Notes from the Field

Mycobacterium abscessus Infections Among Patients of a Pediatric Dentistry Practice — Georgia, 2015

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On September 13, 2015, the Georgia Department of Public Health (DPH) was notified by hospital A of a cluster of pediatric *Mycobacterium abscessus* odontogenic infections. Hospital A had provided care for nine children who developed presumptive or confirmed *M. abscessus* infection after having a pulpotomy at pediatric dentistry practice A (dates of onset: July 23, 2014–September 4, 2015). During a pulpotomy procedure, decay and the diseased pulp are removed to preserve a deciduous tooth. DPH initiated an investigation to identify the outbreak source and recommend prevention and control measures.

M. abscessus, a rapidly growing, nontuberculous mycobacterium (NTM), is found ubiquitously in the environment in water, soil, and dust. It commonly causes skin and soft tissue infection and can cause disease in multiple organs (*1*). NTM species display tolerance to commonly used disinfectants and are frequently found in the plumbing of health care facilities and water distribution systems (*2*). Improperly maintained dental unit water lines can permit growth and amplification of microorganisms, including NTM, which can form a biofilm and replicate within waterline tubing (*3*). Outbreaks have been reported in different clinic settings, including acupuncture clinics, a cosmetic surgery clinic, and a general medical clinic, although not dental clinics (*4–7*).

Probable cases were defined as occurrence of facial or neck swelling and biopsy-confirmed granulomatous inflammation among children with an illness onset date on or after January 1, 2014. Confirmed cases were those in which *M. abscessus* was isolated by laboratory culture. Active case finding included contacting all patients who had a pulpotomy since January 1, 2015, notifying area pediatricians and dentists of the outbreak, and reviewing hospital A pathology reports and *M. abscessus* positive cultures since January 1, 2014. DPH staff visited practice A on September 22, 2015, to evaluate infection control and prevention practices, and to view a mock pulpotomy demonstration. Practice A used tap water for pulpotomies without water quality monitoring or bleaching of waterlines at the end of each day, as recommended in the manufacturer guidelines.* No other infection control deficiencies were noted. Water samples were collected for microbiologic analysis, and patient and water sample isolates were sent to CDC for molecular characterization by pulsed-field gel electrophoresis (PFGE).

Practice A had performed 1,386 pulpotomies since January 1, 2014. As of January 1, 2016, a total of 20 patients with confirmed (n = 11) or probable (n = 9) *M. abscessus* infections were identified, resulting in an attack rate of 1%; case finding is ongoing. Median patient age was 7 years (range = 3–11 years), and median incubation period was 65 days (range = 18–164 days). All patients were severely ill, requiring hospitalization at least once for a median of 7 days (range = 1–17 days); 17 patients required surgical excision and 10 received outpatient intravenous antibiotics (Table). As of April 5, 2016, no deaths have resulted from infection.

TABLE. Demographic characteristics, symptoms, diagnostic evaluations, and treatment of 20 patients with confirmed or probable *Mycobacterium abscessus* infections — Georgia, March 12, 2014–November 12, 2015

Characteristic	No. patients (N = 20)	(%)
Median age, yrs* (range)	7 (3–11)	NA
Male	11	55
Asthma	3	15
Immunocompromised	0	0
Signs and symptoms		
Pain	17	85
Osteomyelitis	14	70
Facial swelling	12	60
Lymphadenopathy	10	50
Pulmonary nodules	7	35
Fever	1	5
Diagnostic evaluation		
Neck CT	17	85
Chest radiograph	11	55
Dental radiograph	8	40
Ultrasound	5	25
Maxillofacial CT	2	10
MRI	1	5
Treatment		
Excision	17	85
Outpatient IV antibiotics by PICC†	10	50
Incision or drainage	7	35
Laboratory result		
AFB stain negative	13	65
AFB stain positive	7	35
AFB culture positive	11	55
AFB culture negative§	9	45

Abbreviations: AFB = acid-fast bacteria; CT = computed tomography; IV = intravenous; MRI = magnetic resonance imaging; NA = not available; PICC = peripherally inserted central catheter.
* Age at illness onset.
† Amikacin or amikacin and cefoxitin by PICC.
§ Two (11%) AFB cultures are pending.

* http://www.midmark.com/docs/librariesprovider6/pdfs/003-1261-00.pdf?sfvrsn=2.

All water samples from the seven dental stations had bacterial counts above the American Dental Association recommended ≤500 colony-forming units (CFU)/mL (average = 91,333 CFU/mL); *M. abscessus* was isolated from all water samples. All water and patient isolates were indistinguishable by PFGE, indicating a common source.

This outbreak was caused by contaminated water used during pulpotomies, which introduced *M. abcessus* into the chamber of the tooth during irrigation and drilling. *M. abscessus* can cause severe infection among immunocompetent children, and because *M. abscessus* is ubiquitous in the environment, it poses a contamination risk. To prevent infections associated with waterlines, dental practices should follow manufacturer guidelines to disinfect waterlines, monitor water quality to ensure recommended bacterial counts, use point-of-use water filters, and eliminate dead ends in plumbing where stagnant water can enable biofilm formation (*3*,*8*). Health care providers should promptly report suspected outbreaks of infectious diseases to public health authorities so that an investigation can be initiated and appropriate control measures implemented.

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References

1. Lee MR, Sheng WH, Hung CC, Yu CJ, Lee LN, Hsueh PR. *Mycobacterium abscessus* complex infections in humans. Emerg Infect Dis 2015;21:1638–46. http://dx.doi.org/10.3201/2109.141634
2. Williams MM, Chen TH, Keane T, et al. Point-of-use membrane filtration and hyperchlorination to prevent patient exposure to rapidly growing mycobacteria in the potable water supply of a skilled nursing facility. Infect Control Hosp Epidemiol 2011;32:837–44. http://dx.doi.org/10.1086/661282
3. Kohn WG, Collins AS, Cleveland JL, Harte JA, Eklund KJ, Malvitz DM; Guidelines for infection control in dental health-care settings—2003. MMWR Recomm Rep 2003;52(No. RR-17).
4. Furuya EY, Paez A, Srinivasan A, et al. Outbreak of *Mycobacterium abscessus* wound infections among "lipotourists" from the United States who underwent abdominoplasty in the Dominican Republic. Clin Infect Dis 2008;46:1181–8. http://dx.doi.org/10.1086/529191
5. Villanueva A, Calderon RV, Vargas BA, et al. Report on an outbreak of postinjection abscesses due to *Mycobacterium abscessus*, including management with surgery and clarithromycin therapy and comparison of strains by random amplified polymorphic DNA polymerase chain reaction. Clin Infect Dis 1997;24:1147–53. http://dx.doi.org/10.1086/513656
6. Griffith DE, Aksamit T, Brown-Elliott BA, et al.; ATS Mycobacterial Diseases Subcommittee; American Thoracic Society; Infectious Disease Society of America. An official ATS/IDSA statement: diagnosis, treatment, and prevention of nontuberculous mycobacterial diseases. Am J Respir Crit Care Med 2007;175:367–416. http://dx.doi.org/10.1164/rccm.200604-571ST
7. Tang P, Walsh S, Murray C, et al. Outbreak of acupuncture-associated cutaneous *Mycobacterium abscessus* infections. J Cutan Med Surg 2006;10:166–9. http://dx.doi.org/10.2310/7750.2006.00041
8. South Carolina Department of Health and Environmental Control. DHEC statement concerning mycobacteria at Greenville Health System. Columbia, SC: South Carolina Department of Health and Environmental Control; 2014. http://www.scdhec.gov/Agency/NewsReleases/2014/nr20140721-01/