

Case Report

A Case of *Plesiomonas* Bacteremia Without Reported Freshwater Exposure

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Abstract

Introduction

Plesiomonas shigelloides is a member of the *Enterobacteriaceae* family generally found in freshwater. There is little substantive data about the prevalence or distribution of *Plesiomonas* within the United States. *Plesiomonas* are most commonly associated with mild, self-limited watery diarrhea among healthy individuals followed by infective colitis. Bacteremia is the most common extraintestinal manifestation of *Plesiomonas*. Few cases of *Plesiomonas* bacteremia can be found in the literature.

Clinical Findings

An elderly female with multiple comorbidities was admitted to our hospital for evaluation of generalized cramping abdominal pain of several days duration. She denied any freshwater or saltwater exposure. The patient's labs were significant for leukocytosis and lactic acidosis. An abdominopelvic CT showed acute colitis of the descending colon.

Outcomes

Surgery was consulted for suspicion of ischemic colitis, and the patient subsequently underwent subtotal colectomy, splenectomy and resection of the distal small bowel with an ileostomy, as extensive necrotic bowel was found. Blood cultures taken on admission grew *Plesiomonas shigelloides*, for which piperacillin-tazobactam was started. Negative blood cultures were obtained 4 days after positive blood cultures.

Conclusions

Relative rarity and variability of presentation, presence or absence of underlying disease or exposure to risk factors, and currently limited data utilizing different antimicrobial regimens contribute to the difficulty in outlining guideline-based regimens for management of *Plesiomonas*.

Keywords

Plesiomonas bacteremia; gram-negative bacteremia; extraintestinal *Plesiomonas*; *Enterobacteriaceae* bacteremia; bacteremia; *Plesiomonas*; *Enterobacteriaceae*, gram-negative bacterial infections; *Enterobacteriaceae* infections, colitis

Introduction

Plesiomonas shigelloides is a member of the *Enterobacteriaceae* family and is the only species within its genus, having previously been a member of the *Vibrionaceae* family. It is oxidase and nitrate reductase positive, facultatively anaerobic and acid-producing from *m*-inositol.¹ A protein/lipopolysaccharide complex toxin is produced by *Plesiomonas*, which has a cytotoxic and enteropathogenic effect.² Some isolates share the capsular O antigen with *Shigella son-*

nei. *Plesiomonas* tends to be found in freshwater (> 0.5% NaCl) and brackish/estuary waters (0.05%–3% NaCl).

At this time, there is very little substantive data about the prevalence or distribution of *Plesiomonas* within the United States. It is not part of the human microbiota. It is associated with freshwater exposure resulting in gastrointestinal, soft-tissue, wound and ocular infections, as well as bacteremia and meningi-

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Figure 1. CT angiography of the abdomen and pelvis with inflammatory changes noted in the descending colon (red arrow).

tis. Mild, self-limited watery diarrhea among healthy individuals is the most common clinical presentation followed by infective colitis, while bacteremia is the most common extraintestinal manifestation of *Plesiomonas*.¹ Risk factors for *Plesiomonas* bacteremia include blood dyscrasias, asplenia, iron overload, liver cirrhosis, foreign travel, consumption of raw shellfish, old age, underlying biliary tract disease and immunocompromised states.^{1,3-5} As of the review of Janda, Abbott, and McIver from 2016,¹ there had been only over 40 cases of *Plesiomonas* bacteremia in the literature, which is just double the amount published since the last review in 1996.⁵

Case Presentation

A 78-year-old white female was evaluated for generalized cramping abdominal pain of several days duration. There was a past medical history of hypertension, hyperlipidemia, multi-vessel coronary artery disease, cardiac bypass surgery, stent placement, sick sinus syndrome, paroxysmal atrial flutter, pacemaker placement and repaired rectovaginal fistula. She denied nausea, fevers, chills, hematemesis and hematochezia. There was no recent exposure to freshwater or saltwater, including going to the beach, fishing, traveling or seafood consumption.

Aside from diffuse abdominal tenderness, the physical exam was mostly unremarkable, and no gross signs of infection were noted. Initial vitals were all within normal limits, and she was afebrile (98.1°F). Labs were significant for

leukocytosis (23.95 x 10³/μL), lactic acidosis (12.93 mmol/L) and procalcitonin elevation (4.11 ng/mL). Computed tomography (CT) of the abdomen-pelvis and CT angiography of the abdomen and pelvis both showed acute colitis of the descending colon concerning possible mesenteric ischemia. (**Figure 1**)

Given the above, surgery was consulted, and the patient underwent emergent exploratory laparotomy. Necrosis of the entire colonic distribution and the distal small bowel was found, as well as left upper quadrant adhesions to the spleen and diaphragm. The patient thus underwent subtotal colectomy (ascending, transverse, descending), splenectomy and resection of the distal small bowel with an ileostomy. Pathology of the small intestine and colon demonstrated transmural infarction with mucosal necrosis as well as acute transmural inflammation. Serositis and serosal adhesions were also noted throughout the intestines. No evidence of malignancy was noted. Splenic pathology was unremarkable.

