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# Actinomycosis

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**Abstract:** ***Actinomycosis was once a common & ultimately fatal disease(1). Now the number has declined since the introduction of antimicrobial agents. The outlook of patients suffering from this infection has improved remarkably.***

**Keywords:** actinomycosis, bacterial

## 1. Introduction

Actinomycosis was once a common & ultimately fatal disease(1). Now the number has declined since the introduction of antimicrobial agents. The outlook of patients suffering from this infection has improved remarkably. Few physicians see many cases. As patients no longer commonly present advanced disease, actinomycosis has become a more diagnostic challenge (2). Actinomycosis is a subacute-tochronic bacterial infection characterized by contiguous spread, suppurative and granulomatous inflammation, and formation of multiple abscesses and sinus tracts that may discharge 'sulfur granules'(3). As a disease process, the causative organism can primarily or secondarily invade gum, jaw(4), neck, pleura, lungs(5), liver(6), kidney (7), appendix (7), caecum (7), skin(1), heart(8), meninges (9) etc. Even bones like mandible, ribs & vertebra (causing osteomyelitis) (10) are not immune to its invasion. The most common clinical forms of actinomycosis are cervicofacial (ie, lumpy jaw), thoracic, and abdominal. In women, pelvic actinomycosis is documented (11). Epidural abscesses (9), Meningitis (9).

## 2. Aetiology

The causative organisms are non-motile, non-spore forming, non-acid fast, Gram positive pleomorphic, anaerobic-tomicroaerophilic filamentous bacterial rods(3). The most common ones are Actinomyces israeli, Actinomyces gerencseriae, Actinomyces naeslundii, Actinomyces odontolyticus, Actinomyces viscosus, Actinomyces turicensis, Actinomyces meyeri, Propionibacterium propionicus. In addition to these microorganisms, almost all actinomycotic lesions contain so-called companion bacteria. The most important of these bacteria is Actinobacillus actinomycetemcomitans, followed by Peptostreptococcus, Prevotella, Fusobacterium, Bacteroides, Staphylococcus, and Streptococcus species, and Enterobacteriaceae, depending on the location of actinomycotic lesions. These companion bacteria appear to magnify the low pathogenic potential of actinomycetes (2).

Actinomycosis can affect people of all ages, but the majority of cases are reported in young to middle-aged adults (aged 20-50 yrs) (2). No racial predilection exists. For unknown reasons, men are affected more commonly than women, with the exception of pelvic actinomycosis (11). The reported male-to-female ratio2 is 3:1.

Actinomycosis occurs worldwide, with likely higher prevalence rates in areas with low socioeconomic status and poor dental hygiene.

## 3. Complications

Osteomyelitis of the mandible, ribs, and vertebrae, CNS disease, including brain abscess, chronic meningitis, actinomycetoma, cranial, epidural, and subdural infection, and spinal epidural infection, Hepatic actinomycosis, Renal actinomycosis, Endocaditis8, Pericarditis (12), Pneumonia (Community Acquired (1) or Nosocomial (5), Lung absecess (5), Bronchiectasis (5), Empyema Thoracis (12) etc. In addition to its serious nature of organ involvement, it can complicate other operations or situations like hip prosthesis infection(13), septic arthritis(14), endodontic infection(15), IUD infection(16), posoperative viscous endophthalmitis (17), etc. Opportunistic actinomycotic infection has been reported in osteoradionecrosis(18) in patients having head & neck cancer. Disseminated actinomycosis(19) by Actinomyces meyeri & and Actinobacillus actinomycetemcomitans has also been reported.

## 4. Clinical Features

**1) History taking20**

For Cervicofacial actinomycosis (ie, lumpy jaw): History of dental manipulation or trauma to the mouth, poor oral hygiene, dental caries, or periodontal disease; local tissue damage caused by neoplasm or radiation treatment, or of painless or occasionally painful soft-tissue swelling involving the submandibular or perimandibular region; over time, multiple sinuses drain pus containing sulfur granules; tendency to remit and recur, or of reddish or bluish discoloration of the skin overlying the lesion or of chewing difficulties (ie, with involvement of mastication muscles)

For Thoracic acinomycosis: History of aspiration (Risk factors include seizure disorder, alcoholisms, and poor dental hygiene), or of dry or productive cough, occasionally blood-streaked sputum, shortness of breath, chest pain, or of fever, weight loss, fatigue, anorexia.

For Abdominal actinomycosis: History of abdominal surgery, perforated viscus, mesenteric vascular insufficiency, or ingestion of foreign bodies (eg, fish)

## 5. Pathology

Actinomycetes are prominent among the normal flora of the oral cavity but less prominent in the lower gastrointestinal tract and female genital tract. As these microorganisms are not virulent, they require a break in the integrity of the mucous membranes and the presence of devitalized tissue to invade deeper body structures and cause human illness. Furthermore, actinomycosis generally is a polymicrobial infection, with isolates numbering as many as 5-10 bacterial species(2). Establishment of human infection may require the presence of such companion bacteria, which participate in the production of infection by elaborating a toxin or enzyme or by inhibiting host defenses. These companion bacteria appear to act as copathogens that enhance the relatively low invasiveness of actinomycetes. Specifically, they may be responsible for the early manifestations of the infection and for treatment failures. Once infection is established, the host mounts an intense inflammatory response (ie, suppurative, granulomatous), and fibrosis may develop subsequently. Infection typically spreads contiguously, frequently ignoring tissue planes and invading surrounding tissues or organs. Ultimately, the infection produces draining sinus tracts. Hematogenous dissemination(7) to distant organs may occur in any stage of the infection, whereas lymphatic dissemination is unusual.

