

Jaw actinomycosis—An opportunistic infection: Case series

Jyoti D. Bhavthankar, Varsha V. Deokar, Mandakini S. Mandale, Jayanti G. Humbe

Department Oral Pathology and Microbiology, Govt Dental College and Hospital, Aurangabad, Maharashtra, India

Abstract

Jaw actinomycosis is a quite rare invasive facultative bacterial infection caused by *Actinomyces*, Gram-positive filamentous bacilli found in human commensal. A break in continuity of epithelium due to surgery, trauma or previous infection can lead to deeper invasion of bacteria causing infection. The risk factors for actinomycosis are trauma, caries, debilitation, and poorly controlled diabetes mellitus. Clinical presentation can mimic other pathologies, such as fungal infection tuberculosis, granulomatous diseases, so the diagnosis of actinomycosis is delayed or misdiagnosed. For the definitive diagnosis of jaw actinomycosis, medical history, dental history histopathological examinations and microbiological culture are important parameters. Actinomycotic bacteria are sensitive to antibacterial agents hence chemotherapeutic agents are used for treatment. This report presents case series of jaw actinomycosis involving mandible and maxilla. The final diagnosis was supported by histopathology.

Keywords: Actinomycosis, infection, jaw osteomyelitis and botryomycosis

Address for correspondence: Dr. Varsha V. Deokar, C5, Chaudhary Thakkars Pride, Sai Vrundavan Colony, Paithan Road, Aurangabad - 431 001, Maharashtra, India.

E-mail: varsha.deokar@gmail.com

Submitted: 17-Dec-2022, **Revised:** 29-Dec-2022, **Accepted:** 25-Jan-2023, **Published:** 21-Mar-2023

INTRODUCTION

Actinomycosis is quite a rare invasive bacterial infection caused by *Actinomyces*, which are gram-positive filamentous bacilli found in the human commensal flora of the oropharynx, gastrointestinal tract, and urogenital tract.^[1] Common species causing cervicofacial actinomycosis is *Actinomyces israelii* but other species like *Actinomyces naeslundii*, *Actinomyces viscosus*, and *Actinomyces odontolyticus* can cause infection. It is a polymicrobial infection, for the infectivity presence of companion bacteria like anaerobic streptococci, fusiform or gram-negative bacilli, and *Haemophilus* species are needed. Whenever there is a break in continuity due to surgery, trauma or previous infection can lead to a deeper invasion of bacteria causing infection.^[2]

Clinical presentation can mimic other pathologies, such as nocardiosis fungal infections, active *Mycobacterium tuberculosis*

infection, or other granulomatous diseases, so the diagnosis of actinomycosis is delayed,^[2] and may be misdiagnosed. Less than 10% of cases of head-and-neck diseases are correctly diagnosed and may prove fatal in up to 28% due to misdiagnosis.^[3] For the definitive diagnosis of actinomycoses, radiography, medical history, histopathological examinations and microbiological culture are important parameters.^[4] Actinomycotic bacteria are sensitive to antibacterial so chemotherapeutic agents are used for treatment.^[2]

The purpose of this report is to present a case series of osteomyelitis with actinomycosis.

DISCUSSION

Actinomyces are non-sporing, anaerobic gram-positive bacteria, belonging to the Actinomycetales order. There are

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Bhavthankar JD, Deokar VV, Mandale MS, Humbe JG. Jaw actinomycosis—An opportunistic infection: Case series. J Oral Maxillofac Pathol 2023;27:224-7.

Access this article online

Quick Response Code:



Website:

www.jomfp.in

DOI:

10.4103/jomfp.jomfp_529_22

Table 1: Clinicopathological parameters of cases

Entity	Case 1	Case 2	Case 3	Case 4
Clinical features [Figures 1 and 2]	Age/sex: 40/M D/H: extraction with 16 E/O: swelling seen on right zygomatic region I/O pus discharge from 13-15. Mobility with 13-15	Age/sex: 65/M D/H extraction with 42 and 43. I/O: Sinus and pus discharge with 41-43	Age/sex: 65/F D/H: extraction 16. E/O: swelling seen on right zygomatic region I/O: pus discharge and exposed bone with 16	Age/sex: 42/M D/H: I/O: pus discharge and pain with 31-43 region
Radiological findings [Figure 3]	Periapical radiolucency was seen with 13-15	Periapical radiolucency was seen with 33-36	Radiolucency was seen in the right maxillary region	Radiolucency was seen with 35-46
Histopathological findings [Figure 4]	Clumps of basophilic radiating filaments with peripheral eosinophilic bulb, which surrounded by chronic inflammatory cell infiltrate is evident suggestive of actinomycotic colonies	Clumps of basophilic radiating filaments with a peripheral eosinophilic bulb, which surrounded by chronic inflammatory cell infiltrate is evident suggestive of actinomycotic colonies	Clumps of basophilic radiating filaments with a peripheral eosinophilic bulb, which surrounded by chronic inflammatory cell infiltrate is evident suggestive of actinomycotic colonies	Clumps of basophilic radiating filaments with a peripheral eosinophilic bulb, which surrounded by chronic inflammatory cell infiltrate is evident suggestive of actinomycotic colonies
PAS staining [Figure 5]	Positive	Positive	Positive	Positive

