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CASE REPORT

First Case of *Pseudoclavibacter alba* Bacteremia in a Patient with Cholangitis

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SUMMARY

***Background:* *Pseudoclavibacter alba* isolated from human urine in culture collection was introduced as a new species, but since then, no other reports on *P. alba* isolated from the environment or organisms have been published. We thus present the first case report of *P. alba* bacteremia.**
***Methods:* An 85-year-old female patient was admitted with intermittent abdominal pain and chills that had persisted for one week. She was diagnosed cholangitis with common bile duct stones.**
***Results:* Gram-positive bacteria were detected in her peripheral blood culture and identified *Pseudoclavibacter* species by matrix-assisted laser desorption-ionization-time of flight mass spectrometry. *Pseudoclavibacter alba* was identified by performing the 16S ribosomal RNA gene sequence.**
***Conclusions:* This is the first case report of *P. alba* bacteremia in a patient with cholangitis.**
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KEYWORDS

Pseudoclavibacter alba, cholangitis, blood culture, bacteremia

CASE PRESENTATION

An 85-year-old female patient was admitted to Kyungpook National University Hospital with intermittent abdominal pain and chills that had persisted for one week. The patient had been diagnosed with hypertension 10 years prior and had received cholecystectomy for gall bladder stones with cholecystitis 2 years prior to admission. At initial admission, body temperature was 37.7°C accompanied by a febrile response. Abdominal computed tomography showed multiple common bile duct (CBD) stones with cholangitis. Hematological investigations revealed a white blood cell count of 13,720 cells/μL (reference range 4,300 - 10,000/μL) with 87.3% neutrophils (reference range, 40% - 74%), a he-

moglobin level of 12.4 g/dL (reference range, 12.0 - 16.0 g/dL), and a platelet count of 153,000/μL (reference range, 130,000 - 400,000/μL). The C-reactive protein level was high at 9.65 mg/dL (reference range, < 0.5 mg/dL). Two sets of blood cultures were collected before intravenous antibiotic treatment initiated with ceftriaxone (2 g every 24 hours) for 2 days. At the request of the patient, the day after hospitalization, she was transferred to Keimyung University Dongsan Hospital. At the time of transfer, the patient's vital signs were all normal, and no fever was observed. After transfer, flomoxef (500 mg every 12 hours) was injected intravenously for 3 days. On the third day after transfer, CBD stones were all removed by endoscopic retrograde cholangiopancreatography (ERCP). The patient's recovery progress was good, and she was discharged the day after ERCP. After the blood specimens collected on the first day of hospitalization were incubated at 35℃ for 48 hours, short, rod-shaped, Gram-positive bacteria were observed in aerobic culture. Forty-eight hours after inoculation on sheep blood agar, the culture was positive for little, smooth, light-gray colonies of non-motile, catalase-positive, Gram-positive rods (Figure 1). The Vitek2 phenotypic system (BioMerieux, Marcy l'Etoile, France) failed to identify the genus or species of the isolate. Matrix-assisted laser desorption-ionization-time of flight mass spectrometry (MALDI-TOF MS; Bruker Daltonik, Bremen, Germany) obtained an identification score of 1.924 for *Pseudoclavibacter* species. Species identification was performed using the 16S ribosomal RNA gene sequence. *Pseudoclavibacter alba* was identified when the sequences corresponded a 99.0% match with the GenBank Basic Local Alignment Search Tool database at the National Center for Biotechnology Information (NCBI Reference Sequence: NR_024673.1). Antimicrobial *in vitro* susceptibility testing by disk diffusion performed on Mueller-Hinton agar supplemented with 5% sheep blood revealed the following zone diameters: amikacin (30 μg), 29 mm; ceftriaxone (30 μg), 22 mm; clindamycin (2 μg), 0 mm; ciprofloxacin (5 μg), 33 mm; and vancomycin (30 μg), 32 mm.

DISCUSSION

The bacterial genus *Pseudoclavibacter* (Family Microbacteriaceae, Class Actinobacteria) is comprised of aerobic, non-motile, catalase-positive, and Gram-positive bacilli. In 2004, Lin et al. [1] first reported the genus *Zimmermannella*, with *Z. helvola* as the type species and three other novel species, namely, *Z. alba*, *Z. bifida*, and *Z. faecalis*. At the time, *Z. alba* was isolated from a human urine culture collection at Strasbourg University Hospital. Meanwhile, the genus *Pseudoclavibacter* was first described by Manaia et al. [2], who reclassified *Brevibacterium helvolum* DSM 20419 into a novel genus and species, *Pseudoclavibacter helvolus*. *Z. helvola* reported by Lin et al. was also a reclassification of *B. helvolum* DSM 20419. Because of the earlier publication by Manaia et al., *Pseudoclavibacter* has become the official genus name [3].

