Treatment of a Dialysate Leak by Simultaneous Catheter Removal and Replacement in a Patient Undergoing Continuous Ambulatory Peritoneal Dialysis

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Continuous ambulatory peritoneal dialysis (PD) is one of the treatment methods used for end-stage renal failure. When mechanical complications occur with this treatment method, methods such as tomographic peritoneography, abdominal scintigraphy, and magnetic resonance peritoneography are used to uncover the problem. Here, we report the detection by tomographic peritoneography of a subcutaneous dialysate leak in a patient undergoing PD. The PD catheter was subsequently removed, and a new catheter was inserted. The patient then restarted continuous ambulatory PD without any problem.

Key words
Complications, leaks, drop-out, prevention

Introduction

In patients with cardiovascular disease or vascular access problems who require dialysis, continuous ambulatory peritoneal dialysis (CAPD) is typically preferred to hemodialysis (HD). Many patients also prefer CAPD because gives them mobility. However, complications are more common in CAPD than in HD (1).

An increase in intra-abdominal pressure is observed in patients receiving CAPD, and that pressure stresses the peripheral abdominal structures and the diaphragm (2). Disruption of peritoneal membrane integrity through rupture or tearing can result in a dialysate leak (3). A dialysate leak is a rare but significant complication of CAPD (4). To diagnose mechanical complications of PD such as leaks, techniques such as computed tomography (CT) imaging, magnetic resonance peritoneography, and peritoneal scintigraphy can be used (3,5,6). Here, we report the use of abdominal CT imaging after an intraperitoneal fill with dialysate containing contrast to diagnose the cause of a subcutaneous leak in a CAPD patient.

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Case description

A 53-year-old woman underwent PD catheter insertion by the percutaneous method. The patient had no serious problems during PD until, after 11 months, she was admitted to the hospital because of ultrafiltration insufficiency and the observation of an "orange peel" appearance in the abdominal region during a clinic visit. Because of suspicion of a subcutaneous leak, special PD treatment was planned for the patient. The patient, who had residual urine of 1500 mL, was followed for 10 days using treatments with moderate-glucose PD solution, a low fill volume, and short cycles.

Because of a lack of regression in the patient's skin edema, CT imaging to detect the suspected leak was performed 15 minutes after inflow into the abdomen of dialysate containing a contrast agent (Figure 1). During imaging, a leak from the catheter into the subcutaneous region was detected.

The patient's catheter was subsequently removed, and a new catheter was placed during the same procedure. At 15 days after placement of the new catheter, the patient was restarted on PD. During the waiting period, the patient was treated using a

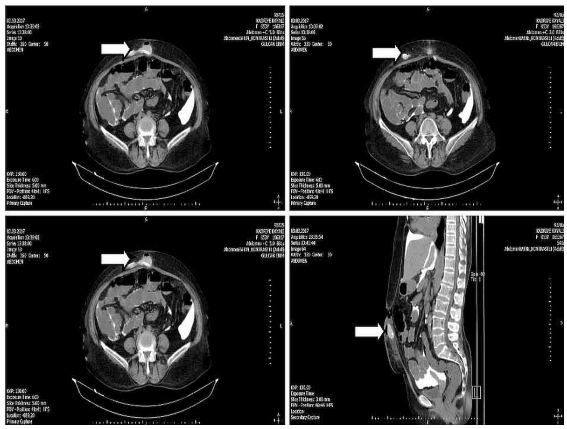

FIGURE 1 Tomographic peritoneography before the catheter replacement procedure.

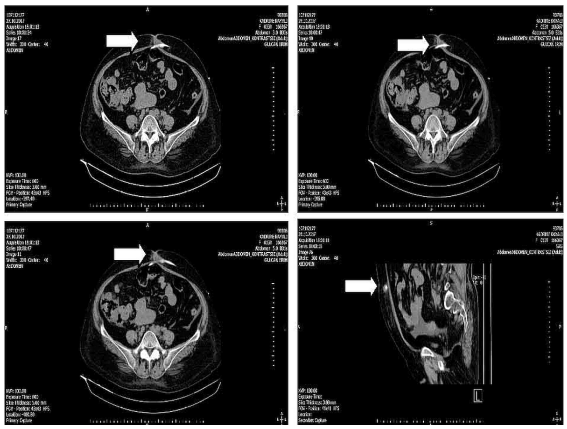

FIGURE 2 Tomographic peritoneography after the catheter replacement procedure (no peritoneal leakage).

temporary femoral HD catheter. After the absence of any problems with inflow and outflow through the newly placed PD catheter had been assured, and after the absence of any leak had been determined by CT imaging (Figure 2), the patient's PD prescription was updated, and the HD catheter was removed. No significant catheter problems were observed during the patient's subsequent visits.

Discussion

Dialysate leaks, a mechanical complication of PD, are associated with the increase in intra-abdominal pressure caused by the dialysate. That pressure increase is directly proportional to the increase in dialysate volume, usually falling into the 2 – 10 cmH_2O range. Walking, obesity, coughing, and stretching further increase intra-abdominal pressure and can lead to herniation and leaks (3). Multiple surgeries, multiple pregnancies, use of steroids, hypothyroidism, polycystic kidney disease, chronic pulmonary disease, age greater than 60 years, and early use of the dialysis catheter can also be predisposing factors (3,7).

Techniques such as CT imaging, magnetic resonance peritoneography, and peritoneal scintigraphy can be used to identify the mechanical complications of PD (3,5,6). Some researchers suggest that CT peritoneography is superior to scintigraphy because CT peritoneography provides better anatomic resolution (8). In our patient's case, ultrafiltration failure developed, and an "orange peel" appearance of the abdomen was detected on clinical examination. Subsequently, a dialysate leak was detected by CT peritoneography where the PD catheter exited the peritoneum. To solve this problem, the catheter was removed and replaced. After 15 days of temporary HD, the patient continued with PD treatment without any further problem.

Conclusions

In studies of PD, dialysate leaks are reported as one cause of PD drop-out (9). In our patient, a dialysate leak was treated by catheter replacement, and PD drop-out was prevented. We believe that drop-out in PD patients experiencing a leak can be prevented by PD catheter replacement, without surgical intervention, but with a temporary interruption in PD, followed by treatment restart.

Disclosures

We understand that *Advances in Peritoneal Dialysis* requires disclosure of any conflicts of interest, and we declare that we have no conflicts to disclose.

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