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ORIGINAL ARTICLE

Pediatric Dental Clinic–Associated Outbreak of *Mycobacterium abscessus* Infection

Lindsay A. Hatzenbuehler,[1,2,3] Melissa Tobin-D'Angelo,[4] Cherie Drenzek,[4] Gianna Peralta,[4] Lisa C. Cranmer,[1,2,5,6] Evan J. Anderson,[1,2,5,6,7,8] Sarah S. Milla,[5,6,9] Shelly Abramowicz,[5,6,10] Jumi Yi,[1,2,5,6] Joseph Hilinski,[2,11] Roy Rajan,[5,6,12] Matthew K. Whitley,[6,13] Verlia Gower,[6,13] Frank Berkowitz,[1,2,5,6] Craig A. Shapiro,[1,2,5,6] Joseph K. Williams,[6,14] Paula Harmon,[6,13] and Andi L. Shane[1,2,5,6]

[1]Division of Pediatric Infectious Diseases, [2]Department of Pediatrics, and [3]Baylor College of Medicine, Houston, Texas; [4]Georgia Department of Public Health, Atlanta; [5]Emory School of Medicine, Atlanta; [6]Children's Healthcare of Atlanta, Georgia; [7]Division of Infectious Diseases, [8]Department of Medicine, [9]Department of Pediatric Radiology, [10]Department of Pediatric Oral and Maxillofacial Surgery, and [11]St. Luke's Children's Hospital, Boise, Idaho; [12]Department of Pediatric Otolaryngology-Head & Neck Surgery, [13]Pediatric Ear, Nose and Throat of Atlanta, [14]Department of Pediatric Plastic and Reconstructive Surgery

Background. *Mycobacterium abscessus* is an uncommon cause of invasive odontogenic infection.

Methods. *M abscessus*–associated odontogenic infections occurred in a group of children after they each underwent a pulpotomy. A probable case-child was defined as a child with facial or neck swelling and biopsy-confirmed granulomatous inflammation after a pulpotomy between October 1, 2013, and September 30, 2015. *M abscessus* was isolated by culture in confirmed case-children. Clinical presentation, management, and outcomes were determined by medical record abstraction.

Results. Among 24 children, 14 (58%) were confirmed case-children. Their median age was 7.3 years (interquartile range, 5.8–8.2 years), and the median time from pulpotomy to symptom onset was 74 days (range, 14–262 days). Clinical diagnoses included cervical lymphadenitis (24 [100%] of 24), mandibular or maxillary osteomyelitis (11 [48%] of 23), and pulmonary nodules (7 [37%] of 19). Each child had ≥1 hospitalization and a median of 2 surgeries (range, 1–6). Of the 24 children, 12 (50%) had surgery alone and 11 (46%) received intravenous (IV) antibiotics. Nineteen of the 24 (79%) children experienced complications, including vascular access malfunction (7 [64%] of 11), high-frequency hearing loss (5 [56%] of 9), permanent tooth loss (11 [48%] of 23), facial nerve palsy (7 [29%] of 24), urticarial rash (3 [25%] of 12), elevated liver enzyme levels (1 [20%] of 5), acute kidney injury (2 [18%] of 11), incision dehiscence/fibrosis (3 [13%] of 24), and neutropenia (1 [9%] of 11).

Conclusions. *M abscessus* infection was associated with significant medical morbidity and treatment complications. Unique manifestations included extranodal mandibular or maxillary osteomyelitis and pulmonary nodules. Challenges in the identification of case-children resulted from an extended incubation period and various clinical manifestations. Clinicians should consider the association between *M abscessus* infection and pulpotomy in children who present with subacute cervical lymphadenitis. The use of treated/sterile water during pulpotomy might prevent further outbreaks.

Keywords. *Mycobacterium abscessus*; pediatric dental infections; pediatric odontogenic infections.

