

*Case report***Chylous Peritonitis in Patients on Continuous Ambulatory Peritoneal Dialysis**

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**Abstract**

In 1984, Pomeranz and coauthors reported a case of a chylous peritonitis in an 8-year-old girl with extensive burns and aminoglycoside-induced acute renal failure, treated with peritoneal dialysis (PD) [1]. There are still very few publications in the medical literature concerning this particular problem in PD patients [2-4]. We report two very similar cases of chylous peritonitis in patients on continuous ambulatory peritoneal dialysis (CAPD).

**Case reports**

A 54-year-old male patient had a history of severe arterial hypertension since 2001, and after a kidney biopsy he was diagnosed with chronic glomerulonephritis. In 2009, chronic kidney disease (CKD) stage 3 was ascertained and after a rapid deterioration of renal function in December 2010 he was referred to the Dialysis clinic and started hemodialysis with a temporary vascular access. After the implantation of a double-cuff curled Tenckhoff catheter two months later, the patient was transferred to CAPD treatment.



**Fig. 1.** Normal unused solution (left) and chylous effluent (right) compared

In May 2011, the patient was admitted with a positive volume balance and a massive scrotal edema, which he re-

portedly associated with higher abdominal pressure inflicted by a tight seat belt during a continuous travel.

CAPD was temporary stopped and a vascular catheter inserted. For a fortnight the patient was treated by hemodialysis and after the edema resolved, peritoneal dialysis treatment continued.

In the next month, the patient was hospitalized with cloudy peritoneal effluent (Figure 1). He also complained of abdominal pain and diarrhea, which had started the night before and stopped by the morning. The patient had a normal body temperature; he was without nausea or vomiting and no local signs of exit site infection. He had a daily diuresis of 1000 ml and did not exhibit ultrafiltration failure.

On admission, an antimicrobial therapy with cefazolin (1000 mg twice daily) and gentamycin (80 mg/daily) was initiated. On the second day of the antibiotic therapy the peritoneal fluid became milky-white. The laboratory analysis of the peritoneal fluid showed a triglyceride concentration of 1.21 mmol/L, which compared to 0.72 mmol/L in the serum, suggested the diagnosis of chylous ascites. Ultrafiltration balance became negative and X-ray revealed a migration of the Tenckhoff catheter, but it was still in cavum Douglasi.

As there were no clinical symptoms and microbiological verification (two consecutive negative peritoneal fluid tests) of peritoneal infection in the following days, the antimicrobial therapy was discontinued. The peritoneal fluid remained cloudy, the decreased ultrafiltration rate and the tendency for a positive volume balance still persisted in the next week. CAPD was temporary stopped, a vascular catheter inserted and for 30 days the patient was treated by hemodialysis. After resolving peritoneal dialysis, the milky-like cloudiness of the peritoneal effluent appeared again and the patient was transferred to hemodialysis after the construction of an AV fistula.

The second patient-a 36-year old male, diagnosed in 2004 with IgA glomerulonephritis reached CKD stage 5 in January 2011 and started hemodialysis with a temporary vascular access. In February 2011 he was transferred to continuous ambulatory peritoneal dialysis.

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In June 2011, the patient was hospitalized due to a massive scrotal edema which he associated with riding a bicycle. Surgical examination did not prove an existing inguinal hernia. Peritoneal dialysis was stopped for a fortnight and the patient was temporary included in the HD program for this period. The scrotal edema resolved and CAPD was re-initiated with 5 exchanges of 2 L bags.

