CASE REPORT

Endobronchial actinomycosis: successful treatment with oral antibiotics

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SUMMARY

This is a case report of an 84-year-old lady who presented with haemoptysis, weight loss and a right hilar mass on chest radiograph. CT scan of the chest revealed complete proximal occlusion of the right upper lobe from an endobronchial lesion consistent with a tumour. The patient was initially reluctant to undergo fibreoptic bronchoscopy as she was deemed to be unsuitable for any curative treatment of lung carcinoma. Bronchoscopy showed an exophytic necrotic tumour within the right upper lobe. Biopsies showed many bacterial colonies consistent with actinomyces and a diagnosis of endobronchial actinomycosis was made. Owing to multiple antibiotic allergies and patient refusal to have intravenous antibiotics, she was started on a course of doxycycline 200 mg once daily. There was near complete improvement in symptoms and radiographic appearances by the end of 4 months. This case highlights the importance of confirmatory diagnosis in the elderly as curable conditions are otherwise missed.

BACKGROUND

Actinomycosis is a chronic suppurative infection due to a group of Gram-positive anaerobic, filamentous, branching and slow growing organisms belonging to the resident flora of the oropharynx, and found in 30–50% of normal saliva specimens.¹ The disease can affect any part of the body, and three classical types have been described depending on anatomical site involved: cervicofacial (55%), abdominopelvic (20%) and thoracic (15%).²

Primary endobronchial actinomycosis is rare and usually occurs in association with foreign body aspiration,³ and can closely mimic endobronchial carcinoma^{4–6} or other chronic suppurative lung diseases.⁷ It is a condition with low mortality but significant morbidity that poses a number of diagnostic challenges. In most cases medical management alone can be curative.

CASE PRESENTATION

This is the case of 84-year-old woman who presented to the respiratory outpatient clinic, with a 1-year history of productive cough, haemoptysis and significant weight loss. She had had multiple hospital admissions during this time for lower respiratory tract infections. Her medical history included chronic obstructive airway disease and ischaemic heart disease. The only family history of note was a recent diagnosis of lung cancer in her daughter. The patient was a non-smoker, lived alone and was independent for activities of daily living.

On examination, oxygen saturation was 92% on air, there was no evidence of oedema or clubbing, cardiovascular examination was unremarkable, but there was reduced air entry across her chest and bronchial breathing in the right upper chest.

INVESTIGATIONS

Initial chest X-ray showed a central right hilar mass, volume loss in the right hemithorax and pronounced right upper lobe bronchiectasis (figure 1). The patient underwent CT scan of the chest, which revealed complete proximal occlusion of the posterior, anterior and apical segmental bronchi of the right upper lobe, with severe distal bronchiectasis and collapse, with a strong suspicion of an endobronchial tumour (figure 2). Comparison was made with a previous scan and showed significant progression over 1 year, with almost complete destruction of the right upper lobe.

The patient was initially told of the possibility of lung carcinoma; she was reluctant to undergo further invasive investigations given the relative lack of treatment options for possible lung carcinoma. After some persuasion, the patient subsequently underwent flexible bronchoscopy (figure 3), revealing an exophytic necrotic tumour within the right upper lobe. Brushings, washings and biopsies were taken for cytological and histological examination. Biopsy specimens (figure 4) showed inflammatory exudate with many bacterial colonies, which had the appearance of actinomyces, and PAS-D stain highlighted the filamentous bacterial colonies. The patient was diagnosed as having a case of endobronchial actinomyces infection. No cultures were carried out as further biopsies could

Figure 1 Right upper lobe bronchiectasis with hilar mass.

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Figure 2 CT scan showing complete obstruction of the right upper lobe bronchus.

not be obtained due to the patient's unwillingness to undergo repeat bronchoscopy.

TREATMENT

The patient refused hospital admission for intravenous antibiotics as she was caring for her daughter, who had been newly diagnosed with terminal lung cancer. Owing to multiple drug allergies, antibiotic options were limited and she was started on a prolonged course of doxycycline 200 mg once daily. The case was also discussed with the thoracic surgeons in view of the extent of right upper lobe involvement, but no surgical intervention was felt to be required at the time of diagnosis.

