Neck abscess: an unusual presentation of actinomycosis

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ABSTRACT
Subcutaneous actinomycosis of the neck is uncommon. Since its presentation is vague and nonspecific, the diagnosis is difficult. Being rare, the diagnosis needs a high index of suspicion. An unusual case of actinomycosis presented as abscess in the neck is discussed here along with review of literature.

Key words: Actinomycosis, Abscess, Neck

Actinomycosis (AM) is a bacterial infectious disease; however, it is often mistaken to be a fungal infection, because of the suffix ‘mycosis.’ In 1876, it was first described in cattle by Bollinger, who coined the term “Lumpy jaw disease of the cattle” [1]. Almost two decades later, Wolff and Israel found a similar infection in man [2]. Human AM is an infection primarily caused by Actinomyces israelii (AI), which is a normal commensal in the upper aerodigestive tract; it is an anaerobic gram-positive, branched, filamentous bacterium. In order to cause illness, AI requires a break in the integrity of the mucous membranes and devitalized tissue to invade subcutaneous planes. Dental or periodontal disease provides an adequate anaerobic environment for the Actinomyces species to flourish [2]. Cervicofacial AM is a chronic disease characterized by abscess formation, draining sinus tracts, fistulae, and tissue fibrosis. It can mimic a number of other conditions, especially granulomatous disease and malignancy; therefore, it should be included in the differential diagnosis of any soft tissue swelling of the head and neck. AM usually spreads to adjacent soft tissues independent of soft tissue plane or lymphatic drainage. Its clinical importance is for two main reasons: the difficulty in diagnosis and the long term treatment needed to eradicate it [1, 2]. One such rare case of AM presenting as a neck abscess is discussed here.

BRIEF HISTORY
A twenty-eight-year-old male patient was referred for a painful swelling in the neck, which slowly increased over the last six months. After a few days of mild fever, he had essentially remained afebrile during the entire duration of his illness. He had been given several antibiotics (oral as well as intravenous) and anti-inflammatory drugs during the course of his swelling. One month ago, a needle aspiration of the swelling had also been done in private clinic. Prior to the swelling, he had recurrent dental infections and several dental fillings. There was no history of any chronic disease, any recent or remote surgical procedure, or of any bite.

On physical examination, the patient was well-nourished, with mild discomfort in his neck. His vital signs were as follows: temperature, 37.0°C; pulse rate, 78/minute; blood pressure, 134/88 mmHg; and respiratory rate 14/minute. The cardiovascular, respiratory, and abdominal examinations were unremarkable. There was a diffuse, soft to firm swelling in front of the neck, extending vertically from the level of hyoid bone to suprasternal notch and horizontally from one sternocleidomastoid muscle to the other. The swelling was more towards the left side; the skin over it was mildly tender, red hot but without any break. The swelling was neither mobile on protrusion of the tongue nor on swallowing. There were no fluctuations, fistula, or bruit and there was no palpable lymphadenopathy (Figure 1).

The oral hygiene was very poor with carious teeth, especially the lower left incisor and left molar; moreover, many teeth were missing while some had fillings. There was no sublingual elevation, indurations or asymmetry,
oral opening was normal. Initial workup showed normal white blood cell count and normal differential counts; the erythrocyte sedimentation rate was 12 mm/1st hour. Hepatitis B, hepatitis C, VDRL and HIV results were normal. X-ray of the chest and neck were unremarkable. The oxygen saturation was 98% while breathing room air. Panoramic dental X-ray confirmed that many teeth had fillings, some teeth were missing and that the left lower molar had caries (Figure 2).

The computerized tomography of the neck showed a subcutaneous swelling (6.5 x 3.5 x 1.5 mm) near the left anterolateral thyroid cartilage, with well-defined margins. There were no pressure effects on the airway. There was neither gas collection nor any malignant spread to the mediastinum (Figure 3). Many differential diagnoses ranging from abscess to neoplasms related to neck structures were considered.

In the outpatient clinic, pus with a strong fishy odour was aspirated from the swelling. Culture of this aspirate did not grow of any microorganism and acid-fast bacillus (AFB) culture was negative. Direct smear of the pus showed mainly acute inflammatory cells admixed with histiocytes. A Gram stain and Periodic acid-Schiff (PAS) stain failed to identify any microorganism.

