CASE REPORT

Isolation of *Plesiomonas shigelloides* from a Case of Inflammatory Bowel Disease on Immunosuppressant Therapy

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Abstract

Plesiomonas shigelloides is a gram-negative, oxidase-positive facultative anaerobe, very rarely encountered in clinical samples. Here we report a case of infective relapse of inflammatory bowel disease (IBD) caused by this organism in a patient on immunosuppressive therapy. *Plesiomonas shigelloides* is known to be a causative agent of acute gastroenteritis in patients with certain common risk factors which is absent in our case. Through this case report, we intend to discover the role of *P. shigelloides* as a causative agent of relapse of IBD.

Keywords: Acute gastroenteritis, Inflammatory bowel disease, *Plesiomonas shigelloides*.

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Introduction

Plesiomonas shigelloides is an oxidase-positive, gram-negative, facultative anaerobe, first isolated from the feces of a patient in 1947. Ferguson and Henderson reported it to be a motile organism, sharing the phase I major antigen with *Shigella sonnei* and named it Paracolon C27.[1] It was classified under the family *Vibrionaceae* and placed in a new genus *Plesiomonas*. Based on its biochemical, morphological, and taxonomical characteristics, many of which matched those of *Shigella*, it was named as *P. shigelloides*, the only species under the genus. Currently, it is taxonomically placed in the family *Enterobacteriaceae* based on the phylogenetic data.[2] It is a rarely encountered pathogen in laboratories and is usually associated with gastrointestinal infections. Infections are more prevalent in Southeast Asia and Africa, because of predisposing conditions such as poor hygiene and dietary habits.[2] Here we report a case of acute diarrhea caused by *P. shigelloides*, in a young woman with IBD on immunomodulators.

Case Description

A 34-year-old woman was presented with an increased frequency of watery stools for a week. It was associated with mild abdominal discomfort and intermittent low-grade fever. There was no blood in stools, abdominal distension, or vomiting. There was no history of consuming any food cooked outside the house or fish or meat or poultry. She was a known case of IBD for 4 years and was in clinical remission with immunomodulators. The laboratory investigations showed a hemoglobin of 11.3 g/dl, a total leucocyte count of 4900 cells/c.mm, and a platelet count of 2.72 lakhs. Her blood sugar, renal, and liver function tests were normal.

A stool sample was sent to the Microbiology laboratory for culture and sensitivity testing. Grossly the stool was liquid in the consistency, with no foul odor and no obvious blood. Direct microscopy did not reveal pus cells, red blood cells, or any parasitic elements. Stool culture was done using MacConkey agar and Xylose lysine deoxycholate agar (XLD) and also in enrichment medium Selenite F broth, which was further subcultured on to the selective media. After overnight incubation at 37°C, there were flat, pale, non-lactose fermenting colonies on MacConkey agar (Fig. 1) and red translucent colonies without a black center on the XLD agar in abundance, while colonies of other normal flora were very few. These pale colonies were catalase and oxidase positive. Further identification of the organism was carried out using conventional biochemical tests, such as indole test, citrate utilization, urea production, Kligler iron agar, mannitol fermentation, amino acid decarboxylation, etc. and was finally confirmed by MALDI TOF MS. The key biochemical characters which helped in identification are as follows:

- Indole ring produced.
- Citrate not utilized.
- Urea not hydrolyzed.
- Kligler iron agar showed pink slant with yellow butt without production of gas or hydrogen sulfide.
- Nitrate reduced to nitrite.
- Methyl red test positive.
- Voges-Proskauer test negative.
- Lysine and ornithine decarboxylated.
- Arginine dihydrolyzed.
- Ortho-nitrophenyl-β-D-galactopyranoside test positive.
- Sucrose or D-mannitol not fermented.

