OPEN ACCESS

Saudi Journal of Pathology and Microbiology

Abbreviated Key Title: Saudi J Pathol Microbiol
ISSN 2518-3362 (Print) | ISSN 2518-3370 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Case Report

Cutaneous Actinomycosis of the Hand: A Rare Localization

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DOI: https://doi.org/10.36348/sjpm.2025.v10i07.001 | **Received:** 24.08.2025 | **Accepted:** 13.10.2025 | **Published:** 20.10.2025

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Abstract

We report an exceptional case of primary cutaneous actinomycosis of the hand revealed by microbiological culture and histopathological analysis. Actinomycosis is a chronic bacterial infection caused by Actinomyces spp., anaerobic Gram-positive filamentous bacteria that are commensals of the human mucosa. The cutaneous form is rare, especially on the hand. The diagnosis relies on prolonged anaerobic culture and histological confirmation. We describe the clinical, microbiological, and therapeutic features of this unusual localization and emphasize the importance of bacteriological analysis for diagnosis and management.

Keywords: Actinomyces; chronic infection; rare; hand surgery.

INTRODUCTION

Actinomycosis is a rare chronic infection caused by anaerobic or microaerophilic Gram-positive filamentous bacteria of the genus Actinomyces [1,2]. These bacteria are part of the normal flora of the oral, gastrointestinal, and genital mucosa [3]. Under certain conditions, such as mucosal injury or local hypoxia, they can invade deep tissues and cause a granulomatous and suppurative infection [4]. Cutaneous actinomycosis of the hand is extremely rare, particularly in its primary form, without a history of trauma or inoculation [5,6].

CASE PRESENTATION

A 57-year-old right-handed woman, with type 2 diabetes controlled by oral medication, presented with a painful, progressively enlarging swelling on the dorsal surface of the right hand for six months. There was no history of trauma, insect bite, tuberculosis, or previous antibiotic use [7]. On examination, a 4 cm firm, slightly tender mass was found over the first and second metacarpals, mobile superficially but fixed in depth. The overlying skin was intact and there was no sensory or motor deficit. Routine blood tests were normal. Plain radiography revealed no bone involvement.

Due to the progressive and painful nature of the lesion and partial functional limitation, complete excision was performed without prior biopsy. The lesion appeared as a multilobulated encapsulated mass, which was removed via a dorsal incision. The specimen was sent for both histopathological and microbiological analysis.

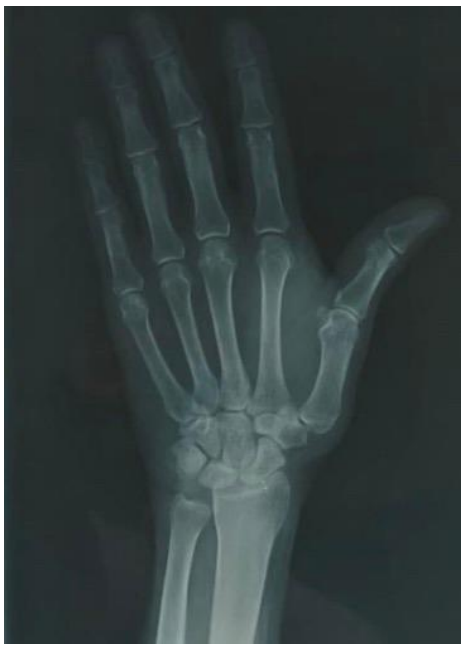

Figure 1: X-ray of the hand showing no evidence of bone damage

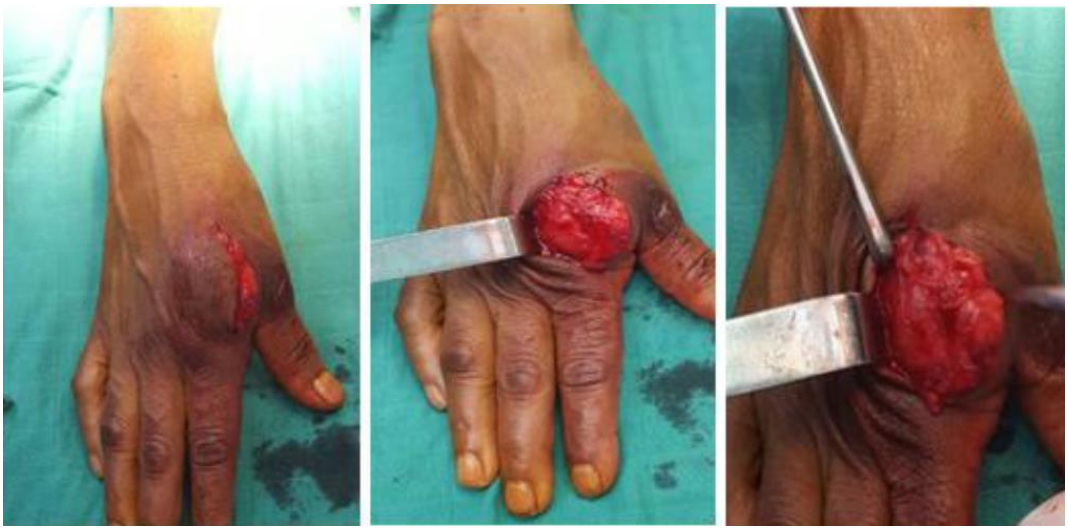

Figure 2: Intraoperative image of the resection of the tissue mass

Microbiological findings

The specimen was directly cultured on enriched chocolate agar and incubated anaerobically at 37°C. The first colonies appeared after ten days as small, rough, beige granules. Subculturing enhanced colony growth and isolation of Actinomyces spp. After fourteen days, abundant mature colonies were observed.

