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Letter to the editor

Ralstonia pickettii sepsis in a hemodialysis patient from Bulgaria

Dear Editor,

We report a case of *Ralstonia pickettii* sepsis in a 75-year old female patient with chronic kidney failure undergoing hemodialysis. The patient had a permanent vascular access for hemodialysis and was febrile for a few days prior to the sampling for microbiological analysis. She had a fever of 38.8 °C, as well as a highly elevated erythrocyte sedimentation rate (64 mm/h), high C-reactive protein (290 mg/L), and high white blood cell count (18,000 cells/μL). The antimicrobial therapy, which consisted of intravenous ceftriaxone 1 g/d, was initiated two days before taking the samples.

The patient's blood culture was positive after 24 h incubation in the BACTEC 9050 system. Typical pinpoint colonies were seen on blood agar and small lactose-negative colonies on McConkey agar. The oxidase test was positive. Gram staining revealed Gram-negative rods. Bacterial identification was done by the BBL Enteric/Nonfermenter ID System (Becton Dickinson). Antimicrobial susceptibility testing was performed by the Etest (LIOFILCHEM) according to the Clinical and Laboratory Standards Institute 2010 recommendations.

The isolate showed a high-level resistance to clinically useful aminoglycosides (amikacin, gentamicin, and tobramycin – MICs > 256 μg/mL). The strain was susceptible to the following antimicrobials: piperacillin/tazobactam (0.5 μg/mL), ceftriaxone (3.0 μg/mL), ceftazidime (2.0 μg/mL), cefepime (1.5 μg/mL), imipenem (0.25 μg/mL), meropenem (0.5 μg/mL), ciprofloxacin (0.064 μg/mL), levofloxacin (0.064 μg/mL), and trimethoprim/sulfamethoxazole (0.25 μg/mL).

Despite the in vitro evidence of susceptibility to ceftriaxone, there was no clinical benefit from the administered treatment, as already described.[1] The discrepancy between the in vitro testing and the in vivo activity of the drug required a switch to intravenous levofloxacin with a starting dose of 750 mg and then 500 mg, four times a day. Clinical symptoms subsided within 36 hours.

To find the molecular basis of the observed high-level resistance to aminoglycosides, we assayed for putative 16S rRNA methylase genes. The *armA*, *rmtA*, *rmtB*, *rmtC* and *rmtD* genes were detected by multiplex polymerase chain reaction (PCR) as previously described.[2] No 16S rRNA methylase gene was identified in the isolate. Enzymatic modification is the other possible mechanism of high-level aminoglycoside resistance. The genes encoding for aminoglycoside modifying enzymes (AMEs) are usually found on plasmids and transposons. Most enzyme-mediated aminoglycoside resistance in Gram-negative bacilli is due to multiple genes. Further studies on AMEs are needed.

In an attempt to determine the source of *R. pickettii* sepsis, an assessment of the microbiological purity of the hemodialysis fluid was carried out. A sample of dialysis fluid was taken from the septum port in the line between the machine and the dialyser while simultaneously drawing a blood sample. This sample was inoculated into a tube of Trypticase soy broth (Beckton Dickinson) for 24 hours at 35 °C. Subcultures on blood agar and McConkey agar media were made. *R. pickettii* was again isolated.

The dialysis fluid strain was compared to that isolated from patient's blood by using random amplified polymorphic DNA (RAPD) typing. RAPD was performed with Ready-To-Go RAPD Analysis Beads (GE Healthcare) as previously described.[3] Two *R. pickettii* strain DNAs revealed identical RAPD profiles, each consisting of four bands (with size ranging from 220 to 1600 bp) (Fig. 1). Thus, we successfully identified the hemodialysis system as a source of infection in our patient.

R. pickettii is a relevantly rare isolate that represents a potential threat for immunocompromised individuals, i.e. cancer patients, patients with hematological malignancies, or infants.[4–6] It could also contaminate permanent indwelling intravenous devices, respiratory care solutions, distilled water, water for injection, or hemodialysis systems.[7–9]In conclusion, to our knowledge, this is the first case of *R. pickettii* sepsis described in Bulgaria. The hemodialysis system was identified as a source of *R. pickettii* infection. To prevent hemodialysis-related infections, it is important to maintain hemodialysis systems clear of microbial contamination.

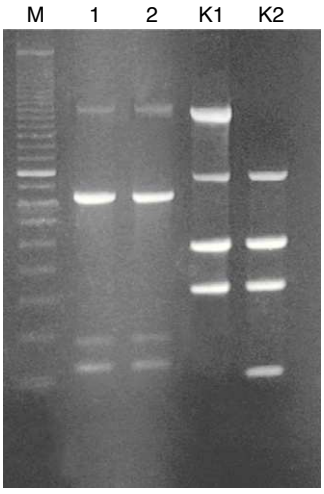

Fig. 1 – Randomly amplified polymorphic DNA (RAPD) of *R. pickettii* isolates generated with RAPD-4 primer (5′-AAGAGCCCGT-3′). Lanes: M, standard size marker (100-bp ladder); 1, *R. pickettii* isolate from the patient's blood; 2, *R. pickettii* isolate from the hemodialysis fluid; K1, RAPD profile of the reference strain *E. coli* C1a generated with RAPD-2 primer; K2, RAPD profile of the reference strain *E. coli* BL21 (DE3) generated with RAPD-2 primer (5′-GTTTCGCTCC-3′).

Conflict of interest

All authors declare to have no conflict of interest.

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