http://jmscr.igmpublication.org/home/
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v13i01.04

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Actinomycosis of the Lower Lip in a Libyan Adult: A Rare Clinical Case Report

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Abstract
Actinomycosis is a chronic, indolent infection primarily caused by Actinomyces israelii, an anaerobic or microaerophilic, Gram-positive, filamentous bacterium. While cervicofacial actinomycosis accounts for the majority of cases, exclusive lower lip involvement is exceedingly rare. This case report presents a 36-year-old male who developed a painless, slowly enlarging swelling on the lower lip over one month. Initially suspected as a mucocele, ranula, or fibroma, histopathological examination disclosed characteristic sulfur granules and filamentous bacterial colonies consistent with actinomycosis. Surgical excision and a four-week antibiotic regimen with penicillin resulted in complete resolution. This case highlights the importance of recognizing atypical presentations of actinomycosis, performing careful histopathological evaluation, and considering prolonged antibiotic therapy for definitive treatment.
Keywords: *Actinomycosis, Lower Lip, Oral Histopathology, Case Report, Antibiotic Therapy, Surgical Excision.*

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Introduction

Actinomycosis is an uncommon chronic infection caused by members of the genus *Actinomyces*, most frequently *A. israelii*. These organisms reside as commensals in the oral cavity, gastrointestinal tract, and female genital tract, typically remaining innocuous unless a breach in the mucosal barrier permits invasion into submucosal tissues[1,2]. Despite a predilection for the cervicofacial region—often referred to as "lumpy jaw syndrome"—actinomycosis rarely presents exclusively in the lower lip[3,4].

This condition can mimic various benign lesions, such as mucoceles, fibromas, or ranulas, making diagnosis challenging. A definitive diagnosis hinges on identifying sulfur granules—aggregates of branching filamentous organisms—on histopathological examination, sometimes coupled

with anaerobic culture [5,6]. Treatment typically involves prolonged antibiotic therapy, with penicillin as the drug of choice, and surgical debridement to remove infected tissue[4,7]. If misdiagnosed or inadequately treated, actinomycosis can lead to extensive tissue destruction and sinus tract formation[2,8].

This report describes an infrequent case of actinomycosis isolated to the lower lip in a Libyan adult, elucidating the clinical presentation, histopathological findings, and successful management strategy. We incorporate recent data from multiple online resources to deepen our understanding of actinomycosis and its rare lip involvement.

Case Presentation

Patient Profile and History

A 36-year-old male presented to the outpatient department with a chief complaint of a gradually enlarging swelling in the lower lip over the past month. The patient denied any pain, fever, or systemic symptoms. He noted a history of occasional lip biting, which could have facilitated direct bacterial invasion of the lower lip. His oral hygiene was poor, with visible dental plaque and calculus, but he had no significant comorbidities or immunosuppressive conditions.

Clinical Examination

On inspection, a solitary, light pink swelling, approximately 2 cm × 2 cm, was noted on the lower lip (Figure 1). The surface mucosa appeared intact but slightly stretched. Palpation revealed a soft-to-fluctuant mass that did not elicit tenderness. No regional lymphadenopathy was detected on palpation of the submandibular and cervical regions. The patient's vital signs were within normal limits.

Initial Differential Diagnoses

1. **Mucocele** – Typically presents as a bluish or translucent cystic lesion in the lip.
2. **Ranula** – A mucus extravasation cyst usually found in the floor of the mouth but can rarely present ectopically.
3. **Fibroma** – A fibrous connective tissue proliferation often arising from chronic irritation or trauma.

   Given the lesion's persistence, submucosal nature, and lack of classical cystic or fibrous features, a diagnostic biopsy was indicated.

