

Bulletin de la Dialyse à Domicile

Peritoneal infection with *Geotrichum* spp in peritoneal dialysis in Dakar: a case report with literature review.

(Infection péritonéale à *Geotrichum* spp en dialyse péritonéale à propos
d'un cas à Dakar avec revue de la littérature.)

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Résumé

En dialyse péritonéale, l'infection péritonéale fongique est une complication relativement rare mais grave. Elle est associée à un risque élevé d'échec de la technique et de mortalité, en particulier en cas de diagnostic tardif. Ces infections fongiques sont dominées par le genre *Candida*. Cependant, au cours de ces dernières années, nous observons l'émergence de nouvelles espèces fongiques avec un pouvoir pathogène établi en dialyse péritonéale. Nous rapportons le premier cas d'infection péritonéale fongique à *Geotrichum* spp survenu au sein de notre unité de dialyse péritonéale à Dakar au Sénégal.

Mots clés : Dialyse péritonéale, infection péritonéale, *Geotrichum* spp, Dakar.

Summary

Fungal peritoneal infection is a relatively rare but serious complication of peritoneal dialysis. It is associated with a high risk of technical failure and mortality, particularly in the event of late diagnosis. Most of these fungal infections are associated with the *Candida* genus. However, in recent years, we have observed an emergence of new fungal species with established pathogenicity in peritoneal dialysis. We report the first case of fungal peritoneal infection due to *Geotrichum* spp that occurred in our peritoneal dialysis unit in Dakar in Senegal.

Key words : Peritoneal dialysis, peritoneal infection, *Geotrichum* spp, fungal, Dakar

INTRODUCTION

Over the past 20 years, the incidence of fungal infections, both superficial and deep, has increased dramatically. These pathologies most often occur in immunocompromised patients (those who have undergone organ transplants, dialysis, bone marrow transplants, chemotherapy, those taking immunosuppressants, etc.). If the patients and the treatments have evolved, the fungi involved in the pathologies have also diversified. Indeed, we have observed the emergence of species previously unknown to the medical community, as well as the re-emergence of already known species.

The latter are responsible for new clinical forms, occurring in different in different circumstances [1]. Fungal peritoneal infection (PI) is a relatively rare but serious complication in peritoneal dialysis (PD). It is associated with a high risk of technical failure and death, especially in the case of late diagnosis [2]. A high mortality rate has been reported [3]. Although its prognosis is bleak, its prevalence is highly variable throughout the world, ranging from 2 to 23.8% in industrialized and developing countries, respectively [2]. In the entire RDPLF database, 1.2% of peritonitis cases over the last 10 years have been fungal, with no cases of *Geotrichum* [personal communication

RDPLF]. *Candida* is the most common genus, implicated in 80% to 90% of cases of fungal PI [4]. Indeed, in Mexico, out of 149 cases of PI reported in 2013, 12 were of fungal origin. Of these, 6 were linked to *Candida albicans*. [5].

In India, the *Candida* genus accounted for 50% of fungal PI in CAPD [6]. Other fungi such as *Fusarium*, *Aspergillus*, *Penicillium* [7], *Cryptococcus* [8], have been described as agents responsible for PI in CAPD. PI due to *Geotrichum* has also been reported. We found one case in 1987 [9] and another in Mexico in 2018 [4].

In Senegal, the incidence of PI is 1.92 person-years [10] and the only fungal species found so far has been *Candida albicans*. We report here the case of a patient from our unit in Dakar who presented with a PI due to *Geotrichum* spp.

PRESENTATION OF CLINICAL CASE

This was a 54-year-old patient who had been in CAPD for 9 months, and whose initial nephropathy was benign nephroangiosclerosis, which had been discovered 2 years prior. In her antecedents, we noted hypertensive heart disease under perindopril 10mg/d. On July 25, 2019, she presented with acute, intense abdominal pain without vomiting or diarrhea. On examination, her blood pressure was 160/80 mmHg and her temperature was 36.7°C. Her catheter exit site was clean and the drainage fluid cloudy. Her abdomen was distended, tender with defense on palpation.