Nontuberculous mycobacterial (NTM) species are ubiquitous in environmental sources such as soil and water, including municipal drinking water systems, hospital water systems, and household plumbing [1]. The Centers for Disease Control and Prevention (CDC) has published guidelines for water-filtration systems, monitoring, and treatment for preventing healthcare-associated infections [2]. *Mycobacterium abscessus*, a rapid-growing multidrug-resistant mycobacterium, is an uncommon source of healthcare-associated infections. Infections have been associated with the use of *M abscessus*–contaminated water or equipment during tympanostomy tube placement [3–5], gastrostomy tube placement [6], laparoscopy [7], acupuncture [8], lung transplantation [9], liposuction [10], abdominoplasty [11], brain biopsy [12], and rhytidectomy [13]. Before 2016, there was only 1 report of an *M abscessus* infection after a dental procedure in Israel (in a 19-year-old child who developed mandible osteomyelitis after a root canal) [14]. The report did not comment on the association of water-supply contamination during the child's dental procedure or her development of infection.

The goal of a pulpotomy is to remove infected nerve or pulp tissue to prevent a tooth abscess and to preserve tooth space for secondary tooth eruption. The adult equivalent to a pulpotomy is a root canal. However, an adult root canal is considered a surgical procedure, and sterile or treated water is used [2, 15, 16]. A pulpotomy is considered a nonsurgical procedure, and municipal water is often used for drilling and irrigation. In its guidelines for infection prevention in dental clinics, the CDC recommends that municipal water meet microbiologic standards for drinking

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Correspondence: L. A. Hatzenbuehler, MD, MPH, Baylor College of Medicine, Division of Pediatric Infectious Diseases, 1102 Bates St. Suite 1150, Houston, TX 77030 (hatzenbu@bcm.edu).

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water before use in nonsurgical dental procedures [2]. Multiple cases of odontogenic *M abscessus* lymphadenitis were observed in school-aged children in the Atlanta, Georgia, area, most of whom had extranodal manifestations, including mandibular or maxillary osteomyelitis with or without pulmonary nodules, after recent pulpotomy restorative dental procedures. An outbreak investigation was conducted, and the clinical presentation, treatment, and outcomes are reported here.

METHODS

In early 2014, a cluster of 5 children with subacute submandibular and cervical lymphadenitis with or without jaw swelling presented for tertiary medical care at 1 of 2 children's hospital in Atlanta. Because each of these children presented with subacute lymphadenitis, an atypical pathogen was suspected. In these initial case-children, a lymph node biopsy was performed and microbiologic cultures were obtained. The pathologic specimens revealed granulomatous inflammation with or without microbiologic isolation of *M abscessus*. Because of these results, pediatric infectious disease physicians suspected a common source. Detailed histories revealed that each of the children had undergone a pulpotomy procedure at common dental practice. An epidemiologic investigation was initiated in conjunction with the Georgia Department of Public Health (GDPH) [17]. A probable case-child was defined as a child with facial or neck swelling and biopsy-confirmed granulomatous inflammation after a pulpotomy performed between October 1, 2013, and September 30, 2015. Confirmed case-children met the probable case-child definition and had *M abscessus* isolated by culture from a surgical specimen. All confirmed and probable case-children were treated at the same pediatric dental practice.

Active surveillance was implemented to optimize case finding (GDPH officials, personal communication, September to January 2016). The dental practice, community physicians, and the GDPH collaborated to inform potentially exposed families about these infections and to increase healthcare utilization and general community awareness. All of the children with significant infections were identified and referred for tertiary medical care. Medical records of children with a histopathologic specimen that revealed granulomatous inflammation or a microbiologic culture that grew *M abscessus* (from the Georgia Public Health Laboratory and clinical laboratories of the local pediatric healthcare system) were reviewed (GDPH officials, personal communication, September to January 2016). Children who were identified were evaluated by a pediatric subspecialist at 1 of 2 local pediatric hospitals. Clinical, radiographic reports, pathologic specimen results, and microbiologic culture results, antibiotic treatment regimens, and outcomes were abstracted from the medical records using a uniform case-report form.