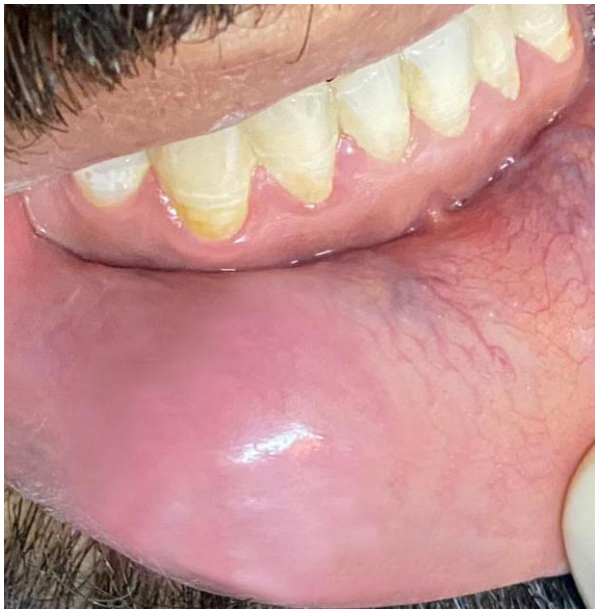

Figure 1: Preoperative clinical presentation of the lower lip lesion. A well-demarcated, light pink swelling of approximately 2 cm × 2 cm is visible, with intact overlying mucosa and minimal surface inflammation. The submucosal growth pattern suggests infectious or neoplastic pathology.

Investigations

Laboratory Tests

The patient's Complete Blood Count (CBC) was within normal limits, with no evidence of leukocytosis; blood sugar levels were normal, effectively ruling out diabetes mellitus as a complicating factor, and other biochemical biomarkers were also within normal ranges.

Histopathological Examination

An excisional biopsy was performed under local anesthesia (Figure 2A). Gross examination revealed a soft tissue mass with a slightly dense core, as shown in Figure 2B. Hematoxylin and eosin (H&E) staining demonstrated multiple

basophilic colonies within amorphous eosinophilic material, forming the characteristic "sulfur granules" (Figure 3). These granules were composed of branching filamentous bacteria arranged in a radiating pattern. Surrounding the colonies were polymorphonuclear leukocytes, indicative of an acute inflammatory response[2,5]. The histopathological findings were pathognomonic for actinomycosis.

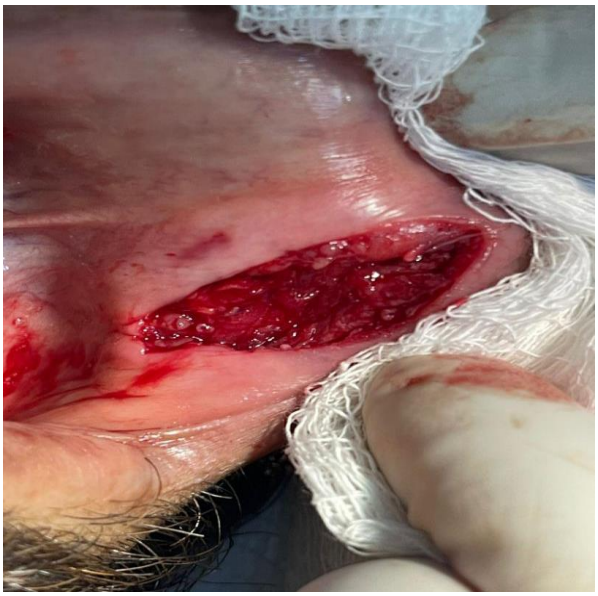

Figure 2A. Intraoperative view of the lower lip lesion following surgical excision. The exposed submucosal area shows a well-defined cavity with no evidence of surrounding tissue necrosis, confirming complete excision of the lesion.

