AMERICAN SOCIETY FOR MICROBIOLOGY | Journal of Clinical Microbiology®

PHOTO QUIZ

Answer to Photo Quiz: Epidural Abscess with Osteomyelitis of the Frontal Bone Due to *Mycobacterium bovis*

O. Carretero,[a] R. Recio,[a] J. T. Silva,[b] I. Panero,[c] C. González,[d] O. Caso,[e] R. San Juan,[b] P. López-Roa[a]

[a]Department of Microbiology, Instituto de Investigación Hospital Universitario 12 de Octubre, Madrid, Spain
[b]Unit of Infectious Diseases, Instituto de Investigación Hospital Universitario 12 de Octubre, Madrid, Spain
[c]Department of Neurosurgery, Instituto de Investigación Hospital Universitario 12 de Octubre, Madrid, Spain
[d]Department of Internal Medicine, Instituto de Investigación Hospital Universitario 12 de Octubre, Madrid, Spain
[e]Department of General Surgery and Intra-abdominal Transplant, Instituto de Investigación Hospital Universitario 12 de Octubre, Madrid, Spain

KEYWORDS *Mycobacterium bovis*, epidural abscess, zoonotic infections, transplant

The organism was identified from the direct sample as a *Mycobacterium tuberculosis* complex organism susceptible to rifampin by Xpert MTB/RIF assay (Cepheid, Sunnyvale, CA, USA). The patient was started on a four-drug antituberculous regimen of isoniazid, rifampin, pyrazinamide, and ethambutol.

Seven days later, the organism grew in Bactec mycobacterial growth indicator tube (MGIT) liquid medium (BD, Franklin Lakes, NJ, USA). The isolate was identified as an *M. tuberculosis* complex organism by means of a lateral-flow immunochromatographic assay based on the detection of the MPT64 antigen (BD MGIT TBc identification test). Testing for susceptibility to first-line drugs was performed using the Bactec method (BD Bactec MGIT 960 SIRE kit). The strain was resistant to pyrazinamide and susceptible to all other first-line antituberculous drugs. When the results of the susceptibility studies were reported, the regimen was changed to isoniazid, rifampin, linezolid, and moxifloxacin until completion at 2 months. Once the induction phase was completed, the regimen was changed to isoniazid and rifampin for 4 months. Currently, the patient in still on treatment.

Since *Mycobacterium bovis* is intrinsically resistant to pyrazinamide (1), the strain was sent to a reference laboratory in order to repeat susceptibility testing using the agar proportion method and for species identification using *gyrB* and *hsp65* PCR-restriction fragment length polymorphism (RFLP)-based analysis and multiplex PCR to determine the presence/absence of the RD9 and RD1 regions (2–4). The isolate was finally identified as non-BCG *M. bovis*.

M. bovis is a member of the *M. tuberculosis* complex and is the primary cause of tuberculosis in cattle. It may also cause human disease in the setting of ingestion of infected dairy products or via airborne-particle inhalation (5). Human-to-human transmission is rare. When the infection is acquired via ingestion of contaminated products, extrapulmonary localization is more likely than pulmonary disease. Extrapulmonary sites include lymph nodes (6), pleural space (7), joints (8), and the central nervous system (9).

Regarding the acquisition of *M. bovis* infection in this case, the patient did not report contact with infected animals or humans. The extrapulmonary localization of the infection suggests that consumption of unpasteurized products could have been the route of the transmission acquisition. Although the possibility of consumption of imported contaminated dairy products could not be excluded, locally produced dairy products were unlikely to be contaminated with *M. bovis*. The characteristics of the patient (elderly and born in Spain) suggest reactivation of latent infection rather than a primary infection.

Citation Carretero O, Recio R, Silva JT, Panero I, González C, Caso O, San Juan R, López-Roa P. 2019. Answer to Photo Quiz: Epidural abscess with osteomyelitis of the frontal bone due to *Mycobacterium bovis*. J Clin Microbiol 57:e00649-18. https://doi.org/10.1128/JCM.00649-18.

Editor Paul Bourbeau

Address correspondence to R. Recio, raul.recio@salud.madrid.org.

O. Carretero and R. Recio contributed equally to this article.

See https://doi.org/10.1128/JCM.00648-18 in this issue for photo quiz case presentation.

Published 24 May 2019

Finally, we postulate that the patient's impaired cellular immunity due to both the immunosuppressive medication and the unexplained persistent lymphopenia might have contributed to the reactivation of this latent infection.

REFERENCES

1. Kurbatova EV, Cavanaugh JS, Dalton T, Click ES, Cegielski JP. 2013. Epidemiology of pyrazinamide-resistant tuberculosis in the United States, 1999-2009. Clin Infect Dis 57:1081–1093. https://doi.org/10.1093/cid/cit452.
2. Parsons LM, Brosch R, Cole ST, Somoskövi A, Loder A, Bretzel G, Van Soolingen D, Hale YM, Salfinger M. 2002. Rapid and simple approach for identification of *Mycobacterium tuberculosis* complex isolates by PCR-based genomic deletion analysis. J Clin Microbiol 40:2339–2345. https://doi.org/10.1128/JCM.40.7.2339-2345.2002.
3. Niemann S, Harmsen D, Rüsch-Gerdes S, Richter E. 2000. Differentiation of clinical *Mycobacterium tuberculosis* complex isolates by *gyrB* DNA sequence polymorphism analysis. J Clin Microbiol 38:3231–3234.
4. Telenti A, Marchesi F, Balz M, Bally F, Böttger EC, Bodmer T. 1993. Rapid identification of mycobacteria to the species level by polymerase chain reaction and restriction enzyme analysis. J Clin Microbiol 31:175–178.
5. Torres-González P, Soberanis-Ramos O, Martínez-Gamboa A, Chavez-Mazari B, Barrios-Herrera MT, Torres-Rojas M, Cruz-Hervert LP, Garcia-Garcia L, Singh M, González-Aguirre A, Ponce de León-Garduño A, Sifuentes-Osornio J, Bobadilla-Del-Valle M. 2013. Prevalence of latent and active tuberculosis among dairy farm workers exposed to cattle infected by *Mycobacterium bovis*. PLoS Negl Trop Dis 257:e2177. https://doi.org/10.1371/journal.pntd.0002177.
6. Kasambira TS, Alwood K, Baker J, Hooper N, Dorman SE. 2007. Lymphadenitis in an 18-month-old traveler to Mexico. Pediatr Infect Dis J 26:968. https://doi.org/10.1097/INF.0b013e31811faaa7.
7. Esteban J, Robles P, Soledad Jiménez M, Fernández Guerrero ML. 2005. Pleuropulmonary infections caused by *Mycobacterium bovis*: a re-emerging disease. Clin Microbiol Infect 11:840–843. https://doi.org/10.1111/j.1469-0691.2005.01225.x.
8. Cachafeiro-Vilar A, García-Padilla C, Reyes E, Hernández-Molina G. 2007. Polyarticular arthritis secondary to *Mycobacterium bovis* infection: an unusual clinical presentation. Joint Bone Spine 74:107–109. https://doi.org/10.1016/j.jbspin.2006.02.014.
9. O'Reilly LM, Daborn CJ. 1995. The epidemiology of *Mycobacterium bovis* infections in animals and man: a review. Tuber Lung Dis 76(Suppl 1):1–46. https://doi.org/10.1016/0962-8479(95)90591-X.