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Case Report

First report of *Actinobaculum schaalii* urinary tract infection in North America

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Abstract

A recurrent urinary tract infection with *Actinobaculum schaalii*, a fastidious, facultative anaerobic, and emerging pathogen, is described. Diagnosis was delayed when routine urine cultures were initially performed yielding recurrently negative results. Resolution of symptoms occurred after anaerobic cultures were done to allow organism isolation, identification, and appropriate antimicrobial treatment.

Keywords: *Actinobaculum schaalii*; Fastidious organism; Urinary tract infection; UTI; Facultative anaerobes; Rapid identification system; Phenotypic testing; Communication

1. Case presentation and discussion

A 76-year-old female presented with recurrently treated urinary tract infections (UTIs) of approximately 50 years' duration. She was referred for increasing frequency and severity of symptoms including dysuria, urgency, frequency, and suprapubic pain despite numerous courses of antimicrobials. Routine aerobic urine cultures were negative, but urinalyses showed pyuria. Cultures for *Mycoplasma*, *Ureaplasma*, and *Mycobacterium* spp. were negative. Other investigations included a computed tomographic scan of her kidneys revealing bilateral cortical irregularity consistent with chronic pyelonephritis and a voiding cystourethrogram that was unremarkable.

Catheter-acquired urine samples were collected, and a special request was made for Gram stain and anaerobic culture, which are not routinely performed in our laboratory on urine specimens. Urine was processed immediately to prevent loss of organism viability. Gram stain of the centrifuged urine revealed the presence of scant Gram-positive bacilli, which grew 5×10^7 colonies in an anaerobic chamber. She was empirically treated with metronidazole with no clinical improvement. Contamination was ruled out by its isolation in another catheterized urine sample, and it was identified as *Actinomyces israelii* (99% confidence) using RapID ANA II identification strips (Remel, Norcross, GA) with profile 470673. It did not resemble *A. israelii* phenotypically, so it was subjected to further characterization at a reference center, where it was identified as *Actinobaculum schaalii* and was found to be resistant to metronidazole (>256 μg/mL) but sensitive to clindamycin (0.125 μg/mL) by E-test (AB Biodisk, Solna, Sweden) using Clinical and Laboratory Standards Institute (2007) MIC breakpoints. Her antibiotic regimen was changed to 6 weeks of clindamycin, and she had complete resolution of her symptoms, remaining asymptomatic at her final follow-up, which occurred 2 months after treatment completion.

Characterization of the isolate (NML080380) was performed at the Canadian National Microbiology Laboratory. Biochemical tests, metabolic products, cellular fatty acid

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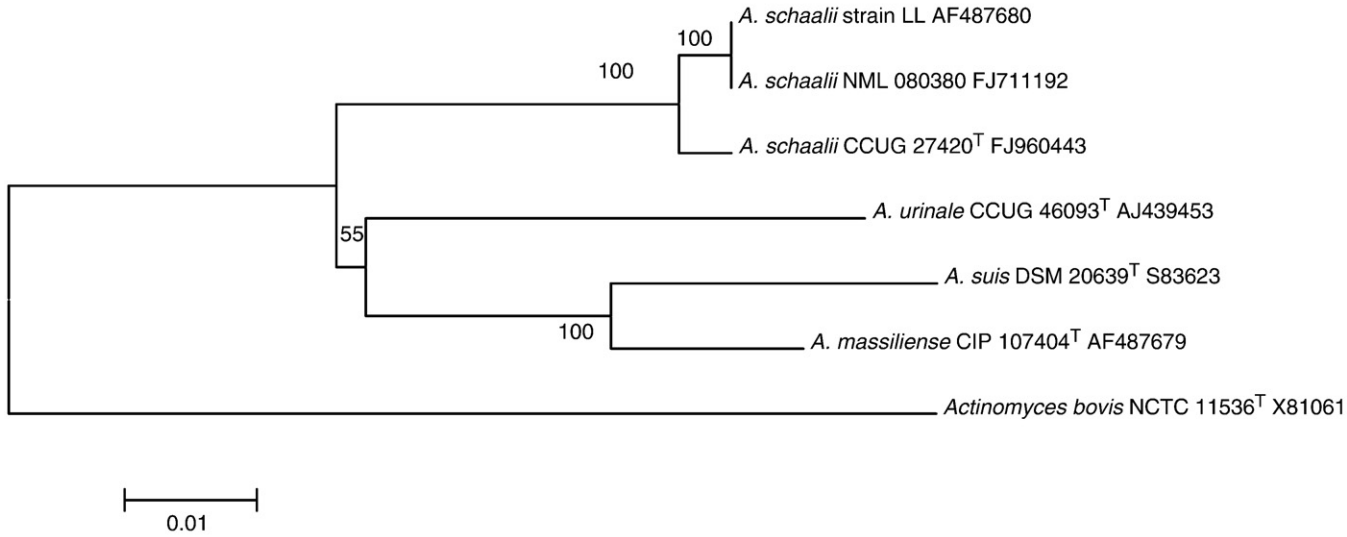