OUTCOME AND FOLLOW-UP

The patient was followed up over a 12-month period since diagnosis. The initial response to treatment was poor with persistent symptoms, but consultation identified non-compliance with treatment to be the issue, based on the patient's concern that doxycycline affected renal function. She was reassured and continued treatment. With compliance achieved there was a near total improvement in symptoms with a 4-month course of doxycycline. A repeat CT scan of the chest ([figure 5](#)) at the end of 4 months' treatment showed near complete resolution of the endobronchial lesion. A repeat bronchoscopy was discussed with the patient to directly assess response to treatment and investigate the possibility of any underlying foreign body. However, the patient refused further bronchoscopy.

Figure 3 Endobronchial lesion on bronchoscopy.

Figure 4 Bronchial biopsy highlighting the filamentous bacterial elements.

DISCUSSION

Endobronchial actinomyces is a rare form of thoracic actinomycosis.² Actinomyces are commensals in humans but a number of pathogenic varieties have been identified, causing a range of clinical presentations including pulmonary manifestations. *Actinomyces israelii* is the main representative pathogen in human infection.⁸ The main clinical symptoms include cough, fever, expectoration of purulent sputum, chest pain and weight loss.¹ Chest CT features include thickened bronchial wall, dense pulmonary alveolar opacity, atelectasis, pleural effusion, bronchiectasis, lymphadenopathy and radiopaque foreign body.²

Actinomyces infections pose a number of diagnostic challenges, not least because they are difficult to culture, and require clinical suspicion to ensure suitable techniques are used. If actinomyces are identified, histology is important to establish pathogenicity as culture from secretions alone may only represent colonisation. Radiological appearances are non-specific and can vary with the duration of infection. Bronchoscopy may only be of diagnostic benefit in the setting of endobronchial disease as it allows biopsy of the lesion. There is also the potential to identify concomitant bronchial carcinoma or an underlying foreign body aspiration.

Treatment of choice has long been penicillin,³ but actinomyces have been demonstrated to be sensitive to a number of antibiotics, providing alternatives in the setting of penicillin allergy. Conventional therapy for actinomycosis is high-dose

Figure 5 CT scan showing near complete resolution of the lesion.

intravenous penicillin at a dosage of 18–24 million units daily for 2–6 weeks, followed by oral penicillin or amoxicillin for a period of 6–12 months.^{2 9}

In this case, therapy was tailored to the patient's circumstances with a 4-month course of oral doxycycline, which deviates from many of the previous recommendations. For adequate treatment, prolonged courses have traditionally been recommended, often with an initial period of intravenous therapy,^{1 3} but recent reports have shown good clinical response with short courses of antibiotics.^{1 4 10} It has been suggested that this may relate to presentation as, classically, patients presented with advanced disease.¹⁰ However, the burden of disease is low in endobronchial actinomyces and we have demonstrated that successful treatment is possible with a short course of oral antibiotics in such cases.

It has been noted that actinomyces infection should not be assumed to have occurred as an isolated event, and a significant number of cases have been reported in association with a foreign body or tumour. In the case of foreign body association, the foreign body is initially colonised by the actinomyces followed by invasion of the surrounding tissue.^{1 4} Removal of the foreign body is key to successful treatment, but other cases have reported that there may be a lack of history of choking and the foreign body may only be identified after treatment. This highlights the importance of bronchoscopy initially and on follow-up. Unfortunately, our patient was not willing to undergo a repeat bronchoscopy and was kept under close surveillance.

Clinical and radiological response to treatment is key to confirming the diagnosis. If there is a failure to respond, and clinical features correlate, a coexistent bronchial carcinoma should be suspected.

As yet, the optimum treatment of pulmonary actinomyces has not been demonstrated and multiple factors influence the success of treatment, such as stage of disease at diagnosis, site of disease, and association with foreign bodies and tumour. We have demonstrated successful treatment of uncomplicated endobronchial actinomyces with a relatively short course of oral antibiotics.

Learning points

- ▶ Endobronchial actinomyces is a rare but important curable differential diagnosis of lung carcinoma.
- ▶ It is important to achieve accurate diagnosis in the elderly and not assume carcinoma, as curable lesions can easily be missed.
- ▶ Endobronchial actinomyces can be treated exclusively with oral antibiotic therapy, however, it is currently not recommended.
- ▶ Repeat bronchoscopy following treatment is advisable given an association of actinomyces with a tumour or foreign body.

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