M/H=medical history, D/H=dental history, E/O=extraoral examination, I/O=intraoral



Figure 1: Extraoral examination



Figure 2: Intraoral examination

49 different species of the *Actinomyces* genus, out of which 27 species are causative agents in human infections.^[4] *Actinomyces* is a commensal bacterium in the oropharynx, gastrointestinal tract, and female genital tract in human beings and breaks in mucosal continuity cause diseased conditions.^[3] In humans, it was first recognised by Von Langenbeck in 1845.^[5]

According to the site, they are classified as orocervicofacial (40%–60%), abdominopelvic (20%–30%), and thoracic (20%–25%) among cervicofacial is the most common type.^[3,5]

The causes of actinomycosis infection are extraction site trauma, periodontal infection, non-viable teeth, diabetes, immunosuppression, corticoid treatment for extended periods, alcoholism, and smoking and disease recurrence may be due to incomplete response to antimicrobial agents.^[6,7]

Actinomyces are devoid of hyaluronidases, which is an enzyme essential for tissue decomposing so, they need other additional bacteria like streptococci and staphylococci for their pathogenicity.^[8]

The most common age group affected is 30–60 years with male predilection (4:1).^[7] Similar findings were found in our cases. Clinically. It shows woody swelling with pain (lumpy jaw), and suppuration with the formation of fistulae or sinus tracts with ‘sulphur granules’, which is a characteristic diagnostic marker of *Actinomyces*. But in 50% of cases, these are not found because of prior antibiotic course and long-standing infections in these

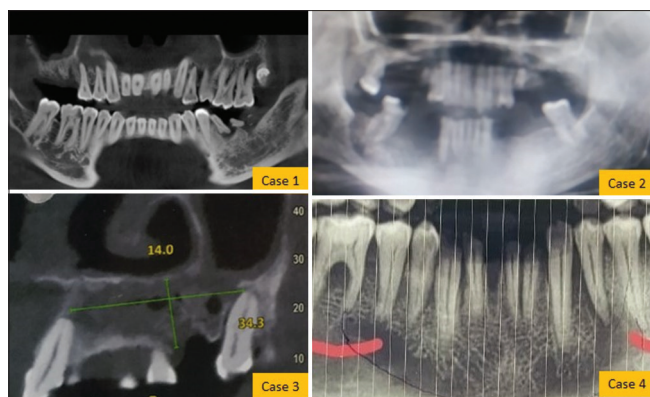


Figure 3: Radiological examination

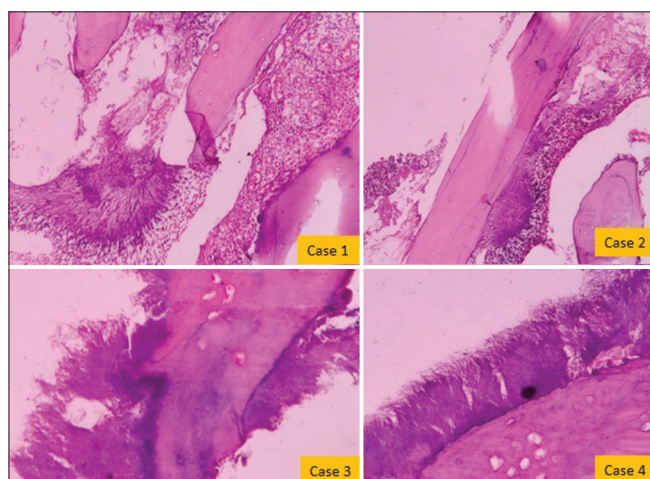


Figure 4: Histopathological examination under high magnification

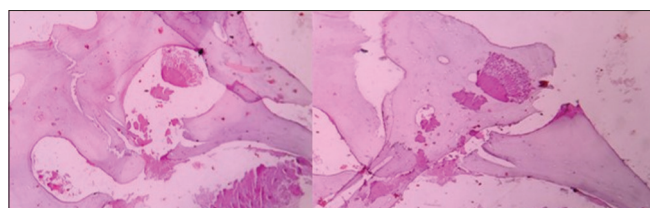


Figure 5: PAS staining

series also sulphur granules were not demonstrated.^[3] In our series, almost all cases showed pus discharge, exposed bone in one and pain in one case [Table 1, Figures 1 and 2].

