uremic pruritus. Our case confirms the efficacy of this approach in a haemodialysis patient with very severe clinical manifestations of the disease, which led her to attempt suicide. In this unblinded single patient we cannot exclude a placebo effect, which can be particularly relevant in patients with pruritus. However, no placebo effect could be observed with all the other treatments (antihistamines, steroids and UVB light) carried out in this patient. In addition, a consistent pharmacological effect from cyclosporin is indicated by the response to challenge, withdrawal and rechallenge.

Although the potential side effects of an immunosuppressive drug in dialysis patients should be kept in mind, our results indicate that cyclosporin treatment might be a new effective approach to severe uremic pruritus refractory to conventional treatment modalities, provided that appropriate patients are selected and careful monitoring is performed. Our observation and hypothesis need to be confirmed by a placebo-controlled double-blind trial.

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Treatment of digoxin intoxication model by hybrid-kidney with hollowfibre module for clinical haemodialysis

Sir,

Although haemoperfusion is frequently used for the treatment of drug intoxication, this has some disadvantages and its use is limited [1]. We have previously reported a unique hybrid-type artificial kidney by culturing the immortalized renal proximal tubule cells with the introduction of multidrug resistance protein (MDR)-1 in the hollowfibre module for cell culture [2]. Moreover, we scaled up the system by connecting 10 modules in parallel and successfully treated dogs with digoxin intoxication, a substrate of MDR-1 [3]. Although this device was effective for the dog, we should further increase the number of modules connected for future clinical use. Here, we succeeded in scaling up the ‘hybrid-kidney’ by utilizing a single clinically used haemodialyzer and evaluated the efficacy for drug removal in vitro and in dogs with digoxin intoxication.

We used the same cell line, into which cDNA of human MDR-1 [4] was introduced. This clone, named PCTL-MDR, possesses about 100 times larger Km and Vmax values for digoxin than control cells, named PCTL [2]. A hollowfibre module available for clinical haemodialysis (APS-08S; Asahi Medical, Tokyo, Japan) made of polysulfone with a surface area of 0.8 m² was purchased. We inoculated the cells onto the hollowfibre by an almost identical method to that reported previously [2,3]. Thus, 5.4 x 10⁹ cells were injected on the pericapillary side of the module and cultured for 1 week in a CO₂ incubator at 37°C. After incubation, transport of digoxin and inulin from the capillary to pericapillary side were evaluated in vitro. We found that >85% of perfused digoxin was transported from the capillary to pericapillary side by the system with PCTL-MDR, while such transport was only ~10% with PCTL and 20% without cells, respectively. Inulin concentration was not reduced on the venous side by the system with the cells, indicating that leakage did not occur. Next, we applied this to the dog model with digoxin intoxication [3,5]. Using PCTL-MDR, the digoxin concentration decreased to the therapeutic level at the end of a 3-h treatment. Although treatment with PCTL reduced digoxin concentration, the observed decrease was significantly smaller than with PCTL-MDR (Figure 1). Estimated digoxin clearance with PCTL-MDR was 31 ± 2 ml/min. Slight leukocytopenia and thrombocytopenia, and elevated activity of circulating granulocyte elastase, was detected. However, the magnitude of these parameters was similar between three trials, and dogs tolerated this treatment well. Comparing digoxin clearance in the present experiments with that of adult [6], we propose to treat patients by increasing surface area of the single haemodialyzer to 2 m², which is now commercially available. Thus, the present results suggest that our scaled-up module has sufficient capacity to treat digoxin-intoxicated patients, especially when complicated by renal failure. It might be useful to apply it to various types of artificial hybrid-kidneys with different types of cells for the treatment of patients in the future.

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Peritoneal dialysis-related peritonitis with bacteraemia due to Erysipelothrix rhusiopathiae

Sir,

Case. A 49-year-old bricklayer with end-stage renal failure secondary to adult polycystic kidney disease had been on continuous ambulatory peritoneal dialysis (CAPD) for 1 year. He presented with a 1-day history of abdominal pain, rigors and cloudy bags. Multiple excoriations were present on his hands. The CAPD fluid had a white cell count (WCC) of > 100 x 10^6/l with no red cells. The fluid was inoculated into an Oxoid bottle (Oxoid signal blood culture system, Oxoid Ltd, Basingstoke, UK). Filtration was not performed as only 20 ml was received. The peripheral WCC was 12.7 x 10^9/l. Intraperitoneal vancomycin and gentamicin were commenced. His abdominal pain failed to settle, and by day 4 signs of severe peritonitis were present. Blood cultures were taken and repeat CAPD fluid had a WCC of >100 x 10^6/l. Laparotomy was performed with removal of the Tenchkoff catheter and peritoneal lavage. Purulent free fluid was present throughout the abdominal cavity. The CAPD fluid was sterile and the patient responded to medical treatment was with intravenous gentamicin and intraperitoneal vancomycin and gentamicin was a common first-line treatment for CAPD peritonitis [3]. Most Gram-positive rods are vancomycin sensitive. Only one reported case of bacteraemia or endocarditis has been treated successfully with ciprofloxacin [4]. Our patient had improved by the time sensitivities were available, so ciprofloxacin was continued instead of switching to penicillin.

This is the second reported case of CAPD peritonitis caused by this organism, and the first European case. The first case occurred in a rancher who cut his hand on a barbed wire fence around an animal enclosure 2 weeks before admission [5]. He became pyrexial with a skin lesion on his hand. Initial treatment was with intravenous gentamicin and intraperitoneal amikacin, changed to intravenous penicillin following isolation of the organism from CAPD fluid. No organisms were seen on the Gram stain. In contrast to our case, blood cultures were sterile and the patient responded to medical treatment.

CAPD peritonitis may occur by several routes. The most common is thought to be intraluminal and is the major route for skin and environmental organisms. The extraluminal (i.e. tunnel migration) route may complicate exit site infections. The transluminal route (i.e. migration across the bowel wall) involves bowel flora. Infection by the haematogenous route may complicate bacteraemia. The intraluminal or haematogenous route seems most likely in this case. No direct animal exposure was documented, but inoculation from a contaminated environmental source may have occurred through excoriated hands.

This case demonstrates the importance of identifying and determining the sensitivity of all isolates from CAPD fluids. Ciprofloxacin may be used to treat E. rhusiopathiae bacteraemia in patients with a severe penicillin allergy.

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