Case Report

Rhodococcus equi in CAPD-associated peritonitis treated with azithromycin

S. Hoque, A. Weir, R. Fluck and J. Cunningham
Royal London Hospital, Whitechapel, London, UK

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Introduction

Continuous ambulatory peritoneal dialysis (CAPD) is the commonest form of dialysis used as renal replacement in the UK. Its most frequent complication is peritonitis, often involving bacteria that are commensals [1]. We describe a case of CAPD-associated peritonitis caused by Rhodococcus equi (R. equi) and discuss therapy with azithromycin.

Case report

A 74-year-old man presented with a 1-day history of abdominal pain and cloudy dialysis fluid. Fifty years previously he had had a left orchidectomy and an inguinal hernia repair had been performed because of an undescended testis. Five years later he was found to have a left hydronephrosis requiring nephrectomy. He had psoriasis and a mild polyarthropathy. Fifteen years before this presentation he was noted to have impaired renal function, which declined until he required haemodialysis. Two years prior to admission a Tenckhoff catheter had been inserted and CAPD begun. Two episodes of peritonitis due to coliform organisms had responded to intraperitoneal antibiotics. At presentation his only medication was aluminium hydroxide.

The patient lived in a house next to a bridleway which was regularly used by horse riders, and he walked his dog along it. The dog was fed in the kitchen and its bowl washed in the kitchen sink. The patient used an adjacent surface to perform his CAPD fluid bag exchanges.

On examination he was afebrile. There was abdominal tenderness but no sign of an exit-site infection associated with his Tenckhoff catheter. Microscopy of the dialysate showed 600 WBC/mm³ (90% neutrophils); no organisms were seen on Gram stain, and direct culture was negative. The fluid enrichment broth grew salmon pink colonies, which were morphologically and biologically identified as R. equi. It was found to be sensitive to penicillin, erythromycin, vancomycin, and netilmicin. Rifampicin sensitivity was not tested. The patient was treated with a 10-day course of intraperitoneal vancomycin and netilmicin according to our standard protocol. His abdominal pain abated and the exchange bags cleared.

Seventeen days after the initial presentation, the patient complained of abdominal pain and distension with cloudy exchange bags. Microscopy of the dialysate showed 700 WBC/mm³ (100% neutrophils); no organisms were seen but R. equi was again grown from the enrichment culture. Antibiotic sensitivities were as before and this time rifampicin resistance was noted. Treatment was commenced as before with the addition of oral amoxycillin. The patient's symptoms failed to improve and he was admitted. Abdominal ultrasound and CT scans were normal. The intraperitoneal antibiotics were continued but amoxycillin was stopped and replaced by oral azithromycin. A standard dose of 500 mg once daily for 3 consecutive days was used. There was clinical improvement and dialysate WBC fell to 8/mm³ with no growth. The patient was discharged. However, 3 weeks after admission the patient relapsed. The Tenckhoff catheter was removed and a further 3-week course of azithromycin was given. He remained well on haemodialysis, and subsequently another Tenckhoff catheter was inserted. To date the R. equi has not returned.

Discussion

R. equi is an aerobic, non-motile Gram-positive coccobacillus [2]. It is an important pathogen of horses and other farm animals. The organism can be excreted in the faeces of horses and in this case the dog may have been a vector of transmission. Increasingly it is being described in humans [3], especially as an opportunistic pathogen in HIV-1-infected patients, where it manifests...
most commonly as a cavitating pneumonia [4]. \textit{R. equi} has been isolated from CAPD dialysate before [5] but this is the first description of treating such an infection with azithromycin.

\textit{R. equi} acts as a facultative intracellular organism, multiplying in the phagosomes of macrophages and eventually destroying them [6]. Azithromycin is one of a new subclass of macrolides called the azalides, which preferentially accumulate in macrophages and polymorphonuclear cells [7]. Preferential delivery of azithromycin to the site of infection is enhanced by cellular inflammatory processes [8] and peritoneal fluid is rich in macrophages. Azithromycin has been shown to be effective against intracellular organisms such as \textit{Legionella} [9], and against Gram-positive bacteria has a similar spectrum of activity to erythromycin [10]. Combination antibiotic therapy for about 2 months is recommended for the treatment of \textit{R. equi} [11], as it has a propensity to form abscesses and relapses can occur [12]. We were unable to use rifampicin and resistance develops rapidly to penicillin—our patient had failed to respond to oral amoxycillin. Thus it was decided to use azithromycin as the long-term oral antibiotic to treat recurrent \textit{R. equi} infection, in combination with catheter removal.

Routine laboratory antibiotic assays are not particularly useful in monitoring intracellular antibiotics [13]. However, we did demonstrate a CAPD fluid cidal effect to the patient’s \textit{R. equi} to a back titration of 1:2 dilutions. We also demonstrated the antibacterial effect of the patient’s CAPD fluid against the patient’s \textit{R. equi} and a control organism \textit{Staphylococcus aureus}. The zone size was larger for the \textit{R. equi} indicating that the azithromycin was reaching its target site. Erythromycin can be used in the laboratory to test for sensitivity to azithromycin.

Azithromycin concentrations in the tissues remain high even after the serum levels have fallen. This affects the dosage regime—we administered 500 mg orally daily for the first 3 days of each week, this dose being expected to produce effective drug levels in the tissues for up to 10 days [14]. Whether this is the case in CAPD fluid has yet to be investigated. The antibiotic is mainly metabolized and excreted by the liver. To date azithromycin has not been experimentally assessed as an oral adjunctive antibiotic in the treatment of CAPD infections. Clinical trials have shown effectiveness in treating respiratory [15], urogenital [16], and skin and soft tissue infections [17]. We feel that the antimicrobial spectrum and pharmacokinetic properties of azithromycin warrant further study in patients with CAPD peritonitis.

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