

**Case Presentation**

# An unusual case of corynebacterium gleum peritonitis in peritoneal dialysis

**Nazzaro Paola\*, Baranello Silvana and Brigante Maurizio**

Nephrology Unit, Cardarelli Hospital, Campobasso, Italy

## Introduction

Peritonitis is a common and serious complication of Peritoneal Dialysis (PD) and its prevention and treatment are very important to reduce patient morbidity and mortality. PD-related peritonitis can be caused by many germs; in most cases Gram-Positive Cocci (GPC) are responsible. In our report instead, we present the first case, to our knowledge, of peritonitis due to *Chryseobacterium gleum* in a peritoneal dialysis patient.

Our aim is to make known this type of opportunistic pathogen that can survive in a hospital environment so as to prevent *C. gleum*-related peritonitis. The rapid identification of this pathogen in the laboratory is very important for guiding therapy and preventing further complications.

## Case report

A 72-year-old man with end-stage renal disease secondary to nephroangiosclerosis had been on PD for approximately two months. He was admitted to the hospital because of fever, abdominal pain, vomiting, and cloudy dialysate for the three-day duration. Physical examination showed diffuse abdominal tenderness with defense but no drainage from exit-site. Blood pressure was 120/80 mmHg, pulse was 88 beats per minute and body temperature was 38 °C. Peritoneal dialysis effluent showed a White Blood Cell (WBC) count of 6345 cells/microL with 75% neutrophils. Hemoglobin was 11.7 g/dl, and hematocrit count was 37.6%. Serum chemistry analysis showed: albumin 2.8 g/L, sodium 138 mmol/L, potassium 3.9 mmol/L, urea 71.7 mg/dl, creatinine 5.88 mg/dl, C-reactive protein 144 mg/L, procalcitonin 0.64 ng/ml.

Based on the available information, the patient was diagnosed with PD-peritonitis and received empirical treatment with intraperitoneal vancomycin (2 gr) and ceftazidime (20 mg/kg). *Chryseobacterium gleum* was isolated from peritoneal effluent on the fifth day after the treatment (Table 1). The isolate was sensitive to ceftazidime (MIC 0,75), cefepime (MIC 0.38), levofloxacin (MIC 0,50), and piperacillin/tazobactam (MIC 4), while was resisted to ciprofloxacin and meropenem. Therefore, vancomycin was

**More Information**

\*Address for correspondence: Nazzaro Paola, Nephrology Unit, Cardarelli Hospital, Campobasso, Italy, Email: p.nazzaro@live.it

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**Table 1:** Antibiotic susceptibility test results of *Chryseobacterium gleum* isolate.

Antibiotic	Susceptibility (Sensitive/Resistant)	Minimal inhibitory concentration (µg/mL)
Ceftazidim	S	0.75
Ciprofloxacin	R	0.75
Cefepim	S	0.38
Levofloxacin	S	0.50
Meropenem	R	16
Piperacillin/tazobactam	S	4

stopped while intraperitoneal ceftazidime was continued and intravenous levofloxacin was prescribed for a total of three weeks.

The abdominal pain was relieved and peritoneal dialysis effluent was clear with a WBC count of 38 cells/microL. At the end of the three weeks of therapy, a new culture sample of peritoneal fluid was performed and it resulted in sterile.

## Discussion

The genus *Chryseobacterium* (formerly *Flavobacterium*) [1], represents a group of Gram-negative, non-spore-forming, non-fermenting, catalase-positive aerobic bacilli, first described by Vandamme, et al. in 1994. There are currently more than 100 species in this genus, among which *Chryseobacterium indologenes* is the most common species associated with human infections, followed by *Chryseobacterium gleum* [2-4]. These microorganisms are uncommon human pathogens, but are ubiquitous in nature especially in chlorine-treated municipal water supplies, in soil and also on wet surfaces of the hospital environment [5-7]. Most cases of human infections are nosocomial [8]



and are often associated with immunosuppression [9] or indwelling devices [10]. These infections usually respond to broad-spectrum antibiotics like carbapenem and colistin [11].