Figure 3: Mature Actinomyces colonies after 14 days of anaerobic incubation at 37 °C

Gram staining of these colonies showed filamentous Gram-positive bacteria consistent with Actinomyces morphology.

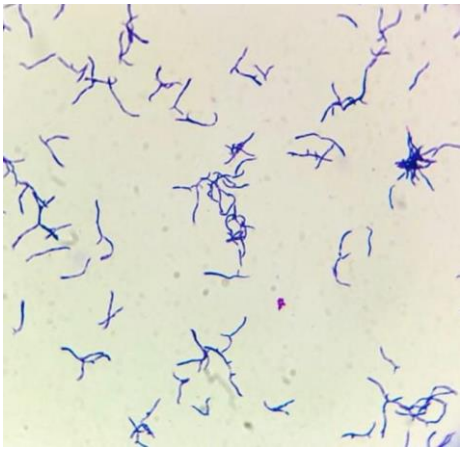

Figure 4: Microscopic image showing filamentous Gram-positive bacteria (Actinomyces spp.)

Histopathological examination revealed connective tissue extensively remodeled by neutrophilic inflammation containing characteristic sulfur granules. These findings confirmed the diagnosis of cutaneous actinomycosis. The patient was treated with oral amoxicillin for one month, resulting in complete recovery and no recurrence after sixteen months of follow-up.

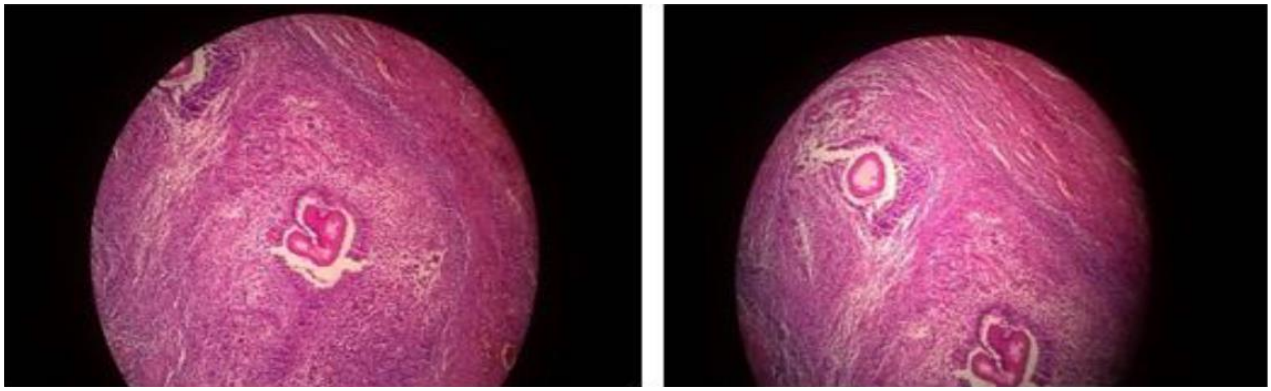

Figure 5: Histopathological examination showing connective tissue remodeled by neutrophilic infiltrate containing sulfur granules

DISCUSSION

Actinomycosis is a chronic, slowly progressive infection that can involve various tissues [8]. The organism's pathogenicity depends on its ability to invade devitalized or hypoxic tissue [9]. Actinomyces israelii is the most frequent species implicated in human infection [10]. The hand is an unusual site due to the endogenous nature of the bacterium, making primary cutaneous actinomycosis extremely uncommon [11,12].

Diagnosis is often delayed because of the nonspecific clinical appearance that may mimic neoplasms, tuberculosis, or nocardiosis [13,14]. Culture remains the diagnostic gold standard, but yields are often low (24–30%) due to the organism's slow growth and sensitivity to oxygen [15]. For optimal recovery, samples must be collected aseptically and incubated under strict anaerobic conditions for at least two weeks [16]. Histopathology typically shows sulfur granules composed of bacterial colonies surrounded by inflammatory infiltrate [17]. These granules, together with filamentous Gram-positive bacteria, are pathognomonic when found in tissue specimens [18].

Treatment relies on prolonged antibiotic therapy. Penicillin G and amoxicillin are the drugs of choice [19]. For penicillin-allergic patients, doxycycline, clindamycin, or erythromycin may be used [20]. Surgical excision may be required for diagnostic confirmation or removal of necrotic tissue [21]. Prognosis is excellent when diagnosis is early and appropriate antimicrobial therapy is given [22].

CONCLUSION

Cutaneous actinomycosis of the hand is an extremely rare entity. Accurate diagnosis requires a high index of suspicion and relies primarily on microbiological culture and histopathological examination. Prolonged antibiotic therapy ensures complete eradication and prevents recurrence. This case underscores the vital role of bacteriology in confirming and managing unusual infections presenting in atypical sites.

Ethical approval and patient consent

The study is exempt from ethical approval in our institution. Written informed consent was obtained from the patient for the publication of this case report and accompanying images.

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