The time to illness onset (determined by hospital chart review and parent reports), was defined as the time from the child's first pulpotomy to his or her seeking medical care at a tertiary pediatric hospital. The time from illness onset to presentation was defined as the time from symptom onset to the time of presentation at a tertiary pediatric hospital where definitive care was received. The diagnosis of lymphadenitis was suspected on the basis of physical examination findings and confirmed with pathologic examination of lymph tissue containing granulomatous inflammation. Associated osteomyelitis was suspected on the basis of radiologic imaging that revealed a periosteal reaction or osteolytic changes and confirmed on pathologic examination of bone tissue that revealed granulomatous inflammation and associated acute or chronic inflammation. Pulmonary nodules were an incidental radiographic finding from computed tomography (CT) imaging of the neck. A single child underwent a lung biopsy, which confirmed the association of a disseminated *M. abscessus* infection based on the pathologic examination of tissue obtained via lung biopsy that revealed granulomatous inflammation. Mycobacterial cultures were prepared locally, and species identification was performed at the GDPH laboratory or at 1 of 2 reference laboratories. Susceptibility testing was performed at 1 of 2 reference laboratories. Incomplete resection was defined as the presence of residual granulomatous tissue at the site of infection. Morbidities associated with a surgical procedure or medical treatment for the *M. abscessus* infection in these children included central venous line complication, permanent tooth loss, aminoglycoside-associated high-frequency hearing loss, facial nerve palsy, urticarial rash, elevated liver enzyme levels, acute kidney injury, incision dehiscence/fibrosis, and neutropenia.

Statistical analysis was performed using SAS 9.4 (SAS, Inc, Cary, NC). The Emory University School of Medicine and Children's Healthcare of Atlanta institutional review boards considered this study exempt from review.

RESULTS

Between October 24, 2013, and September 18, 2015, 1062 children underwent a pulpotomy at a common dental practice, and 24 of them met the probable-case-child definition, which equates to an attack rate of 2.3%. Of these 24 (58%) children, 14 were confirmed case-children, and 10 (42%) were probable case-children.

Representatives from the GDPH visited the dental practice and confirmed that municipal water was used for drilling and irrigation during pulpotomies. The water was used to remove the infected portion of the vital pulp, after which, prepackaged ferric sulfate was applied with a sterile disposable brush to stop the bleeding. The tooth cavity was stabilized with glass ionomer cement before the placement of a metal crown. The GDPH found that the dental practice flushed its waterlines without the use of disinfectant and that the suction tubing was sterilized at the end of each day and changed every 1 to 2 years. The clinic did not perform active water-monitoring procedures (GDPH officials,

personal communication, September to January 2016) [2, 17]. The CDC guideline recommends that water used in nonsurgical dental procedures meet the Environmental Protection Agency's microbiologic cut-off safety standard for drinking water (which is ≤500 CFU/mL of heterotrophic water bacteria) [2]. At the time of the epidemiologic investigation, microbiologic testing of the water at the dental chairs revealed an average *M abscessus* level of 91 333 CFU/mL (>180 times the recommended maximum level) [2]. *Mycobacterium gordonae* and *Mycobacterium szulgai* also were identified in cultures of the dental clinic's water supply at a microbiologic level ranging from <10 to 100 CFU/mL. Because the levels of these mycobacteria were below the Environmental Protection Agency's safety cut-off value of <500 CFU/mL, and neither was isolated in the clinical specimens, they were not considered pathogenic. Thirteen dental chair water sample isolates from 7 dental chairs and 8 tissue sample isolates from 7 children were identified by the CDC as indistinguishable according to pulsed-field gel electrophoresis, which suggests a common source. The GDPH recommended that the dental practice no longer use municipal water during pulpotomies but to use distilled chlorinated water instead (GDPH officials, personal communication, September to January 2016). After the dental practice's change in procedure with this recommendation implemented, no other cases have been reported.

The median age at the encounter for which definitive care was provided was 7.3 years (interquartile range, 5.8–8.2 years), and a similar distribution of infections was found among boys and girls; all the children had a history of poor dentition (Table 1). No child had a documented underlying immunodeficiency. The median time to symptom onset was 74 days (range, 14–262 days). Each child had received at least 1 course of empiric antimicrobial therapy before his or her presentation for definitive management. The median time from symptom onset to presentation was 29 days (range, 5–108 days). The most common presenting symptoms included submandibular swelling, jaw swelling, gum swelling, and tooth pain. One child presented with systemic symptoms of fever, weight loss, and erythema nodosum. None of the children had respiratory symptoms (Table 1).

All the children underwent radiologic imaging. Contrasted maxillofacial CT of the head or neck or magnetic resonance imaging of the head and neck were used to identify associated osteolytic or periosteal changes of the adjacent mandible or maxilla and to guide surgical intervention. Pulmonary nodules were identified incidentally on CT imaging of the neck (Figure 1). Clinical diagnoses included cervical lymphadenitis (24 [100%] of 24), adjacent mandibular or maxillary osteomyelitis (11 [48%] of 23), and disseminated infection with pulmonary nodules (7 [37%] of 19).

