JCM Journals.ASM.org

LETTER TO THE EDITOR

Accidental Exposure to *Burkholderia pseudomallei* in the Laboratory in the Era of Matrix-Assisted Laser Desorption Ionization–Time of Flight Mass Spectrometry

Tanis C. Dingle, Susan M. Butler-Wu, April N. Abbott

Department of Laboratory Medicine, University of Washington, Seattle, Washington, USA

Burkholderia pseudomallei is the causative agent of melioidosis, a disease that can vary in severity from fulminant sepsis to chronic infection with fatality rates of up to 42% (1, 2). As world travel has increased, so have melioidosis rates in travelers to countries where melioidosis is endemic, particularly Thailand and northern Australia (3). *B. pseudomallei* is considered a category B bioterrorism (BT) agent, and despite efforts of clinical microbiology laboratories to quarantine potential *B. pseudomallei* isolates, laboratory worker exposures have been reported (4, 5). Here, we report a case of accidental laboratory exposure to *B. pseudomallei* following genus-level identification by matrix-assisted laser desorption ionization–time of flight mass spectrometry (MALDI-TOF MS).

A 65-year-old male was vacationing in Thailand for 3 days, hiking in rural areas and near waterfalls, when he suffered a myocardial infarction. He was hospitalized for 7 days prior to returning to the United States. Approximately 1 month later, he developed dysuria and urinary frequency and was prescribed nitrofurantoin. His symptoms did not improve after 4 days of antibiotics, and a urine specimen was then obtained for culture. After 24 h of incubation, growth of small colonies was noted on sheep blood agar, with no growth evident on MacConkey agar, and was initially reported as 1,900 CFU/ml of Gram-positive flora. At 48 h, a pure culture of gray, medium-sized colonies was growing equally well on blood and MacConkey agars. The oxidase-positive Gram-negative rod (GNR) was identified by MALDI-TOF MS (Bruker Daltonics database v3.3; Bruker, Billerica, MA) as *Burkholderia thailandensis* with a log score value of 1.864 (genus-level identification [ID] score value of 1.7 to 2.0), while concurrent susceptibility testing was performed (TREK; Thermo Fisher Scientific, Oakwood Village, OH). The following day, the culture was discussed during daily rounds, at which point the culture plates were sealed over concern for the possibility of *B. pseudomallei*. The Washington State Public Health Laboratory identified the organism as *B. pseudomallei* with a species-specific PCR assay. An extensive investigation by the University of Washington Employee Health Center and King County Public Health ensued to determine the extent of employee exposure in the laboratory. Following recommendations by Peacock et al. (5) for assessment of *B. pseudomallei* exposure risk, 21 employees were categorized into high- and low-risk exposure groups. Regardless of the exposure risk, all 21 employees were offered antibiotic prophylaxis. Serology testing was performed on exposed individuals, and no employees seroconverted.

BT organisms have been successfully identified by MALDI-TOF MS using custom databases (6–9); however, the Bruker Biotyper database v4.0 (as well as earlier database versions) contains no spectra from BT agents. Although Bruker has developed a database containing 53 spectra from 6 BT agents, it currently has limited availability. The Vitek MS IVD database contains spectra for *Bacillus anthracis* and *Yersinia pestis*, but these are not FDA cleared. The Vitek MS RUO database v4.12 contains a number of BT agent spectra (including *B. pseudomallei*), but this database is also not FDA cleared. Therefore, the ability of technologists to recognize and quarantine BT agents is imperative. Nevertheless, because *B. pseudomallei* grows on both blood and MacConkey agars and is nonpigmented and nonhemolytic, it can be difficult to distinguish from other non-lactose-fermenting Gram-negative rods, particularly in young cultures where the characteristic wrinkled colony morphology is not yet apparent (10). With the increasing use of MALDI-TOF MS for bacterial identifications, it is likely that this pathogen may continue to go unrecognized. Until such time that MALDI databases for BT agents have more widespread accessibility, clinical laboratory scientists and directors should be wary of genus-level identification of *Burkholderia* species by MALDI-TOF MS.

