

## Case reports

A commentary on the following three papers appears on pp 226-7.

# Pulmonary actinomycosis appearing as a "ball-in-hole" on chest radiography and bronchoscopy

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### Abstract

**A 40 year old diabetic man with pulmonary actinomycosis was admitted to hospital with recurrent haemoptysis. The chest radiograph showed an air meniscus in the left upper lobe, a rare presentation of pulmonary actinomycosis. Bronchoscopic examination revealed a mass in a cavity which has never been reported previously. He underwent lobectomy and the surgical specimen revealed sulphur granules, the typical pathological finding of actinomycosis, without evidence of fungal or mycobacterial infection.**

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Pulmonary actinomycosis is a rare disease which has a tendency to occur in patients with diabetes mellitus or those receiving immunosuppressant therapy. The radiographic findings reported by Flynn and Felson are of a mass lesion, chronic alveolar infiltrates, pulmonary fibrosis, cavitation, transgression of an interlobar fissure, pleural effusions, chest wall involvement, soft tissue swelling, bony destruction or pulmonary osteoarthropathy.<sup>1</sup> Other findings include hilar lymphadenopathy,<sup>2</sup> disseminated lesions mimicking pulmonary embolism, or Wegener's granulomatosis. A pulmonary air meniscus is rare in pulmonary actinomycosis, only 10 cases having been previously reported. Severo *et al*<sup>3</sup> in 1989 reported four cases of pulmonary actinomycosis with an air meniscus; coexistent fungal infections were identified in all four cases.<sup>3</sup> In 1990 Coelho reported another six cases with an air meniscus but no mention was made of fungal infection.<sup>4</sup> We report a diabetic patient with pulmonary actinomycosis in whom a pulmonary air meniscus was visible on the chest radiograph and a mass in a cavity mimicking a "ball-in-hole" which was also seen at bronchoscopy. Microscopically sulphur granules were present in the surgical specimen without contaminating fungal hyphae or caseous necrosis.

### Case report

A 40 year old diabetic man presented with haemoptysis in 1991, and pulmonary tuberculosis was diagnosed by chest radiography without bacteriological proof. A three-drug antituberculous regimen was administered for a year. The chest radiograph one year later showed airspace consolidation with an air meniscus in the left upper lobe. He visited Keelung Chang-Gung Memorial Hospital in August 1993 with a three week history of haemoptysis. The chest radiograph was unchanged from one year previously (fig 1). He was admitted with a provisional diagnosis of old pulmonary tuberculosis with a possible mycetoma in the upper lobe.

On physical examination he was malnourished but not anaemic. Oral hygiene was poor with multiple caries and gingivitis. The neck was supple and free from wounds or lymphadenopathy. The lungs were clear and no fistulae were visible on the chest wall.

The haematological studies, liver biochemical tests, and renal function tests were all within normal limits. Sputum smear and culture for acid fast bacilli were negative on three occasions. The "ball-in-hole" did not move on a chest radiograph in the left decubitus position. A computed tomographic (CT) scan of the thorax showed a mass-like lesion within an ill-defined cavity in the left upper lobe. The

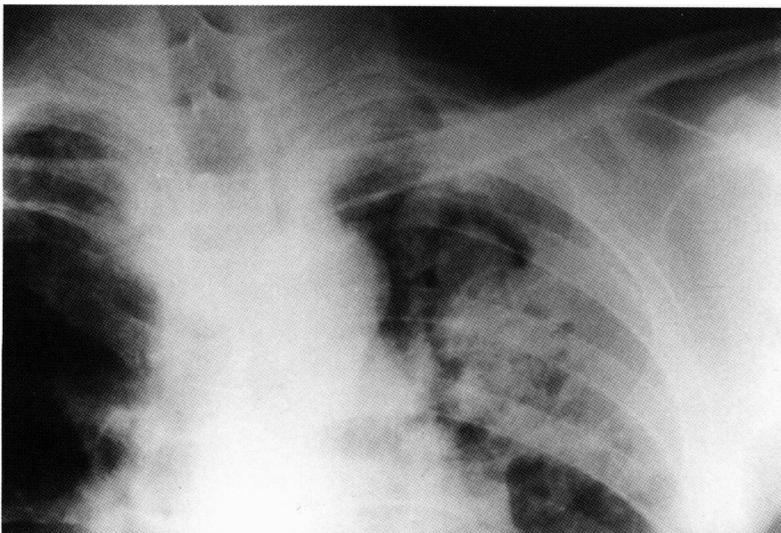


Figure 1 Chest radiograph showing airspace consolidation and an air meniscus in the left upper lobe.