Each child required hospitalization and at least 1 surgical debridement/tissue excision. The average number of total hospital days was 8 (range, 2–19), and the median number of surgical procedures was 2 (range, 1–6). The surgical procedures included partial or complete resection of lymphadenitis with or without mandible/maxilla debridement and tooth extraction; 1 child underwent a pulmonary nodule biopsy. Twelve (50%) children were treated with complete resection alone. Indications for repeat surgery are described in Table 2. Two children with extensive cervical lymphadenitis required a bilateral total neck dissection. The children with incomplete resection had lymph node tissue adherent to the facial nerve, and removing this tissue would have risked complete and irreversible facial palsy on the affected side. Many children had 1 or more adverse events related to their surgical procedure, including permanent tooth loss, temporary facial nerve palsy, and incision dehiscence or scar fibrosis (Table 2).

Tissue specimens from 10 (42%) children were acid-fast bacillus smear positive, and 14 (58%) had *M abscessus* isolated from culture. Susceptibility testing was performed on 11 (79%) of 14 *M abscessus* isolates. All of the isolates were susceptible to amikacin. Isolate susceptibility to macrolides (azithromycin and clarithromycin) was determined by microtiter minimum inhibitory concentration testing at 3 days of culture growth.

Table 1. Demographic and Clinical Characteristics of Children Evaluated for *Mycobacterium abscessus* Infection[a]

Characteristic	Value
Age (median [interquartile range]) (y)	7.3 (5.8–8.2)
Sex, male (n [%])	13 (54)
Past medical history (n [%])	
Poor dentition	24 (100)
Seasonal allergies/asthma	4 (17)
Immunodeficiency	0 (0)
Symptoms at onset (n [%])	
Submandibular swelling	14 (58)
Jaw swelling	12 (50)
Gum swelling	9 (38)
Tooth pain	7 (29)
Fever, weight loss, erythema nodosum	1 (4)
Diagnostic imaging modality (n [%])	
Maxillofacial CT	21 (88)
Chest CT	19 (79)
Neck ultrasound	2 (8)
Head and neck MRI	1 (4)
Advanced imaging findings (n/N [%])	
Cervical lymphadenitis	24 (100)
Osteolytic or periosteal changes of the mandible/maxilla[b]	14/23 (61)
Pulmonary nodules[c]	7/19 (37)
Pathologic and microbiologic results (n/N [%])	
Granulomatous inflammation[d]	24 (100)
Mandibular or maxillary osteomyelitis[e]	11/23 (48)
M abscessus culture positive	14 (58)
AFB smear positive	10 (42)

Abbreviations: AFB, acid-fast bacillus; CT, computed tomography; MRI, magnetic resonance imaging.
[a]Denominator was 24 unless otherwise specified.
[b]Includes those with available imaging results to evaluate for osteomyelitis (n = 23).
[c]Includes those with available results of contrasted CT imaging of the neck or chest (n = 19).
[d]Indentified on lymph node, bone, and/or lung biopsy tissue specimens.
[e]Bone tissue revealed granulomatous inflammation and acute and/or chronic inflammation.

