

A Case Report of *Leclercia adecarboxylata* Peritonitis in a Peritoneal Dialysis Patient with Review of the Literature

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Received date: 11 Oct 2016; Accepted date: 26 Jan 2017; Published date: 31 Jan 2017.

Citation: Hobby G, Mandavilli K, Singh M (2017) A Case Report of *Leclercia adecarboxylata* Peritonitis in a Peritoneal Dialysis Patient with Review of the Literature. *Int J Nephrol Kidney Failure* 3(1): doi <http://dx.doi.org/10.16966/2380-5498.140>

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Abstract

Leclercia adecarboxylata, is an anaerobic gram negative bacillus in the Enterobacteriaceae family which has been found in food, water, blood, feces, sputum and urine. Although infrequently reported in human infection, cases of peritonitis in peritoneal dialysis patients may not be as rare as previously thought. We are reporting a case of peritonitis in a peritoneal dialysis patient who presented with typical signs and an effluent cell count of 6404 WBC/mm³ (89% neutrophils). *Leclercia adecarboxylata* was isolated from peritoneal dialysis fluid and was found to be sensitive to all antibiotics tested. The patient was treated with intraperitoneal ceftazidime resulting in resolution of the infection without catheter removal.

Keywords: Gram negative; *Escherichia adecarboxylata*; Infection

Introduction

Leclercia adecarboxylata, formerly known as *Escherichia adecarboxylata*, is an anaerobic gram negative bacillus in the Enterobacteriaceae family. *Leclercia* isolates have been found in food, water, blood, feces, sputum and urine [1].

Although this organism has not been frequently described in human infections, we are presenting such a case to report the fact that this pathogen may not be as rare as previously thought and highlight the outcome of our case and similar cases in regards to peritoneal dialysis (PD) catheter removal.

Leclercia adecarboxylata was first described in 1962. The majority of past *L. adecarboxylata* reports have noted it as a questionable pathogen, described it as a constituent in mixed microbial growth in immunocompromised patients, or listed it as the cause of cutaneous infections in immunocompetent patients exposed to marine environments [2,3]. Less common infections such as infective endocarditis, catheter-related bacteremia, skin and soft tissue infections, spontaneous bacterial peritonitis, peritonsillar abscess, bacteremia, pneumonia, meningitis, and peritoneal dialysis (PD) peritonitis have been described [2,4,5]. This organism is typically susceptible to tetracyclines, aminoglycosides, most beta-lactams, quinolones, folate pathway inhibitors, nitrofurantoin, chloramphenicol, and azithromycin, although multi-drug resistant isolates have been reported [1,6,7]. PubMed and Google Scholar were used to search the existing literature for cases of catheter-related peritonitis in PD patients due to *L. adecarboxylata*. To the best of our knowledge, five prior cases of this type have been reported and are summarized in table 1. The majority of these episodes of PD peritonitis involved *L. adecarboxylata* as an isolated culture which has generally showed no great degree of resistance to antibiotics. Peritoneal dialysis catheter removal was only performed in one patient.

Case Report and Discussion

Our patient was a 68-year-old woman with end-stage renal disease secondary to diabetes mellitus who had been on continuous

cycling peritoneal dialysis for 7 years. Other medical history included hypertension, coronary artery disease, failure to thrive and multiple prior episodes of PD peritonitis. She had refused to be transitioned to hemodialysis and PD was considered a terminal plan for her.