The diagnosis of PI was confirmed by cytology of the peritoneal fluid, which was 2620 leukocytes/mm³ with neutrophil predominance (85%). A probabilistic antibiotic therapy based on ceftriaxone 1g/24h intraperitoneally associated with oral ciprofloxacin 500mg/24h was started. The initial evolution was marked by a decrease in the number of leukocytes in the liquid after 72 hours of treatment (L= 2000 /mm³). However, the drainage fluid was still cloudy, and the patient's abdominal pain persisted. Bacteriological culture was negative. After 7 days of treatment, a new cytology performed counted 2500 leukocytes/mm³, still predominantly neutrophilic (70%). A new culture of the drainage liquid intended to locate opportunistic germs, a parasitological and mycological examination were requested. Mycological examination had isolated *Geotrichum* spp. A treatment based on oral fluconazole (200mg in the loading dose, then 100mg/d) was administered and the PD catheter was removed after 5 days. The patient was transferred to hemodialysis. After 2 hemodialysis sessions, she died in cardiogenic shock.

DISCUSSION

Geotrichum spp. are fungi belonging to the phylum Ascomycota, class Hemiascomycetes, order Saccharomycetales, family Dipodascaceae [11, 12]. Currently, three species of *Geotrichum* have been described as human pathogens: *G. candidum*, *G. capitatum* and *G. clavatum* [11, 13]. They are macroscopically identical to each other, and only the analysis of their microscopic and physiological characters makes it possible to differentiate the species. They are cosmopolitan filamentous yeasts usually present in soil, manure, fruits and dairy products, especially cheeses [16]. In humans, *Geotrichum* can be most often isolated in the digestive tract, and sometimes in the respiratory tract and skin [13, 14]. These are commensal species that can become pathogenic in certain circumstances, particularly in PD. Two cases of *Geotrichum* PI similar to our case have

been described (1987; 2018) [9, 4]. If in our case it was a primary infection with *Geotrichum* spp, in the Mexican one [4] it was instead a recurrence of *Geotrichum candidum* after 2 months with a history of bacterial PI. All these cases had been in CAPD for a few months and had hypertension as a comorbidity.

The risk factors that generally predispose patients to the development of fungal PI are long-term antibiotic therapy, recent episodes of bacterial peritoneal infection, extra-peritoneal *Candida* infection, immunosuppression, hospitalization, prolonged stays in PD with the same peritoneal catheter and advanced age [15,3,16]. None of these risk factors was found in our case, which suggests that the infection was caused by other, unknown factors or was linked to manipulations at home during bag changes.

The clinical manifestations of fungal PI are similar to bacterial ones, and the diagnosis should be considered in the event of a negative culture and the persistence of cloudy dialysis fluid and symptoms despite antibiotic treatment [4]. In our clinical case, a fungal PI was suspected in view of the persistence of the symptoms after 7 days of antibiotic therapy.

The identification of the liquid drainage by mycological examination is the most important data to confirm the diagnosis and start an appropriate treatment. In the literature, the results of this antifungal treatment are variable. Amphotericin B, fluorocytosis, ketoconazole, miconazole, econazole, fluconazole, and more recently posaconazole and voriconazole are the most commonly used antifungals. Fluconazole has some advantages over other antifungals. Its bioavailability in the peritoneal cavity when administered orally or intravenously and good tolerance of it are the main ones [4]. According to the latest update of the ISPD recommendations [17], in addition to antifungal treatment, which must be carried out for at least 14 days and sometimes beyond 4 weeks, early catheter removal remains the cornerstone of the treatment of fungal PI. In the case of our patient, the catheter was removed after 5 days of antifungal treatment.

It should be noted that the ideal antifungal treatment has not yet been identified. The appropriate dosage, the routes of administration or the duration of the treatment have not been established, though it is agreed that treatment should last at least two weeks. Prophylaxis with fluconazole (100 mg/day), ketoconazole (200 mg/day) or nystatin has been shown to be effective in reducing the incidence of fungal PI [4].

In this case, the patient died of cardiogenic shock following decompensation of her heart disease. This often unfavorable evolution has been reported several times in the literature [2]. Nevertheless, the mortality rate in the world remains variable, ranging from 5 to 40% [2]. It is higher in patients with oligoanuria [18] and in those whose peritoneal catheters were not removed quickly once infections were diagnosed [1, 2]. In a study by Wang et al. [19], catheters were removed in 83% of cases of fungal PI after an average delay of 7 days, and the mortality rate was 44.3%. In another study, PD catheters were removed in all patients at diagnosis, and the mortality rate was only 20% [18]. The delay in diagnosis and management could explain the unfavorable evolution in our patient.

CONCLUSION

Fungal peritonitis due to *Geotrichum* remains very rare in the literature, and this case was a first

in our center. This experience should prompt clinicians to always consider it in the face of persistent signs of PI despite appropriate antibiotic therapy.

CONFLICT OF INTEREST

The authors declare no conflict of interest for this article.

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