Mycobacterium simiae Infection of the Parotid Gland in an Immunocompetent Child

David Hankins,1 Maria Kelly,2 and Vini Vijayan3
1College of Medicine, 2Department of Pediatrics, and 3Division of Immunology, Rheumatology and Infectious Diseases, Department of Pediatrics, University of Florida, Gainesville

Corresponding Author: Vini Vijayan, MD, Division of Pediatric Immunology and Infectious Diseases, University of Florida, 1600 SW Archer Rd, Box 100296, Gainesville, FL 32610. E-mail: vvijayan@ufl.edu.

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Mycobacterium simiae is a multidrug-resistant, slow-growing, nontuberculous mycobacterium (NTM) that has been rarely reported as a cause of pulmonary infections and disseminated disease in immunocompromised hosts, especially in patients with advanced AIDS [1]. Nontuberculous mycobacterium infections caused by M simiae have increasingly been reported as a cause for cervical lymphadenitis in immunocompetent children [2, 3]; however, infection of the parotid gland secondary to M simiae has not been reported in the literature.

We present the diagnosis and management of a child with suppurative parotitis caused by M simiae with excision and adjunctive antimicrobial therapy.

CASE REPORT

A previously healthy 2-year-old African American male was seen by his primary care physician for a 2-day history of swelling and pain over the right side of his face and neck. The patient had no history of fever, ill contacts, night sweats, or weight loss. There was no history of preceding upper respiratory or dental infection. There was no history of exposure to unclean water or animals. The family denied any travel outside of Florida or visitors from abroad.

Physical examination of the child revealed a well-appearing boy in no apparent distress. Vital signs were within normal limits and his growth was appropriate for age. On examination of the neck, a discrete 3.5 × 4 cm, firm mass was palpable over the angle of the right mandible, extending inferiorly to obliterate the angle of the mandible. The overlying skin was intact and with mild warmth and erythema but minimal tenderness. Multiple smaller nontender lymph nodes measuring <1 cm were palpated along the right anterior and posterior cervical chain. They were soft, discrete, and not matted to underlying tissue. Examination of the ear and nose were within normal limits. There was no erythema or exudates of the posterior pharynx. Dental examination was normal with no evidence of caries or gingival inflammation. The remainder of his physical examination was normal. He was diagnosed with bacterial cervical lymphadenitis and started empirically on amoxicillin-clavulanate. Despite completing a 14-day course of medical treatment, the swelling continued to progress to involve the right side of his face. Due to persistence of the swelling, otolaryngology was consulted and the child was subsequently admitted to the Pediatric Inpatient Service for further evaluation.

Laboratory evaluation revealed a complete blood count with a peripheral white blood cell count of 14 500 cells/μL with 22.6% neutrophils, 58.3% lymphocytes, 7% monocytes, and 5.6% eosinophils. The hemoglobin and hematocrit were 11.3 g/dL and 37.3%, respectively, and platelets were 375 000 cells/μL. The erythrocyte sedimentation rate was 22 mm/hour, and C-reactive protein was 2.7 mg/dL. Serology for Bartonella henselae was negative.

Computed tomography with intravenous contrast was performed and revealed a 3.5 × 2.2 cm, rim-enhancing mass in the right parotid tail with internal hypodensity suggestive of necrosis. There was also evidence of reactive cervical lymph nodes (Figure 1). Otolaryngology performed a fine-needle aspiration of the mass, and approximately 3 mL of purulent fluid was obtained and sent for bacterial, fungal, and acid-fast stain and culture. After surgical aspiration and obtaining of cultures, he was started on intravenous clindamycin, quickly transitioned to oral clindamycin, and was discharged home on post-operative day 2 to complete a 10-day course.
The bacterial and fungal stains and cultures were negative. However, acid-fast staining of the aspirate was determined to be positive. A tuberculin skin test was positive with a 12-mm induration. A chest radiograph was obtained and was found to be within normal limits. He was started on clarithromycin (30 mg/kg divided twice daily) and rifabutin (20 mg/kg daily), and the clindamycin was discontinued. Three weeks after his fine-needle aspiration, the aspirate was identified to be *M simiae* by our state laboratory using the polymerase chain reaction restriction analysis method.

By this time, the child was readmitted to the pediatric service due to progression of the parotid swelling. He had also developed low-grade fevers. A right-sided subtotal parotidectomy with neck dissection and cervical node excision was performed by the otolaryngology service. Pathology of superficial and deep parotid tissue revealed the presence of granulomatous inflammation and granulation tissue, and there were no signs of neoplasia. Focal lymphoid hyperplasia and germinal center formation was noted on pathology of the submandibular salivary gland. Repeat bacterial, fungal, and acid-fast bacilli (AFB) cultures of the specimen were obtained, and these were subsequently negative.

Susceptibility testing of *M simiae* isolated from the initial parotid aspirate indicated resistance to amikacin, rifabutin, rifampin, and ethambutol; susceptibility to clarithromycin; and intermediate to streptomycin and ciprofloxacin. Hence, therapy was changed to ciprofloxacin and clarithromycin was continued.

