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CASE REPORT

# A successfully treated case of peritonitis due to *Fusarium dimerum*☆

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**Summary** Fungal peritonitis is a rare but serious complication of continuous ambulatory peritoneal dialysis (CAPD). We report the first known case of CAPD peritonitis due to *Fusarum dimerum* successfully treated with antifungals and catheter removal.


## Introduction

Fungal peritonitis is a rare but serious complication of continuous ambulatory peritoneal dialysis (CAPD) with a reported mortality of 12–44%.[1] Approximately 4–8% of CAPD peritonitis has a fungal aetiology with 75% of these due to *Candida* species.[2] Infection by a variety of other yeasts and filamentous moulds has been reported less frequently. Cases of peritonitis due to *Fusarium* species have been reviewed in the past.[3] The organism has a propensity to attach to foreign bodies such as intra-vascular and intra-peritoneal catheters. We report the first case of CAPD peritonitis due to *Fusarum dimerum*.

## Case report

A 39-year-old man on CAPD was admitted to the renal unit with a 10-day history of cramping abdominal pain, and a cloudy dialysate effluent.

The patient was an insulin-dependent diabetic for more than 20 years with associated nephropathy, retinopathy and neuropathy. He was commenced on CAPD 6 months prior to this presentation and this was his first episode of peritonitis. On physical examination he looked well, he had a low grade fever and generalised abdominal tenderness, bowel sounds were present and there was no evidence of peritonism. There was no evidence of infection or inflammation at the peritoneal dialysis (PD) catheter site.

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PD effluent was sent for microscopy and culture and he was started on intra-peritoneal vancomycin and gentamicin in keeping with the local antibiotic policy. The initial PD fluid cell count revealed a white blood cell count of 2880/mm$^3$ with lymphocyte predominance and there were no organisms seen on the Gram stain. Two days later, culture revealed a light growth of a fungus, following which the initial antibiotics were stopped and he was started on intravenous liposomal amphotericin B 1.5 mg/kg/day and intravenous flucytosine 75 mg/kg/day. Three subsequent PD fluid samples also grew a fungus, which was later identified as *Fusarium dimerum* (Fig. 1a). His symptoms failed to improve, and 4 days after his admission his PD catheter was removed and a central venous catheter was inserted for temporary haemodialysis. Microscopy of the PD catheter contents showed fungal elements, which on culture grew *F. dimerum* again.

The patient improved dramatically after removal of the catheter. Following subsequent identification of the fungus as *F. dimerum*, the flucytosine was stopped and the dose of amphotericin B was increased to 3 mg/kg/day. The isolate was sent to the reference laboratory for susceptibility testing and the minimum inhibitory concentrations (MIC) were as follows, amphotericin-1 mg/l, itraconazole-16 mg/l, caspofungin-64 mg/l, and voriconazole-2 mg/l. Two weeks later, following complete resolution of his symptoms he was discharged home on haemodialysis. He was admitted for re-insertion of a new PD catheter four weeks following his episode of peritonitis and currently is back on CAPD. He remains well on his last follow-up visit.

