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Case Report

# Peritonitis Due to *Haemophilus Influenzae* in Peritoneal Dialysis: Report of An Exceptional Case

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## Abstract

**Case Description:** 33-year-old woman with a history of end-stage renal disease on peritoneal dialysis, who came to the emergency department for abdominal pain of sudden onset associated with a change in the color of the peritoneal fluid.

**Clinical Findings:** The patient had signs of systemic inflammatory response and generalized abdominal pain, with marked leukocyte response in peritoneal fluid cytochemistry.

**Treatment and Outcome:** Empirical antibiotic treatment was started targeting the most prevalent microorganisms in abdominal infections associated with peritoneal dialysis, however with poor response to it and subsequent isolation of *Haemophilus Influenzae* for which antibiotherapy was modified with subsequent progressive clearance of peritoneal fluid and resolution of symptoms.

**Clinical Relevance:** We describe the case of a patient on peritoneal dialysis who presented a bacterial peritonitis caused by *H. Influenzae*, an extremely infrequent germ in this type of infections. Although the presence of this germ is exceptional in peritoneal dialysis catheter-associated peritonitis, this microorganism should be ruled out in a patient with catheter-associated peritonitis that does not respond to the usual antibiotic therapy. To our knowledge only 8 cases have been reported in the literature and none in our setting.

***Keywords:*** *Kidney Failure, Dialysis, Peritoneal, Haemophilus Influenzae, Peritonitis, Vaccination, Case Report.*

## Introduction

In renal replacement therapy under peritoneal dialysis modality, the most frequent complication is infection of the peritoneum, which can lead to the loss of the peritoneal cavity with the consequent impact on renal homeostasis, hydro electrolyte and morbimortality (1). The most frequently isolated germs in this type of infection are gram-positive bacteria, such as coagulase-negative staphylococci, staphylococcus aureus and streptococci (2). We present the case of a patient with a history of end-stage chronic kidney disease on automated peritoneal dialysis therapy (APD), who presented bacterial peritonitis caused by Haemophilus Influenzae, an exceptional microorganism in this type of infection. To our knowledge, less than ten cases like this one have been reported in the literature to date, none of them in our setting.

## Case Description

A 33-year-old female patient attended the emergency department for 2 hours of clinical symptoms consisting of generalized abdominal pain, predominantly epigastric, colicky and of sudden onset, initially associated with chills. Subsequently, she presented abdominal distension, meteorism and diarrheic stools. The patient had a history of left renal agenesis and right renal hypoplasia for which she had been on automated peritoneal dialysis for six months, hyperparathyroidism secondary to renal disease and incomplete immunization in childhood in her country of origin. On examination the abdomen was painful on palpation in all quadrants, although without clear signs of peritoneal irritation. The rest of the physical examination was normal. Taking into account the history of end-stage renal disease in APD and abdominal pain, paraclinical studies were performed, finding leukocytosis with neutrophilia without other alterations, in addition to ultrasound and abdominal radiography that ruled out abdominal surgical pathology. In view of the suspicion of primary peritonitis as the probable cause of abdominal pain, a cytochemical and microbiological study of peritoneal fluid was performed, which showed a yellow color and cloudy appearance, without red blood cells although with a white blood cell count of 1984/mm3, polymorphonuclear 88% and mononuclear 12% and an abundant leukocyte response in the Gram stain.

In view of these results, which reinforced the diagnostic suspicion and while awaiting the peritoneal fluid culture, empirical antibiotics were started with vancomycin and amikacin. The following 36 hours the patient remained symptomatic and two days after initiating antimicrobial therapy, H. Influenzae was isolated in the fluid analyzed, an extremely unusual microorganism in these cases, so the diagnostic study was extended with a computed axial tomography of the abdomen, which identified the peritoneal catheter normopositioned, ruled out collections or other abnormal findings, except for the already known renal malformations and a bicornuate uterus (Figure 1). Also, serology for human immunodeficiency virus (HIV), hepatitis B and C virus was performed, which were negative, and primary immunodeficiencies were excluded. Antinuclear antibodies, extractable nuclear antibodies and lupus anticoagulant were also negative.