REFERENCES

1. **Wiersinga WJ, Currie BJ, Peacock SJ.** 2012. Melioidosis. N. Engl. J. Med. **367:**1035–1044. http://dx.doi.org/10.1056/NEJMra1204699.
2. **Limmathurotsakul D, Wongratanacheewin S, Teerawattanasook N, Wongsuvan G, Chaisuksant S, Chetchotisakd P, Chaowagul W, Day NP, Peacock SJ.** 2010. Increasing incidence of human melioidosis in northeast Thailand. Am. J. Trop. Med. Hyg. **82:**1113–1117. http://dx.doi.org/10.4269/ajtmh.2010.10-0038.
3. **Currie BJ, Dance DA, Cheng AC.** 2008. The global distribution of *Burkholderia pseudomallei* and melioidosis: an update. Trans. R. Soc. Trop. Med. Hyg. **102**(Suppl 1):S1–S4. http://dx.doi.org/10.1016/S0035-9203(08)70002-6.
4. **Centers for Disease Control and Prevention.** 2004. Laboratory exposure to *Burkholderia pseudomallei*—Los Angeles, California, 2003. MMWR Morb. Mortal. Wkly. Rep. **53:**988–990. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5342a3.htm.
5. **Peacock SJ, Schweizer HP, Dance DA, Smith TL, Gee JE, Wuthiekanun V, DeShazer D, Steinmetz I, Tan P, Currie BJ.** 2008. Management of accidental laboratory exposure to *Burkholderia pseudomallei* and *B. mallei*. Emerg. Infect. Dis. **14:**e2. http://dx.doi.org/10.3201/eid1407.071501.
6. **Karger A, Stock R, Ziller M, Elschner MC, Bettin B, Melzer F, Maier T, Kostrzewa M, Scholz HC, Neubauer H, Tomaso H.** 2012. Rapid identification of *Burkholderia mallei* and *Burkholderia pseudomallei* by intact cell matrix-assisted laser desorption/ionisation mass spectrometric typing. BMC Microbiol. **12:**229. http://dx.doi.org/10.1186/1471-2180-12-229.

Published ahead of print 11 June 2014

Editor: R. Patel

Address correspondence to April N. Abbott, anabbott@u.washington.edu.

doi:10.1128/JCM.01238-14

7. **Seibold E, Maier T, Kostrzewa M, Zeman E, Splettstoesser W.** 2010. Identification of *Francisella tularensis* by whole-cell matrix-assisted laser desorption ionization–time of flight mass spectrometry: fast, reliable, robust, and cost-effective differentiation on species and subspecies levels. J. Clin. Microbiol. **48:**1061–1069. http://dx.doi.org/10.1128/JCM.01953-09.
8. **Lista F, Reubsaet FA, De Santis R, Parchen RR, de Jong AL, Kieboom J, van der Laaken AL, Voskamp-Visser IA, Fillo S, Jansen HJ, Van der Plas J, Paauw A.** 2011. Reliable identification at the species level of *Brucella* isolates with MALDI-TOF-MS. BMC Microbiol. **11:**267. http://dx.doi.org/10.1186/1471-2180-11-267.
9. **Ayyadurai S, Flaudrops C, Raoult D, Drancourt M.** 2010. Rapid identification and typing of *Yersinia pestis* and other *Yersinia* species by matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF) mass spectrometry. BMC Microbiol. **10:**285. http://dx.doi.org/10.1186/1471-2180-10-285.
10. **American Society for Microbiology.** 2014. Sentinel level clinical laboratory guidelines for suspected agents of bioterrorism and emerging infectious diseases: *Burkholderia mallei* and *Burkholderia pseudomallei*. http://www.asm.org/images/PSAB/Burkholderia.pdf. Accessed 9 April 2014.