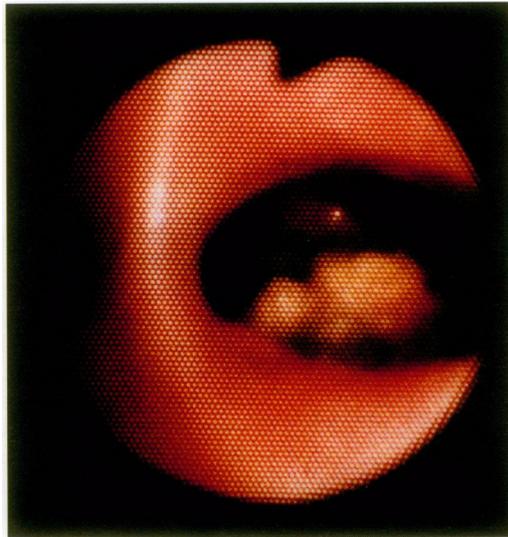


Figure 2 A fragile mass-like lesion in a cavity in the apical segment of the left upper lobe, seen at bronchoscopic examination.

mass was adherent to the wall of the cavity at some locations. Bronchoscopic examination showed the mucosa of the left upper lobar bronchus to be erythematous and filled with purulent secretions. A white fragile mass was seen inside a cavity in the apical segment of the left upper lobe (fig 2). Biopsy samples obtained by bronchoscopy showed sulphur granules and hyphae-like components within granulomatous formations. Bronchial washing for acid fast bacilli, fungus culture, and cytological studies were all negative.

The patient underwent left upper lobe lobectomy under the tentative diagnosis of a fungal infection and the resected specimen contained a thick walled cavity 5 cm in diameter, with a ball of necrotic material within the cavity. Elsewhere the lung showed focal haemorrhage and consolidation. Multiple sulphur granules with acute and chronic inflammation were seen microscopically. No fungus was seen on Gram's stain or periodic acid Schiff (PAS) stain.

The patient was treated with intravenous penicillin G (12 million units/day) for two weeks followed by oral penicillin V (2 g/day) for six months. He was clinically stable and no new lesion had developed during one year of follow up.

### Discussion

Actinomycosis is a chronic infectious disease caused by several species of the family Actino-

mycetaceae. They are anaerobic or micro-aerophilic and form mycelia which appear as granules called "sulphur granules" which are diagnostic for actinomycosis. The organisms are normal inhabitants of the oropharynx and pulmonary infection is acquired by aspiration of the contaminated secretion from the oropharynx. Thoracic involvement occurs in 15% of these patients.<sup>5</sup>

A pulmonary air meniscus is a rare presentation of thoracic actinomycosis. The common causes of a pulmonary air meniscus are fungus ball, blood clot in a tuberculous cavity, bronchial adenoma, carcinoma, Rasmussen aneurysm, hamartoma, hydatid cyst, lung abscess, pulmonary gangrene, sarcoma, and tuberculoma. In the 10 previously reported cases of actinomycotic intracavitary colonisation with an air meniscus, four had coexistent fungal infection in the cavities. In the present case the components of the "ball-in-hole" were mostly actinomycetes mycelia without any evidence of fungal infection.

A CT scan of pulmonary actinomycosis usually reveals a soft tissue mass with varying degrees of infiltration, abscess formation, and pleural thickening adjacent to the airspace consolidation which is seldom diagnostic. Attenuation of the mass on the CT scan is usually less than of muscle and solid viscera,<sup>6</sup> as in our case.

The diagnosis of pulmonary actinomycosis is usually based on microscopic examination or culture of the material aspirated from the lesion, anaerobic sputum culture, or histological examination of the resected specimen and from bronchoscopic biopsy. The bronchoscopic findings are usually not diagnostic and include yellowish, hard or friable endobronchial masses.<sup>7,8</sup> In this case a characteristic "ball-in-hole" was seen at bronchoscopy and histological proof of actinomycosis was obtained before surgical intervention.

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