The next day, an incision and drainage of abscess was done under general anesthesia. No necrosis of underlying tissue or granuloma was observed. Tissue was taken for histopathological examination from the bed of the wound. Histopathology of the tissue confirmed non-specific granuloma with typical actinomycotic colonies of filamentous branched gram-positive bacteria. Grocott staining also demonstrated filamentous actinomycotic organisms (Figure 4, 5, 6). Daily dressings and I.V. crystalline penicillin healed the wound within eight days. Patient was discharged on a course of oral penicillin VK (500 mg every 6 hours for 12 weeks) for the treatment of AM. The carious
teeth were extracted. The patient was in hospital for 10 days; he was fine at six months of follow-up.

DISCUSSION
AI is of low virulence, and it generally causes disease after previous tissue injury [3]. AM commonly (95% patients) manifests in three areas: cervicofacial, thoracic and abdominal [4-6] with a frequency of 55%, 15% and 25%, respectively; subcutaneous AM and AM at other sites account for the remaining 5% patients. The incidence of symptomatic AM infection is quite low; furthermore, it is decreasing gradually [1]. Wees and Smith reported prevalence of one per 12000 admissions in 1930, which reduced to one per 21,000 admissions by 1950 [7]. In 1970, Bennhoff reported a prevalence of just one case per 63000 admissions [2]. AM shows no racial predisposition and shows no geographical preference. Incidence is similar in both developing and developed countries [4].

Oral and cervicofacial infections of AM have classically been linked to AI [3]. These facultative anaerobic gram-positive microorganisms are generally present in the normal upper aerodigestive tract mucosa. For becoming pathologic, they need a pathway to the underlying tissues [1, 3, 5] and a suitable anaerobic environment to thrive [8, 9]. In the cervicofacial region, both these conditions are generally provided by tooth extraction especially with poor dental hygiene, or after trauma to the jaw. For active proliferation, AM requires the presence of many other types of aerobic bacteria, which use oxygen; thus, it results in an environment favorable for anaerobic growth [1]. The clinical presentation can be acute, with rapid onset and purulent drainage from multiple sinus tracts, or chronic which slowly progresses to fibrosis with or without any suppuration. The disease process is characterized by abscesses, fibrosis, woody indurations and draining sinuses that discharge 'sulfur granules' [5]. It takes a few weeks to a few months for the infection to develop after the organism penetrates the deeper tissues. The diagnosis can be challenging, because of nonspecific and vague symptoms; it can often be delayed until a vital organ gets involved.

Cervicofacial AM frequently affects the maxillary sinus or the mandibular area causing slowly progressive swelling of the cheek or the mandibular region, with woody induration and draining sinus tracts. Sulfur granules are present in 40% of the patients in the discharge from the sinus or needle aspiration. The presence of sulfur granules is pathognomonic [1, 5, 7, 10]. Because the sulfur granules reside deep in the tissue, they are specific but less sensitive for AM. These granules may be visualized with the naked eye in the test tubes during preparation of the biopsy specimen. Under the microscope, sulfur granules may appear as cauliflowers (low magnification) with an inflammatory reaction (high magnification). With Gram stain, these micro colonies show gram-positive, filamentous bacteria. The surgical management includes excision and debridement of the abnormal or devitalized tissue. Curettage is also essential in cases of osteomyelitis involving mandible or skull [5]. However, surgical management alone is inadequate and long term penicillin-type antibiotics are required to eradicate the disease [1, 3, 5, 7, 8]. The duration of therapy depends on the patient's clinical condition and generally requires at least two months of antibiotic therapy. Second and third generation cephalosporins, macrolides and tetracyclines are also found effective in some cases [3, 7], but aminoglycosides, metronidazole, co-trimoxazole and cephalixin show no efficacy in the treatment of AM [7]. Invasion of the cranium or the bloodstream may occur if the disease is left untreated. At present, the cure rates are high, and neither deformity nor death is common. But a high rate of suspicion, proper investigations and long term treatment are necessary. A common

Figure 4: Actinomycotic colony with Splendore-Hoeppli phenomenon within the microabscess (H & E stain; original magnification 10 x)
presentation consists of chronic submandibular swelling, usually brawny indurations with fistula formation and purulent discharge [1, 5]. Mandible is the site of predilection in most of the patients [1]. Being an endogenous infection, there is no risk of person to person transmission.

**CONCLUSION**

Cervicofacial AM is an uncommon disease. However, it can mimic various other common conditions. A high index of suspicion, proper investigations and long term treatment are needed for complete eradication. Therefore, AM should be suspected in any soft tissue swelling not responding to conventional treatment.

**REFERENCES**