He was next admitted to the Clinic in December 2011 with cloudy effluent solution (Figure 2), swollen feet and lower legs, low serum protein levels and small scrotal edema. The patient reported that he had observed intermittent fluid cloudiness in the last month without any other symptoms. His plasma laboratory investigations showed: total protein-40.5 g/L, albumin-16.7 g/L, triglycerides-0.85 mmol/L, cholesterol-3.78mmol/L; and in the peritoneal fluid they were as follows: cholesterol-0.10 mmol/L, triglycerides-0.86 mmol/L, leukocytes- $23 \times 10^3/\mu\text{L}$ . Microbiological tests of the peritoneal fluid showed growth of *Staphylococcus*



Fig. 2. Normal PD effluent (left) and chylous effluent (right)

epidermidis. Microbiological and laboratory evaluations of the peritoneal fluid (the cholesterol/triglyceride ratio less than 1 and positive chylomicron test) led to the diagnosis of staphylococcal chylous peritonitis in CAPD. Abdominal ultrasound suggested a mild chronic pancreatitis. Cytological tests of peritoneal fluid revealed small groups of proliferated mesothelial cells and scattered lymphocytes. A very high protein loss was ascertained (10.66 g/ 2L bag to 4.78 g/ 2L bag at the start and end of the peritonitis episode) and fresh frozen plasma and human serum albumin were infused. An antibiotic therapy was initiated-ceftriaxone (Medaxone) (1 g in the peritoneal solution twice daily) for 5 days, gentamicin 80 mg/d for 2 days and 40 mg/d for 5 days, followed by two intraperitoneal applications of vancomycin 2g each on the sixth and eleventh day. During the hospitalization, the milky-white color of the effluent persisted, mostly pronounced in the morning exchanges, although the transparency of the effluent solution regained. After the successful treatment of the peritonitis episode, CAPD was temporary discontinued, due to the pronounced hypoproteinemia-hypoalbuminemia.

In Jan. 2012 an attempt to restore CAPD with five-fold fluid exchange was made due to the high transport status ascertained by the peritoneal equilibration test. One week

after that, the patient was hospitalized again with catheter obstruction and relapsing peritonitis. It was decided the PD catheter to be explanted and the patient to be transferred to hemodialysis.

## Discussion

Chyloperitoneum is defined as high triglyceride levels in the peritoneal fluid-1.2 mmol/L or higher than those in the plasma; cholesterol level in the fluid higher than plasma cholesterol level; cholesterol/triglyceride ratio less than 1; presence of chylomicrons and lipoproteins; milky-white peritoneal fluid in the absence/presence of peritonitis.

Chylous ascites in CAPD is generally due to a traumatic injury of a lymphatic vessel during the Tenckhoff catheter insertion. Non-traumatic causes include: malignant tumors, heart failure, cirrhosis, tuberculosis, aseptic inflammation (pelvic irradiation), nephrotic syndrome, dihydropyridine-type calcium channel blockers. Chylous ascites can be combined, but also confused with peritonitis, which makes the distinction rather difficult [5].

In the first patient the diagnosis of chylous ascites was based on the high triglyceride level in the peritoneal fluid-1.21mmol/L which was much higher than the serum triglyceride concentration-0.72mmol/L, and on the absence of clinical and microbiological evidence for bacterial peritonitis. Inflammatory or malignant processes were excluded by abdominal sonography. A possible explanation for this complication was the tightly fastened seat-belt, which might have dislocated the catheter and caused a minor injury to the lymphatic system.

In the second patient there also might have been a lymphatic vessel injury. The data for intermittent fluid cloudiness for over a month, the cholesterol/triglyceride ratio in the fluid less than 1 and the positive chylomicron test confirmed the diagnosis chylous ascites complicated with bacterial infection.

Definitive resolution of chylous ascites in PD patients with drug treatment is somewhat difficult to obtain and decision to continue peritoneal dialysis is taken on individual basis [5,6]. In the discussed two cases the presence of other serious complications such as frequent peritoneal infections, hyperhydration, substantial protein losses, prompted the transfer of the patients to hemodialysis.

Both patients received lercanidipine as antihypertensive medication. There are data showing there might be a lercanidipine-induced chylous ascites in CAPD patients. We cannot exclude the treatment with this calcium-channel blocker as a reason for our patients' complications.

*Conflict of interest statement.* None declared.

## References

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