Fig. 1. Relationship of *A. schaalii* NML080380 with the species in the genus *Actinobaculum* using nearly full 16S rRNA gene sequencing. Phylogenetic tree based on 16S rRNA gene sequences, showing the position of NML080380 and *A. schaalii* within the genus *Actinobaculum*, with *Actinomyces bovis* being used as an outlier. Bar represents percent substitutions. Bootstrap values, expressed as percentage of 1000 replications, are given at the branching points. Reference type and sequence from a related isolate is shown.

composition analysis, and 16S rRNA gene sequence were done as described previously (Bernard et al., 2002). RapID ANA (Remel), API Coryne strip (Biomerieux, Montreal, QC), and An-Ident disks (Oxoid, Ottawa, ON) were used as described by their manufacturers. The 16S rRNA sequence was aligned using ClustalW, with the relationship inferred in Fig. 1 done using MEGA4's neighbor-joining software (Kumar et al., 2008) with 1000 replicates.

NML080380 was a medium-length, curved, nonmotile, Gram-positive rod (Fig. 2A). It grew best at 37 °C under strictly anaerobic or microaerophilic conditions, less well in 5% CO_2, and poorly in air (Fig. 2B). Growth was not enhanced by supplementation with glucose, serum, or Tween. It was sensitive to An-Ident disks erythromycin (60 μg), rifampicin (15 μg), penicillin (2 IU), kanamycin (1000 μg), and vancomycin (5 μg) but resistant to disks containing colistin (10 μg), metronidazole (5 μg), and sodium polyanethol sulfonate (5%) (Jousimies-Somer et al., 2002). The biochemical reactions are shown in Table 1, and acetic acid was the major metabolic end product detected.

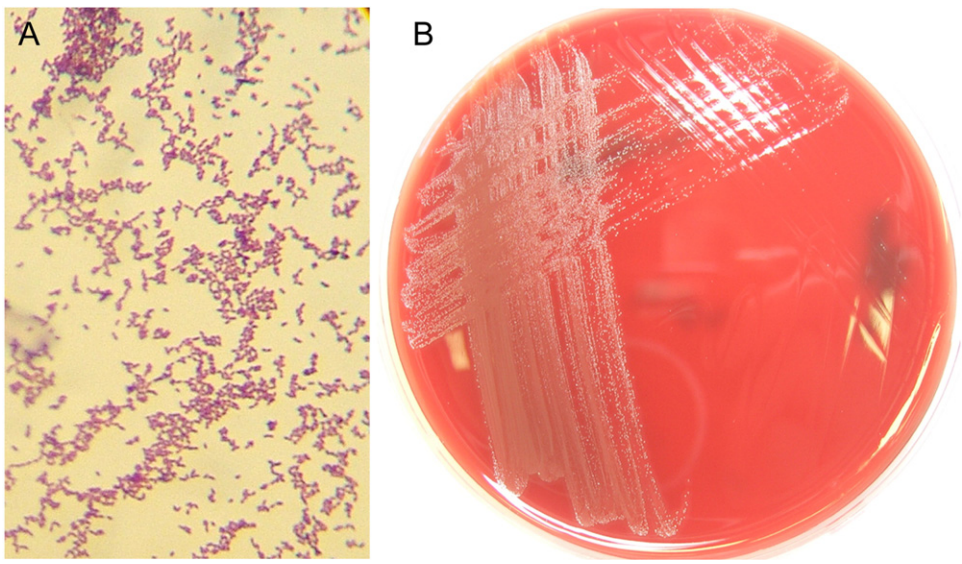

Fig. 2. (A) Gram stain of NML080380 grown from frozen stock. (B) NML080380 from frozen stock grown on *Brucella* agar with 5% sheep blood, vitamin K, and hemin (BD Diagnostics, Franklin Lakes, NJ) after 24 h of incubation in 5% CO_2 at 37 °C.