CASE REPORT http://doi.org/10.3126/njr.v14i1.64627

Role of MRI in the diagnosis of Actinomycosis: A Case Report

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Received: September 20, 2023 **Accepted:** October 15, 2023 **Published:** April 26, 2024

Cite this paper:
Yadav AK, Yadav S, Kayastha P, Poudel S, Regmi PR. Role of MRI in the diagnosis of Actinomycosis: A Case Report. *Nepalese Journal of Radiology* 2024;14(1):29-32. **http://doi.org/10.3126/njr.v14i1.64627**

ABSTRACT

Actinomycosis is caused by non-spore-forming, anaerobic, gram-positive bacteria called actinomyces. Its wide range of manifestations and non-specific symptoms cause complications by delaying diagnosis. We here present a case of a 34-year-old female with a history of recurrent discharging sinus and skin rashes in the posterior chest wall for 1 year and 6 months. Initially, it was suspected of malignancy with secondary infection. The patient was advised for MRI which shows suspicion of actinomyces. Later on, it was confirmed with a biopsy of the posterior chest wall. Here we present a case to describe the role of MRI in the diagnosis of actinomycosis.

Keywords: *Actinomycosis; Magnetic Resonance Imaging; Posterior Chest Wall*

INTRODUCTION

Actinomycosis is an uncommon condition caused by gram-positive bacteria called actinomyces species, which are typically commensals in the urogenital, gastrointestinal tract, and oral cavity. Actinomyces can grow rapidly if it coexist with other microorganisms that lower the amount of oxygen in the air and if the natural defense mechanism is lowered. The most often isolated is Actinomyces israelii which commonly causes cervicofacial, lung, and abdominopelvic infection. Most often skin involvement occurs due to underlying focus. The skin actinomycosis presented as localized swelling, skin rashes, mass lesions on the radiograph, or multiple skin sinuses from the chest wall. Diagnosis of actinomycosis is still challenging due to its similar presentation as more common conditions like neoplasm and tuberculosis. Radiological investigations like CT scans and MRIs can help in the early diagnosis of actinomycosis.[1,2,3,4,5]

CASE REPORT

A 34-year-old female presented with a history of prolonged skin rashes and multiple discharging sinuses in the posterior chest wall. She has no history of chronic medical illness. She had a history of surgical excision of discharging sinuses 6 months back but according to her, it reoccurred again. Blood reports were unremarkable. MRI was suggested for further evaluation which raised the suspicion of actinomycosis. Later on biopsy was done which confirmed the diagnosis.

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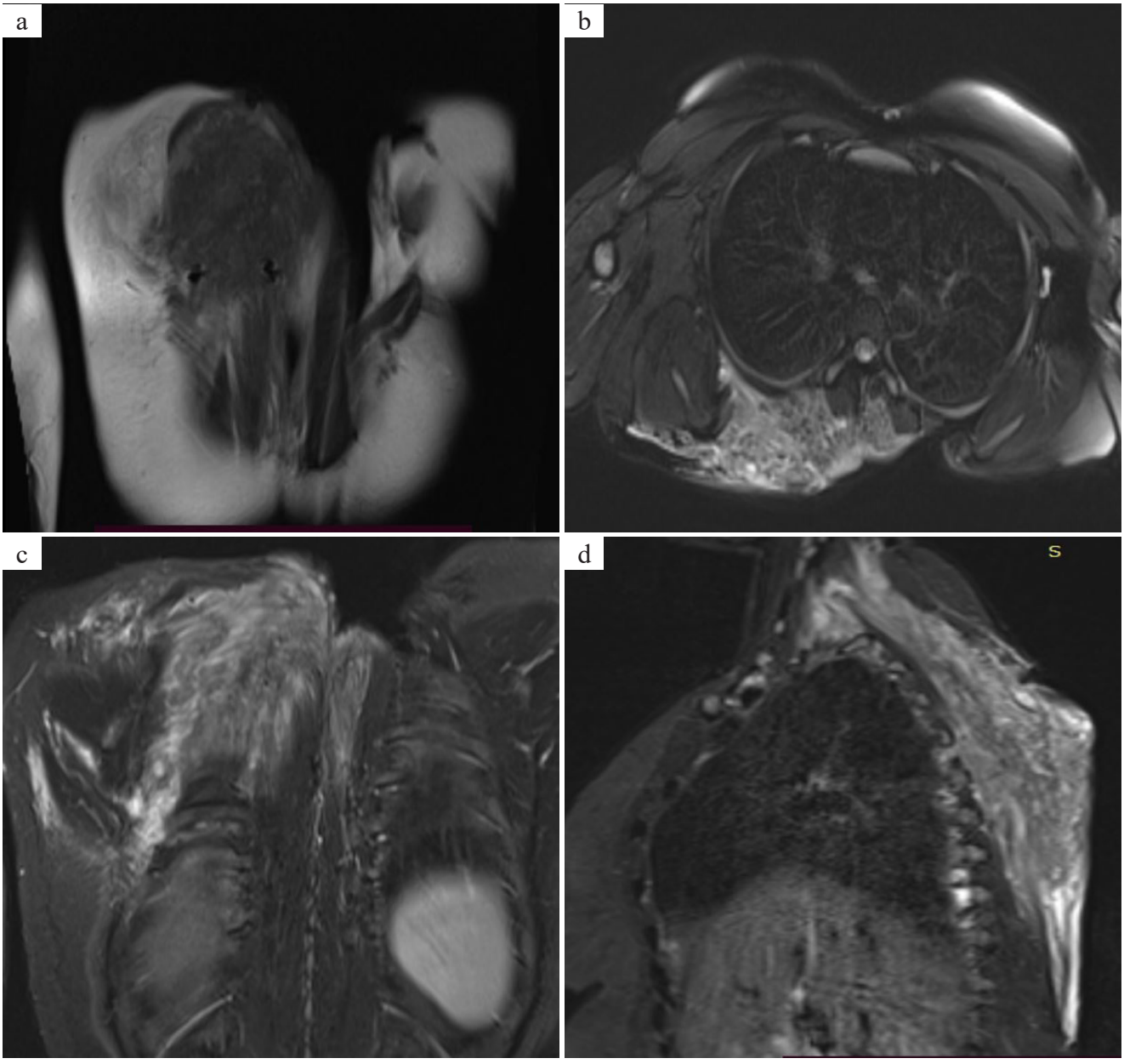
Figure 1: *Gross image of skin lesion showing diffuse and dense fibrotic escharious skin surface with multiple discolored nodules in between.*