She presented to a peritoneal dialysis clinic with two days of diarrhea, abdominal pain, weakness, and cloudy peritoneal dialysis fluid. She reported fever to 38.9°C prior to arriving at clinic. Initial blood pressure reading was 85/52 mmHg per paramedic report during transport to the emergency department. Hypotension resolved with a 500 mL normal saline bolus. On arrival to the emergency department, her vital signs included a blood pressure of 116/52 mmHg, heart rate of 77, and an oral temperature of 36.8°C. She was in no acute distress and was oriented to person, time, and place. Abdominal exam revealed slight tenderness to palpation in all quadrants with normal bowel sounds. There was no rebound tenderness. The peritoneal dialysis catheter exit site displayed no signs of infection. Initial effluent cell count was 6404 WBC/mm³ with 89% neutrophils. There was no peripheral leukocytosis. Blood cultures were not performed. As the patient displayed no rebound tenderness, had bowel sounds, and was hemodynamically stable after a small volume fluid bolus, she was presumed to have catheter-related peritonitis without any condition requiring surgical management. Nevertheless, end stage renal disease patients are prone to developing abdominal surgical complications without displaying typical signs on physical examination. This is especially true in the presence of PD fluid. With that in mind, we closely observed the abdomen and definitely ruled out secondary peritonitis. Empiric treatment was started with intraperitoneal (IP) vancomycin and ceftazidime. Effluent culture was positive for gram negative bacilli which were later identified as *Leclercia adecarboxylata* by mass spectrometry. Intraperitoneal vancomycin was discontinued and treatment consisted of daily IP ceftazidime 1.5 grams along with resumption of peritoneal dialysis during hospitalization. On the second day, effluent cell count essentially unchanged at 6035 WBC/mm³, but decreased to 4353 WBC/mm³ by day 3 of treatment. Although vital signs were stable, abdominal pain continued to day four of antibiotic therapy and catheter removal was considered. By the 5th day of treatment though, peritoneal dialysis

| Demographic Information | Initial Effluent Cell Count | Organism(s) Cultured | Culture Sensitivities of <i>L. adecarboxylata</i> | Intraperitoneal Antibiotic Regimen | Peritoneal Dialysis Catheter Removal | Reference |
|-------------------------|-----------------------------|--|--|-------------------------------------|--------------------------------------|-----------|
| 60-year-old man | 1,400 WBC/mm ³ | <i>L. adecarboxylata</i> | Sensitive to all antibiotics tested | Cephalothin Amikacin | Not removed | [6] |
| 5-year-old-boy | 48,000 WBC/mm ³ | <i>L. adecarboxylata</i> | Sensitive to all antibiotics tested | Ceftazidime Gentamicin | Not removed | [7] |
| 74-year-old man | unknown | <i>L. adecarboxylata</i> <i>Acinetobacter lwoffii</i> | Resistant only to fosfomycin | unknown | unknown | [8] |
| 48-year-old woman | 8,900 WBC/mm ³ | <i>L. adecarboxylata</i> | Sensitive to all tested cephalosporins | Cefazolin Ceftazidime | Not removed | [9] |
| 38-year-old woman | 5,800 WBC/mm ³ | <i>L. adecarboxylata</i> | Sensitive only to amikacin, trimethoprim-sulfamethoxazole, tetracycline, meropenem | Tobramycin Cefazolin Amikacin | Removed | [10] |

Table 1: Literature for cases of catheter-related peritonitis in PD patients due to *L. adecarboxylata*

fluid cell count had fallen to 1328 WBC/mm³ and the patient exhibited an improvement in abdominal pain, absence of fever, and stable vital signs. The patient continued to improve and was discharged on the 11th day after admission to complete a 21 day course of daily intraperitoneal ceftazidime. The peritoneal dialysis catheter was not removed as the patient showed clinical improvement by the fifth day of treatment. This is in accordance with guidelines from the International Society of Peritoneal Dialysis for the management of peritonitis for gram negative organisms [8]. Effluent cell count on day 3 has been shown to provide prognostic information to the outcome of peritonitis. A 2006 publication showed that an effluent cell count of at least 1090 WBC/mm³ on day 3 of treatment has an area under the receiver-operating characteristic curve of 0.98 for the prediction of treatment failure in peritonitis cases [9]. Based on this, our patient would have been expected to have treatment failure. Although daily effluent cell counts are not available for other reported cases of *L. adecarboxylata* peritonitis, initial effluent cell counts were largely similar and all but one reported case resolved without catheter removal. This suggests that better outcomes may be experienced with this organism as compared to other gram negative organisms. In conclusion, *L. adecarboxylata* has been shown to be a causative organism of catheter-related peritonitis in peritoneal dialysis patients, exhibiting low levels of resistance with cases generally resolved without PD catheter removal [10-14].

Funding: No grants or other sources of support were used for the preparation of this manuscript.

Conflict of Interest: The authors of this manuscript note no conflicts of interest.

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