Abstract: Background. Parotitis caused by nontuberculous mycobacteria, a very rare disease entity, has never been reported to be caused by Mycobacterium fortuitum (M. fortuitum) in the literature.

Methods and Results. An 8-year-old girl was seen with painful swelling of the right parotid gland despite antibiotic treatment of more than 1 month. Elevated serum amylase activity and diffuse contrast-enhanced CT of the parotid gland confirmed the diagnosis of parotitis. Histopathological study of specimens taken from the right parotid tail mass showed granulomatous inflammation with acid-fast positive bacilli; culture later confirmed M. fortuitum. After administration of clarithromycin and ciprofloxacin for 9 consecutive months, the parotitis and parotid tail mass were completely resolved at follow-up examination.

Conclusion. To our knowledge, this is the first case report of parotitis caused by M. fortuitum and its successful medical treatment.

Keywords: Mycobacterium fortuitum; nontuberculous mycobacteria; parotitis; clarithromycin; ciprofloxacin

Primary salivary gland tuberculosis is common, occurring more frequently in the parotid gland than in other salivary glands. Compared with Mycobacterium tuberculosis, primary nontuberculous mycobacterial infection of the parotid gland is a very rare disease, usually manifested unilaterally as either an acute inflammatory process or a chronic tumorous lesion. The acute inflammatory lesion poses a challenge to clinicians, because it mimics acute bacterial parotitis or mumps.

Mycobacterium fortuitum (M. fortuitum), a nontuberculous mycobacteria (NTM), is generally accepted as a skin commensal in humans. Although cervical lymphadenitis caused by M. fortuitum has been reported in the literature, parotitis caused by M. fortuitum has never been reported. Recently, we experienced an 8-year-old girl with persistent parotitis and parotid tail mass attributed to the infection by M. fortuitum. Herein, we present this case.
**CASE REPORT**

An 8-year-old girl had persistent painful swelling of the right preauricular area for more than 1 month. She was 27 kg in weight and 130 cm in height. She denied fever, generalized malaise, weight loss, cough, or sputum. She also denied history of oral trauma or dental procedures. Her medical and past histories were unremarkable, and all vaccinations (including measles-mumps-rubella [MMR] vaccine) were on schedule. Initially, she had been diagnosed for acute suppurative parotitis, but oral treatment with 10 mL Augmentin syrup (each 5 mL containing 125 mg amoxicillin and 31.25 mg clavulanic acid) every 8 hours for 2 weeks showed no improvement. At admission, physical examination revealed generalized tender swelling of the right parotid gland with a 3.0- × 3.0-cm mass at the parotid tail. Laboratory tests revealed elevated serum amylase activity (156 IU/L; normal range, 30–110 IU/L) and leukocytosis (13,420 cells/μL). The result for HIV antibody was negative. There was no presence of a 4-fold rise in serum mumps immunoglobulin G titer between acute and convalescent phase. A CT scan of the head and neck demonstrated diffuse enhancement of the right parotid gland (Figure 1) as well as a 3.3- × 3.0- × 2.3-cm soft tissue mass at the parotid tail, which showed central low-density with peripheral rim enhancement (Figure 2). Additionally, CT scan ruled out cervical lymph node involvement. Histopathology of biopsy specimens from the parotid tail mass revealed granulomatous inflammation (see Figure 3) with acid-fast positive bacilli (Figure 4). At first, primary *M. tuberculosis* of the parotid gland was suspected, and the patient was treated with ethambutol (400 mg once a day), pyrazinamide (1000 mg once a day), and Rifinah-300.

**FIGURE 1.** Axial contrast-enhanced CT scan shows diffuse enhancement of the right parotid gland (arrows) compared with the left side.

**FIGURE 2.** Contrast-enhanced axial CT image demonstrates asymmetrical right parotid tail mass (arrows) associated with low-density ring enhancement.

**FIGURE 3.** The tissue section of the parotid tail mass stained with hematoxylin-eosin shows granulomatous inflammation (arrows) with lymphoplasmacytic infiltrate and focal necrosis. Foci of histiocyte aggregate and a few multinucleate giant cells are present. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]
(300 mg rifampicin and 150 mg isoniazid; once a day). Unfortunately, persistent parotitis and poor wound healing were noticed. Two months later, acid-fast bacilli culture grew \textit{M. fortuitum}. Drug susceptibility report showed the organism to be sensitive to imipenem, amikacin, cefoxitin, ciprofloxacin, and clarithromycin. Subsequently, ciprofloxacin (125 mg twice a day) and clarithromycin (250 mg twice a day) were given for 9 consecutive months. She has done well, and her 1-year follow up revealed no subsequent problems.