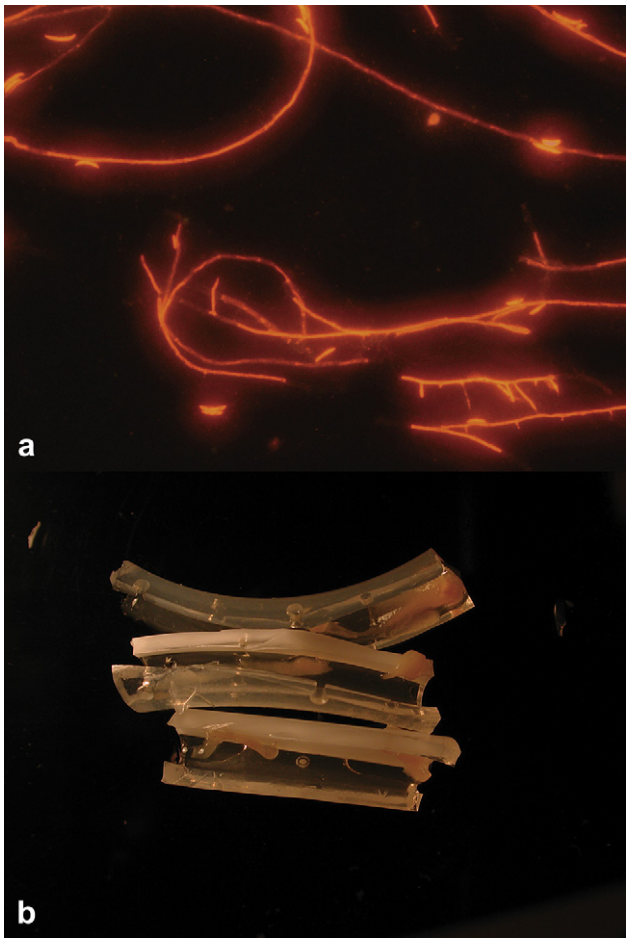


**Figure 1** a: *Fusarium dimerum* as seen under the fluorescent microscope. Slow growing species with smaller macroconidia (5—25 × 1.5—4.2 μm) in comparison to others and absence of microconidia. Macroconidia have 0—3 septa. The apical cell is hooked and the basal cell blunt or slightly notched. b: Cut section of PD cannula showing masses of fungal hyphae.

## Discussion

*Fusarium* species are soil-borne fungi that are distributed worldwide and are known to be plant, animal and human pathogens. In recent years disseminated *Fusarium* infection has emerged as a significant and usually fatal infection in immuno-compromised individuals, especially those with haematological malignancies.[4]

*Fusarium* peritonitis in peritoneal dialysis patients is rare but has been reported in the past. The clinical presentation is similar to that of bacterial peritonitis i.e. cloudy dialysate, diffuse abdominal pain, and fever. Our patient had no preceding history of bacterial peritonitis, which is a risk factor for fungal peritonitis.[5] Absence of response to conventional antibacterial antibiotics may indicate a possible fungal aetiology. The patient did not improve symptomatically when antifungal chemotherapy was started and removal of the PD catheter alone was associated with a dramatic improvement. Examination of a cut-section of the PD cannula revealed masses of fungal hyphae plugging the pores of the cannula (Fig. 1b). This has been reported in the past.[6] In a previous report *Fusarium* species actually invading the catheter was shown.[7] Systemic or intraperitoneal antifungal therapy, without removal of the PD cannula, has been associated with persistent infection resulting in the loss of an effective dialysis membrane. Consequently, once a CAPD cannula is colonised or invaded by a fungus, catheter removal is inevitable.

*Fusarium* species are resistant to many antifungals including flucytosine and may not be uniformly susceptible to amphotericin B. In-vitro sensitivity testing of the current isolate revealed the organism to be borderline susceptible to amphotericin B and resistant to itraconazole and caspofungin. The organism was susceptible to voriconazole, which has been used successfully in some cases.[8] The role of antifungal chemotherapy in CAPD peritonitis is mainly as an adjunct to PD catheter removal. The duration of treatment following catheter removal is not clear. Our patient responded well to two weeks of liposomal amphotericin B, following PD catheter removal and resumed CAPD four weeks after the initial episode.

The case we report is remarkable due to the unusual species involved. The *Fusarium* species most involved in human infections are *F. solani*, *F. oxysporum* and *F. moniliforme*.[9] *F. dimerum* has been involved in superficial infections, but has been involved only rarely in invasive infections.[10,11] To the best of our knowledge this is the only report of its involvement in CAPD peritonitis.

In conclusion, an aggressive approach to the treatment of CAPD peritonitis with these organisms is required, which should consist of early catheter removal with temporary

haemodialysis and adjunctive systemic antifungal therapy during and after catheter removal.

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