A Rare Case of Refractory Peritonitis after Draining High-Temperature Peritoneal Dialysis Fluid into Abdominal Cavity

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Citation: Liu Y, Chai H (2017) A Rare Case of Refractory Peritonitis after Draining High-Temperature Peritoneal Dialysis Fluid into Abdominal Cavity. J Nephrol urol Vol.1 No.2:9

Abstract
Peritonitis is a common complication of peritoneal dialysis (PD), but peritonitis due to draining high-temperature peritoneal dialysis fluid into abdominal cavity was unusual and no lecture reported so far. Here we report a case of daytime ambulatory peritoneal dialysis (DAPD)-related peritonitis due to draining high-temperature peritoneal dialysis fluid into abdominal cavity. Importantly, we made a culture of the peritoneal dialysis fluid instantly the patient was admitted though she without any symptom of peritonitis. And be different with previous treatment, here peritoneal dialysis was stopped and replaced by hemodialysis and using intravenous antibiotics treatment, but without abdominal catheter removal. Final, peritonitis was controlled and the patient restarted to DAPD.

Keywords: Peritoneal dialysis; High-temperature; Peritoneal dialysis fluid; Peritonitis; Dialysis fluid culture

Introduction
Peritoneal dialysis common complication is Peritonitis. This case report states that ambulatory peritoneal dialysis (DAPD)-related peritonitis leads to draining high-temperature peritoneal dialysis fluid into abdominal cavity. The report concludes that peritonitis was controlled and the patient restarted to DAPD.

Case Study
A 57 year old female was admitted to hospital in January 2016 because abdominal discomfort after draining high-temperature peritoneal dialysis fluid into abdominal cavity for 10 min. She suffered from end stage renal failure due to unknown cause and was resumed on daytime ambulatory peritoneal dialysis (DAPD) in June 2015. Peritoneal permeability in the fast-peritoneal equilibrium test remained at low average transport (D/Pcrr=0.61) and peritoneal Kt/V urea was 1.83. She had been prescribed with 1.5% glucose dialysate (2 L/bag, 3 bags/day, 4 h/bag) and kept abdomen dry at night. She had no past history of infectious peritonitis.

The moment admitted to hospital, she had no fever and abdominal pain and peritoneal dialysis (PD) fluid was clear. Physical examination revealed her blood pressure was 155/92 mm Hg, pulse 72 beats/min and temperature 36.4°C. Her abdomen was soft, no tenderness and rebound tenderness. Meanwhile, inflammatory markers (white blood cells, C-reactive protein [CRP] and procalcitonin) were not evidently elevated (11970 μL, <1 mg/L and 0.18 ng/ml, respectively) and the total leukocyte count of the dialysis fluid was only 5 × 10^6/L (Table 1). Though she without any symptom of peritonitis we made a culture of the peritoneal dialysis fluid instantly. Over the next two days, abdominal discomfort gradually disappeared and the general condition of the patient was well. But at the third day of admission she presented with fever (39.0℃), abdominal pain and PD fluid became turbid without known cause. Blood analysis showed neutrophils, CRP and procalcitonin levels elevated significantly (Table 1). The total leukocyte count of the dialysis fluid was 830 × 10^6/L, with 95% neutrophils (Table 1) shows the clinical condition. Infectious peritonitis was tentatively diagnosed based on these findings. Intraperitoneal (IP) ceftriaxone and vancomycin were started for empirical treatment of PD peritonitis. Culture of the dialysis effluent yielded streptococcus oralis which was sensitive to vancomycin, while blood culture was negative. However, after five days of IP antibiotics therapy (vancomycin) her peritonitis did not respond and she still with fever and abdominal pain. We explained the necessity of a surgical operation to the patient,
but she did not accept PD catheter removal. Therefore, DAPD was stopped and replaced by hemodialysis and intravenous (IV) vancomycin treatment, but without abdominal catheter removal. Her peritonitis gradually resolved after 2 weeks of intravenous vancomycin. Then she was resumed on peritoneal dialysis again and the dialysis prescription as previous, while hemodialysis was stopped.

Two months later for peritoneal function evaluation, the fast-peritoneal equilibrium test revealed peritoneal permeability at 2.08. Low average transport (D/Pcr=0.58) and peritoneal Kt/V urea was stopped.

and the dialysis prescription as previous, while hemodialysis was continued intravenous vancomycin therapy. Gradually, fever and abdominal pain improved. Two weeks later, all the clinical symptoms of peritonitis were disappeared and repetitive effluent became turbid.

