Persistent *Bordetella petrii* Infection Related to Bone Fractures

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Dear Editor,

*Bordetella*, of the family *Alcaligenaceae*, is a genus containing gram-negative coccoid rod species. To date, nine species have been assigned to the genus *Bordetella* [1]. Human infections caused by *B. petrii* have seldom been reported since its first detection in 2001 [2-8]. Among seven reported cases, four were recovered from respiratory specimens [4-6, 8], while three were recovered from pus specimens of patients with bone-related infections [2, 3, 7].

A 52-yr-old man without any medical history was admitted to a tertiary-care hospital (Hospital A) in Seoul, Korea, for tibia and fibula fractures of both legs. He had sustained a crush injury to both legs on a riverboat in Thailand. He had undergone surgery and subsequently presented with purulent discharge from the muscle flap site of the left leg. The wound culture revealed a gram-negative rod identified as *Achromobacter denitrificans* by using a VITEK 2 GNI card (bioMérieux, Marcy l’Etoile, France). After a month of managing the abscess site, the patient was transferred to another hospital (Hospital B) in Ilsan, Korea. At that hospital, deep tissue and bone cultures revealed the presence of *Bordetella bronchiseptica* and *Alcaligenes* species, respectively, using MicroScan (Dade Behring, West Sacramento, CA, USA). During a 15-month follow-up, nonunion of fractured sites was observed. The patient was then admitted to our hospital (Hospital C) in Seoul, Korea, to undergo surgery for the delayed union. After discharge, his leg wound was managed at an outpatient clinic because his laboratory tests carried out three days after the surgery showed leukocytosis (14×10^9/L) with elevated C-reactive protein (CRP) level (182.2 mg/L).

Deep wound culture yielded medium to large grayish and convex colonies that were non-hemolytic on sheep blood agar plate (BAP), and colorless, opaque pinpoint-sized colonies on MacConkey agar plate (isolate C1). Two serial follow-up cultures revealed the same species (isolates C2 and C3). Smear preparation of these colonies showed short gram-negative rods. Subculture on triple-sugar iron slant agar revealed that the bacteria did not ferment glucose or produce H₂S. Isolates exhibited an umbrella-shaped growth pattern when cultured in motility-in-dole-ornithine semisolid agar, suggesting that the microorganism is strictly aerophilic and motile. API 20NE (bioMérieux) and VITEK 2 GNI cards identified the isolates as *A. denitrificans* and *Burkholderia* species, respectively. However, matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS; Bruker Daltonics, Billerica, MA, USA) identified them as *B. petrii* with a 2.089 score. The isolates were finally confirmed as *B. petrii* on the basis of partial sequences of the 16S rRNA gene, which showed 100% identity to those of DSM 12804, the type strain of *B. petrii*, when analyzed by...
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BLASTn (http://www.ncbi.nlm.nih.gov/BLAST). XbaI-macrorestriction analysis was performed by using pulse field gel electrophoresis (PFGE) (CHEF-DRII System, Bio-Rad, Hercules, CA, USA), as described previously [9]. All three clinical isolates exhibited identical PFGE banding patterns (Fig. 1).

Antimicrobial susceptibility testing (AST) was performed with the disk diffusion method. The minimal inhibition concentrations (MICs) of antimicrobials were determined by Etest according to the Clinical and Laboratory Standard Institute guidelines [10]. Clinical isolates C1-3 exhibited antimicrobial susceptibility patterns similar to those of the type strain DSM 12804. However, all three clinical isolates were resistant to cefepime and ciprofloxacin, while the type strain was susceptible to both drugs (Table 1).

Long-lasting B. petrii infections have been reported previously [5]. Chronic infections, despite continuous use of antibiotics, suggest the clinical difficulty of treating B. petrii. Bone-related infections are associated with reduced effects of antimicrobial therapy, which possibly contribute to persistent B. petrii infection.

Authors’ Disclosures of Potential Conflicts of Interest

No potential conflicts of interest relevant to this article were reported.

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