Abdominal Abscesses And Encysted Fluid Collections After Catheter Removal For Peritonitis In Peritoneal Dialysis Patients: Management And Outcomes

* Ribat center for Regular Peritoneal Dialysis, Ribat University Hospital.  
** Department of Microbiology, Ribat University Hospital. Burri, Khartoum, Sudan

Abstract: This report describes three patients on continuous ambulatory peritoneal dialysis (CAPD) who developed abdominal abscesses following catheter removal for peritonitis. Two of these episodes were fungal with Candida spp. being the causative agent, while the third was caused by Pseudomonas spp. Subtypes of the causative organisms could not be identified due laboratory shortcomings. Each of the three patients received appropriate antimicrobial therapy following catheter removal according to culture and sensitivity results and the recommended treatment guidelines. None could resume PD; all were subsequently shifted to hemodialysis(HD). It would seem from this limited experience that, following recurrent peritonitis, while aspiration of encysted transudate abdominal fluids is probably adequate, thick-walled abscesses should probably be surgically drained with drains left in until pus is completely drained.

Key Words: CAPD, Fungal peritonitis, Pseudomonas peritonitis, Encysted abdominal fluid collection.

Introduction

Peritonitis is one of the most frequently encountered complications of CAPD since it has been introduced the in the Sudan in June 2005. By the end of January 2007 the peritonitis rate for the whole program was 1 episode per 14 patient-months (0.87 per year at risk)(1). Fungal infection is an uncommon cause of peritonitis in patients on CAPD; it carries a higher morbidity and mortality than bacterial infections. Reported complications include sclerosing peritonitis, adhesions with resulting bowel obstructions or stricture, invasion of the bowel wall, and abscess formation(2). Tapson et al described the clinical and microbiological features of 10 cases of fungal peritonitis: although all patients survived, morbidity was high. Abscess and adhesion formation were particular problems. Only two patients were able to return to CAPD after microbiological cure(3). Digenis et al reported four cases of abdominal abscess complicating peritonitis(4).

Pseudomonas aeruginosa peritonitis, similar to S. aureus peritonitis, is generally severe and is often related to a catheter infection. There may also be severe systemic manifestations, such as digital necrosis(5).

If catheter infection is present or has preceded peritonitis, catheter removal is necessary as per the International Society for PD (ISPD) guidelines(6). By the end of the first year of operation of the Sudan National PD program the culture negative peritonitis rate was 53%. Pseudomonas species was responsible for 13.3% of all episodes (1). This case report from Ribat PD center, the head-quarters for the seven centers constituting the Sudan National Peritoneal Dialysis Program, describes three episodes of abdominal abscess/ fluid collection complicating catheter removal for different types of peritonitis.

Text

Table 1 shows data of the three cases of encysted abdominal fluid collection complicating catheter removal for peritonitis. Regarding peritonitis risk factors, all three patients received multiple antibiotics for several prior episodes of peritonitis during their PD course. H.M. had extrusion of the external cuff and fluid leak from the exit site prior to the diagnosis of peritonitis. Laboratory constraints precluded recognition of subtypes of the causative organisms. All catheters were removed by surgical dissection; the peritoneum, as well as the abdominal wall was closed in layers. All patients received appropriate antimicrobial therapy according to the ISPD
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guidelines and culture sensitivity. J.A. presented with abdominal pain, abdominal distension and fever, while the other two presented only with abdominal distension and discomfort.

Table 1: clinical summary of three CAPD patients with encysted abdominal fluid collection following catheter removal for peritonitis

<table>
<thead>
<tr>
<th>Parameter</th>
<th>J.A.</th>
<th>A.H.</th>
<th>H.M.</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>66</td>
<td>42</td>
<td>73</td>
<td>60.3</td>
</tr>
<tr>
<td>Duration on PD (months)</td>
<td>21.4</td>
<td>9.4</td>
<td>5.9</td>
<td>12.2</td>
</tr>
<tr>
<td>Predisposing factor to peritonitis</td>
<td>Several antibiotic courses for previous peritonitis episodes. Type 2 DM</td>
<td>Several antibiotic courses for previous peritonitis and exit site infection episodes.</td>
<td>Catheter-related peritonitis.</td>
<td></td>
</tr>
<tr>
<td>Causative organism</td>
<td>Candida spp</td>
<td>Candida spp</td>
<td>Pseudomonas spp</td>
<td></td>
</tr>
<tr>
<td>Interval between diagnosis of peritonitis and catheter removal (days)</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Antimicrobial therapy</td>
<td>Fluconazole 200mg OD for 3 weeks</td>
<td>Fluconazole 200mg OD for weeks</td>
<td>Gentamicin and oral Ofloxacin for 3 weeks</td>
<td></td>
</tr>
<tr>
<td>Interval between catheter removal and fluid collection (days)</td>
<td>15</td>
<td>48</td>
<td>31</td>
<td>31.3</td>
</tr>
<tr>
<td>Outcome</td>
<td>Transferred to HD</td>
<td>Transferred to HD</td>
<td>Transferred to HD</td>
<td></td>
</tr>
</tbody>
</table>

**J.A.**

This is a 66 year old male with long standing diabetes mellitus and end stage renal failure due to diabetic nephropathy. He had been on CAPD for 21.4 months. He got his first peritonitis 6 months of commencing CAPD. Thereafter he contracted several attacks of culture negative peritonitis for which he received multiple courses of empirical intraperitoneal (IP) antibiotics according to the ISPD guidelines. He started the last antibiotic course two weeks prior to the diagnosis of fungal peritonitis after which he was immediately started on oral Fluconazole 200 mg daily for 3 weeks. The catheter was removed on the next day and the patient was shifted to HD. Two weeks following catheter removal he presented with high grade fever, abdominal pain, and pus discharging from the old exit site. Abdominal CT scan revealed two separate fluid collections; the first was a localized pus collection in the old catheter tunnel draining by the exit site and the second was a fluid collection in the anterior abdominal wall extending to both lumbar and iliac fossae (Figure 1). The pus collection at the tunnel site was surgically drained. Ultra-sound guided diagnostic aspiration of the fluid from the anterior abdominal wall revealed a clear yellow transudate with a total white count of 50 cells/cubic millimeter, the culture of which revealed no organisms.
Conservative management by careful follow-up with serial ultra-sound scans was decided. Until the time of writing this report the fluid remains static in size and consistency causing no troublesome symptoms.

**A.H.**

This is a 42 year old female who had been on CAPD for 9.36 months. She was transferred from HD after a failed arteriovenous fistula and difficult vascular access. She contracted her first peritonitis attack 3 weeks after starting CAPD. Following the treatment of the second attack she continued to have on and off abdominal pain and diarrhea, with abdominal tenderness and guarding despite clear peritoneal effluent. At this period she had hypokalemia; serum potassium of 2.1 mmol/L. Upon an impression of subacute intestinal obstruction she was managed conservatively with potassium supplements and nil orally for few days followed by gradual introduction of soft foods. However, she continued to suffer from intermittent abdominal discomfort. Five months later she presented with exit site infection for which she received an oral empirical antibiotic. One week afterward she presented with insidious onset of abdominal pain and cloudy peritoneal fluid. Peritoneal fluid analysis revealed *Candida spp.* She was immediately started on Fluconazole 200 mg daily for 3 weeks, the catheter was removed 4 days later, and patient was shifted to HD. Seven weeks later she presented with painless abdominal swelling, she was afebrile and otherwise feeling well. Abdominal CT scan reported a large collection with an air fluid level which was extending from the right subdiaphragmatic area down to the left iliac fossa. The wall

**Figure (2): Abdominal CT scan of A. H. showing a large collection with an air fluid level**

was thick and enhancing (Figure 2). Aspiration under ultrasound guidance revealed a large amount of pus, but complete drainage was not feasible. The patient’s symptoms have largely abated; subsequent ultrasound scan showed remaining fluid that is also under close surveillance.

**H.M.**

This is a 73 year old male with dilated ischemic cardiomyopathy. He had been on CAPD for 5.9 months. CAPD was his initial renal replacement therapy. He was referred to us with peritonitis from another center where the Tenckoff catheter was inserted and CAPD commenced 4 months earlier. Upon referral he had extrusion of the external catheter cuff. Culture of the effluent revealed *Klebsiella spp.* that was successfully treated with IP antibiotics according to sensitivity results for three weeks. The external cuff was totally shaved. Few days later he experienced fluid leak from the exit site. This was managed successfully with low fill volumes in the supine position. Several weeks afterward he was self-treated with a 3-day course of IP antibiotics for episodes of cloudy effluent without informing the center. Later he presented with frank clinical peritonitis caused by *Pseudomonas spp.* that was likely catheter-related, but this was not microbiologically confirmed. The catheter was therefore removed and the patient shifted to HD with two antibiotics according to sensitivity results. About a month later he presented with painless, superficial abdominal swelling. Ultrasonic scan reported left lumbar and left iliac fossa fluid collection extraperitoneally. Complete aspiration was successful. Microbiological analysis of the aspirate showed a total white blood cell count of 50 cells/cubic millimeter and no organism was isolated. The patient is symptom-free and stable on HD for the past two months.

**Discussion**

Among patients undergoing PD, peritonitis resulting from fungi carries a higher morbidity and mortality than bacterial infections. Reported complications include sclerosing peritonitis, adhesions with resulting bowel obstructions or stricture, invasion of the bowel wall, and abscess formation. *Pseudomonas* infections are often difficult to eradicate, are associated with catheter infection, and, in severe cases, may result in damage to the peritoneal membrane. Immediate catheter removal is recommended for fungal peritonitis *per se*, and *Pseudomonas* peritonitis complicating an exit site infection(6). In this report we describe encysted intra-abdominal collections following two episodes of *Candida* peritonitis and an episode of *Pseudomonas* peritonitis.
necessitating aspiration. These cases suggest that catheter removal for such cases needs to be accompanied by adequate lavage, and possibly leaving an intra-abdominal drain with the purpose of preventing that complication. Another potentially sound approach is to keep the peritoneum wet by inserting a temporary peritoneal catheter and resuming PD while using IP, in addition to systemic antifungals. This has resulted in preservation of the peritoneum and increasing the chances of reintroducing the Tenckoff catheter successfully as described by Keogh et al(7). If fluid collection proves to be infected as in one of our cases, open surgical drainage will probably be more effective than aspiration. On the other hand, encysted fluids of transudate nature will probably do well on simple ultrasound guided needle aspirations.

References


