Actinomycosis of the Nasal Cavity
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Introduction

The genus *Actinomyces* is composed of a unique group of anaerobic, Gram-positive rods which include 28 different species.1 These bacteria whose name literally translates in Greek to “ray fungus” resemble fungal hyphae by forming branching filaments. First known for causing “lumpy jaw” disease in cattle, *Actinomyces* is a rare cause of disease in humans. *A. israelii* is responsible for most cases of actinomyotic infection and can manifest in any of three forms: cervicofacial, abdominal-pelvic, or pulmonary. Cervicofacial is the most common accounting for approximately 55% of cases.2 We present a case of *Actinomyces* infection in the anterior nasal cavity, an anatomic location that has not been previously been reported.

Case Presentation

A 44-year-old male with a history of hypertension and end-stage renal failure requiring dialysis was referred to the otolaryngology clinic with nasal airway obstruction for approximately one year and right-sided, intermittent epistaxis for eight days. The patient had nasal packing placed in the emergency room prior to presentation. The patient denied any history of facial trauma or prior surgery in the head and neck region. Review of his home medications revealed several anti-hypertensive medications, mineral supplements for his renal failure, and metoclopramide. He did not take any immunosuppressive medications. The patient had worked in an aluminum factory for many years where he was exposed to various gases, dust and debris. He also admitted to smoking one half of a pack of cigarettes daily for the past thirty years. Family history was significant for hypertension and renal disease. On review of systems, the patient reported the additional symptoms of bilateral aural fullness with right side worse than left side as well as post-nasal discharge.

On examination, the patient was in no apparent distress. His extraocular muscles were intact and his pupils were equal, round and reactive to light. His tympanic membranes were intact bilaterally with some evidence of hemotympanum bilaterally. The nasal packing was removed, and anterior rhinoscopy revealed a mass in the right nasal cavity medial to the inferior turbinate. Oral cavity was clear without masses or lesions. There was no evidence of recent bleeding on examination of the oropharynx. Palpation of the neck did not reveal any mass or lymphadenopathy.

The patient was admitted to the hospital for pre-operative optimization and endoscopic biopsy of his right nasal mass. Laboratory studies revealed normal electrolyte levels with elevated creatinine (6.3 mg/dL), white blood cell count of 7,700 cells/mm³, hemoglobin concentration of 7.0 g/dL, and hematocrit of 22.0%. The coagulation profile was within normal limits. The patient received dialysis and a red blood cell transfusion prior to surgery. A computed tomography scan of the maxillofacial region revealed a calcified lesion with a stippled margin in the region medial to the right inferior nasal turbinate. No other abnormalities were identified.

The patient underwent endoscopic biopsy and removal of the right nasal mass in the operating room without complication. The mass was found to be a gray, inorganic-appearing material that had been impacted in the nasal cavity. Its appearance and consistency was similar to the volcanic rock pumice. Pathologic evaluation showed amorphous, calcified debris as well as sulfur granules. On Gomori methenamine silver (GMS) stain, there was an abundance of parallel, branching, filamentous bacteria morphologically consistent with *Actinomyces*.

Postoperatively, the patient reported resolution of his nasal airway obstruction and epistaxis. To treat any residual *Actinomyces* infection, he was started on a six-month course of oral penicillin at a reduced dose secondary to his renal failure.

Discussion

*Actinomyces* is part of the normal gastrointestinal tract flora and can be found anywhere from the oropharynx to the colon. It is a commensal organism found on teeth, gingival crevices, and tonsillar crypts of healthy individuals. Actinomyces becomes pathogenic when tissue injury or mucosal breach allows the bacteria to inoculate otherwise healthy tissue. This usually occurs following surgery, facial trauma, dental caries, or with poor gingival hygiene. The presence of other surrounding commensal flora provides a functional anaerobic environment allowing the Actinomyces to flourish.3 Actinomycosis is slow-growing and spreads directly through tissue without regard to fascial planes or anatomic barriers. Hematogenous and lymphatic spread does not usually occur. As actinomycotic lesions grow, they form characteristic sulfur granules which are grainy microlasers of lobulated filaments arranged in a rosette pattern. Acute or chronic inflammatory cells are present with surrounding fibrotic tissue.4 Cervicofacial actinomycosis presents clinically in one of two patterns. The most common is a chronic, slowly progressive, non-tender, indurated mass that over time develops multiple fistulae and draining sinus tracts. The sinus tracts drain characteristic yellow-sour exudate containing sulfur granules and often open and close spontaneously. In some forms of actinomycosis, such as nasopharyngeal actinomycosis, these tracts have never been reported.5 A less common manifestation of actinomycosis is an acute, tender, fluctuant mass that progresses rapidly. In this form, constitutional symptoms such as fever, fatigue and pain are noticeable. In either case, regional lymph nodes are not usually reactive due to the lack of lymphatic spread. The mandibular region is the most common site of infection, but other less common sites have been reported. These include the tongue, palate, paranasal sinuses, posterior triangle of the neck, and nasopharynx.2,3,4

Actinomycosis is slow-growing and spreads directly through tissue without regard to fascial planes or anatomic barriers. Hematogenous and lymphatic spread does not usually occur. As actinomycotic lesions grow, they form characteristic sulfur granules. This also can be difficult and require multiple biopsies since sulfur granules may only comprise 1% of the total lesion. Fluorescent-conjugated monoclonal antibodies can detect Actinomyces, although this serological test has been shown to be unreliable.4 Computed tomography (CT) and magnetic resonance imaging (MRI) scans are helpful in determining the exact location and extent of the lesion. These masses appear ill-defined, infiltrative, and extend to contiguous spaces without regard to fascial planes. Small areas of central necrosis may be seen.5

Treatment consists of extended penicillin therapy and surgical debridement. For complicated cases, IV penicillin is used for 4-6 weeks followed by oral penicillin for up to one year. Acceptable alternatives to penicillin include tetracyclines, erythromycin, clindamycin, and imipenem.

Nasopharyngeal actinomycosis does not always follow nasal trauma, but is being shown to more commonly follow insult to mucosa after exposure to inhaled toxins. It is an elusive disease that requires a high index of suspicion to diagnose. Cultures and histological examination are often required to make the diagnosis. Prolonged antibiotic use with surgical debridement is the accepted treatment option.

Conclusions

Nasopharyngeal actinomycosis does not always follow nasal trauma, but is being shown to more commonly follow insult to mucosa after exposure to inhaled toxins. It is an elusive disease that requires a high index of suspicion to diagnose. Cultures and histological examination are often required to make the diagnosis. Prolonged antibiotic use with surgical debridement is the accepted treatment option.

References