Acute Perforated Appendicitis in an End-Stage Kidney Disease Patient with Dormant Peritoneal Dialysis Catheter in Place

Himanshu Rao MS3[3], Catherine Olang MS3[3], Shubham Bhatia MD[2], Patrick Kiarie MS3[3], Martine A. Louis MD, FACS, SCCM[1]

[1]: Department of Surgery, Flushing Hospital Medical Center, Flushing, NY
[2]: New York Institute of Technology College of Osteopathic Medicine, Westbury, NY
[3]: St. George's University School of Medicine, St. George's, Grenada

INTRODUCTION

Peritoneal dialysis (PD) is widely used to manage patients with End-stage renal disease (ESRD). PD is associated with an increased incidence of gastrointestinal pathologies (1). A small number of case reports have documented the occurrence of emphysematous pyelitis, encapsulating peritoneal fibrosis (EPF), sterile peritonitis, and methicillin-resistant Staphylococcus aureus (MRSA) infections in patients undergoing PD (2-4).

We present a case of perforated appendicitis, complicated by peritonitis and sepsis in a patient with ESRD on hemodialysis and an unused PD catheter.

CASE PRESENTATION

A 41 year-old male with PMH of hypertension, type 2 diabetes, and ESRD on hemodialysis (HD) was admitted with fever, chills, nausea, and abdominal pain. These symptoms started during his HD session 36 hours prior; the patient had been refusing removal of his PD catheter.

His vitals were: BP: 149/83 mmHg, Pulse: 106, Temp: 101.2°F, RR: 20, SpO2: 97%.

Physical exam was significant for dry mucous membranes, diffuse severe abdominal tenderness, and purulent drainage from PD catheter.

Labs were significant for leukocytosis (*WBC*: 14.0 K/µL), elevated *CRP* (26.4 mg/dL), *ESR* (56 mm/hr), elevated troponin (1.5 ng/dL), and brain natriuretic peptide (175,000 pg/L). He was diagnosed with peritonitis, sepsis, and type 2 myocardial infarction. CT AP showed acute appendicitis (Figures 1-2).

On exploration, he was found to have a gangrenous perforated appendix with peritonitis; he underwent laparoscopic appendectomy and PD catheter removal.

The HD center and ER blood cultures were concurrent for Escherichia Coli types 1 and 2, but the PD catheter culture was negative. The patient improved clinically over the next 48 hours and signed out against medical advice (AMA), He was seen doing well in the outpatient office a week later and the JP drain was removed.

Figure 1

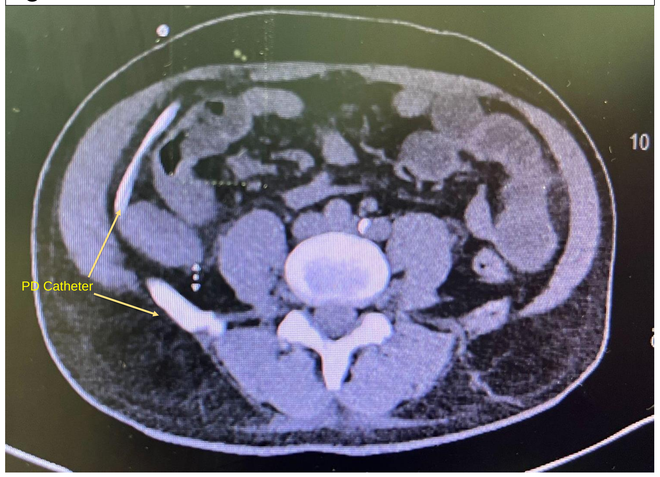
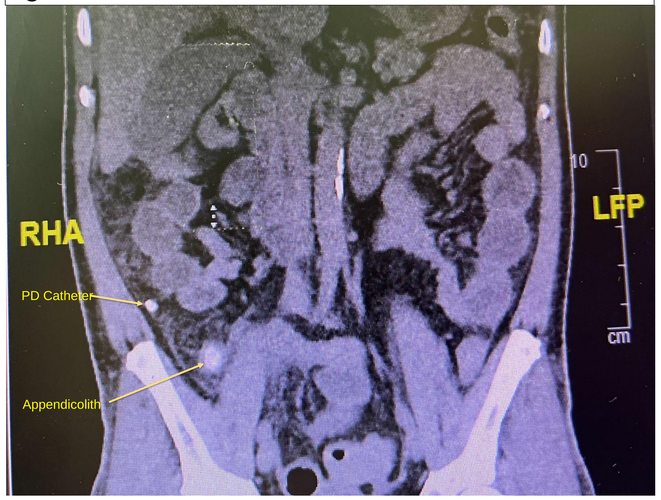


Figure 2



DISCUSSION

- PD catheter exit site and tunnel infections remain prevalent due to touch contamination from gram-positive cocci in skin flora and organisms outside of the abdominal cavity.
- Secondary peritonitis can result from cholecystitis, cystitis, diverticulitis, appendicitis-related complications, and breaks in continuity of the catheter.
- Fibrosis caused by increased mast cells, decreased defensin expression, progressive deterioration of the catheter membrane and direct peritoneal injury by matrix metalloproteinases have all been proposed as possible explanations as well.
- Bacterial and fungal testing should be performed on the peritoneal fluid and blood. Once the causative organism is determined, antibiotic therapy can be narrowed down from empiric therapy. Delays often due to suspicions of "endogenous peritonitis"can pose serious complications. No clear guidelines regarding timing and indications for PD catheter removal exist; however, studies agree that prompt assessment and evaluation can prevent mortality and morbidity.
- Dialysate fluid cloudy drainage and abnormal abdominal imaging indicate the need for prompt diagnostic laparoscopic or open intervention. However, abdominal CT are not always diagnostic and clinical correlation is paramount.
- Recurrent infections necessitate the permanent removal of the PD and HD initiation.

CONCLUSION

Acute appendicitis represents one of many abdominal diseases that can occur in ESRD patients with a PD catheter. The clinical presentation can vary and at times present without symptoms, but concerns arise when slow peritoneal dialysis inflow, no outflow, and cloudy dialysate are present. It can even occur in an unused PD, such as in our patient. The appendicitis can be associated with sepsis, major cardiac events, and result in mortality.

Early abdominal CT scan, resuscitative measures, initiation of empiric antibiotics and prompt exploration for immediate source control via an expedited appendectomy improve survival odds.

REFERENCES

1. Lee YC, Hung SY, Wang HH, et al. Different risk of common gastrointestinal disease between groups undergoing hemodialysis or peritoneal dialysis or with non-end stage renal disease: A nationwide population-based cohort study. *Medicine (United States)*. 2015;94(36). doi:10.1097/MD.0000000000001482
2. Ekart R, Horvat M, Koželj M, Pečovnik Balon B, Bevc S, Hojs R. *Gangrenous Appendicitis Presenting as Acute Abdominal Pain in a Patient on Automated Peritoneal Dialysis: A Case Report*.; 2012. http://www.jmedicalcasereports.com/content/6/1/309
3. Nwanji V, Burkholder G, Kaur G. A Case Report of Malfunctioning Peritoneal Dialysis Catheter in a Patient With Diverticulitis With a Phlegmon. *Cureus*. Published online April 13, 2021. doi:10.7759/cureus.14455
4. Thom T, Leonard D, Fitzpatrick P, Aslam N. Transection versus infection: Acute appendicitis in a peritoneal dialysis patient presenting as catheter dysfunction and discontinuity on X-ray. *BMJ Case Rep*. 2018;2018. doi:10.1136/bcr-2017-223863