Urology Case Reports 41 (2022) 101963

Contents lists available at ScienceDirect

Urology Case Reports

journal homepage: www.elsevier.com/locate/eucr

Peritonitis related to continuous ambulatory peritoneal dialysis due to *Mycobacterium tuberculosis*: A case report

Andria Yuananda *, Tjahjodjati

Department of Urology, Faculty of Medicine Universitas Padjadjaran, General Hospital Hasan Sadikin Bandung, Indonesia

ARTICLE INFO

Keywords:
Continuous ambulatory peritoneal dialysis (CAPD)
Mycobacterium tuberculosis (MTB)
Peritonitis

ABSTRACT

Continuous ambulatory peritoneal dialysis (CAPD) has been an effective treatment for end-stage renal disease (ESRD). Tuberculous peritonitis (TBP) in patients on CAPD is a perilous condition. A 28-years-old female presented to the emergency unit with a chief complaint of intermittent abdominal pain and fever. The patient had a history of renal failure and CAPD was inserted. CAPD fluid analysis revealed leukocytes of +3/visual field and positive for acid-fast bacilli. The patient was given antituberculous agents, CAPD removal, and AV shunt installment for the subsequent HD access. A high index of suspicion must always be maintained for CAPD-associated tuberculous peritonitis.

1. Introduction

Continuous ambulatory peritoneal dialysis (CAPD) has been an effective treatment for end-stage renal disease (ESRD). In the United States, the treatment of approximately 13% of patients requiring long-term renal substitution is managed with CAPD.[1] One of the infectious complications of CAPD that causes failure of this modality requiring a switch over to hemodialysis is peritonitis, which might lead to technical failure, peritoneal membrane failure, increased length of hospitalization, and mortality.[2]

Mycobacterial peritonitis is considered an uncommon cause of peritonitis (<3%) and also uncommon in Southeast Asian countries. Peritonitis due to *Mycobacteria* might be caused by *Mycobacterium tuberculosis* or non-tubercular *Mycobacteria*.[3] It is accepted that CAPD patients differ from hemodialysis patients because of their predisposition to peritonitis.

Patients with end-stage renal failure on continuous ambulatory peritoneal dialysis are at significantly higher risk for peritoneal tuberculosis (PTB). Therefore, we reported a rare case of peritonitis related to Continuous Ambulatory Peritoneal Dialysis (CAPD) due to *Mycobacterium tuberculosis* (MTB) infection.

2. Case presentation

A 28-years-old female presented to the emergency unit with a chief complaint of intermittent abdominal pain for 2 months, which worsened in one week before hospital admission. The complaint was accompanied by fever, nausea, vomit, and abdominal distention. Due to her symptoms, the patient had been admitted twice. The patient had a history of renal failure since August 2020 and received routine hemodialysis from October to December 2020. CAPD was inserted in November 2020 and was repaired laparoscopically in May 2021 due to CAPD malposition. In addition, there was a history of hypertension for one year and a family history of chronic kidney disease.

On presentation, the patient's consciousness was compos mentis, vital signs within normal limit. Physical examination of the abdomen revealed an inserted CAPD, tenderness in all abdominal quadrants, and no abdominal distention during palpation, and bowel sound within normal limit during auscultation. (Fig. 1).

Her initial laboratory evaluation showed significant results of leukocyte 19,150 cells/μL, urea 142 mg/dL, creatinine 17.27 mg/dL. CAPD fluid analysis revealed Gram-positive coccus +1/visual field; leukocyte was found in +3/visual field with 10x magnification. Acid-fast bacilli were positive and with increased cell counts (3044 cells/uL). Urinary resistance test revealed *Klebsiella pneumoniae* isolate, which was resistant to Ampicillin/Sulbactam, Ceftriaxone, Gentamycin, Ampicillin, Piperacillin/Tazobactam, Cefotaxime, Ceftazidime, Cefepime, Ciprofloxacin, Cotrimoxazole, Tigecycline, and Aztreonam. Chest radiography showed normal cardiopulmonary, no opacity in a segmental or lobar intrapulmonary. Plain abdominal radiography showed that the CAPD catheter was inserted with the distal end visualized at the right-side of level L5. (Fig. 2).