On MRI, there is a diffuse T2 intermediate signal intensity lesion involving the subcutaneous and intramuscular plane of the right upper back region. The lesions show sharply high signal intensity in fat-suppressed images. It extends from the nape of the neck region to the D12 vertebral level. The lesion is also abutting the right posterior ribs and is insinuating in the intercostal muscles as well. Well-defined oval lesion Showing T1/T2 / STIR low signal intensity noted within affected muscle showing T1 intermediate, T2 high signal intensity in the periphery and surrounding T1/T2 low signal intensity rim, suggestive of dot in circle sign. (Images 1, 2, 3 and 4, 5).



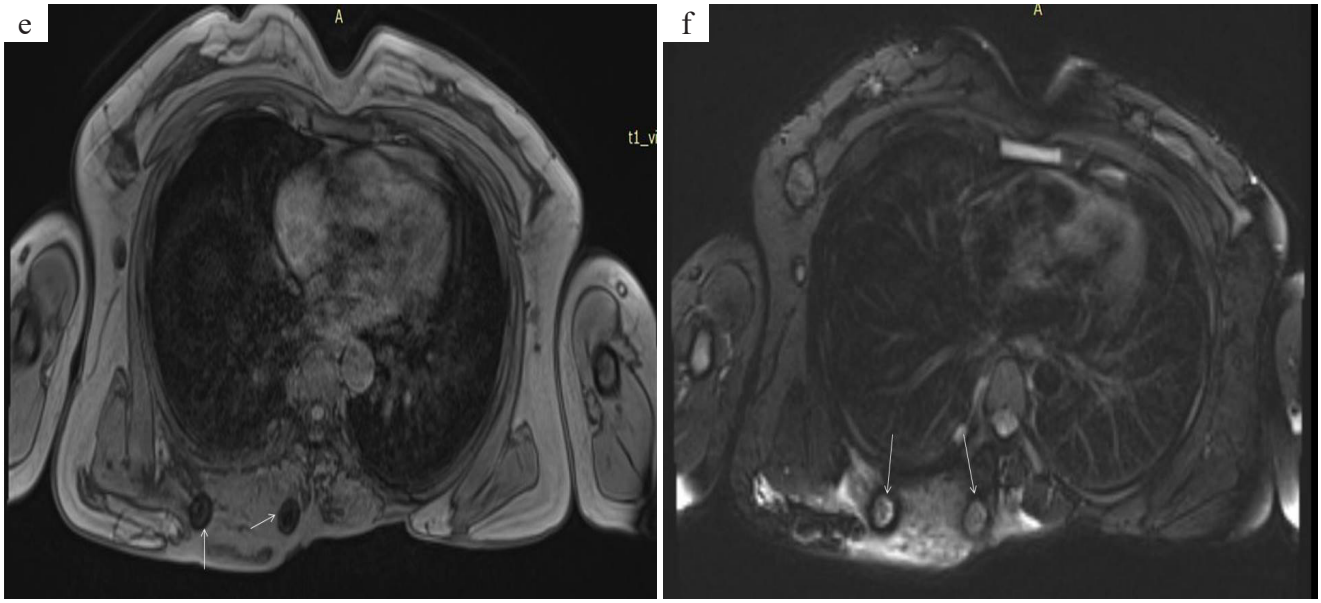


Figure 2; a) *MRI T2 coronal image shows an Ill-defined intermediate signal intensity lesion (comparison to muscles) is seen in the upper back (shown by white arrow),* ***b)*** *Axial MRI T2 FS image shows an ill-defined high signal intensity lesion involving subcutaneous plane as well as the para-spinal muscles. It abuts the posterior rib (shown by a white arrow).* ***c)*** *Coronal STIR MRI image shows an ill-defined high signal intensity lesion in the upper backcrossing the midline (shown by white arrow).* ***d)*** *Sagittal STIR MRI image shows a thickened subcutaneous plane along with a high signal intensity lesion insinuating between the intercostal spaces (shown by white arrow).* ***e)****Axial T1 MRI showing two oval-shaped low signal intensity lesions in affected muscle (shown by white arrow).* ***f)*** *Axial T2 FS image showing high signal intensity lesion with central low signal intensity dot surrounded by low signal intensity peripheral rim giving " Dot in the circle sign" (shown by white arrow).*

DISCUSSION

Actinomycosis is a rare disease with an annual incidence between 1/100000 and 1/300000. It mostly infects a male and the ratio of male to female is 3:1.2 Actinomyces is caused by actinomyces species which is the natural flora of the oral cavity, gastrointestinal tract, and urogenital tract. Around 30 species of actinomyces species are identified among them the most common microorganisms causing infection are A. israelii, A. naeslaundii, A. ganensriae. Nowadays improved dental hygiene and the availability of antibiotic treatment decreases its incidence.[6]

Although actinomycosis is not considered an opportunistic infection mostly it occurs among people with weak immune systems such as malnutrition, leukemia, HIV, and post-radiation therapy. Actinomycosis commonly causes cervicofacial, lung, and abdominopelvic infection and no person-to-person transmission has yet been documented. Usually, the breach in the mucous membrane is the first step in the pathogenesis of actinomycosis and cutaneous actinomycosis rarely