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## Peritonitis caused by *Pantoea agglomerans* in peritoneal dialysis<sup>☆</sup>

## Peritonitis causada por *Pantoea agglomerans* en diálisis peritoneal

Dear Editor,

*Pantoea agglomerans* is a germ that infrequently causes peritonitis in peritoneal dialysis patients. Let us look at the case of a peritoneal dialysis patient who presented with peritonitis due to this germ.

The patient was an 83-year-old man living in an urban environment, who carried out basic daily activities independently and who had been on outpatient peritoneal dialysis with 4 daily exchanges for 4 years. The cause of the chronic kidney disease was nephroangiosclerosis, with no other comorbidity. The patient was well adapted to the dialysis and had no adequacy, ultrafiltration or fluid overload problems. However, he had suffered 6 episodes of peritonitis. Peritonitis is defined as peritoneal inflammation caused by microorganisms, with the presence of cloudy peritoneal fluid, a count of more than 100 leukocytes/ $\mu$ l with more than 50% polymorphonuclear cells. It remains the most significant complication deriving from the dialysis technique itself. It is generally caused by Gram-positive skin bacteria such as *Staphylococcus epidermidis* and *Staphylococcus aureus*, or by enterobacteria and fungi. Prevention is the fundamental weapon, acting on the routes by which microorganisms enter the peritoneal cavity: peritoneal access, connection systems, dialysis solutions and examinations that enable infection. The germs identified in the previous peritonitis episodes were gram-positive. The patient had been retrained in the performance of the dialysis technique on multiple occasions to try to prevent new

episodes and it had been proven that he was not a nasal carrier of *Staphylococcus aureus*.

The patient came to the dialysis unit complaining of abdominal pain and with a cloudy peritoneal effluent, detected in the last exchange. He had not had fever, nausea, or intestinal transit alterations. His count was 560 leukocytes/ $\mu$ l with 80% polymorphonuclear cells. Examination revealed signs of peritoneal irritation. Gram stain and cultures were taken. Treatment was started with intraperitoneal cefazolin and tobramycin. Since the patient's condition was unchanged, he was monitored as an outpatient. At the 48-h follow-up, he showed a clinical improvement with clear peritoneal fluid, a peritoneal count below 100 leukocytes/ $\mu$ l, and the culture received tested positive for *Pantoea agglomerans*.

*Pantoea agglomerans* (formerly known as *Enterobacter agglomerans* and previously as *Erwinia agglomerans*) is a gram-negative bacillus from the *Enterobacteriaceae* family which basically causes nosocomial infections in immunocompromised patients,<sup>1</sup> our elderly patient and in dialysis.

Species of the *Pantoea* genus are generally isolated from soil, plants, fruits and vegetables, but they have also been found in human and animal faeces. In our case, there is no evidence of contact with plants or animals, but it is possible that there were deficiencies in washing hands and making connections after touching fruit.

As a pathogen, it has traditionally been described as a causative factor of localised infections such as synovitis, post-traumatic arthritis<sup>2</sup> due to plant thorns or splinters, as well as

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cases of peritonitis in dialysis patients, since it can grow in glucose-rich media (gardener's peritonitis?)<sup>3-5</sup> and in carriers of invasive devices, in the paediatric population it can cause sepsis<sup>6</sup> and it has also been cultivated in bile samples from patients with cholangitis and choledocholithiasis.<sup>7</sup>

The patient was kept on tobramycin treatment for 14 days, showing an excellent sensitivity to cephalosporins, aminoglycosides and ciprofloxacin.

Following this new peritonitis episode, after identifying errors in performing the exchange during retraining sessions and due to his advanced age, we decided to transfer the patient to carer-assisted automated peritoneal dialysis.

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## Calcium mass balance with citrate dialysate is lower than with acetate<sup>☆</sup>

### El balance de calcio es menor con un líquido de diálisis con citrato que con acetato

Dear Editor,

The topic of what is the ideal calcium concentration in dialysis fluid (DF) is currently on the agenda of most scientific dialysis meetings. With a calcium concentrations of 1.25 mmol/L, haemodialysis tolerance worsens, and with calcium levels of 1.5 mmol/L, positive calcium balance together with the development of alkalemia at the end of the hemodialysis session may favour vascular calcification. Dealing with this issue is not easy because the concept of "balance" (concentration measured before and after the haemodialysis session) is interpreted as the theoretical "gradient" that is not measured nor calculated. The reason for this letter is to try to clarify these concepts and to provide some data.

Calcemia usually increases significantly during the haemodialysis session using acetate DF with a calcium concentration of 1.5 mmol/L, this is more evident if the initial serum calcium concentration is low.<sup>1,2</sup> If the acetate of the DF is replaced by citrate, the increase in the concentration of both total and ionic serum calcium after hemodialysis or online haemodiafiltration (OL-HDF) is less or even null.<sup>3-5</sup> It could be thought that by using a DF with 1.5 mmol/L of calcium, the smaller increase in calcaemia at the end of the citrate session generate a positive calcium gradient from the DF to the blood, which would induce a positive balance for the patient, which would cause the patient's calcification; or, it could be interpreted that the smaller increase in calcemia observed with citrate is the result of a lower, or even negative, calcium balance.

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