Radiographically, they can be useful for the recognition of extension in bone but are nonspecific for actinomycosis.^[7] It may show radiolucency with hazy and fuzzy bony trabeculae or diffuse irregular sclerosis of the bone, often described as a ‘cotton-wool’ appearance.^[8] These series show irregular and patchy radiolucent areas with affected areas [Table 1 and Figure 3].

In the present case, clinical and radiographic features provided a provisional diagnosis of osteomyelitis.

Bacteriological and histopathological examination is required for the final diagnosis of actinomycosis,^[8] but the bacterial isolation from culture, the success rate is less than 30%, because actinomyces require a careful anaerobic culture of these bacteria that are sensitive to oxygen; up to 14 days of strict anaerobic incubation.^[3,7] Prior antibiotic treatment, overgrowth of organisms such as *Aggregatibacter* species, *Bacteroides* and *Fusobacterium*.^[3] All the patients in the series have a long-standing infection and they had taken antibiotics for the same so laboratory cultures were not attempted.

Histopathological findings of incisional biopsy can help greatly in the diagnosis of actinomycosis. The most common microscopic feature of actinomycosis is the central zone of necrosis containing multiple basophilic granules that represent lobulated microcolonies of *Actinomyces* with an outer zone of granulation. In histopathological staining, these colonies appear as round or oval basophilic masses with an eosinophilic terminal.^[9,10] In this series, observed features are clumps of basophilic radiating filaments with a peripheral eosinophilic bulb surrounded by chronic inflammatory cell infiltration, which is evidence suggestive of actinomycotic colonies [Table 1 and Figure 4]. PAS staining shows magenta-pink-coloured radiating filaments with a peripheral bulb [Table 1 and Figure 5].

Treatment for actinomycotic infection includes abase drainage, and surgical debridement, and if a bone is involved, curettage and ablating sequestra are required with antibiotic therapy like penicillin, erythromycin, tetracycline, clindamycin, imipenem, streptomycin, and cephalosporin. In this series, patients received the same treatment regimen.^[11]

The prognosis of actinomycosis was poor before the antibiotic treatment era but nowadays prognosis is good with different effective antibiotics.^[10,11]

CONCLUSION

The diagnosis of actinomycosis in orofacial soft tissues is often challenging and appropriate diagnosis greatly influences the prognosis of cervicofacial actinomycosis. A clinical, cultural and histopathological examination may provide more valuable information. For a good prognosis, a multidisciplinary approach with antibiotic therapy and surgical management is required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have

given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Valour F, Sénéchal A, Dupieux C, Karsenty J, Lustig S, Breton P, *et al.* Actinomycosis: Etiology, clinical features, diagnosis, treatment, and management. *Infect Drug Resist* 2014;7:183-97.
2. Sezer B, Akdeniz BG, Günbay S, Hilmioglu-Polat S, Başdemir G. Actinomycosis osteomyelitis of the jaws: Report of four cases and a review of the literature. *J Dent Sci* 2017;12:301-7.
3. Sharma HK, Prashar S. An unusual case of intraoral actinomycosis: Case report and literature review. *Int J Oral Health Sci* 2020;10:113.
4. Stájer A, Ibrahim B, Gajdács M, Urbán E, Baráth Z. Diagnosis and management of cervicofacial actinomycosis: Lessons from two distinct clinical cases. *Antibiotics* 2020;9:139. doi: 10.3390/antibiotics9040139.
5. D'Amore F, Franchini R, Moneghini L, Lombardi N, Lodi G, Sardella A, *et al.* Actinomycosis of the tongue: A case report and review of the literature. *Antibiotics* 2020;9:124. doi: 10.3390/antibiotics9030124.
6. Krzysztofak A, Deriu D, Roversi M, Grandin A, Cirillo M, Villani A. Actinomycotic osteomyelitis of the jaw in a child. *J Oral Health Dent Sci* 2019;3:204.
7. Figueiredo LM, Trindade SC, Sarmiento VA, de Oliveira TF, Muniz WR, Valente RO. Actinomycotic osteomyelitis of the mandible: An unusual case. *Oral Maxillofac Surg* 2013;17:299-302.
8. Simre SS, Jadhav AA, Patil CS. Actinomycotic osteomyelitis of the mandible-A rare case report. *Ann Maxillofac Surg* 2020;10:525.
9. Moturi K, Kaila V. Cervicofacial actinomycosis and its management. *Ann Maxillofac Surg* 2018;8:361.
10. Swain SK, Behera IC, Jena PP. Actinomycosis in head and neck region of pediatric patients: A review. *Int J Contemp Pediatr* 2022;9:140.
11. Matsuda S, Yoshida H, Yoshimura H. Orofacial soft tissues actinomycosis: A retrospective, 10-year single-institution experience. *J Dent Sci* 2021;16:365-9.