

CASE REPORT

# *Chryseobacterium gleum* catheter-related blood stream infection: a case report and a review of literature

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## ABSTRACT

**Background:** *Chryseobacterium (Flavo.) gleum* is a rare organism causing catheter-related bloodstream infections. The organism is primarily found on moist hospital surfaces, like washbasins and dressing trolleys. It has been described as the agent for bacteremia, pneumonia, and skin and soft tissue infections in clinical settings.

**Case Presentation:** We report the case of a 60-year-old man with end-stage kidney disease, who presented with fever, chills, and rigours at the third hours of dialysis session, associated with intradialytic hypotension. The patient underwent dialysis using a left subclavian cuffed catheter, after multiple failures of fistula formations previously. Diagnosis of catheter-related bloodstream infection was made, and blood culture showed *C. Gleum* from both catheters' lumens. The patient showed improvement with intravenous Ciprofloxacin and tablet bactrim. Culture became negative after treatment and catheter was saved.

**Conclusion:** *Chryseobacterium gleum* is an emerging pathogen that causes healthcare-associated infection for people with indwelling hemodialysis catheters. The condition poses a diagnostic and therapeutic challenge since it has been resistant to numerous broad-spectrum antibiotics. However, early management of the disease with correct antibiotics results in better response without removing indwelling catheters.

**Keywords:** Case report, *Chryseobacterium (Flavo.) gleum*, catheter, blood stream infection.

## Introduction

Catheter-related bloodstream infection (CRBSI) is one of the common complications related to hemodialysis central venous catheter. Causal organisms mostly reported are staphylococci, enterococci, aerobic Gram-negative bacilli and yeast [1]. However, few microorganisms were identified as less frequent causal pathogen, such as *Acinetobacter* spp., *Enterobacter* spp., and *Klebsiella pneumonia* [2]. On the other hand, *Chryseobacterium (Flavo.) gleum* is an uncommon organism described till date. Found in numerous reservoirs in the hospital setting, *C. gleum* is a nonfermenting gram-negative bacillus (NFGNB). It is known to be notorious for its potential to colonize mechanical devices, resulting in CRBSI. Most of the infections respond to broad-spectrum antibiotic regimens, fluoroquinolones, rifampicin, and macrolides. Treatment with adjunctive treatment with antibiotic lock therapy has also shown promising results and the catheter is salvaged.

## Case Presentation

We report a rare case of a 60-year-old gentleman, who had end-stage kidney failure, and since 2001 was on regular hemodialysis. He had multiple failed fistulas previously,

resulting in a left subclavian cuffed catheter inserted in May 2020. The patient had tertiary hyperparathyroidism which led to a pathological fracture of the left neck of the femur. Therefore, in 2014, the patient required a parathyroidectomy and surgical correction of the fracture. The patient never smoked and had no history of alcohol consumption. His performance status otherwise was good before hospitalization.

The patient presented with fever, chills, and rigors at the third hours of dialysis associated with intradialytic hypotension. Upon examination, the patient was normotensive and had a low-grade fever. Other physical examinations were unremarkable. The exit end of the left

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**Received:** 21 December 2020 | **Accepted:** 26 April 2021



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**Table 1.** Full sensitivity report.

Blood culture and sensitivity	Flavobacterium gleum
From Peripheries	Sensitivity to antibiotics;
Both from catheters lumens.	Ciprofloxacin
	Trimethoprim/Sulfamethoxazole
	Resistant to antibiotics;
	Erythromycin
	Rifampicin
	Vancomycin

subclavian catheter was also clean and dry. The patient was empirically treated as CRBSI with intravenous cloxacillin and ceftazidime prior culture. Blood culture and sensitivity from all the lumens, and the peripheries were taken, which later grew *C. gleum*, sensitive to ciprofloxacin (Table 1).

Oral ciprofloxacin was given for 3 weeks, and the patient was discharged from the ward on 8th day of admission, as he showed signs of improvement in his symptoms.

