



## **CASE REPORT: *Ralstonia pickettii* bacteremia in a maintenance haemodialysis patient: a case report from western part of India**

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### **Abstract:**

The gram negative bacillus, *Ralstonia pickettii*, is emerging as clinically important nosocomial pathogen. Its particular involvement is seen in immune-compromised patients including end stage kidney disease patients. Contaminated medical solutions, including dialysis RO water, sterile water, as well as disinfectants, can lead to *R. pickettii* outbreak. There have been case reports of invasive infections with variable presentations, also. Very few cases of *R. pickettii*, have been reported from western part of India. We are reporting a case of 36 year old lady, end stage kidney disease patient on maintenance haemodialysis with *R. pickettii* bacteremia. Referred from outside dialysis centre, she presented with complaints of fever and chills during haemodialysis. Blood culture samples from central venous catheter and peripheral blood showed growth of *R. pickettii*. Patient was treated with inj. Ciprofloxacin as per the culture sensitivity report. She improved clinically, with blood culture showing no growth at the end of 14 days of antibiotic treatment.

**Key words:** *Ralstonia pickettii*, end stage kidney disease, haemodialysis, India

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### **Introduction:**

Gram-negative, non-fermenting bacilli are common causes of nosocomial infections. They are also a cause of infection from the environment. Major pathogens of clinical significance from this group are *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, *Stenotrophomonas maltophilia* and *Burkholderia cepacia*. Another emerging opportunistic pathogen, in both the hospital setting and from environmental sources, from this group is *Ralstonia pickettii*. *Ralstonia spp.* is a new genus that includes former members of *Burkholderia spp.* (*Burkholderia pickettii* and *Burkholderia solanacearum*). These organisms have been renamed as *R. pickettii* and *R. solanacearum*, respectively.<sup>1</sup>The main pathogenic species of this genus is *R. pickettii*. It has been isolated from a wide variety of clinical specimens

including blood, urine and cerebrospinal fluid.<sup>2</sup> Patients undergoing haemodialysis (HD) are considered at-risk group to acquire *Ralstonia* infection. Symptoms in these patients can range from asymptomatic clinical signs to severe sepsis with septic shock and death.<sup>3</sup> *R. pickettii* has shown variable sensitivity to the carbapenems and aminoglycosides.<sup>4</sup> Thus, the treatment of these infections is still not well-defined.

### Case report:

36 year old lady, known case of end stage kidney disease on maintenance haemodialysis since 6 months at secondary HD centre near her native place, presented with history of fever and chills during dialysis since 15 days. Patient had right internal jugular vein tunnelled cuffed catheter as dialysis access. The catheter was inserted 6 months back. Patient was a known case of immune complex mediated membrano-proliferative glomerulonephritis (MPGN). She was a known hypertensive since 2 years. On presentation to emergency department, she had a pulse rate of 110 beats per minute, regular, BP 90/ 60 mmHg, temperature 100<sup>0</sup> F, pallor present, bilateral pitting pedal edema present. She was conscious, oriented in time, place and person. On admission, blood culture samples were sent from the central venous catheter and peripheral blood sample, simultaneously. Patient was started on inj. Cefeperazone+ sulbactam, 3 gm. IV bolus dose, followed by 1.5 gm. IV bd. Following were her laboratory parameters on admission:

**Table 1: Laboratory parameters on admission**

Laboratory parameter	Value
Hb	4.1 gm%
Total leukocyte count	8100/ mm <sup>3</sup>
Platelet	87,000/mm <sup>3</sup>
Urea	138 mg/dl
Creatinine	11.8 mg/dl
Sr. procalcitonin	6.24 ng/ml
Sr. protein	6.1 mg/dl
Sr. albumin	2.8 mg/dl
LFTs	WNL
Urine routine microscopy	pH 6, Protein 1+, glucose – absent, Pus cells 2-3/hpf, RBCs – absent
Dengue NS1, IgG, IgM	Negative
Peripheral smear for malarial parasite	Negative
2D Echo	No evidence of vegetation, no regional wall motion abnormality, LVEF 60%