The patient was started empirically on piperacillin-tazobactam and metronidazole. Blood cultures taken on admission grew *Plesiomonas shigelloides*. This isolate was susceptible to cefepime, levofloxacin, ciprofloxacin and meropenem, using proposed MICs from the EUCAST Breakpoint Committee consultation on *Aeromonas* and *Plesiomonas* breakpoints from October 2017. More susceptibilities were recognized by the laboratory used by the hospital,

including ceftriaxone and piperacillin-tazobactam, based on the CLSI 2019 interpretive criteria against *Pseudomonas aeruginosa*, CLSI 2019 interpretive criteria against *Enterobacteriaceae* and CLSI 2014 interpretive criteria for cefepime against enterics.

Subsequent urinalysis was consistent with infection, with urine cultures positive for vancomycin-resistant *Enterococcus faecium*. The patient was started on linezolid. Negative blood cultures were obtained four days after positive blood cultures. The patient was discharged with intravenous ertapenem and oral metronidazole.

Discussion

Plesiomonas typically presents with diarrhea (88–99%), bloody diarrhea (5–45%), fever (6–51%), abdominal pain (6–72%) and vomiting (14–74%) based on a review of studies from African and Asian countries.¹ Aside from the aforementioned manifestations of *Plesiomonas*, *Plesiomonas* has been implicated in septic abortion and bacteremia in a 24-year-old pregnant female who had recently traveled to the Caribbean, and was involved in pyosalpinx acquired in an immunocompetent patient from swimming in contaminated water.^{6,7} It may be a possible human pathogen in the setting of water-related natural disasters, as it has been isolated in water pumps after a tsunami and isolated from a corpse after a typhoon.^{8,9} A case of *Plesiomonas* pneumonia was reported in 2009. At that time, the patient underwent gastrectomy and esophageal-jejunostomy for gastric adenocarcinoma and was admitted for clinical signs of pulmonary infection. Bronchial lavage of a cavernous lesion in the right upper lobe showed granulocytic inflammation, and culture was positive for *Plesiomonas*.¹⁰ Another case describes a 51-year-old male who underwent liver transplantation who developed *Plesiomonas* bacteremia. It was found that the donor, a drowning victim, had *Plesiomonas* bacteremia.¹¹

There are few cases published regarding wound infections. Various wound infections in the literature include cutaneous abscess secondary to abrasions sustained from diving into a rocky freshwater basin, infectious keratitis when struck in the eye with creek bedrock, and

infection of laceration sustained from falling into pondwater.¹²⁻¹⁴ It is hypothesized that the lack of protease expression may contribute to this organism's infrequent association with soft tissue infections and an injury is needed to facilitate this type of infection.¹ Regardless, the majority of *Plesiomonas* infections, primarily gastroenteritis, are self-limited.¹⁵

A study of 167 laboratory-confirmed cases (98.8% of cases being gastroenteritis) found that infections were sensitive to ofloxacin, levofloxacin and ceftriaxone. Resistance was found for ampicillin, tetracyclines, co-trimoxazole and chloramphenicol.¹⁵ One study found the resistance of *Plesiomonas* to cephalosporins; however, although beta-lactamase production is noted, resistance was mostly attributed to extensive filament formation.¹⁶

In this case, *Plesiomonas* was recovered only from the blood. This patient had no reported freshwater exposure, direct or indirect. The patient lacked many of the associated risk factors and presented with significant colitis. Although the patient did not report freshwater exposure, the possibility that the patient ingested something with contaminated water exposure cannot be excluded, and it can only be summarized that the consumption may have resulted in gastroenteritis and subsequent seeding of the blood. No guidelines-based therapy was available for decision-making, which could have been far more problematic given its relative rarity and the acuity of the patient's presentation.

Conclusion

Developing guideline-based therapy for extraintestinal manifestations of *Plesiomonas* is difficult. Relative rarity, the variability of presentation, presence or absence of underlying diseases, exposure to risk factors, currently limited data and the utilization of varying antimicrobial regimens, all contribute to the difficulty in outlining an appropriate treatment regimen. Future studies should focus on better characterizing its presence in the United States, additional risk factors and appropriate antibiotic therapy.

Conflicts of Interest

The author declares she has no conflicts of interest.

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