* Corresponding author.
E-mail address: andria.yuananda@gmail.com (A. Yuananda).

https://doi.org/10.1016/j.eucr.2021.101963
Received 21 November 2021; Accepted 2 December 2021
Available online 3 December 2021

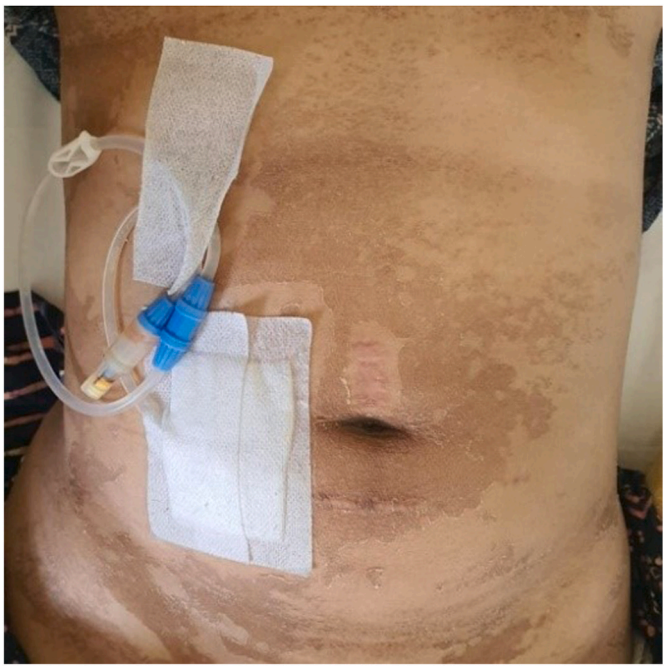

Fig. 1. Clinical picture of the abdominal region, CAPD was inserted.

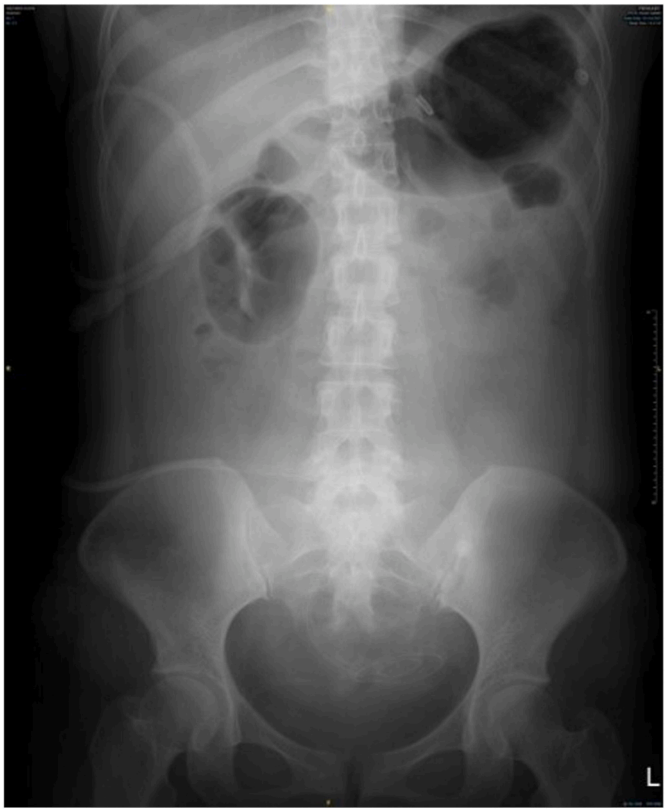

Fig. 2. Plain abdominal radiography showed CAPD catheter.

This patient was treated with: oxygen therapy 3 L per minute with a nasal cannula, fluid therapy, antibiotics with moxifloxacin, and antituberculous agents. Sodium bicarbonate, folic acid, and callos were administered. This patient was planned for CAPD removal due to the non-resolving peritonitis and ineffective dialysis.

At the time of surgery, peritoneal fluid was cloudy and 50 ccs in volume. The Tenchkoff catheter was attached to the proximal tissue but could be detached. After removing the Tenchkoff catheter, the vascular surgeon continued the surgery to insert an AV shunt for the subsequent HD access. Finally, the patient was transferred to hemodialysis.