Patient continued to have fever for 6 days after hospitalisation, though frequency of fever spikes reduced. Both the blood culture samples, from central venous catheter and peripheral blood, showed growth of *Ralstonia pickettii*. Following table shows the antibiotic sensitivity pattern of the culture growth:

**Table 2: The antibiotic sensitivity report, source: blood culture from central venous catheter and peripheral blood sample, organism isolated- *Ralstonia pickettii***

Antibiotic	MIC ( $\mu\text{g/ml}$ )	Susceptibility
<b>Piperacillin/Tazobactam</b>	8	S
<b>Ceftazidime</b>	8	S
<b>Cefepime</b>	$\leq 8$	S
<b>Amikacin</b>	$\leq 1$	S
<b>Gentamicin</b>	$\leq 1$	S
<b>Ciprofloxacin</b>	0.5	S
<b>Levofloxacin</b>	0.5	S
<b>Minocycline</b>	2	S
<b>Co-trimoxazole</b>	$\leq 20$	S
<b>Aztreonam</b>	$\geq 64$	R
<b>Meropenem</b>	$\geq 16$	R
<b>Imipenem</b>	8	I

(MIC- minimum inhibitory concentration, S- sensitive, I- intermediate, R- resistant)

Patient was started on Inj. Ciprofloxacin, as per the antibiotic sensitivity report. Patient became afebrile within 72 hours of starting Inj. Ciprofloxacin and continued to receive the injectable for a total duration of 14 days. She also received 2 units of packed RBCs transfusion during haemodialysis. Considering the response to the antibiotic, she was continued with the same cuffed tunnelled catheter as haemodialysis access. At the time of discharge, her Hb was 8.9 gm%, TLC 6400, platelet count of 2.10 lakh/  $\text{mm}^3$ , sr. procalcitonin 0.18 ng/ml. Repeat blood culture samples (from peripheral blood and central venous catheter) sent at the time of discharge, showed no growth. Patient discharged home.

### Discussion:

*Ralstonia pickettii* is a waterborne organism of low virulence. It is rarely known to cause severe invasive infections, including catheter related blood stream infection (CRBSI), pneumonia, endocarditis, osteomyelitis, meningitis, and septic arthritis.<sup>5</sup> Contamination of medicinal products occurs during the manufacturing phase as the bacterium can pass through the 0.2 micron filters used for the sterilization. *Ralstonia* spp. has low nutrient requirements and can survive in water and soil for long periods. In the immuno-compromised persons, it has propensity to cause severe infections, resulting in significant morbidity and mortality. Immuno-compromised subjects, newborns in the neonatal ICU and hemato-oncology patients with central venous catheters are the at risk groups for *Ralstonia pickettii* infections.<sup>6</sup> Chronic kidney disease, an immuno-compromised state, was the risk factor in our case.

Anderson *et al.* identified *R. pickettii* in plastic water piping biofilm formation.<sup>7</sup> The organism has the ability to produce cell-cell signalling molecules, e.g. homoserine lactones. This leads to the formation of the biofilm.<sup>8</sup> It has been identified in ultrapure water in

industrial systems, in the space shuttle water system and in laboratory-based ultrapure water systems.<sup>9,10,11</sup> Cases linked to the contamination of dialysis water have also been reported.<sup>12</sup>

In vitro data suggests that *R. pickettii* is susceptible to ceftriaxone but clinical failure has been reported. The underlying resistance mechanisms are not fully understood yet.<sup>13</sup> In vitro susceptibility to quinolones, third and fourth generation cephalosporins, trimethoprim and sulphamethoxazole, amikacin or carbapenems has been reported.<sup>14</sup> In a similar case reported by Nosheen Nasir *et al*, patient had required inj. Meropenem along with inj. Levofloxacin for clinical recovery. In our case, patient responded very well to inj. Ciprofloxacin monotherapy. Also, the organism was found to be resistant to Meropenem. Our case is the first to be reported from this region and highlight the importance of suspecting these infections in patients with end stage kidney disease on haemodialysis.

### Conclusion:

In spite of its low virulence, the organism *R. pickettii*, should be considered as clinically important pathogen, especially in end stage kidney disease patients on haemodialysis.

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Conflicts of interest: Nil