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Empyema necessitans caused by actinomycosis: A case report

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ABSTRACT

INTRODUCTION: Pulmonary actinomycosis is an uncommon clinical entity that the practicing thoracic surgeon rarely encounters. Empyema necessitans represents an even less common presentation of this pathology, and the often indolent disease course leads to early misdiagnosis in many cases. Familiarity with the varied presentations and possible operative strategies is essential to obtaining successful outcomes.
PRESENTATION OF CASE: A 56-year-old male presented with swelling and pain over the lateral chest wall. Initial imaging studies demonstrated a mass concerning for infection vs. neoplasia. Further studies were obtained to confirm the diagnosis, with rapid progression of the mass. Surgical exploration with aggressive debridement of the chest wall without thoracotomy was performed. Actinomyces was identified on final pathology, confirming the diagnosis of Actinomycosis empyema necessitans.
DISCUSSION: Traditional management strategies often involve pulmonary resection in addition to extended duration antimicrobial therapy. This report describes the uncommon clinical presentation and successful management of actinomycosis empyema necessitans with early limited operative intervention.
CONCLUSION: In the event of minimal pulmonary involvement and absence of lung abscess, as was seen in this case, a thoracotomy with pulmonary resection can be avoided, and antibiotic duration limited.

1. Introduction

Actinomyces is a filamentous, gram-positive, anaerobic bacteria that is a component of the normal flora of the aerodigestive tract. Although rarely pathologic, the 3 most common sites of infection are orocervicofacial, pulmonary, and abdominopelvic [1]. Actinomycosis more commonly affects men, with a gender ratio of 3:1 [2]. It is often polymicrobial and represents an uncommon pathology in immunocompetent individuals. Infection tends to occur following a break in the integrity of the tissues of the aerodigestive tract, which accounts for the typical presentations of orocervicofacial or pulmonary disease. We report the case of a rapidly growing actinomycosis of the chest wall presenting as empyema necessitans and chest wall abscess, with minimal underlying pulmonary parenchyma and pleural space involvement. Traditional management entails long-term antibiotic therapy with pulmonary resection for refractory cases. In this report we discuss the clinical presentation, imaging findings, and management strategy of this uncommon clinical entity. Written informed consent was obtained from the patient as per institutional guidelines.

2. Case presentation

A 56-year-old male with no significant past medical or surgical history presented with 3 weeks of progressive, localized, right-sided posterior chest wall pain and swelling. He denied fevers or chills, productive cough, hemoptysis, changes in weight or appetite, recent travel, or sick contacts. He is a 25-pack-per-year smoker and consumes alcohol occasionally. On physical exam, he had a 7×10 cm hard and fixed mass on the right posterior chest wall at the level of the 11th rib with minimal tenderness to palpation. There was no surrounding erythema, purulent or sanguineous drainage.

CT of the chest that was performed prior to the physical exam demonstrated a right posterior chest wall mass of 3×2.5 cm at the level of the 11th rib, minimal right lower lobe parenchymal changes and no pleural effusion. (Fig. 1a). A needle biopsy was performed to evaluate for infectious versus neoplastic etiology. Results were consistent with an inflammatory process. Stains for bacteria, acid-fast bacilli, and fungus were negative. Subsequent MRI showed a growing $9 \times 9 \times 5$ cm centrally necrotic mass at the level of the 11th

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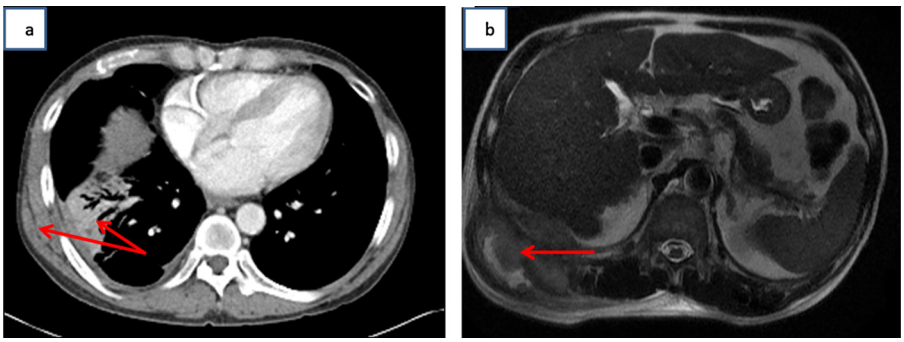

Fig. 1. (a) Axial computed tomography image demonstrating a 3 × 2.5 cm chest wall mass with limited surrounding inflammatory changes at the level of the 11th rib and minimal right lower lobe parenchymal changes. (b) Magnetic resonance imaging demonstrating progression of the soft tissue mass from computed tomography obtained 9 days prior. The mass measured 9 × 9 × 4.5 cm, with a central necrosis and fluid collection.