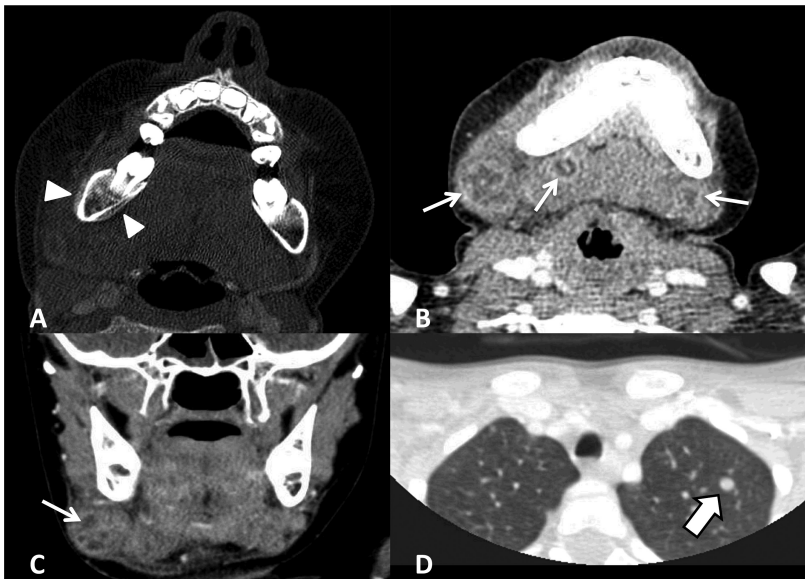

Figure 1. Computed tomography image of the neck with contrast in a 7-year-old girl. (A) Axial image, bone windows reveal early periosteal reaction (arrowheads) along the right mandible. (B–D) Axial (B) and coronal images (C), with soft tissue windows revealing necrotic lymphadenopathy (arrows), and (D) axial image, with lung windows revealing a pulmonary nodule. (Image courtesy of Sarah S. Milla, MD, FAAP, Department of Pediatric Radiology and Imaging Services, Emory University School of Medicine, Children's Healthcare of Atlanta. Parental permission was obtained for use of the images.)

Inducible macrolide resistance was identified by microtiter testing at 14 days of culture growth. Molecular testing confirmed the presence of the *erm41* gene, which confers inducible macrolide resistance. Of 11 isolates, 5 (45%) were susceptible to cefoxitin; the remainder of the isolates had intermediate cefoxitin susceptibility (Table 3).

Twelve children received antibiotic therapy. One child underwent lymph node resection, was treated with oral clarithromycin monotherapy for 4 months, and did not experience infection recurrence. Eleven (46%) children with incomplete surgical excisions or pulmonary nodules underwent postsurgical IV antibiotic therapy. Treatment regimens included amikacin (10–30 mg/kg every 24 hours), cefoxitin (100–160 mg/kg per day divided every 8 hours) with or without oral azithromycin (5–10 mg/kg per day every 24 hours), or oral clarithromycin (20 mg/kg per day divided every 12 hours). The median duration of antibiotic treatment was 16 weeks (range, 4–24 weeks); 3 children received 6 months of IV therapy with or without an oral macrolide [18]. All children who received IV therapy underwent weekly laboratory monitoring, which included a complete blood count and basic metabolic panel. Some children were monitored with liver function and weekly amikacin level testing.

Of the 11 children who received IV antibiotic therapy, 7 (64%) had a vascular access catheter malfunction, which included thrombus formation, dislodgement, or inadvertent child removal. Of 12 children, 8 (67%) experienced morbidity associated with antibiotic administration, including urticarial rash (n = 3), elevated liver enzyme levels (n = 1), or neutropenia (n = 1), which led to either an unintended discontinuation of cefoxitin therapy (n = 3) or a brief discontinuation of cefoxitin followed by a successful reintroduction of the antibiotic (n = 2).

Nine (82%) of 11 children who received amikacin underwent a monthly follow-up hearing evaluation. Two children experienced reversible amikacin-induced acute kidney injury, and 5 (56%) of the 9 children tested experienced sustained irreversible high-frequency hearing loss that led to premature discontinuation of amikacin.

Table 2. Surgical Management of and Complications in Children With *Mycobacterium abscessus* Infection[a]

Surgical Intervention/Management	n (%)
Surgical debridement/excision (n [%])	24 (100)
Time from symptom onset to first surgery (median [interquartile range]) (days)	39 (27.5–65)
Children treated with resection alone (n [%])	12 (50)
Surgeries (n [range])	2 (1–6)
Indications for repeat surgical intervention (n/N [%])	
Persistence of lymphadenitis after initial excisional biopsy or incision and drainage	7 (29)
Persistence of lymphadenitis after osteomyelitis debridement	6/11 (55)
Repeat debridement at site of osteomyelitis	3/11 (27)
Incision dehiscence	1 (4)
Surgical site abscess formation	1 (4)
Central venous line placement/removal	3/11 (27)
Complications (n/N [%])	
Permanent tooth loss[b]	11/23 (48)
Facial nerve palsy	7 (29)
Incision fibrosis	2 (8)

[a]Denominator was 24, unless otherwise specified.
[b]All 11 children with osteomyelitis required permanent tooth extraction.