## 6. Histologic Findings

Actinomycosis is characterized by mixed suppurative and granulomatous inflammatory reactions, connective-tissue proliferation, and the presence of sulfur granules1,2,20.

The sulfur granules are nearly pathognomonic for actinomycosis, although similar findings have been reported with infections caused by Nocardia brasiliensis, Streptomyces madurae, and Staphylococcus aureus presenting as botryomycosis. The granules are approximately 0.1-1 mm in diameter and may be seen with the naked eye as yellowish particles.

Microscopically, the granules manifest a cauliflower like shape at low magnification; at higher magnification (X100), when the particle has been pressed between slide and cover slip, a clump of filamentous actinomycete microcolonies surrounded by polymorphonuclear neutrophils (PMNs) can be observed. Gram stain renders these microcolonies visible as gram-positive, intertwined branching filaments, with radially arranged, peripheral hyphae. Coexisting with them are the companion bacteria, which are gram-positive and gram-negative cocci and rods.

## 7. Treatment

**Medical treatment**

In most cases of actinomycosis, antimicrobial therapy[1,2] is the only treatment required, although surgery can be adjunctive in selected cases. Penicillin G is the drug of choice for treating infections caused by actinomycetes. High-dose penicillin [Adult:Penicillin G million U/d IV by continuous infusion or in divided doses q4h for [1,2]

**Prophylaxis**

Maintenance of good oral hygiene and adequate regular dental care are important. Patients and physicians alike should be aware of the increased risk of infection associated with insertion of IUCD[2].

**Prognosis**

The availability of antibiotics has greatly improved the prognosis for all forms of actinomycosis1. At present, cure rates are high and neither deformity nor death is common. When actinomycosis is diagnosed early and treated with appropriate antibiotic therapy, the prognosis is excellent. The more advanced and complicated actinomycotic forms require aggressive antibiotic and surgical therapy for optimal outcome; however, deaths can occur despite such therapy[10].

## 8. Conclusion

As it is an endogenous disease, there is no risk of person to person transmission. This is an important message for health personnel's & patient attendants e.g. relatives. To minimize delays in diagnosis, actinomycosis should be considered in the differential diagnoses of any inflammatory lesion of subacute or long-term nature.

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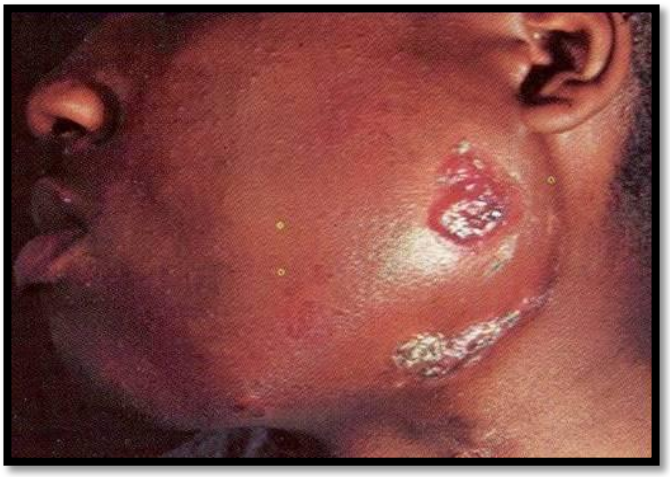
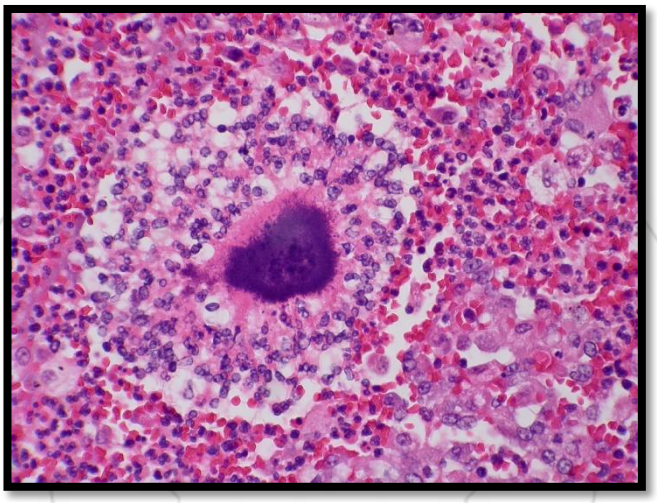


Cervicofacial Actinomycosis



Histological findings showing sulphur granules