The surgical wounds healed well with good cosmetic results, and at 4 months after surgery, the patient showed no signs of recurrence of the disease or side effects of therapy. Due to the known association of *M simiae* with immunocompromised patients, an immunodeficiency workup, including human immunodeficiency virus testing, was performed on our patient and he was found to be immunocompetent.

**DISCUSSION**

Nontuberculous mycobacteria are known to cause infection of the head and neck in children and rarely have been reported to involve the parotid gland [4]. This is the first report of a child with supplicative parotitis caused by *M simiae*. Our patient was successfully treated with subtotal parotidectomy and adjunctive antimicrobial therapy.

*Mycobacterium simiae* was first isolated in 1965 from Macacus rhesus monkeys [5]. It is an obligatory aerobic, gram-positive, slow-growing AFB [5, 6]. *Mycobacterium simiae* rarely causes disease in immunocompetent patients, but pulmonary, intra-abdominal and disseminated disease has been reported among immunocompromised hosts [1]. Recovery of *M simiae* from clinical specimens was thought to be restricted to 3 primary geographical locations; Israel, Cuba, and Southwestern United States (Arizona, New Mexico, and Texas) but has now been reported worldwide [6, 7]. The primary mode of transmission and natural reservoir of the organism remain unclear, but investigators have recovered *M simiae* from water supplies, and pseudo-outbreaks involving contaminated water supplies have been described [8].

Clinical distinction between colonization and infection remains difficult, and the American Thoracic Society (ATS) has developed diagnostic criteria to assist in distinguishing colonization from true infection [6]. Similar to other NTM, persistence of symptoms, repetitive organism isolation, and tissue diagnosis are indicators of true disease. In the case of our patient, both the AFB smear and culture from the initial aspiration of the parotid gland were positive. Despite the absence of growth of AFB from the pathology specimen, granulomas suggestive of mycobacterial infection were present, establishing a tissue diagnosis. A tuberculin skin test on our patient was positive at 12 mm.

Children presenting with *M simiae* infections pose a significant therapeutic challenge. *Mycobacterium simiae* is the most drug resistant of all the NTM, and this may explain the very low cure rates associated with medical treatment alone [6, 7]. There are no published clinical trials for the treatment of *M simiae* disease, and, because too few isolates have been studied, no specific susceptibility method has been recommended at this time, although
broth microdilution minimum inhibitory concentration testing has been suggested for slow-growing bacteria [6, 10]. In vitro, \textit{M. simiae} is resistant to high concentrations of rifampin and ethambutol alone as well as in combination and may have limited efficacy. Agents reported to have activity against members of the \textit{M. simiae} include clarithromycin, ethambutol, ethionamide, fluoroquinolones, amikacin, and cycloserine and linezolid [6, 7, 9, 10]. Although the optimal therapy is still unclear, the ATS has suggested a clarithromycin-based multiple drug regimen. Recent reports suggest that some isolates are susceptible in vitro to sulfamethoxazole and linezolid, and therefore regimens containing a macrolide, moxifloxacin, and trimethoprim-sulfamethoxazole may be successful [9, 10]. The duration of antimycobacterial therapy has varied from 6 months to more than 1 year and is often based upon clinical response. Immunocompetent patients with NTM cervical lymph node excision with \textit{Mycobacterium avium} complex may not require adjunctive antimicrobial therapy [11].

Our patient had suppurative parotitis with necrosis of intraparotid lymph nodes and underwent a subtotal parotidectomy with neck dissection, resulting in significant improvement of his disease process. Studies of cervicofacial lymphadenitis secondary to NTM in children have shown that complete surgical excision of the affected glands resulted in better cure rates compared with medical treatment alone (96% vs 66%) [11]. Early treatment of this disease is imperative because it is well known that cervicofacial infections with NTM have resulted in damaging sequelae including facial nerve involvement, local destruction with scarring of the skin, and sinus tract formation [11]. Fine-needle aspiration is not recommended because of the risk of creating a chronically draining sinus tract [11]. Susceptibility testing performed on our patient also indicated resistance to antimicrobials commonly used to treat NTM.

Despite the increased availability of enhanced isolation and accurate identification methods in mycobacteriology, very few reports of \textit{M. simiae} infections exist in the literature. Pulmonary and disseminated infections secondary to \textit{M. simiae} have been reported in adults with advanced AIDS or other immunocompromising conditions. In stark contrast to adults, we found only 2 reported cases of \textit{M. simiae} cervical lymphadenopathy in children, both of which were immunocompetent [2, 3]. Our patient presented with \textit{M. simiae} parotitis and underwent an immunological evaluation workup and was determined to be immunocompetent.

CONCLUSIONS

\textit{Mycobacterium simiae} infection should be included in the differential diagnosis of a child with suppurative parotitis, despite absence of an immunocompromised state. Secondary to the multidrug resistance and the low cure rates associated with \textit{M. simiae}, surgical intervention is required for optimal management of suppurative parotitis and adjunctive antimicrobial therapy may also prevent disease recurrence.

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References