Table 3. Antibiotic Susceptibility of *Mycobacterium abscessus* Isolates (N = 11)[a,b]

Susceptibility	Antibiotic								
	AMK (N = 11)	MAC (N = 11)	CLF (N = 8)	FOX (N = 11)	CIP (N = 11)[d]	TGC (N = 10)	IPM (N = 11)	SXT (N = 11)	LZD (N = 11)[d]
Susceptible (% [n/N])	100	100[c]	100	45 (5/11)	0	100	18 (2/11)	0	27 (3/11)
Intermediate (% [n/N])	0	0	0	55 (6/11)	9 (1/11)	0	82 (9/11)	0	55 (6/11)

Abbreviations: AMK, amikacin; CIP, ciprofloxacin; CLF, clofazimine; FOX, cefoxitin; IPM, imipenem; LZD, linezolid; MAC, macrolide (azithromycin and clarithromycin); SXT, sulfamethoxazole-trimethoprim; TGC, tigecycline.

[a]Isolates from 3 children with *M abscessus*–positive culture results did not undergo susceptibility testing.

[b]Susceptibility testing was performed at 1 of 2 reference laboratories, ARUP Laboratories (Salt Lake City, UT) or National Jewish Mycobacterial Laboratory (Denver, CO).

[c]Macrolide susceptibility was determined on the basis of microtiter minimum inhibitory concentration testing at 3 days of culture growth. Macrolide resistance was detected by microtiter testing at 14 days of culture growth (ARUP Laboratories). The National Jewish Mycobacterial Laboratory identified the presence of the *erm41* gene, which confers inducible macrolide resistance, in every isolate.

[d]Ten (91%) of 11 of isolates were resistant to ciprofloxacin, and 2 (18%) of 11 isolates were resistant to linezolid.

Six (50%) of 12 children underwent end-of-treatment imaging. For 3 children, resolution of the initial imaging findings was found; for the remaining 3 children, there were persistent imaging findings, including submandibular soft tissue swelling (n = 1) and residual but smaller pulmonary nodules (n = 2).

After their final surgical procedure and/or surgical plus medical management, all of the children remained without infection recurrence through at least 6 months.

DISCUSSION

M abscessus is an uncommon cause of head and neck infection in children [19–22]. More than 70% of pediatric cases of NTM lymphadenitis are caused by *Mycobacterium avium* complex (MAC), a group of slow-growing nontuberculous mycobacteria. MAC lymphadenitis occurs in young children (median age, 3.4 years), who develop unilateral submandibular lymph node swelling that is slow to progress (over 4–8 weeks), unresponsive to empiric antimicrobial therapy, and not associated with osteomyelitis or pulmonary nodules [19–23]. This outbreak of odontogenic *M abscessus* head and neck infections affected school-aged children, most of whom had extranodal manifestations, including osteomyelitis with or without pulmonary nodules. We speculate that the severity of these infections might have been related to the virulence of the pathogen in addition to the introduction of a high *M abscessus* inoculum at the site of the infection during the pulpotomy procedure. Only 1 of 7 children with pulmonary nodules presented with systemic symptoms (fever and weight loss), and none of the children had respiratory symptoms. In children who had end-of-treatment CT chest imaging, the pulmonary nodules had decreased in size, but none had resolved completely, which suggests that antibiotic therapy might have had little impact on the pulmonary nodules, and their clinical significance remains unclear.

Guidance regarding optimal management of *M abscessus*–associated NTM lymphadenitis is limited. Most studies address management of MAC followed by *Mycobacterium haemophilum* or *Mycobacterium scrofulaceum* lymphadenitis, and few have described management of *M abscessus* or another rapid-growing mycobacterium–associated infection [19–22]. Excision, when feasible, is the management of choice [24–26]. Complications of resection include the risk of facial nerve injury, wound dehiscence, and scar fibrosis [24–26]. Furthermore, studies have found that antimicrobial treatment of NTM lymphadenitis does not result in resolution that is more rapid than that after resection alone [27–29]. An observational study found spontaneous resolution of pediatric NTM lymphadenitis in 10 to 12 months without medical or surgical treatment. However, in that cohort, 90% of the children had either MAC or *Mycobacterium haemophilum* isolated on culture, and less than 5% of the children had *M abscessus*–associated NTM lymphadenitis [29]. The authors of that report did not comment on the association of NTM species with clinical outcome. On the basis of our experience, *M abscessus* might be associated with more severe manifestations of infection. Current Infectious Disease Society of America/American Thoracic Society guidelines for the management of *M abscessus*–associated skin, soft tissue, and bone infections suggest management with a combination of surgical debridement and adjunctive antibiotic therapy for 4 to 6 months [18].

