CAPD, swimming in Shewanella

Sir,

Peritonitis is a major complication associated with continuous ambulatory peritoneal dialysis (CAPD). It is the most frequent cause for discontinuation of CAPD [1]. *Shewanella (Pseudomonas) putrefaciens*, a rare pathogen in humans, can produce a number of clinical syndromes [2]. We present a case of *S. putrefaciens* as a cause of CAPD peritonitis associated with splenic abscess in a patient with end stage renal disease treated with CAPD. Isolation of rare organisms from relatively clear PD fluid should alert one to other associated intra-abdominal pathology.

Case. A 69-year-old Caucasian man, who had been on CAPD for 4 years, due to polycystic kidney disease-related renal failure, presented with fevers, rigors, upper abdominal pain, progressively worsening shortness of breath and generalized weakness. He was febrile (39°C), dehydrated and hypotensive (90/60 mmHg). There was epigastric tenderness but no masses or clinical organomegaly. Bowel sounds were present. His peritoneal dialysis catheter exit site was clean. A 2 cm irregular ulcer with an erythematous and swollen border was noted on the right lower leg. No stigmata suggestive of endocarditis were apparent. His past history included previous coronary artery bypass surgery; insulin-treated diabetes mellitus and a cholecystectomy.

Laboratory investigations showed a mild anaemia (91 g/l) and leucocytosis (11.5 × 10⁹). Electrolytes were consistent with chronic renal failure. Liver function tests were normal. The peritoneal dialysate was visually clear. Chest and abdominal X-rays were unremarkable. Trans-oesophageal echocardiography showed mitral, tricuspid and trivial aortic regurgitation, with an ejection fraction of 30%. No vegetations or thrombus were identified. Contrast enhanced abdominal CT scan revealed a complex, multi-loculated fluid collection, involving the anterior aspect of the spleen and abdominal wall laterally, consistent with a splenic abscess (Figure 1). Cultures of the peritoneal fluid grew a mixture of organisms, *Klebsiella pneumonia*, *Proteus mirabilis* and predominantly *S. putrefaciens*. Gram-negative rods identified as *S. putrefaciens* were isolated from blood cultures. Urine sample was sterile.

The patient underwent CT-guided drainage, with aspiration of approximately 200 ml of brown coloured fluid. *Shewanella putrefaciens*, *Bacteroides fragilis* and *K. pneumonia* were isolated. These organisms were sensitive to gentamicin, tobramycin, ampicillin, ciprofloxacin and meropenam.

The patient was treated by continuous drainage of the splenic abscess with continuation of peritoneal dialysis. The lower leg ulcer was dressed regularly with dramatic improvement. Conservative therapy for 6 weeks with broad-spectrum intravenous antibiotics and subsequent oral ciprofloxacin and metronidazole failed to resolve the splenic abscess, necessitating splenectomy with retention of the CAPD tube. Examination of the gross spleen specimen confirmed an abscess cavity. He was haemodialysed post-operatively for 2 weeks and subsequently recommenced on peritoneal dialysis without complication.

Comment. Most episodes of peritonitis result from colonization by Gram-positive organisms (60%), with Gram-negative bacteria accounting for 15% of cases and a sterile dialysate in 20% of cases [1]. In this report, we present *S. (Pseudomonas) putrefaciens*, as a cause of CAPD periton-
Shewanella putrefaciens is a saprophytic Gram-negative rod that produces a number of clinical syndromes including bacteremia and various soft tissue and intra-abdominal infections [2]. It is most commonly thought of as a contaminant along with other bacteria (Echerichia coli, K. pneumonia, Enterococcus, Pseudomonas aerogenosa, Morganella morgani, Viridens streptococcus, Bacteroides fragilis and Proteus mirabilis) [2] or as a saprophyte, surviving with other organisms on previously damaged tissues in the body [3]. Consequently, its pathogenic role and clinical significance is uncertain.

Shewanella putrefaciens is found in various environmental and animal sources including all forms of water (fresh, stagnant, sea, lake, river, and sewage), fish, oily foodstuffs and soil [2]. Shewanella putrefaciens has been associated with biliary tract infection, empyema, skin and soft-tissue manifestations, including fulminant peri-orbital-facial cellulitis, dacrycystitis, perianal abscess, finger abscess, traumatic/burns lesions of the lower limbs [2,3]. It has also been described with pneumonia in premature babies [3]. Most of these patients had predisposing factors such as malignancy, hepatobiliary disease, neutropenia or prematurity. Renal failure may also represent a potential predisposing risk factor. The finding of a splenic abscess due to S. putrefaciens, in a patient on CAPD has not previously been documented. The pathogenesis of these findings is difficult to resolve and the ports of entry remains poorly defined. In this case, a possible source of infection is river water as the patient is an avid swimmer and trap fisher and has been participating in both activities at the river near to his home. Although investigation of collected samples of river water did not reveal any offending agent, factors such as river currents and the depth from which the samples were retrieved might confound the analysis. Possible ports of entry for the infection include via the leg ulcer while fishing or swimming, followed by haematogenous spread of the organism to the spleen and peritoneal cavity resulting in formation of a splenic abscess and peritonitis.

The literature supports an association between S. putrefaciens and leg ulceration with subsequent septicaemia as a result of exposure to seawater [4]. Another possibility is direct entry from colonization of the peritoneal dialysis exit site while swimming although this hypothesis is less likely as the patient claimed the exit site was well covered. Whatever the mechanism, it may be prudent to warn patients on CAPD who are avid swimmers of the importance of adequate coverage of entry sites and also any sites of potential infection such as ulcers. Also, failure of peritonitis to resolve or relapse of peritonitis and the presence of multiple organisms including S. putrefaciens should alert one to associated intra-abdominal pathology [5].