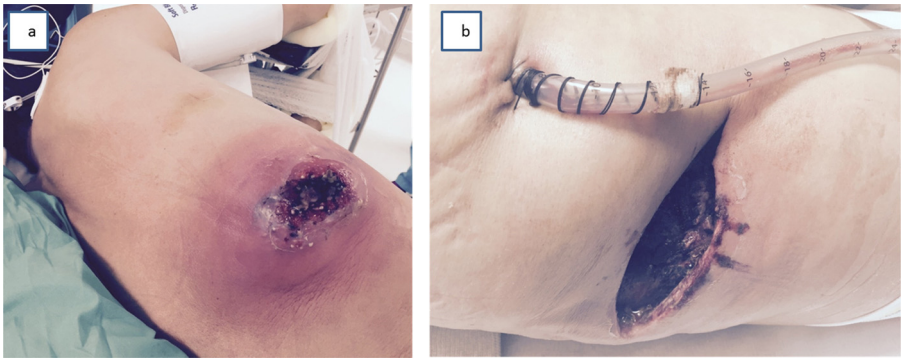

Fig. 2. (a) Preoperative appearance of chest wall abscess. Central necrotic area with extensive erythema and edema. (b) Immediate postoperative appearance. The surrounding erythema and soft tissue edema are significantly improved.

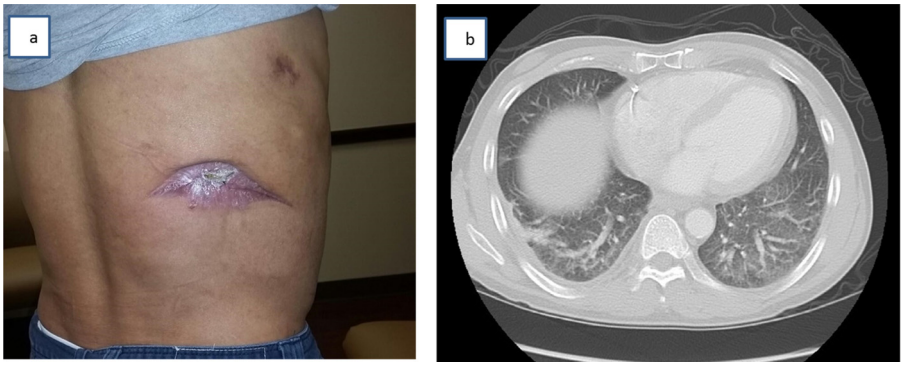

Fig. 3. (a) Six-week follow-up appearance, the wound bed is well granulating, without drainage or persistent of sinus tract. (b) Six-week follow-up axial computed tomography image showing complete resolution of the mass.

rib, infiltrating the right hemidiaphragm with minimal changes in the right lower lobe. (Fig. 1b)

The patient was promptly scheduled for the operating room. On the day of operation, the patient was complaining of progressive right-sided posterior chest pain. He was afebrile and had no shortness of breath. His white cell count was 17,000. On exam, he was found to have 10 × 12 cm erythematous fluctuant mass, with 5 × 5 cm area of central skin necrosis without visible draining sinus. (Fig. 2a)

A wide local excision with drainage of the abscess cavity was performed. Purple-tinged purulent material was obtained from the central cavity. There was an underlying inflammatory mass that was debrided in combination with a large portion of the latissimus dorsi. The mass extended within the thorax at the level of the 10th interspace and into the pleural cavity. Inflammatory changes were palpable within the right lower lobe, although the pleural cavity was not grossly soiled. Pleural space drainage was performed via tube thoracostomy in the 5th interspace. At the conclusion of the procedure, there was significant improvement in the erythema of the surrounding skin. (Fig. 2b)

The patient was discharged on postoperative day 5 with a wound VAC dressing and 8-week course of ampicillin/sulbactam. Imaging obtained 6 weeks postoperatively demonstrated adequate healing and granulation tissue on the chest wall (Fig. 3a) and complete resolution of the mass on the imaging studies. (Fig. 3b)

The pathology of the right chest wall mass showed skin, fibroadipose tissue, and skeletal muscle with necrosis and marked acute inflammation consistent with abscess and acute cellulitis. Surrounding soft tissues showed organizing fat necrosis and fibrosis. Within the abscess, there were granules composed of filamen-