Evidence was insufficient to identify the optimal agent, route or duration of antibiotics to treat peritonitis [2]. Bennett-Jones 1987 reported that IP antibiotics were superior to IV antibiotics in peritonitis treatment [3]. Coincidentally, the latest recommendation described that IP antibiotics were superior to IV antibiotics in peritoneal dialysis-related infections [4]. In this case, according to peritoneal fluid culture result the patient was treated with intraperitoneal antibiotics, specifically vancomycin. However, after five days therapy the peritonitis still not respond. According to guideline PD catheter removal may be the best treatment for persistent peritonitis [2]. For this patient we did not remove PD catheter but only stopped peritoneal dialysis and replaced by hemodialysis, meanwhile continued intravenous vancomycin therapy. Gradually, fever and abdominal pain improved. Two weeks later, all the clinical symptoms of peritonitis were disappeared and repetitive effluent fluid cultures were all negative. So stopped peritoneal dialysis and replaced by hemodialysis but without PD catheter removal may be a recommended treatment strategy for peritonitis induced by high-temperature peritoneal dialysis fluid.

Discussion

Peritonitis is a common and important complication in PD patients, but peritonitis due to draining high-temperature peritoneal dialysis fluid into abdominal cavity was rare and no lecture repotted such cases so far. Dialysis fluid culture is a most important examination for peritonitis patient, which is helpful for treatment. When draining high-temperature peritoneal dialysis fluid into abdominal but without any clinical symptom, do dialysis fluid culture is needed? In our case we made the culture instantly, though without clinical symptom, we should keep gut function well and perform peritoneal dialysis through a rigorous cleaning process to prevent clinical peritonitis, though initially without fever, abdominal pain and PD fluid became turbid.

Usually peritoneum with host defence to eliminate some bacteria into the abdominal cavity, so clinical peritonitis may not happened though bacteria into abdominal cavity. There are two approaches of bacteria into abdominal cavity of peritoneal dialysis patients, including exogenous and endogenous ways. Common causes include contamination during dialysate exchange, exit site/ tunnel tract infection, intra-abdominal pathologies or ascending gynaecological infections. In this case, culture of the dialysis effluent yielded streptococcus oralis, which usually existed in oral cavity [1]. So we speculated that peritoneum injured by high-temperature peritoneal dialysis fluid, then not able to eliminate bacteria transferred from gut or contamination during dialysate exchange, finally result in peritonitis. Therefore, when the peritoneum injured by high-temperature peritoneal dialysis fluid we should keep gut function well and perform peritoneal dialysis through a rigorous cleaning process to prevent clinical peritonitis.

Evidence was insufficient to identify the optimal agent, route or duration of antibiotics to treat peritonitis [2]. Bennett-Jones 1987 reported that IP antibiotics were superior to IV antibiotics in peritonitis treatment [3]. Coincidentally, the latest recommendation described that IP antibiotics were superior to IV antibiotics in peritoneal dialysis-related infections [4]. In this case, according to peritoneal fluid culture result the patient was treated with intraperitoneal antibiotics, specifically vancomycin. However, after five days therapy the peritonitis still not respond. According to guideline PD catheter removal may be the best treatment for persistent peritonitis [2]. For this patient we did not remove PD catheter but only stopped peritoneal dialysis and replaced by hemodialysis, meanwhile continued intravenous vancomycin therapy. Gradually, fever and abdominal pain improved. Two weeks later, all the clinical symptoms of peritonitis were disappeared and repetitive effluent fluid cultures were all negative. So stopped peritoneal dialysis and replaced by hemodialysis but without PD catheter removal may be a recommended treatment strategy for peritonitis induced by high-temperature peritoneal dialysis fluid.

Conclusion

So far, it is the first reported case that peritonitis induced by high-peritoneal dialysis fluid and had a successful treatment. From this case we can extract experience and draw a lesson when peritoneum injured high attention should take and dialysis fluid culture should make instantly, though without clinical symptom, and when peritonitis developed stopping peritoneal dialysis and replaced by hemodialysis but without PD catheter removal may be a recommended method.
Disclosures

The authors have no financial conflicts of interest to declare. This article was supported by grant from the Program of Ke Jiao Xing Wei of Suzhou City (kjxw2015021).

References


