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Rare Cases of *Ralstonia pickettii* Associated with Tonsillitis and Wound Infection

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ABSTRACT

Background: We describe here two rare case of *Ralstonia pickettii* infection associated with tonsillitis and wound infection. *Ralstonia pickettii* is a gram negative bacteria, usually isolated from the soil and water. Infection-associated *Ralstonia* species though rare, has become an emerging nosocomial pathogen due to its capability to survive in harsh conditions like antiseptic solutions. Both of our reported cases presented to the outdoor patient unit and thus possibility of community acquired *Ralstonia pickettii* infection cannot be ruled out.

Methods: Isolates were subjected to Siemens MicroScan WalkAway 96 Plus (Beckman Coulter Diagnostics, USA) for identification and antimicrobial susceptibility testing.

Results: *Ralstonia pickettii* was identified as a rarely detected pathogen.

Conclusion: *Ralstonia pickettii* though rarely associated with wound infections and tonsillitis, could be a potential hospital acquired pathogen.

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Introduction

Ralstonia is a poorly known member of the Proteobacteria. This genus harbors gram negative rods which are oxidase positive non-fermenters, usually found in soil and water that have the potential to cause nosocomial infection in hospital settings. Infection caused by *Ralstonia* spp. though rare, but several cases have been reported, worldwide. *Ralstonia* spp. have been associated with severe nosocomial infections like meningitis, sepsis, pneumonia, osteoarticular infection especially in immunocompromised patients (1). Most common mode of acquiring infection is probably contamination of hospital supplies, as it has an ability to survive in antiseptic solutions, saline solution, and disinfectants (2).

This study presents two cases of *Ralstonia pickettii*, one associated with tonsillitis, and other with wound infection.

Case Report

Case 1

A 6-years old male child presented to the Pediatrics OPD with the complaint of cough and sore throat suggestive of upper respiratory tract infection. On examination red inflamed pharynx with pus over inflamed tonsillar pillars were noted. After cleaning the oral cavity with sterile normal saline, fresh exudate swab from the tonsillar pillars were collected under aseptic precautions and were sent to microbiology laboratory for culture and sensitivity.

Sample once received into the microbiology laboratory was immediately inoculated on routine culture media and was incubated in aerobic environment at 37 °C. Grams stain of the swab was also performed which revealed plenty of pus cells with gram negative bacilli. After 24 hours of aerobic incubation pure culture was obtained, which was oxidase positive Gram negative bacilli with inconclusive biochemical reactions neither going in favor of *Pseudomonas* nor *Burkholderia*. For further analysis, pure culture from Blood agar

were subjected to Siemens MicroScan WalkAway 96 Plus (Beckman Coulter Diagnostics, USA). *Ralstonia picketti* was identified. The isolate was susceptible to cefotaxime, ceftazidime, ciprofloxacin, Levofloxacin, Imipenem, Meropenem, Piperacillin + Tazobactam and Cotrimoxazole while resistance to Gentamicin (MIC > 8) and Tobramycin (MIC > 8). Patient was started with oral ciprofloxacin and responded well.

Case 2

A 20 years old Female presented to the surgery OPD with multiple infected wound over her lower limbs. The patient was non-diabetic and non-hypertensive. In minor OT debridement with sterile normal saline was done and frank pus from the base of the wound was sent to microbiology laboratory for culture and sensitivity.

Pus sample received was inoculated on routine aerobic culture media and incubated at 37 °C under aerobic environment. Direct Gram's stain microscopy revealed plenty of pus cells along with few Gram negative bacilli. Pure culture obtained after 24 hours of incubation and with inconclusive biochemical reactions, was subjected to Siemens MicroScan WalkAway 96 Plus (Beckman Coulter Diagnostics, USA). The isolate was identified as *Ralstonia picketti*. The isolate showed higher MIC and was resistant to Amikacin (>32), Aztreonam (>16), Gentamicin (>8) and Tobramycin (>8) while it was susceptible to several oral antibiotics like Ciprofloxacin, levofloxacin, cefepime, cotrimoxazole and injectable drugs like Cefotaxime, Piperacillin-tazobactam. Patient responded well with three days of injectable Piperacillin-tazobactam followed by oral ciprofloxacin.

Discussion

Ralstonia pickettii previously known under the names of *Pseudomonas pickettii* and *Burkholderia pickettii* is an aerobic, non-fermentative, oxidase positive, Gram negative bacillus classified under the subphylum of β -proteobacteria. *Ralstonia* genus consists of four species, namely *R. pickettii*,

R. solanacearum, *R. insidiosa* and *R. mannitolilytica*. They show some properties of chemoautotrophs and either photoautotrophs enabling them to survive in a wide array of environments including hospital water supplies and disinfectants (2). These properties of *Ralstonia* species is responsible for pseudo-outbreaks in hospital settings (3). *Ralstonia* spp. have also been reported to be associated with prosthetic joint and implant contamination (4) and renal infection in patient on dialysis (5). On the other hand, since both of our reported cases presented to us in Outdoor unit of unrelated departments, so possibly they might be a case of community acquired infections.

In two of our reported cases, Case 1 so far is the first case of tonsillitis associated with *Ralstonia pickettii* infection, as we could not find any such previously reported case. While association of *Ralstonia mannitolilytica* with lower respiratory tract infection especially in patients with Cystic Fibrosis was reported by Coman et.al (6).

Ralstonia pickettii a gram negative bacillus usually found in environmental water sources but also leads to contamination of hospital water supply and saline preparations. Thus had led to several hospital acquired infections in form of bacteraemia, meningitis, respiratory infection and even renal transplant infection (6). In both of our reported cases the isolate showed resistance to Gentamicin and Tobramycin, and one isolate even had resistance to Aztreonam. *Ralstonia* spp. have shown resistance to multiple antibiotics globally. Most of the clinicians prefer piperacillin-tazobactam and third generation cephalosporins for complete recovery (7). While few authors suggests that *Ralstonia* spp. being low virulent, aggressive treatment with broad spectrum antibiotics may lead to emergence of resistant strains against higher antibiotics (8).

Ralstonia spp. are no longer considered to be an environmental saprophyte as its association with multiple clinical conditions especially in hospitals has raised the concern. Its ability to pass through 0.2 micrometer filters that are used for sterilization of several medical products including saline

solutions (7) and also to survive in 0.05% chlorhexidine aqueous solution has made this organism a potential pathogen responsible for hospital acquired infections. Beside this contaminated municipal water supply also contributing it as an emerging pathogen.

Conclusion

Ralstonia pickettii though a low virulent organism has emerged as a potential agent for hospital acquired infection mainly through contaminated water supply and saline preparations. Unintentionally exposing the organism to higher and broad spectrum antibiotics might lead to emergence of resistance strains. Regular water bacteriological monitoring and good hospital infection control practices can restrict these organisms to become a potential threat. Both of our cases reported in outdoor unit without any history of hospitalization or any medical instrumentation in recent past, possibility of community acquired infection cannot be ruled out.

Conflict of interest

None declared.

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