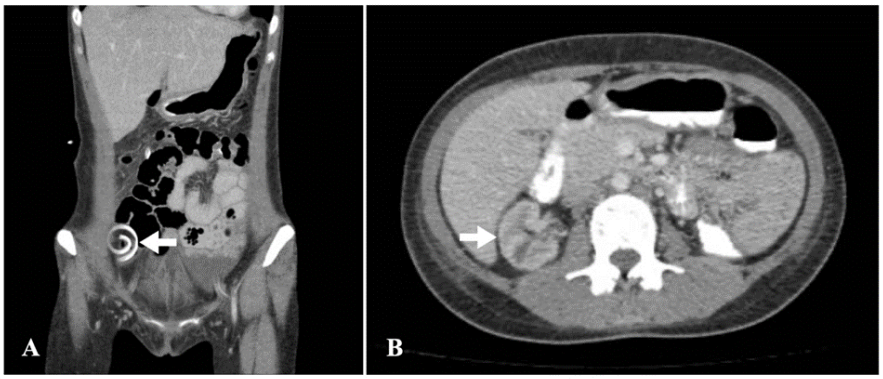


***Figure 1. A:*** *Contrast abdominal tomography showing the peritoneal dialysis catheter in the right lower quadrant (arrow). B: Right renal hypoplasia (68 x 29 x 41 mm; arrow) and anatomical void in the left renal cell compatible with renal agenesis.*

Considering the isolated microorganism, the antibiotic treatment was modified to Piperacillin/Tazobactam with clinical improvement, remission of abdominal pain and clearance of peritoneal fluid. The patient completed 10 days of intravenous antibiotic therapy, the last five on an outpatient basis, with an adequate evolution. She is currently asymptomatic, performing peritoneal dialytic therapy without problems and with successive cultures of peritoneal fluid without isolation of H. Influenzae or other microorganisms.

## Discussion and Conclusion

Infectious peritonitis is a relatively frequent complication in patients on peritoneal dialysis therapy, and it is estimated that the bacterial origin represents approximately 90-95% of the cases (1). Among bacterial infections, gram-positive germs are isolated in 45-60% of patients, while gram-negative germs account for 15-35% of cases (3).

Peritoneal infection caused by H. Influenzae is currently an anecdotal situation, mainly due to the global decrease in infection and colonization by this microorganism thanks to immunization programs (4). However, the few cases described have been reported in young subjects who had not been vaccinated, as reported in a recent study by Otsuka et al. (5), who presented the case of a 5-year-old patient with a history of nasal colonization by H. Influenzae who developed peritonitis due to this bacterium. This ratifies the importance of immunization programs in childhood not only to prevent common diseases, but also to avoid other less frequent but potentially serious conditions. This is why in this type of patients the immunization status should be taken into account and in case of incomplete immunization, the presence of unusual germs should be suspected. When performing the retrospective analysis of the case presented, the patient was a native of another country and had not been immunized against H. influenza, a vaccine that is part of the expanded immunization plan (EPI) in our environment (6), which could explain the microbiological finding of this case.

To our knowledge, 8 cases of H. influenzae peritonitis have been described since 2017. Of these eight cases, two patients were on automated peritoneal dialysis and six on manual peritoneal dialysis, four were 18 years of age or younger, and one patient had a history of HIV infection. Although predominance of infection in terms of gender has not been described, it is noteworthy that of these eight patients, seven were women (5), as in our report, which could suggest that there is some morphophysiological component linked to sex that predisposes to infection by this type of germs, perhaps hormonal, and it would be an interesting field of future research to analyze this hypothetical association.

Additionally, the finding of a bicornuate uterus alerted us to the presence of other types of syndromic malformations, such as Herlyn-Werner-Wunderlich syndrome, a rare congenital anomaly of the genitourinary system, caused by a failure in the fusion of the Müllerian ducts, which is characterized by an obstructed hemivagina, didelphic uterus and ipsilateral renal anomaly (11). Which was ruled out in our patient since she had no other anatomical malformations, the bicornuate uterus being an incidental finding in this case. Although H. Influenzae has been cultured in feces, jejunal fluid and genital tract of asymptomatic individuals (7-10), colonization by this germ could not be established in our patient. However, taking into account that the abdominal CT scan revealed a bicornuate uterus as the only unusual finding, we cannot rule out that this anatomical anomaly, due to possible colonization and contiguity to the abdominal cavity, could favor peritoneal infection.

Despite the exceptional presence of H. Influenzae in the abdominal infection of patients on peritoneal dialysis therapy, this microorganism must be taken into account due to the high comorbidity and risk of loss of the peritoneal cavity that can be associated with a diagnostic-therapeutic delay. To our knowledge, this is one of the few described cases of this type of infection, and the first in our setting.

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## Conflict of Interest

The authors declare that they have no conflict of interest.

## Funding

None to declare.

## Informed consent and patient details

The authors declare that this report does not contain any personal information that could lead to patient identification; however, written informed consent was obtained for publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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