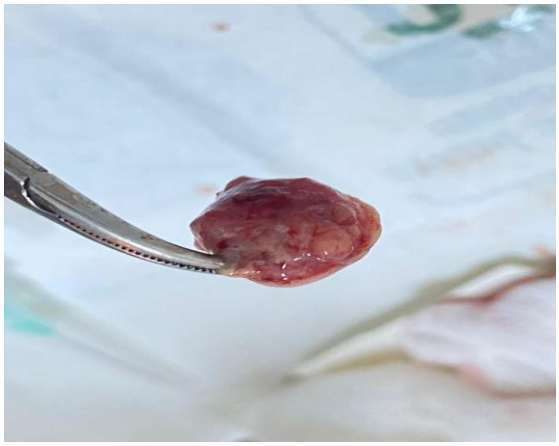

Figure 2B. The excised lesion from the lower lip, measuring approximately 2 cm × 2 cm, showing a firm, irregular mass. The gross specimen was subjected to histopathological and microbiological analysis.

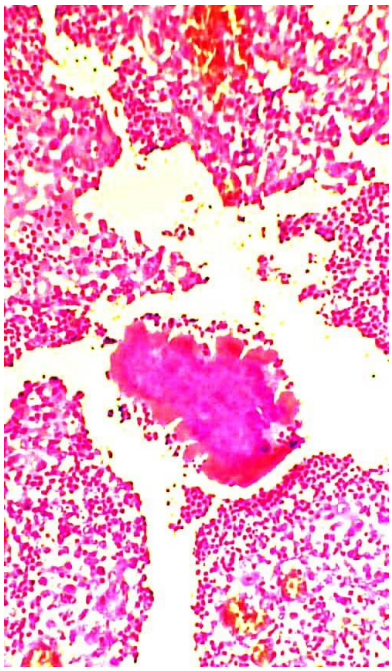

Figure 3. Histopathological examination of the excised lesion (Hematoxylin and Eosin stain). The image reveals basophilic sulfur granules composed of filamentous, branching Actinomyces bacteria surrounded by an intense inflammatory infiltrate, characteristic of actinomycosis.

Postoperative and Follow-Up:

One week after the surgical excision, the clinical examination of the lower lip (Figure 4A) showed mild erythema at the surgical site, with intact sutures and no signs of infection or complications, indicating normal healing progression. At the one-month follow-up (Figure 4B), the surgical site was fully healed, with no visible scar, residual inflammation, or signs of recurrence. The oral mucosa appeared healthy and normal, reflecting the effectiveness of the surgical and antibiotic treatment.

Figure 4A. One-week postoperative clinical image of the lower lip. The surgical site shows mild erythema with no signs of infection or complications. Sutures are intact, and tissue healing is progressing as expected.

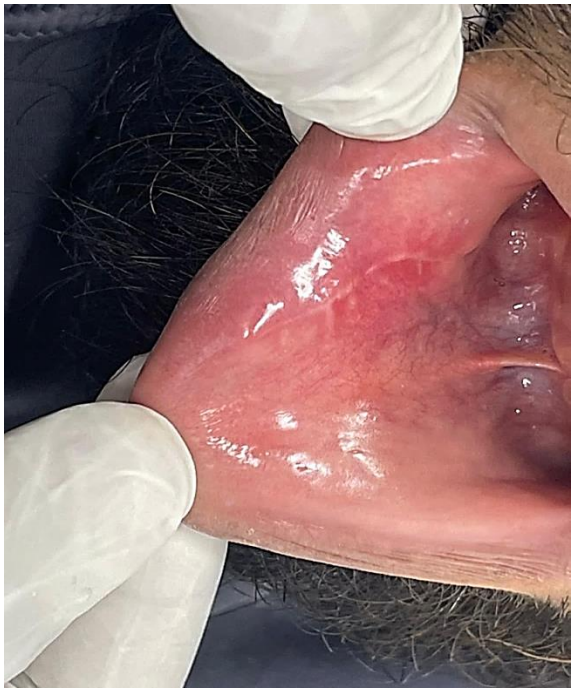

Figure 4B. One-month postoperative clinical image of the lower lip. The surgical site has fully healed, with no visible scar or residual inflammation. The oral mucosa appears normal, confirming successful surgical intervention and antibiotic therapy.