3. Discussion

Tuberculosis remains a serious global health concern since 13 million deaths annually worldwide are attributable to *M. tuberculosis*. Patients with ESRD have relative deficits in the cell-mediated immunity required to prevent active tuberculosis.[1]

In this patient, TB infection was thought to be transmitted directly through the insertion, removal, or repair of the CAPD catheter. Our findings were similar to the study by Fried et al. and Holley et al., who determined that polymicrobial infection that involves more than one Gram-positive bacteria would suggest touch contamination or catheter infection, whereas polymicrobial Gram-negative bacteria would suggest perforation of the bowel.[4]

This patient was coinfected with MTB and also Gram-positive coccus bacteria. The peritoneal immune system is defective in CAPD patients. These reductions include reduced phagocytosis by macrophages, reduced cytokine production, and a significant reduction in the total number of peritoneal lymphocytes. These defects occur possibly due to the high lactate and hydrogen ion concentration of the dialysate; a dilutional effect of relatively large volumes of dialysate used also results in a reduction in macrophage/organism interaction. As a result, the peritoneum may be involved in most cases by hematogenous dissemination from pulmonary tuberculosis.[5]

Peritoneal TB is challenging when it comes to diagnosis; it has a subacute presentation. Our patient presented with a complaint of abdominal pain with nausea and vomiting without fever, since the patient in our case already had antipyretics and analgetics from prior hospitalizations.

High clinical suspicion supported by microbiological and histopathology confirmation of TB infection is usually required for the definitive diagnosis. The gold standard for diagnostic procedures remains laparoscopy and peritoneal biopsy. In this patient, the peritoneal fluid collected from the CAPD tube revealed positive MTB, Gram-positive coccus +1/visual field, leukocyte +3/visual field with 10x magnification. In addition, the acid-fast bacilli were positive with increased cell counts. The diagnosis could be confirmed with additional plain abdominal radiography, which also revealed ascites and peritoneal thickening of the central quadrant loops of the small intestine.

The medications include isoniazid and rifampicin along with pyrazinamide and ofloxacin. Oral pyridoxine should be given daily. Rifampicin, however, is found only in low levels in dialysis fluids and hence may need to be given via the intraperitoneal route.[2] This patient was given antibiotics with moxifloxacin and antituberculous agents since the aetiology was MTB and Gram-positive bacteria. Sodium bicarbonate was administered due to hyponatremia, and folic acid was administered for her anaemia condition. Callos was administered as a calcium supplement intake to overcome hypocalcemia due to glucocorticoid administration.

4. Conclusion

Tuberculous peritonitis remains underdiagnosed due to the nonavailability and lack of standard diagnostic techniques. A high index of suspicion must always be maintained for CAPD-associated tuberculous peritonitis. Possible routes of infection include contiguous, direct, or hematogenous. The treatment delay is known as a significant factor for mortality in patients with tuberculous peritonitis. Peritoneal dialysis catheter may be removed if symptoms do not improve and dialysis is ineffective.

References

1. Talwani R, Horvath JA. Tuberculous peritonitis in patients undergoing continuous ambulatory peritoneal dialysis: case report and review. *Clin Infect Dis*. 2000;31(1):70–75.
2. Li PK-T, Szeto CC, Piraino B, et al. Peritoneal dialysis-related infections recommendations. *Perit Dial Int*. 2010;(30):393–423, 2010.
3. Rohit A, Abraham G. Peritoneal dialysis related peritonitis due to Mycobacterium spp.: a case report and review of literature. *J Epidemiol Global Health*. 2016;6(4):243–248.
4. Fried L, Piraino B. Peritonitis. In: Khanna R, Krediet RT, eds. *Nolph and Gokal's Textbook of Peritoneal Dialysis*. New York, NY, USA: Springer Science & Business Media; 2009:543–570.
5. Rapoport J, Hausmann MJ, Chaimovitz C. The peritoneal immune system and continuous ambulatory peritoneal dialysis. *Nephron*. 1999;81:375–380.