

Case report

Pulmonary actinomycosis affecting chest wall: a case report

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Abstract:

Thoracic actinomycosis is an uncommon, chronic suppurative bacterial infection caused by *Actinomyces* species. Thoracic actinomycosis represents about one-fourth of all cases of actinomycosis. We report a case of left sided pleural effusion with hydropneumothorax with collapse and consolidation of left lung with discharging sinus in the left anterior chest wall. Actinomycosis was suspected and confirmed by microscopic identification of “sulfur granules” in the discharge of the sinus tract and also identification of gram-positive filamentous bacteria in the specimen of discharging sinus.

Keywords: thoracic actinomycosis; chest wall; lung; Bangladesh

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Introduction:

Actinomycosis is a rare, chronic slowly progressive granulomatous infection caused by *Actinomyces*¹. Out of 14 species of *Actinomyces*, six are pathogenic and *Actinomyces israelii* is the most common human pathogen. The Gram-positive filamentous anaerobic (or facultative) bacilli is the normal flora of oropharynx, gastrointestinal tract and female genital tract². The most common clinical forms of actinomycosis are cervicofacial (55%), abdominopelvic (20%) and thoracic (15%)³. Pulmonary actinomycosis results from aspiration of oropharyngeal secretion containing *actinomyces*⁴. Patient presents with haemoptysis (42%), persistent cough(37%), fever, dyspnea and chest pain⁵. The infection may present as pulmonary infiltrate or a mass which can involve the pleura, pericardium and chest wall leading to sinus tract formation⁶. Due to nonspecific and varied clinical and radiologic presentations diagnosis of pulmonary actinomycosis is difficult and often lead to delayed diagnosis or misdiagnosis as tuberculosis, lung abscess or lung cancer^{7, 8}. Weese et al reported a case series where only

3% (6/ 194) cases were initially diagnosed as actinomycosis⁸. Additionally, improved oral hygiene and early antibiotic use has resulted in decreased incidence of the disease and less aggressive presentation compared with pre-antibiotic era⁹. So, diagnosis of actinomycosis is now even more challenging than before especially in limited facility situations like Bangladesh¹⁰.

The Case:

The patient was a 53 year-old male, presented with 18 months history of multiple discharging sinus from chest wall and one month history of left lateral chest pain and cough. He had been well at about one and half year back when he noticed gradual development of a painful swelling over the left chest wall just lateral to xiphisternum. It was excised surgically but was not healing despite antibiotic and regular dressing. A month later he developed another swelling and subsequently three more swelling in the left anterior chest. He got admitted to hospital in a surgery ward. He was investigated and complete blood count revealed hemoglobin 10.5 mg/dl, total leukocyte count 11,300/mm³,

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66% Neutrophil, normal thrombocytes and an ESR of 118 mm in first hour. Routine Urine examination revealed normal except one plus albumin. His Random blood sugar was 105 mg / dl, sputum AFB was negative and induration at Montoux test was 6 mm. The pus was examined and was negative for Gram or AFB stained organisms and culture yielded no growth. Chest X-ray revealed left sided hydropneumothorax with collapse, consolidation of left lung. The radiological description of the chest X-ray was-left dome of diaphragm is obscured, mediastinum shifted to the left, obscured left heart border, not delineated, homogeneously dense opacity was noted in left upper and mid zone, another dense opacity with a fluid level was seen in left hemi thorax along lateral chest wall, and anterior rib crowding was present on left side. With these investigation reports the patient was referred to the medicine unit. In the medicine ward revised further history evaluation revealed past history of left pleural effusion treated as TB pleural effusion 25 years back and was treated with Anti-TB drugs discontinued of his own after 3 months. The patient also gave a history of mandible fracture and tooth extraction two years back. The patient was physically examined and laboratory evaluation was negative for active TB. The case was suspected for a thoracic actinomycosis, as the patient complained of discharge of small granular substances from the sinuses during revision of case history. New investigations were planned and sent accordingly with repeating couple of investigations. Repeated CBC showed hemoglobin 9.2 mg/dl, total leukocyte count 9,000/mm³ with 71% polymorphs and ESR was 80 mm in first hour. Pus was sent for Gram staining, AFB staining, culture and sensitivity and PCR for MTB DNA. The results were negative on PCR and culture but showed gram negative filamentous bacteria with significant number of sulphur granules. The gram stain was repeated and revealed similar results and a diagnosis of thoracic actinomycosis.

Discussion:

We report the case to inform clinicians that Actinomycosis should be suspected in cases with chronic discharging sinuses in the chest or pulmonary lesions suspecting smear negative PTB and not responding to Anti-TB medications. Actinomycosis is more common in male (3:1) and can affect all age group but common

between 20 and 50 years⁸. Risk factors includes poor dental hygiene or dental caries, pre existing structural lung disease, chronic alcoholism and cognitive delay^{11, 12}. Inhalation of contaminated aerosol particles or aspiration of oropharyngeal or gastrointestinal secretions, or hematogenous spread from a distant lesion is the mechanisms for pulmonary actinomycosis^{13, 14}. In our case the patient had a history of mandible fracture and tooth extraction two years before the onset of illness and had poor oral hygiene with severe caries, so secondary aspiration might have been the mechanism of infection. Actinomycosis may spread from the lung to the pleura, mediastinum and chest wall, with little regard for anatomic barriers. The organisms produce proteolytic enzymes, and peripheral pneumonia tends to involve the pleura, producing empyema, and invade the chest wall with involvement of bones such as the ribs or vertebrae^{15, 16}. Chest wall involvement is an uncommon manifestation, contributing to 12% of thoracic actinomycosis³. Chest wall involvement is usually preceded by lung infection, but may occur by means of a direct extension from the neck, esophagus, abdomen or retro peritoneum¹⁷. Chest wall involvement is much less common now than previously reported due to early antibiotic treatment¹⁶.

Radiological manifestations of chest wall involvement include a soft tissue chest wall mass continuous with pulmonary disease, with or without central low-attenuation, empyema, periosteal proliferation along the ribs, and destruction of ribs or vertebrae¹⁶. Pulmonary infections, which can produce similar findings of contiguous chest wall invasion, are tuberculosis, blastomycosis, nocardiosis, cryptococcosis and invasive aspergillosis. Other differential diagnoses are lymphoma, bronchogenic carcinoma, malignant mesothelioma and rare chest wall tumors¹⁶.

Definitive diagnosis of actinomycosis is made by examining the specimen from draining sinus, sulphur granule, deep needle aspirate or by biopsy³. Gram stain and microscopy demonstrate filamentous, branched gram-positive rod. Isolation and identification of *actinomyces* in anaerobic culture require 2-3 weeks¹⁸.

The treatment of choice is penicillin. In severe or rapidly progressive cases, penicillin should be started intravenously at high doses (10-20 × 10⁶ IU/d)³. Treatment duration is variable depending

on the location and therapeutic response. Tetracyclines or macrolides are alternatives in case of resistance or allergy to penicillin¹⁹. Surgery is indicated for empyema drainage, fistula repair, and resection of destroyed lung tissue⁶.

Conclusion:

Thoracic actinomycosis is extremely rare and presents with nonspecific symptoms, an insidious

course, and a variety of clinical manifestations. Failure to early diagnosis and appropriate treatment leads to significant morbidity including unwanted surgery. The prognosis is excellent with low mortality when the disease is recognized early and appropriate treatment is given. So it is worthy to consider actinomycosis as part of the differential diagnosis when confronted with chronic unresolving pulmonary lesion.

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