An immunocompetent patient presenting with severe septic arthritis due to *Ralstonia pickettii* identified by molecular-based assays: a case report

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Received: 2 June 2009   Accepted: 2 July 2009   Published: 16 July 2009

Cases Journal 2009, 2:8125 doi: 10.4076/1757-1626-2-8125

This article is available from: http://casesjournal.com/casesjournal/article/view/8125

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**Abstract**

**Introduction:** *Ralstonia pickettii* is an infrequent pathogen of invasive infections in healthy individuals. The microorganism is supposed to be of relatively low virulence, but can cause infections, mainly of the respiratory tract, in immunocompromised and cystic fibrosis patients. *Ralstonia pickettii* has also been associated with hospital outbreaks related to contamination of products used for medical care and laboratory diagnosis.

**Case presentation:** We report here a case of septic arthritis due to *Ralstonia pickettii* in a female diabetic patient. The microorganism was identified from the synovial fluid by molecular-based methods, while the conventional synovial and blood cultures proved to be negative. The patient was treated by intravenous cefazidime with complete remission of her symptoms; she was discharged 3 weeks after admission in a very good health. At follow-up examination 3 weeks later, she was still in good health condition without any sign of arthritis of the right knee and afebrile.

**Conclusion:** In culture negative serious bacterial infections, as septic arthritis, the use of molecular-based techniques might be of outmost importance as additional and rapid diagnostic tools for the identification of the causative agent allowing a prompt and appropriate antimicrobial therapy and a favourable outcome.

**Introduction**

*Ralstonia pickettii*, formerly known as *Pseudomonas (Burkholderia) pickettii*, is a non-fermenting gram-negative bacillus that is found in water, soil, plants, fruits and vegetables [1]. Infections due to *Ralstonia pickettii* are very rare in healthy individuals, since the microorganism is supposed to be of relatively low virulence and is often associated with pseudobacteremia or asymptomatic
colonization of the respiratory tract as, for instance, in cystic fibrosis patients [2]. However, *Ralstonia pickettii* hospital outbreaks have been reported and associated with extrinsic contamination of disinfectants, saline solution, sterile water and other solutions used for patient care [3,4]. Herein, we describe a case of septic arthritis caused by *Ralstonia pickettii* in a female diabetic patient. Of interest, the microorganism was identified rapidly and directly from the clinical sample by molecular techniques, while the conventional culture methods proved to be negative.

**Case presentation**

An 83-year-old female Greek patient of Caucasian origin patient was admitted to the Department of Medicine, Medical School University of Thessaly, Larissa, Greece because of fever and severe arthritis of the right knee. Her past medical history was positive of arterial hypertension, adult-onset diabetes mellitus and an episode of ischemic stroke. She was on treatment with amlopidine, moxonidine, valsartan, clopidogrel, atorvastatin and sc insulin. On admission the patient was febrile (38°C) and was complaining for pain at the right knee for the last 15 days. Physical examination revealed warmth, redness and swelling in the area of the right knee and a harsh systolic murmur (2-3/6) that was heard along the left sternal border radiating to the neck. The remaining physical examination was unremarkable. Blood pressure was 144/88 mmHg, heart rate was 98 beats per min and her respiratory rate was 16 per min. White blood cell count (10.5 × 10⁹/L), erythrocyte sedimentation rate (80 mm/1h), blood glucose (170 mg/dL) and C-reactive protein (127 mg/dL; upper normal limit: 10 mg/dL) were elevated. The remaining haematological and biochemical parameters were within normal limits. Synovial fluid aspiration was unremarkable. Laboratory inflammatory indices returned back to normal gradually, the fever disappeared and no repeated drainage was required as the arthritis resolved completely. The patient was discharged 3 weeks after admission in a very good health. At follow-up examination 3 weeks later, she was still in good health condition without any sign of arthritis of the right knee and afebrile. Of note, the conventional synovial fluid cultures and consecutive blood cultures failed to detect the microorganism; after a prolonged incubation of fifteen days no growth of microorganisms was observed.

**Conclusion**

A few number of reports in the English literature indicate that *Ralstonia pickettii* may be responsible for more invasive and severe infections than was previously thought. Indeed, reports on bacteremia and septicemia caused by *Ralstonia pickettii* have already been described [7,8]. Occasionally, *Ralstonia pickettii* has been identified as the causative agent in infectious endocarditis [9], meningitis [10], seminal infection [11], osteomyelitis or spondylodiskitis [12] and septic arthritis [13]. Immunocompromised patients and those with cystic fibrosis are also at increased risk of acquiring infection with *Ralstonia pickettii* [14,15]. Other underlying conditions that have been implicated in *Ralstonia pickettii* invasive infections include alcoholic and hepatitis C related cirrhosis, chronic renal failure and diabetes mellitus [16]. Although *Ralstonia pickettii* is not a fastidious microorganism, in our hands the conventional cultures of synovial fluid and blood samples were negative. The latter could be attributed to the fact that this microorganism in general, is characterized by a relatively low inoculum. In addition, it is well known that conventional cultures may lack the sensitivity and specificity to establish an aetiologically definite diagnosis in cases of septic arthritis. It seems that at least in some cases, broad-range 16S rRNA PCR assay
followed by sequencing might be of outmost importance in an attempt to successfully identify microorganisms involved in such infections like septic arthritis and in particular, when patients have previously received antibiotics or in the presence of slow-growing or intracellular microorganisms [5,17]. In this context, our findings further emphasize the potential usefulness of molecular-based methods as additional and rapid diagnostic tools for the identification of the causative agent of serious bacterial infections. Furthermore, the use of a viability test in case of a positive result by the 16S rRNA PCR assay gives an additional advantage of the molecular-based assays as with this test we are capable to assess whether the causative microorganism is alive or not. However, the use of these assays should be rather restricted mainly in culture-negative cases and when serious infections are suspected on the basis of clinical signs and symptoms [5].

**Abbreviations**

sc, Subcutaneous; CO2, Carbon dioxide; DNA, Deoxyribose Nucleic Acid; RNA, Ribose Nucleic Acid; PCR, Polymerase Chain Reaction; bp, Base Pairs; rRNA, Ribosomal RNA.

**Consent**

Written informed consent was obtained from the patient for publication of this case report. A copy of the written consent is available for review from the journal’s Editor in Chief.

**Competing interests**

The authors declare that they have no competing interests.

**Authors’ contributions**

KPM and GND had the original idea and along with NG wrote the paper. CHN and EP did the whole laboratory work and investigate the patients’ samples while contributed to the final version of the paper. From the clinical point of view, KPM, NG and GND collected the whole data, treated the patient and performed the follow-up assessment. GND and KPM wrote the final version of the paper. All authors have seen and approved the final draft of the paper.

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