In our cohort, 12 (50%) of the children with limited infection were treated with surgery alone. The remaining 12 children, with incomplete resection of cervical lymph node tissue and/or the presence of pulmonary nodules, received antibiotic therapy after surgical debridement. One child received 4 months of oral clarithromycin alone. The effect of this adjunctive antibiotic treatment (either combination or monotherapy) on clinical outcome is unknown. The choice of an antibiotic treatment regimen for *M abscessus*–associated pediatric infection was limited by multidrug resistance, antibiotic toxicity, and a lack of randomized controlled trials on the best treatment regimens for *M abscessus*–associated infection. In our cohort, children were treated with IV amikacin and IV cefoxitin with or without an oral macrolide for a median of 4 months [18]. Of the 11 clinical isolates that were sent for resistance testing, 6 (55%) were found to have intermediate susceptibility to cefoxitin, which guided clinicians to use high-dose cefoxitin therapy (up to 160 mg/kg per day divided every 8 hours) but might have increased the risk of antibiotic-associated drug toxicity (neutropenia) or a reaction (rash or elevated liver enzyme levels). All of the isolates were susceptible to macrolide (both azithromycin

and clarithromycin) therapy on the basis of isolate microtiter susceptibility testing at 3 days of culture growth; however, macrolide resistance was detected at 14 days of culture growth. Molecular testing of the *M abscessus* clinical isolates revealed the presence of the *erm41* gene, which confers inducible macrolide resistance. Reports have associated the presence of the *erm41* gene in clinical *M abscessus* isolates from pulmonary specimens with poor clinical outcome [30, 31]. The influence of the addition of clarithromycin or azithromycin on clinical outcomes in our cohort is unknown [31]; few alternative antimycobacterial treatment agents were available. All of the isolates were susceptible to tigecycline (which was not recommended for our child population because of its effects on tooth development [23]) and clofazimine (which was not readily available for clinical use).

Medical management was not well tolerated. Five (42%) of the 12 children experienced an adverse event that led to a modification of their initial treatment regimen. The most commonly reported adverse events in our experience were similar to those noted in previous studies (eg, nephrotoxicity [including acute renal failure], ototoxicity, antibiotic-associated rash, and neutropenia). Other studies also found that these events led to discontinuation or replacement of the initial antibiotic regimen [9–11].

The dental practice's lack of regular water monitoring led to the unintentional use of municipal water that had a high concentration of *M abscessus* during pediatric pulpotomies. Because of the unusual presentation of school-aged children with *M abscessus* lymphadenitis after restorative dental procedures, an epidemiologic investigation was initiated. Despite active measures to improve the identification of infected children, most case-children experienced delays in referral and definitive management. Variations in clinical presentation and prolonged time to seeking medical care contributed to the challenges to medical and surgical management. After the clinic's use of treated distilled water during pulpotomies, no other cases occurred.

We acknowledge limitations of our report. Clinical data were extracted from electronic medical records. Physician variability was observed in the documentation of the clinical course, surgical procedures, and management decisions.

CONCLUSION

The 24 children in this dental care–associated *M abscessus* outbreak experienced significant medical and surgical morbidity. The association of *M abscessus* infection and restorative dental procedures should be considered in children who present with subacute cervical lymphadenitis. Unique clinical manifestations included extranodal manifestations of mandibular and maxillary osteomyelitis and pulmonary nodules. Early identification with complete resection led to clinical cure. The risks of resection included permanent tooth loss, temporary facial nerve palsy, and incision dehiscence/fibrosis. Medical therapy was limited by the available antimycobacterial agents for treatment and complicated further by adverse effects related to antibiotics and the vascular access needed for their administration. Dental procedure–associated *M abscessus* odontogenic infection can be prevented by the use of sterile or treated water during pediatric restorative dental procedures, as is the routine practice for adults.

Notes

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