Actinomycosis: An Unusual Cause of Maxillary Sinusitis

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A 58-year-old lady, a known diabetic, presented with fever, left facial pain, swelling, and redness of 3 days duration. She reported a similar episode 3 months ago, which subsided with medications. There were no other ENT complaints.

There was a notable past history of multiple discharging sinuses over the abdominal wall and around right hip which took few months to heal, several years back. The patient also gave history of undergoing tooth extractions and dental implantation 2 years prior to the current symptoms.

On examination, there was diffuse swelling with erythema and tenderness over the left cheek. Rest of the ENT examination was unremarkable except for discharge and debris in left middle meatus on diagnostic nasal endoscopy (DNE). A contrast-enhanced computed tomography of paranasal sinuses (PNS) showed heterogeneous soft tissue density filling left maxilla and ethmoids, with no clear bony erosions (Figure 1).

Endoscopic sinus surgery revealed mucopurulent discharge, debris, and underlying unhealthy inflamed mucosa in the left maxillary sinus and ethmoids, with no clear bony erosion (Figure 1).

Anaerobic bacterial culture grew *Actinomyces spp*.

She was treated with Co Amoxiclav for 2 weeks but defaulted further treatment till her review 3 months later when a DNE showed granular mucosa with yellow spots in the postoperative cavity. Although she was asymptomatic and repeat debridement and cultures were sterile, she was treated with oral amoxicillin 500 mg 3 times a day for 3 months. On follow-up 9 months later, she was asymptomatic with no endoscopic evidence of recurrence.

Actinomycosis is a slowly progressive infection with granulomatous and supplicative features commonly involving the cervicofacial, thoracic, abdominal, and genital areas.1 Although almost 50% of actinomycosis involve head and neck region, the disease is relatively rare in nose and PNS.2

Actinomycosis is caused by *Actinomyces israelii*, a gram-positive, anaerobic, saprophytic, human commensal bacterium commonly found in the mouth and aerodigestive tract. The organism usually crosses mucosal surfaces and becomes pathogenic only following local trauma and spread through tissue due to direct contiguity.3 The disease generally shows a male predominance (1.5:3:1) affecting patients in the age-group 40 to 70 years, without racial predilection.1 In the head and neck region, this may follow a dental procedure like dental extraction or implant.3,4

Actinomycosis of PNS is very rare and most such reported cases involved maxillary sinus. Poor oral hygiene, dental procedures, dental disease especially oroantral fistula, puncture wounds, and compound fractures predispose to actinomycosis in the PNS. The disease or any associated nasal pathology causing edema and obstruction of osteomeatal complex can lead to hypoxia in the sinus thus facilitating the growth of this anaerobic pathogen. Even though diabetes mellitus, immune suppression, long-term steroid use, and malnutrition have been implicated as predisposing factors,2 there is no confirmation of this causal relationship of actinomycosis to host immune state.5

Presenting symptoms and examination findings of PNS actinomycosis are usually similar to chronic bacterial or fungal sinusitis. Actinomycosis should be suspected when a patient with chronic sinusitis does not respond to medical therapy especially if there is a history of facial trauma, dental disease, or dental treatment. Some patients show clinical pattern of remission and exacerbation of symptoms that coincide with the initiation and termination of antibiotic therapy.6

Computed tomography findings of actinomycosis are mostly nonspecific and include unilateral lesion, sinus

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opacification, mucosal thickening, bony wall thickening, or focal areas of destruction and focal central calcified densities. The radiological differentials include fungal ball and allergic fungal sinusitis.

Diagnosis is confirmed by presence of sulfur granules in the exudate, isolation of Actinomyces on culture, and histopathological identification on the biopsy specimen. Sulfur granules are white-yellow in color and are small, granular aggregates of bacterial filaments measuring 1 to 5 mm in diameter. Nocardiosis, caused by aerobic similar looking organism, can mimic this infection with discharging sinus and similar granules.

The causative organism is arduous to culture and the culture may show presence of concomitant aerobic and anaerobic bacterial overgrowth. Actinomyces are seen as thin, branching, filamentous organisms which stain positive on Gram stain, Grocott methenamine silver, and periodic acid-Schiff.

Complete endoscopic surgical clearance and restoration of sinus ventilation followed by long-term antibiotic therapy is the standard treatment of PNS actinomycosis. The antibiotic of choice is penicillin, as intravenous therapy for 2 to 6 weeks followed by oral penicillin for an additional 2 to 12 months, depending on the severity of disease including bone involvement and response to treatment. Actinomyces species also are susceptible to doxycycline, macrolides, clindamycin, piperacillin/tazobactam, imipenem, and cephalosporins.

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