occurs due to hematogenous spread. Cervico-facial actinomycosis is mainly caused due to dental procedures and oral trauma and aspiration is mostly caused by pulmonary disease. Skin involvement is caused by to contiguity of foci from any other location and mostly primary skin lesion occurs after trauma or local ischemia. The cutaneous manifestation of this disease consists of dense fibrotic tissue that tends to spread beyond fascia and muscle. In the earlier phase of this disease, there is abscess formation centrally which finally discharges on the skin surface as sinus tract formation. In the chronic stage (as in our case) there is a painless indurated mass with multiple nodules/ papules. Since it doesn't spread through lymphatics, there is no lymphadenopathy in this disease process which helps us to differentiate it from malignancy.[2,6,7,8]

Actinomycosis is part of the normal flora of the oral cavity so culture and cytological examination has no diagnostic value. CT scan and USG show no specific radiological finding. Although Contrast Enhanced CT scan (CECT) may be used to approach the multicystic lesion for biopsy. Although the radiological investigation was added on for the diagnosis, actinomycosis was confirmed with histopathological and microscopic examination. MRI plays an important role in diagnosis, knowing the extension of the disease, planning the treatment, and follow-up. In our case, extension of the lesion is very important since it is insinuating into the intercostal muscles and abutting the ribs. Information about the invasion of the vertebra, thorax, and neural foramina is important in this case to know whether to go for surgical debridement or not.[4,5,6,7]

Histopathological examination shows inflammatory granulation tissue with necrosis and colonies of gram-positive filamentous bacteria. Microscopically sulphur granules of 0.1-1.0 mm with yellowish clumps of bacterial colonies were seen.[1]

The antibiotic of choice is penicillin which is given intravenously for up to 2-6 weeks with oral penicillin for 3-12 months. If no improvement occurs after 4 weeks of treatment and resistance to therapy is seen after 12 weeks then surgical treatment should be considered.[2,7]

CONCLUSION

Cutaneous actinomycosis usually occurs due to extension from primary focus or primary cutaneous lesion may occur due to local trauma or ischemia. In either cutaneous or systemic actinomycosis radiological imaging such as MRI plays a vital role in the early diagnosis of actinomycosis as in our case where MRI suggested actinomycosis. Histopathological and microscopic examination remains the gold standard for diagnosis of actinomycosis.

CONFLICT OF INTEREST

None

SOURCES OF FUNDING

None

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