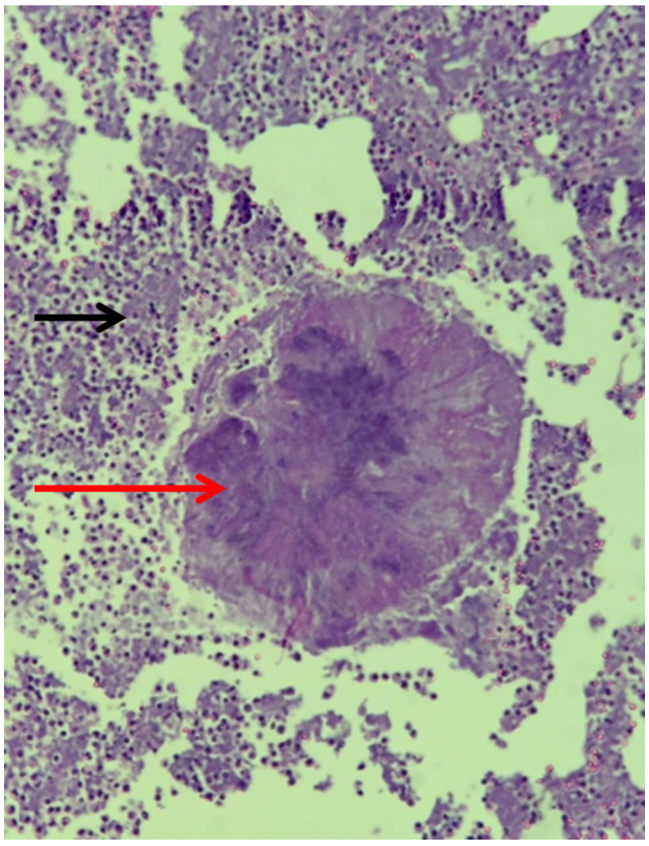

Fig. 4. Sulfur granule (red arrow) composed of filamentous bacteria consistent with actinomyces in background of neutrophils (black arrow), (hematoxylin-eosin stain, 200× magnification).

tous bacteria consistent with actinomycosis (Fig. 4). No granulomas were identified.

3. Discussion

Thoracic actinomycosis is a relatively uncommon and traditionally chronic, indolent infection secondary to pulmonary contamination with actinomyces species. Pathologic infection from actinomyces is thought to arise from aspiration of oropharyngeal contents, which accounts for its prevalence among alcoholics and persons with poor dental hygiene [3]. Pulmonary actinomycosis accounts for 15–20% of cases [1,4], and a diagnostic delay is quite common [5]. This is related both to the subacute symptom onset as well as early misdiagnosis. A significant percentage of patients will receive an initial diagnosis of malignancy, with a diagnostic work-up within that framework [2]. Despite chronic infections at the time of presentation, it is generally associated with a good prognosis [2,3,6]. Underlying pulmonary parenchymal disease may represent a risk factor for infection. Cavitary disease processes, such as pulmonary tuberculosis, bronchiectasis or aspergillosis, are common comorbid conditions [2]. Treatment with surgery has generally been reserved for cases failing to resolve with antibiotic therapy. Empyema necessitans represented one of the early descriptions of thoracic actinomycosis, but is not commonly seen. A chronic draining sinus tract associated with vague systemic symptoms should alert the clinician to expand the differential to include this clinical entity. In most cases of thoracic actinomycosis, surgery can be avoided and the prognosis is generally good with long-term antibiotic therapy with intravenous penicillin alone. Patients who receive early surgical intervention may have equally good or improved outcomes, with a shorter required length of antibiotic therapy [3,6].

4. Conclusion

We present the rare case of empyema necessitans secondary to actinomycosis with extensive chest wall involvement and sinus tract resulting in soft tissue abscess with minimal underlying pulmonary parenchymal disease.

In the case presented, the physical exam initially suggested a chest wall neoplasm, but the rapid progression in size, overlying skin changes, and pain favored an infectious/inflammatory process. The presence of fluid and a necrotic mass on MRI mandated prompt surgical intervention. In the event of minimal pulmonary involvement and absence of lung abscess, as was seen in this case, a thoracotomy with pulmonary resection can be avoided. The intervention should address the chest wall abscess with resection and debridement of the sinus tract, avoiding further contamination or soiling of the pleural space. With limited pulmonary parenchymal involvement, antibiotic therapy alone is appropriate. Actinomycosis of the chest wall with draining sinus is appropriately managed with early surgical intervention and antibiotic therapy, minimizing contamination of the pleural space. Early diagnosis, prompt debridement and narrow spectrum beta-lactam antibiotics can result in complete resolution of infection and good prognosis.

Conflicts of interest

None.

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Ethical approval

IRB approval not required per institutional policy for case series with n < 3. HIPAA authorization is required, and was obtained from the patient.

Consent

Written informed consent was obtained from the patient for publication of this case report, including the accompanying, de-identified images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request. No identifying characteristics were altered which could distort the conclusions drawn from the data as presented.

Author contribution

Atay S.—study design, collection of data, analysis/interpretation, writing.

Banki F.—study design, collection of data, analysis/interpretation, writing, supervision.

Floyd C.—collection of data, analysis/interpretation.

Guarantor

Farzaneh Banki.

Disclosures

Written informed consent was obtained from the patient for publication of this case report and accompanying de-identified

images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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