Thoracic Actinomycosis on Radiologic Study: Case Report

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Actinomycotic disease is an uncommon bacterial infection. Primary actinomycosis of the lung and chest wall has rarely been reported. We here present the image findings in a case of thoracic actinomycosis with lung infection, rib and chest wall involvement.

It is a chronic infection with the ability to spread to contiguous tissue. Major image findings on the chest include pneumonia-like consolidation of lung with pleural effusion or pleural wall thickness, soft tissue mass on the chest wall, and destruction of rib or vertebral body. Medical treatment is the first consideration, and it always has good prognosis if clinical doctor made correct to diagnosis early.

Key word: thorax actinomycosis, pneumonia-like consolidation.

Thoracic actinomycosis is a chronic suppurative infection with the ability to spread to contiguous tissue without regard to normal anatomic barriers [1,2,3]. The disease is found world-wide and has no racial predisposition. Men are affected three to four times more often than women [2].

The radiographic findings which are dependent on the chronicity of the disease, include pneumonia-like patchy consolidation with lower lobe predominence, pleural effusion or thickness, and chest wall extension by either a soft tissue mass, wavy periostitis of rib or vertebral body destruction [3,4,5].

We report a case of thoracic actinomycosis with sonography, chest film and computer tomographic (CT) findings.

CASE REPORT

A 47-year-old man was admitted to our hospital due to a reddish mass with swelling and pain over the right anterior chest wall for three days. He also had a nonproductive cough and low-grade fever for one week.

Physical examination showed a bulging mass about 8x8cm over the right chest wall, and decreased breath sounds over the right lower lobe. Body temperature was 38.3°C, and WBC were 8300/uL. The patient had history of chronic hepatitis B, but he denied other systemic disease.

Sonography showed soft tissue swelling over the right anterior chest wall with central hypoechoic abscess formation (Fig.1). The chest film showed patchy infiltration over the right lower lobe with pleural effusion or pleural wall thickness (Fig. 2). The pattern was similar to pneumonia. CT of the chest showed air-space consolidation over the right lower lobe with a soft tissue lesion on the pleural wall (Fig. 3), which was contiguous to a soft tissue mass on the
anterior chest wall (Fig. 4). There was destruction of the involved rib with loss of bone density (Fig. 3, 4). Under the impression of actinomycosis with chest wall involvement, a CT-guided biopsy of the mass on the chest wall and consolidated areas of the lung were performed. The pathology report showed negative acid-fast stain with few mycelial filaments, consistent with actinomycosis.

The patient received penicillin G 3000000 units IV. q6h for months. He recovered and was discharged in the thirty-two hospital days.

**DISCUSSION**

*Actinomyces israelii*, the most common human pathogen is a slow-growing, filamentous, gram-positive, non-acid-fast anaerobic bacteria with a tendency to form mycelium-like colonies. Morphologically and clinically, these agents resemble fungi, but they have been established as bacteria because of the composition of their cell walls, their reproduction through bacillary fusion and their sensitivity to antibiotics [1,6].

The organisms are not highly virulent and are found normally in the crypts of the tonsils, mouth, saliva, dental plaque, gingival sulci and pyorrheal pockets [4,5,6], particularly in people with poor oral hygiene, elderly people and patients with cachexia. Tests of skin, saliva, and serum have no value in diagnosis and even bronchoscopic specimens may be contaminated [7]. Disease can occur when these endogenous organisms are able to invade normal tissue because of infection, trauma or surgery [1,5].

Epidemiologically, there are two peak age periods of actinomycotic infection: 11-20 year old and 30-50 year old. Men are affected three times as often as women. Only 27% of actinomycotic infections occur in people under 20 years old [1,2].

There are three major clinical forms of actinomycosis—the cervicofacial, thoracic and abdominopelvic. The thoracic form accounts for about 15% of cases, the cervicofacial form for about 55% and abdominal form for about 20%. Infection of other organs including skin, brain, pericardium and extremities accounts for 10% of cases [4,6,7].

Pulmonary actinomycosis is most common in patients with alcoholism and chronic obstructive lung disease. The primary location involves the peribronchial tissue, bronchioles and alveola, and its organisms may spread from lung to pleura, ribs, spine, heart, pericardium and chest wall without regards for tissue plane and boundaries [1,4,6,8]. The reason may relate to the proteolytic activity of the bacteria [1,5]. Thoracic disease may occur by means of direct extension from the cervicofacial and abdominopelvic regions [5].

The symptoms may be acute or chronic and
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vary depending on rib and chest wall involvement. These include nonproductive cough, low-grade fever, chills, hemoptysis, body weight loss, pleuritic chest pain, and soft tissue swelling of the chest wall. In advanced disease, it may present as cutaneous fistulas, empyema, periostitis or osteomyelitis of the ribs and spine, vascular shunts, chronic sinus tract infection with typical “sulfur granule” content, superior vena cava syndrome or pericardial effusion [4,6].

Radiographic findings include nonsegmental pneumonia-like infiltration (more frequently occurring peripherally and over the lower lobe), empyema, mass-like consolidation, cavitation, pleural effusion or thickening, and chest wall extension by either soft tissue mass, wavy periostitis of rib, or destruction of vertebral body [2,3].

The diagnosis may be difficult as the organism is hard to recover even with percutaneous needle biopsy, transbronchial biopsy and open lung biopsy, so the final diagnosis is often made histologically [3,5,6]. The lung abscess or empyema typically are surrounded by granulation tissue with a variable degree of fibrosis and masses of polymorphonuclear cells which may contain typical “sulfur granules”. These granules represent conglomerate masses of organisms that have become mineralized [1].

With treatment, most patients are cured by means of large doses of penicillin administered over a period of weeks to months. Surgery may be of help in draining empyemas, or in resecting badly damaged lung tissue when lesions do not respond to medical treatment [1,6,8]. The differential diagnosis of pulmonary lesions should include pneumonia with poor response to treatment, nocardiosis, tuberculosis, bronchogenic carcinoma, alveolar cell carcinoma, lymphoma, and malignant mesothelioma, in addition to some fungal diseases such as histoplasmosis, cryptococcosis, blastomycosis and coccidiodomycosis [4,5,6].

Actinomycosis, when it presents with the classical triad of lung infection, empyema, and rib or chest wall involvement, is not much of a problem in diagnosis[6], but when it does not present in the classical form, an aggressive approach is needed for early diagnosis, and institution of penicillin therapy to prevent serious complications and avoid unnecessary surgery.

REFERENCES

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胸部放線菌病在影像學上的研究：病例報告

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放線菌疾病是一種罕見的細菌性感染，在胸部和肺部的原發性放線菌病很少被報導。在這裡，我們提出一個有關放線菌病侵犯肺部，胸壁和肋骨的病例在影像上的發現，包括像肺炎般的實質浸潤，合併肋膜積水或肋膜增厚，胸壁上有腫塊，肋骨或椎體的破壞。早期的發現可以內科療法治癒，因此提出來以作為放射科醫師早期診斷上的依據與線索。

關鍵詞：放線菌病，肺炎實質浸潤