



## From Water to Blood: *Cupriavidus pauculus* Bacteremia in a Hemodialysis Patient

### Abstract

*Cupriavidus pauculus* is a gram-negative rod isolated from water. It is rarely known to cause infections in humans. We present the case of a 72-year-old lady who developed *Cupriavidus pauculus* bacteremia probably originating from the water treatment plant of a hemodialysis unit. The patient improved with timely treatment with appropriate antibiotics.

**Keywords:** *Cupriavidus pauculus*, Water treatment plant, Hemodialysis, Bacteremia

### Introduction

Infections are the second most common cause of mortality in hemodialysis (HD) patients.<sup>1</sup> Catheter-related blood stream infection (CRBSI) complicating tunneled HD catheters are the major cause of infection in patients on HD. Infections causing fever and chills during dialysis are assumed to originate from the HD catheter, unless proven otherwise. Occasionally, the water used during dialysis may carry a microbe. We report a patient who developed infection from *Cupriavidus pauculus*, a protean gram-negative bacillus rarely isolated from water and ultrafiltration units.<sup>2</sup>

### Case Report

A 72-year-old female, a known case of diabetic kidney disease taking maintenance hemodialysis (MHD) for one month from a private medical facility, presented with complaints of fever with chills during her last two HD sessions. She had been taking HD through a right internal jugular vein tunneled HD catheter that had been placed one month back at our center.

On presentation, she was hemodynamically stable with mild pallor, bilateral pedal edema, and was febrile. Paired blood culture samples were obtained, one from the tunneled HD catheter and other from the right cubital vein. The patient was empirically started on gentamicin (2mg/kg) injection and Vancomycin (15mg/kg) injection intravenous (IV) on alternate days after dialysis. She continued to have fever with chills during the first two dialysis sessions. Both the blood culture bottles flagged positive within one day of incubation. Gram stain from the positive blood culture bottles revealed gram-negative motile bacteria, which was subjected to manual biochemical tests as well as automated identification system, VITEK-II. The organism was found to be oxidase positive, urease positive, non-saccharolytic, and colistin sensitive motile gram-negative rod growing in routine culture media like Mc Conkey and blood agar. Automated VITEK-II also confirmed this organism as *Cupriavidus pauculus*.

Her blood culture showed growth of *Cupriavidus pauculus* which was sensitive to penicillin, oxacillin, erythromycin, clindamycin, cotrimoxazole, ciprofloxacin, and levofloxacin, and resistance to aminoglycosides.

She was loaded with IV Levofloxacin 750 mg followed by 500 mg on alternate days after dialysis. Levofloxacin catheter lock (5 mg/ml) in each catheter port was administered after each dialysis session.<sup>3</sup> The patient became afebrile within 24 hours. Repeat blood cultures after five days did not reveal any growth. IV antibiotics and antibiotic lock therapy were continued for 14 days, following which the patient was discharged. The previous dialysis unit was informed about the bacterial growth so that the water treatment plant could be disinfected.

### Discussion

*Cupriavidus pauculus* is a rare aerobic non-fermentative motile gram-negative bacillus.<sup>4</sup> It is usually isolated in water and from ultrafiltration facilities.<sup>2</sup> It is rarely pathological in human beings for mostly being so in immunocompromised hosts. Oncological disease, chemotherapy, presence of central lines, end-stage renal failure and need of dialysis, congestive heart failure, and primary immunodeficiency are notable risk factors.<sup>5</sup>

Our patient had multiple risk factors, which included age, chronic renal failure requiring dialysis, and presence of HD catheter. The patient might have picked up the infection from suboptimal quality water that was being used at the dialysis facility. However, prompt administration of sensitive antibiotics, that is, levofloxacin, coupled with catheter lock therapy lead to rapid elimination of the organism and salvage of the HD catheter. Though the organism might not have originated from the HD catheter, we still continued with the antibiotic lock therapy to eliminate any bacteria that might have seeded into the catheter during bacteremia.

### Conclusion

This case highlights the importance of maintaining good water quality in the ultrafiltration units, so that infections can be prevented in CKD patients who are already immunocompromised. Prompt therapy with antibiotics and locks should be pursued for catheter salvage even in cases of organism, for whom there is lack of clinical experience.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

## Conflicts of interest

There are no conflicts of interest.

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**How to cite this article:** Saha AK, Das P, Rathore V, Badge R, Pathak NM. From Water to Blood: *Cupriavidus pauculus* Bacteremia in a Hemodialysis Patient. Indian J Nephrol. doi: 10.25259/IJN\_219\_2024

**Received:** 09-05-2024; **Accepted:** 31-05-2024

**Online First:** 01-08-2024; **Published:** \*\*\*

**DOI:** 10.25259/IJN\_219\_2024