**DISCUSSION**

The Runyon Classification divided NTM into 4 groups based on colonial morphology, pigmentation, and growth rate.\textsuperscript{4} Of the groups, \textit{M. fortuitum} is classified as Runyon group IV, rapidly growing mycobacteria. Rapid growth is characteristic only for subcultured organisms which form well-developed colonies after just 7 days of incubation, while their primary isolation may take 3 to 6 weeks.\textsuperscript{5}

\textit{M. fortuitum} has been isolated from soil, dust, water sources (including hospital sinks), human abscess, and sputum,\textsuperscript{2} but no strong evidence supports person-to-person spread.\textsuperscript{6} However, \textit{M. fortuitum} can infect almost every tissue and organ system. It has been implicated in skin and soft tissue infections, trauma site and catheter-related infections,\textsuperscript{7} keratitis,\textsuperscript{8} peritonitis, artificial heart valve replacement infections, augmentation mammoplasty, cardiothoracic surgery, and arthroplasty.\textsuperscript{9} In general, \textit{M. fortuitum} usually causes localized infections with low mortality in immunocompetent patients. Disseminated disease, usually with skin and soft tissue lesions, occurs almost exclusively in the setting of severe immunosuppression, especially acquired immunodeficiency syndrome.\textsuperscript{3,4,9} Deep organ involvement and disseminated infections manifest in high mortality.\textsuperscript{9}

Most patients with cervical lymphadenitis caused by NTM infection are children. They usually show normal chest radiograph and have no fever, malaise, or weight loss.\textsuperscript{10,11} Contrast-enhanced CT scan typically demonstrates asymmetrical cervical lymphadenitis and contiguous low-density, necrotic, ring-enhancing masses but with minimal inflammatory stranding of the subcutaneous fat, a finding that may distinguish lymphadenitis caused by NTM from other conventional bacteria.\textsuperscript{12,13} Among NTM, \textit{M. fortuitum} is an extremely rare cause of isolated lymphadenitis or neck abscess.\textsuperscript{4,10,11,13} A history of dental procedures or defects in the immune system such as human immunodeficiency virus infection may provide insight to the cause of such an infection.\textsuperscript{4} However, in the present case, she was neither an immunocompromised patient nor receiving any dental procedure; CT scan ruled out cervical lymphadenitis.

NTM-induced parotitis is very rare, and to our knowledge, \textit{M. fortuitum}-induced parotitis has never been reported in the literature. One of the main etiologic factors that may facilitate parotitis is decreased salivary production. Common causes of decreased salivary production include chemotherapy and radiotherapy, autoimmune disease and/or xerogenic medication. The patient, however, exhibited none of the above characteristics. Thus, we inferred that reduced saliva production due to ductal obstruction might be the predisposing factor for \textit{M. fortuitum}-induced parotitis by means of an ascending salivary duct infection via the oral cavity.

Guidelines for treating patients specifically with parotitis caused by \textit{M. fortuitum} are lacking in the literature. In the past, NTM generally have shown poor in vitro susceptibility to standard antituberculous drugs,\textsuperscript{14} and many authors have recommended surgical interventions including partial or total parotidectomies for NTM infection of the parotid gland lymph nodes.\textsuperscript{13,15,16} Conversely, many studies show that clarithromycin, amikacin, cefoxitin, fluoroquinolones (ciprofloxacin and ofloxacin), doxycycline, imipenem, and sulfonamides have good in vitro activity against \textit{M. fortuitum}.\textsuperscript{17,18} A combina-
tion of 2 or more agents should always be utilized, as with all mycobacterial infections, to avoid drug resistance. Based on the present case and in vitro data in the literature, our recommendation is to treat *M. fortuitum*-induced parotitis with a combination of ciprofloxacin and clarithromycin for at least 9 months.

**Acknowledgment.** We thank Anthony Lee for manuscript editing.

**REFERENCES**