcinoma with cavitation, pleural adenocarcinoma or lymphoma with mediastinal lymphadenopathy and bony invasion. Case 2 also highlighted the importance of considering a diagnosis of actinomycosis when there is a direct chest wall invasion associated with pleural effusion. In conclusion, thoracic actinomycosis is a rare but important clinical disease with excellent prognosis if treated promptly. Therefore, respiratory physicians should consider thoracic actinomycosis in the differential diagnosis of persistent pulmonary shadowing.

Conflicts of interest statement

None to declare for any author.

References