Unfortunately, 10 days after the discharge, the patient returned with similar symptoms suggestive of catheter-related bloodstream infection. Knowing the culture, the patient was started with intravenous ciprofloxacin. Oral *bactrim* (sulfamethoxazole and trimethoprim) was also added. The patient received intravenous ciprofloxacin for 1 week and oral *bactrim* for 3 weeks. This time compliance with the medications was emphasized, and repeated blood culture was negative by the end of 1 week of therapy. Given patient's vascular access difficulty, adjuvant treatment with the catheter's gentamycin-lock was also started, so that the catheter could be salvaged. The patient was recovering well, and other comorbidities were managed well accordingly.

## Discussion

Common complications related to hemodialysis central venous catheter use includes CRBSIs, exit-site infections, and tunnel infections [3]. Catheter-related bloodstream infection refers to the presence of bacteremia originating from an intravenous catheter, and it is the most common cause of nosocomial *pneumonia* [4].

The potential risk factors for developing CRBSI depends on the method, the site of the catheter, duration and the purpose of insertion, i.e., administration of parenteral nutrition. Other risk factors are dialysate or equipment contamination, inadequate water treatment and re-use of the dialyzer. The underlying diseases associated with CRBSI include diabetes mellitus or peripheral atherosclerosis, older age, higher total intravenous iron dose, increased recombinant human erythropoietin dose, lower hemoglobin level, and lower serum albumin [4]. Recent hospitalization or surgery are among other related risk factors described.

The gram-positive bacteria has been described as the most common causative pathogens, with 40% *Staphylococcus aureus* cases and 80% of coagulase-negative staphylococci accounting for CRBSIs [5]. Gram-negative organisms cause 20%-40% CRBSIs, whereas polymicrobial infections (10%-20%) and fungal infections (<5%) are less common [3]. NFGNB have been associated with a higher mortality rate [6]. Those NFGNB are classified as aerobic microorganisms that are incapable of utilizing carbohydrates as sources of energy or degrade them via oxidative rather than fermentative pathway [7]. These organisms usually could be found primarily in soil and water and on moist hospital surfaces, like washbasins and dressing trolleys and transmitted through contact with a healthcare worker [8]. Other than that, they could also colonize mechanical devices causing ventilator-associated pneumonia [8].

The flavobacterium group contains peculiar NFGNB was renamed as species of the genus *Chryseobacterium*, which included 50 strains of members, and prevalence was detected among the elderly. *Chryseobacterium meningosepticum* was the most common species, while *C. gleum* was the least frequently isolated species [9]. In terms of age group, the highest *Chryseobacterium* prevalence was detected among the elderly [9].

*Chryseobacterium* sp. antimicrobial susceptibility data remains very limited as this pathogen is rarely isolated from clinical specimens [9]. However, it was shown that they are resistant to broad-spectrum antibiotics like carbapenems and colistin and showed low potency toward vancomycin [9]. Instead, they respond to antibiotics like fluoroquinolones, followed by rifampicin and macrolides. Trimethoprim-sulfamethoxazole, ciprofloxacin, and piperacillin-tazobactam also showed moderate activity. Antibiotic-lock therapy is recommended as adjunctive therapy specifically for catheter salvage when it is not removed [10].

## Conclusions

*Chryseobacterium gleum* infection is not well documented in the medical community and is very rarely encountered. However, this organism could become a major infectious threat due to its extremely limited susceptibility. Many reports showed that *C. gleum* susceptibility patterns demonstrated resistance to many antimicrobials. Therefore, healthcare workers need to recognize their potential risk factors and maintain clinical suspicion.

Even though in the presented case, the *C. gleum* infection was a sensitive organism and responded well to antibiotics, the prevention of the disease should diligently be geared towards adherence to hand hygiene and maintaining aseptic procedures upon handling central venous catheters.

## List of Abbreviations

CRBSI catheter-related bloodstream infection  
NFGNB non-fermentative gram-negative bacilli

**Conflict of interest**

The authors declare that there is no conflict of interest regarding the publication of this case report.

**Funding**

None.

**Consent of publication**

Informed consent was obtained from the participant.

**Ethical approval**

Ethical approval is not required at our institution to publish an anonymous case report.

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