Ethical Approval and Patient Consent Statement

This study was approved by the Ethics Committee at Al-Jalaa Trauma Hospital, Benghazi, Libya. The patient was fully informed about the purpose of the research and the potential publication of their clinical case in a medical journal. Written informed consent was obtained, ensuring the patient's understanding of the use of their clinical data and images for academic and research purposes. All efforts were made to maintain confidentiality and anonymity throughout the process.

Discussion

Actinomyces israelii is commonly found in the oral cavity as part of the normal flora. When a disruption in the mucosal barrier occurs—such as lip biting, dental extraction, or chronic irritation—these bacteria can infiltrate deeper tissues, leading to localized infection[3,10]. Poor oral hygiene, as noted in this patient, further predisposes to infection by allowing more extensive bacterial colonization and facilitating their entry into submucosal layers[6,9].

The rarity of isolated lower lip involvement underscores the diagnostic difficulty. Cervicofacial actinomycosis commonly presents with jaw swelling, sinus tracts, or draining fistulas[1,8]. In contrast, early lip lesions may be clinically indistinguishable from mucoceles, fibromas, or other benign tumors[5]. The absence of pain or systemic symptoms can delay suspicion of an infectious etiology, increasing the potential for misdiagnosis[7,11]. Hence, actinomycosis should be included in the differential diagnosis in cases of persistent or atypical submucosal swellings, especially those unresponsive to conservative management.

Identifying sulfur granules remains the gold standard for diagnosing actinomycosis[2]. These granules comprise masses of branching filamentous organisms, frequently enveloped by neutrophils and other inflammatory cells.

Although culture is helpful for speciation, *Actinomyces* is slow-growing and can be technically challenging to isolate[4,6]. A thorough histopathological examination is thus paramount for accurate and timely diagnosis.

The mainstay of actinomycosis management is prolonged antibiotic therapy—most frequently high-dose penicillin—for a duration ranging from several weeks to months, depending on the severity and location of the infection[1,3,5]. Surgical debridement or excision of infected tissue is often required to remove the bacterial load and disrupt any sinus tracts or fibrotic capsules that could harbor the organisms[7]. In our case, a four-week course of oral penicillin V (500 mg four times daily) following complete lesion excision resulted in full recovery without recurrence. Notably, inadequate treatment duration increases the likelihood of relapse[9].

Early detection and intervention are crucial to preventing complications such as sinus tract formation, extensive fibrosis, and tissue destruction[8]. Regular follow-up is recommended to ensure sustained resolution of infection. In addition, patients should be counseled on improving oral hygiene to minimize reinfection risk[6,11]. In this case, the patient's condition remained stable and asymptomatic at the one-month follow-up, with evident improvements in his oral hygiene regime.

Conclusion

Actinomycosis of the lower lip is an exceptionally rare entity that can readily be mistaken for more common benign lesions. This case underscores the pivotal role of histopathological assessment in identifying the pathognomonic sulfur granules and emphasizes the necessity of a combined surgical and antibiotic approach for definitive resolution. Maintaining a high index of suspicion for actinomycosis in atypical lip lesions—and reinforcing good oral hygiene—can avert diagnostic delays and ensure favorable treatment outcomes.

Conflicts of Interest Statement

The authors declare no conflicts of interest related to this manuscript. All aspects of the study, including data collection, analysis, and interpretation, were conducted independently without any influence from external parties.

Acknowledgments

The authors extend their sincere gratitude to Dr. Hoda Mohammed and Dr. Malek Idris Al-Mahdawi at Al-Jalaa Trauma Hospital for their invaluable clinical support and insightful contributions to this study. We also wish to acknowledge the Department of Histopathology at the Medical Center of the Libyan International Medical University for their meticulous histopathological analyses, which were crucial in establishing the diagnosis.

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