Fungal Peritonitis In A CAPD Patient Caused By *Emericella Nidulans*

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**Abstract:** Fungal peritonitis is uncommon in patients on continuous ambulatory peritoneal dialysis (CAPD); it is difficult to treat and has a high mortality rate. Aspergillus peritonitis is a rare complication of CAPD. The case describes eight year old boy on CAPD in whom Aspergillus nidulans (teleomorph Emericella nidulans) was isolated from the peritoneal fluid. Next to institution of appropriate antifungal therapy, early removal of the peritoneal catheter is recommended because retained catheter may serve as a nidus for persistent infection.

**Key words:** Fungal peritonitis, Aspergillus nidulans, CAPD

**Introduction:**
Children with end stage renal disease (ESRD) are treated with peritoneal dialysis. Peritonitis is a common complication of peritoneal dialysis. Incidence of fungal peritonitis reported in children is less than 3% (1-3) compared to adult where the incidence is 2.8-15% (4-7). The occurrence of fungal peritonitis in children can be multifactorial and not clear. However recent treatment for bacterial peritonitis increases the risk of fungal peritonitis. There is no clear agreement regarding treatment of fungal peritonitis, leading to various treatment modalities such as usage of antifungal drugs and catheter removal (8).

Aspergillus peritonitis is a rare complication of peritoneal dialysis. Fungal peritonitis had higher mortality than bacterial peritonitis in peritoneal dialysis patients.

**A case report:**
Eight year boy with a history of ESRD secondary to obstructive uropathy on continuous ambulatory peritoneal dialysis (CAPD) for one year was admitted with fever, abdominal pain and cloudy peritoneal effluent of short duration. The laboratory investigation correlated with the clinical picture and peritonitis was confirmed and patient was initiated on intraperitoneal antibiotics. He had catheter malfunction and no clinical improvement with treatment. Decision was made to remove catheter as fungal peritonitis was suspected and patient was converted to hemodialysis. Subsequently six weeks later he had peritoneal dialysis catheter reinserted and CAPD reinitiated.

**Microbiological findings**
The dialysate effluent was cloudy. On wet mount KOH examination: Fungal elements were seen. The specimen was inoculated in two Sabouraud’s dextrose agar and incubated at 25°C and 37°C respectively. The growth rate was slow in comparison to other significant *Aspergillus* spp. Hyphae were septate and hyaline. Plenty of brown globose cleistothecia were seen. Ascospores were reddish brown with two longitudinal crests (fig 1). The identification *Aspergillus nidulans* teleomorph *Emericella nidulans* was confirmed.

**Figure 1:** Lactophenol Cotton Blue Mount showing plenty of globose cleistothecia. Ascospores with two longitudinal crests (Magnification 400X)

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Mycolgy of Aspergillus nidulans

Macroscopic morphology

Colonies on potato dextrose agar at 25°C are dark green with orange to yellow in areas of cleistothecial production. (fig 2). Reverse is purplish to olive. Exudate is usually present and may be brown to purplish. Growth rate is slow to moderate in comparison with other clinically significant Aspergillus species(9).

Figure 2 Colonies on potato dextrose agar with orange to yellow in areas of cleistothecial production. Reverse is purplish to olive.

Microscopic morphology

Hyphae are septate and hyaline. Conidiophores are brown, short (60-150 μm in length), and smooth-walled. Vesicles are hemispherical, small (8-12 μm in diameter), with metulae and phialides occurring on the upper portion. Conidia are globose (3-4 μm) and rough. A. nidulans is a homothallic species capable of producing the telemorph (sexual stage) without mating studies. The ascomycetous telemorph (Emericella nidulans) produces brown to black globose cleistothecia (100-250 μm) that are engulfted with globose Hülle cells. Ascospores are reddish brown, lenticular (4 x 5 μm), with two longitudinal crests(9). This species has been reported from cutaneous aspergillosis, maxillary sinus disease osteomyelitis, pulmonary disease, and a cerebral abscess(9).

Discussion:

Fungal peritonitis in CAPD leads to high mortality and increased dropout rate from peritoneal dialysis. The major predisposing factor for fungal peritonitis is the recent treatment for bacterial peritonitis or even treatment with antibiotics for common childhood infections(8). The presence of the gastrectomy catheter has been reported to increase the incidence of fungal peritonitis(11).

A large number of fungal species have been found in patients with CAPD peritonitis. Predominating is C. albicans followed by C. tropicalis and other Candida species. Filamentous fungal peritonitis has also been reported(12). Unusual fungal species causing peritonitis are listed in table 1. Except for the dimorphic fungi, peritonitis originates from the environment or from the patients’ skin or mucous membrane.

Table 1

Unusual fungi in CAPD peritonitis

<table>
<thead>
<tr>
<th>Species/genus</th>
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<tbody>
<tr>
<td>Alternaria</td>
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<tr>
<td>Aspergillus sp</td>
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<tr>
<td>Cephalosporium sp</td>
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<tr>
<td>Coccioides immitis</td>
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<tr>
<td>Cryococcus laurenii</td>
</tr>
<tr>
<td>Cryococcus neoformans</td>
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<tr>
<td>Droschlera spicifera</td>
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<tr>
<td>Exophiala jeaneselmei</td>
</tr>
<tr>
<td>Fusarium sp</td>
</tr>
<tr>
<td>Histoplasma capsulatum</td>
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<tr>
<td>Mucor sp</td>
</tr>
<tr>
<td>Rhizopus sp</td>
</tr>
<tr>
<td>Torulopsis glaborata</td>
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<tr>
<td>Trichoderma sp</td>
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<tr>
<td>Trichosporon sp</td>
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Invasive fungal infections are a major challenge in the management of immunocompromised patients and those with renal dysfunction. Although filamentous fungal organisms in CAPD- associated peritonitis are low in incidence, they are often associated with significant morbidity and/or mortality. Currently, diagnosis is by a combination of clinical signs and symptoms, and isolation of the causative agent from CAPD fluid.

The management is to administer systemic and intraperitoneal antifungal drugs while continuing peritoneal dialysis. The timing of catheter removal varies from immediate removal to delayed removal. Delayed removal of 48-72 hours enables peritoneal lavage with antifungal which may result in peritoneal membrane conservation and prevention of peritoneal adhesions (1,8,13). The antifungal regimen is individualized in most situations and is not uniform.
After PD catheter removal patients are maintained on hemodialysis for a period of 4-6 weeks. PD catheter is reinserted after 4-6 weeks and peritoneal dialysis reinitiated.

Conclusion:
Fungal peritonitis is a challenging problem in CAPD patients. It needs aggressive management which includes PD catheter removal and antifungal drugs.

References: