

Case Report

***Actinomyces* peritonitis: removal of the peritoneal catheter unnecessary for resolution**

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Introduction

Peritonitis is one of the most frequent complications in peritoneal dialysis (PD) patients. Most of them have a bacterial origin, especially gram-positive microorganisms. *Actinomyces* peritonitis is rare in PD patients, in spite of being part of the normal flora in the oral cavity, gastrointestinal and genital tracts [1]. *Actinomyces* is a filamentous gram-positive bacterium that lives in aerobic and anaerobic conditions [1]. It has a low virulence potential, usually causing opportunistic diseases. Factors that predispose towards abdominal *Actinomyces* infections include surgery, trauma, neoplasia or a perforated viscus. Penicillin is still the treatment of choice, but there are other effective antibiotics, such as erythromycin, clindamycin or tetracycline [2]. *Actinomyces israelii* is the major human pathogen of this species. We report a peritoneal infection due to *Actinomyces neuii*, a microorganism firstly described in 1985. In the present case, the removal of the catheter was not necessary for healing, unlike other cases published in the literature.

Case report

A 70-year-old man presented with a history of 8 hours of abdominal pain and cloudy peritoneal effluent. He was diagnosed with end-stage renal disease (ESRD) due to nephrosclerosis and has been treated by automated peritoneal dialysis (APD) since October 2006. He had had six previous episodes of peritonitis due to diverse agents, all resolved with intraperitoneal antibiotic treatment. The first episode also required peritoneal catheter removal for its resolution. He reported no fever or gastrointestinal symptoms, nor disconnections of the dialysis circuit.

Physical examination detected diffuse abdominal pain, but no tenderness or guarding. The rest of the examination was normal. After admission, the peritoneal effluent was sent for cytological examination, gram stain and aerobic, anaerobic and fungal cultures. The first cellular count showed 1140 cells per microlitre with 98% neutrophils and 2% macrophages. Gram stain showed leucocytes but not bacteria. The

empirical treatment for peritonitis included ampicillin, teicoplanin and tobramycin (he is allergic to vancomycin). The initial dose of the antibiotics was: 800 mg of teicoplanin, 1 g of ampicillin and 100 mg of tobramycin, all of them administered by intraperitoneal route. Maintenance dose was: 400 mg of teicoplanin at 48 hours and later every 5 days, 250 mg of ampicillin in each change and 50 mg of tobramycin in the nocturnal bag.

After diagnosis of peritonitis, as is usual in our hospital, the patient was changed to continuous ambulatory PD, with four peritoneal exchanges daily for observation. The peritoneal effluent caught on at 48 h. Five days after diagnosis, we performed another cellular count in the peritoneal effluent which showed 20 cells per microlitre, with 74% macrophages, 21% lymphocytes and 4% neutrophils. Peritoneal culture was firstly reported sterile, so at this moment, we decided to withdraw ampicillin but maintain tobramycin and teicoplanin until 2 weeks of treatment were completed. Four days after finishing the antibiotics, the laboratory reported that a filamentous and gram-positive bacterium grew in the first culture, *Actinomyces*. At that moment, our patient was asymptomatic and peritonitis seemed to be cured, so the treatment was not re-introduced. Follow-up was performed and another sample of the effluent confirmed the absence of microorganisms. Catheter removal was not, therefore, required to cure the infection and the patient was then definitely asymptomatic, in APD and with good control.

Discussion

The frequency of peritonitis in PD patients has been reduced in recent years, but it remains a major complication in these patients, accounting for considerable mortality and hospitalization rates. It is well known that coagulase-negative *Staphylococcus* is a very common cause of peritonitis, usually due to touch contamination. Other microorganisms, like *Staphylococcus aureus* and *Pseudomonas aeruginosa*, are most often due to catheter-related infections [3].

Peritonitis due to gram-negative microorganisms is usually associated with other clinical problems. Sterile perito-

Table 1. Cases reported in literature of *Actinomyces* peritonitis in PD patients

	Age (years)	Gender	Cause of ESRD	Dialysis type	Etiology	Antibiotic treatment	Removal of the catheter
De Santo <i>et al.</i> [6]	15	Female	Chronic pyelonephritis	HD ^a	<i>Actinomyces</i> spp.	Penicillin, tetracycline, streptomycin	^a
Benevent <i>et al.</i> [7]	24	Male	Bilateral hypoplasia	CAPD	<i>Actinomyces odontolyticus</i>	Cephalothin ^b , cefotaxime, tobramycin, vancomycin, gentamicin, TMT-STX	Yes
Hiremath <i>et al.</i> [8]	60	Male	Fabry's disease	CCPD	<i>Actinomyces</i> spp.	Cefazolin, ceftazidime, vancomycin, clindamycin	Yes
Present case	70	Male	Nephroangiosclerosis	CCPD	<i>Actinomyces neuui</i>	Ampicillin, teicoplanin, tobramycin	No

HD, hemodialysis; CCPD, continuous cyclical peritoneal dialysis; CAPD, continuous ambulatory peritoneal dialysis.

^aBefore the beginning of HD she had PD on two occasions. There is no information about the removal of the catheter but we supposed that they withdrew it because the patient developed HD.

^bThese antibiotics had been used before the infection of *Actinomyces* but they continued treatment with them for 2 weeks more until they saw that the only necessary treatment was the removal of the catheter.

nititis is reported in 20% of peritonitis [4], and many of them are caused by slow growth microorganisms. The removal of the catheter is most frequent in peritonitis caused by gram-negative microorganisms [5] and in co-infections with other agents. It is necessary to consider it when the evolution of the infection is more than 5 days to preserve the peritoneum and to reduce mortality.

Actinomyces peritonitis is a very uncommon cause of peritonitis in PD patients. There are only three cases reported in the literature (Table 1) prior to the present case. Epidemiological data shows that the infection can occur in individuals of all ages. Abdominal actinomycosis has been described more frequently in men, with three cases reported in males and only one in a female. It seems that there is no relation between the cause of the ESRD and the infection of *Actinomyces* because it was reported in patients with different renal disease aetiologies. The modality of PD seems not to influence the appearance of actinomycosis because infection has been described in both types of PD treatments. The removal of the catheter seems to be more advisable when co-infections with other agents are present, as in the case reported by De Santo *et al.* (co-infection with *E. coli* and *Candida* sp.) or that reported by Benevent *et al.* (co-infection with *Flavobacterium*). In the case described by Hiremath *et al.*, the removal of the catheter was necessitated by the persistence of peritoneal inflammation. In contrast to the other cases reported, the outcome of peritonitis in our patient was successful with antibiotics and it was not necessary to remove the peritoneal catheter. There are few antibiotics used in the clinical practice that seem to be useful for these cases, but we cannot forget that penicillin is usually the treatment of choice. We obtained the antibiogram when the treatment was finished. We were not able to identify which antibiotic resolved the peritonitis, but *Actinomyces* is sensitive to penicillins so it may have been that ampicillin played an important role. This experience reinforces the idea of in-

cluding ampicillin in our empirical treatment of peritonitis. There is not sufficient information in the literature about the optimal duration of the treatment. Some groups recommend a treatment of between 2 and 6 weeks. It seems to be reasonable that treatment should continue until negative cultures are obtained and to perform a suitable follow-up to confirm its eradication.

In conclusion, this is an exceptional case of peritonitis due to *Actinomyces neuui* that benefitted from an early diagnosis and an appropriate antibiotic treatment, allowing the removal of the peritoneal catheter to be avoided.

Conflict of interest statement. None declared.

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