More commonly isolated *Chryseobacterium* species are *C. meningosepticum*, *C. odoratum*, *C. multivorum*, *C. breve*; *C. indologenes* and *C. gleum* are in group IIb of *Chryseobacterium* species [6,12].

*C. gleum* infections are substantially less frequently reported than infections due to *C. indologenes* [4]. In fact, according to SENTRY Antimicrobial surveillance program, *Chryseobacterium* species were only 0,03 of all isolated bacteria and only 0,27 of non fermentative bacteria collected during the five-year period from 1997 to 2001 across 33 medical centers in 16 countries which only 2 isolates were identified as *C. gleum* [3]. As stated above, infections due to *Chryseobacterium* in humans, particularly infections due to *C. gleum*, are rarely reported. But probably, the incidence of *C. gleum* infections in humans is underestimated.

*C. gleum*, ubiquitous in nature, can colonize mechanical devices, causing device-associated infections like centraline-associated bloodstream infection (CLABSI) and ventilator-associated pneumonia (VAP) [13]. So, this bacillus causes bacteremia, catheter-related infection, pneumoniae, urinary tract infections, and pyonephrosis [5,14]. Risk factors for *Chryseobacterium* infections are extremes of age, immunocompromised conditions, prolonged use of antibiotics, and comorbidities (cardiovascular disease, malignancy, chronic kidney disease, diabetes mellitus, and chronic obstructive pulmonary disease) [15]. In our case, the patient was elderly with chronic renal disease and hypertension but hadn't a history of a prolonged hospital stay. We suppose that the patient who lives in the country may have contracted the infection while working on the ground.

The virulence factors of *Chryseobacterium* species are not known. Lo and Chang performed a focused study in Taiwan on 14 *C. gleum* isolates; the most prevalent sample was urine and sputum. Their study revealed that 40% of these could form a biofilm [16]. However, the biofilm-forming potential of *C. gleum* appeared to be much lower than that of *Elizabethkingiameningoseptica* (formerly *Chryseobacterium meningosepticum*), indicating its lower pathogenic potential. In fact *C. gleum* is less virulent than *E. meningoseptica* and *C. indologenes* [8].

Information about the susceptibilities of *Chryseobacterium* to antimicrobial agents is limited [4].

*Chryseobacterium* is variable susceptible to piperacillin-tazobactam, ceftazidime, cefepime, fluoroquinolones, tigecycline, trimethoprim-sulfamethoxazole, but is usually resistant to ceftriaxone, aztreonam, carbapenems, and

aminoglycides [3]. In our case, *C. gleum* was susceptible to ceftazidime, cefepime, levofloxacin, piperacillin-tazobactam, It was resistant to ciprofloxacin and meropenem. Based on the antibiogram pattern, the patient was successfully treated with intraperitoneal administration of ceftazidime for 10 days and intravenous administration of levofloxacin for 15 days, followed by oral administration of levofloxacin for other 7 days. He responded clinically to imported therapy without the need for Tenckhoff catheter removal.

Antibiotics are widelused therapeutic agent treatment of different infectious diseases either bacterial or fungal. Misuse of antibiotics and other social factors are the main factors for emerging antibiotic-resistant pathogenic stains. It was proven that the high mortality rates increased healthcare economical costs and reduced productivity are highly associated with antibiotic resistance [17].

## Conclusion

This case, to our knowledge, is the first reported case of PD peritonitis caused by the emerging pathogen *C. gleum*; whereas, cases of PD-peritonitis secondary to *C. indologenes* were reported by Carvalho, et al. with a relapsing course requiring Tenckhoff catheter removal [18]. In terms of presentation, no specific clinical signs are typically present to differentiate *C. gleum* peritonitis from other etiologies. To reduce the risk of *C. gleum*-peritonitis it is necessary to avoid long hospital stays and the presence of indwelling devices. Proper infection control practices and outbreak investigations are essential to prevent the spread of infections related to this organism.

In our case, we emphasize the importance of rapid and accurate identification of this opportunistic pathogen in the laboratory, essential for guiding therapy.

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