Infections caused by *Pseudoclavibacter* are few and far in between: a *Pseudoclavibacter*-like subcutaneous infection [4], a *Pseudoclavibacter* otitis media [5], a *P. bifida* bacteremia [3], and recently a case of *Pseudocalvibacter* endocarditis have been described [6]. To our knowledge, this report is the first to describe *P. alba* bacteremia. The authors could not confirm whether *P. alba* was isolated in transient bacteremia or was a source of infection in the patient. Infection-related symptoms, such as fever, neutrophils, and elevated CRP were observed, but the patient's condition rapidly stabilized with empirical antibiotic treatment. The seemingly low pathogenicity of *Pseudoclavibacter* species could account for the rarity of reported infections caused by this bacterial species. To date, the accurate identification of this species by the phenotypic method remains challenging, as the phenotypic system lacks classificational data on *Pseudoclavibacter*. Although the authors failed to identify *P. alba* in the Vitek2 phenotypic system, we identified the genus level using MALDI-TOF MS (Bruker Daltonik). Also, we required 16S rRNA sequencing to determine the species level. Strains isolated from patient specimens were deposited with the National Culture Collection for Pathogens of the Korean Disease Control and Prevention Agency (NCCP Number: 15,835).

CONCLUSION

In 2004, *P. alba* isolated from human urine was introduced as a new species [1], but since then, no other reports on *P. alba* isolated from the environment or organisms have bene published. This is the first case report of *P. alba* bacteremia in a patient with cholangitis.

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Declaration of Interest:
The authors declare no conflict of interest.

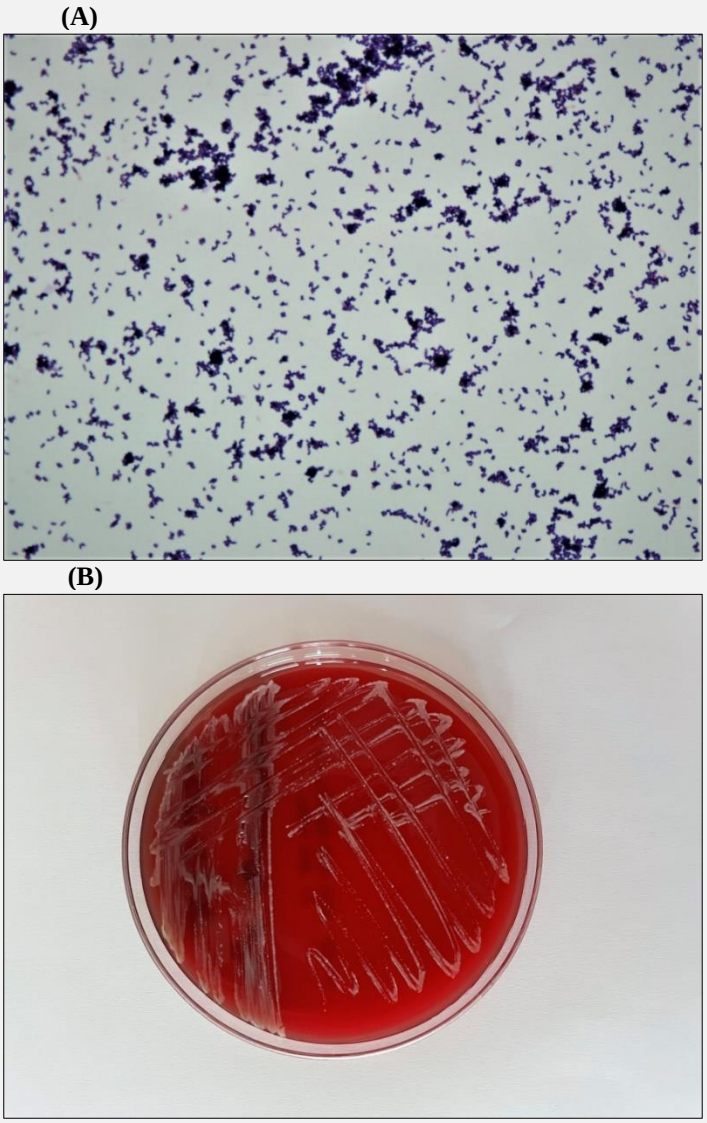

Figure 1. *Pseudoclavibacter alba* (A) under Gram stain and (B) colony on sheep blood agar after 48-hour incubation.

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