Based on these findings, the organism was presumptively identified as *P.shigelloides* which was further confirmed by MALDI TOF MS with a 99.9% confidence level. Antibiotic susceptibility test was performed by the disk diffusion method on Mueller Hinton Agar

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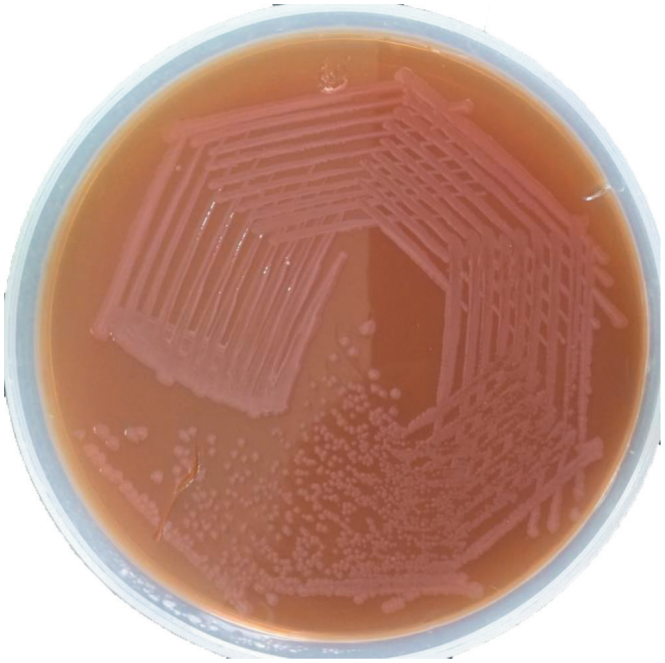

Fig. 1: Nonlactose fermenting colonies of *Plesiomonas shigelloides* on MacConkey agar

as per the Clinical Laboratory Standards Institute[3] and the isolate was found to be susceptible to ampicillin, ciprofloxacin, ceftriaxone, and cotrimoxazole. The patient showed significant improvement in symptoms within 48 hours after starting ciprofloxacin and had a complete resolution in 5 days.

Discussion

Gastrointestinal (GI) infections are closely associated with IBD, either as an initiating event or as part of subsequent relapses.[4] A wide range of organisms is known to cause infective relapse in IBD, the most common being *Clostridioides difficile*.[4] The major challenge in the treatment of these relapses is that it is very difficult to distinguish between infective and noninfective exacerbations clinically. Therefore routine testing of the stool for the presence of such pathogens is essential, to avoid exposing the patients to immunosuppressants or steroids unnecessarily.[5] As far as the present case is concerned, the patient was a known case of IBD, who presented with symptoms of acute exacerbation, and *P. shigelloides* was isolated from the stool sample.

Plesiomonas shigelloides is a pathogen that is rarely encountered in routine clinical practice. It is now accepted as a proven pathogen of the human GI tract even though some studies have shown contradictory results.[2,6] The present patient was symptomatic, and *P. shigelloides* was isolated from the stool in abundance with no other significant pathogen being detected from the stool on culture.

Plesiomonas shigelloides has been known to be associated with GI infections for the past few decades, the most common presentation being acute secretory gastroenteritis followed by dysentery and chronic persistent diarrhea of >14 days duration.[2] But most of these infections were commonly associated with risk factors like consumption of food items from aquatic sources or contact with the aquatic environment.[2,7,8] This is probably because the most common habitats of *P. shigelloides* are freshwater sources, brackish water, estuaries, etc. and it has been isolated from many of the aquatic organisms including freshwater fish, crustaceans, mollusks, etc, some aquatic birds and marine mammals.[2] Another common predisposing factor for *P. shigelloides* infections is the history of foreign travel, especially to Southeast Asian countries where this organism is found to be more prevalent.[2] But in our case, none of these risk factors were present. As the source of infection could not be traced, the role of other factors that could have contributed to the disease has to be evaluated, the most important being IBD. An earlier study conducted to determine the role of enteric pathogens causing exacerbation of IBD had observed a higher prevalence of *P. shigelloides* infection among patients with ulcerative colitis compared to non-IBD patients (2.6% *vs* 0.7%, $p = 0.049$).[9] Another contributing factor could be the use of immunomodulator therapy in this patient.

Gastrointestinal infections caused by *P. shigelloides* are usually self-limiting. But these organisms are also known to cause various serious extraintestinal infections, such as, osteomyelitis, septic arthritis, meningitis, pneumonia, sepsis, etc. in immunosuppressed individuals and is more common in patients with blood dyscrasias, hepatobiliary dysfunctions.[2] Antimicrobial therapy is mandatory in such situations and has to be guided by antimicrobial susceptibility testing.[2] Various studies have documented that *P. shigelloides* is capable of producing beta-lactamases rendering it resistant to most of the penicillin group of antibiotics, whereas, our isolate was susceptible to ampicillin. Most isolates have shown *in vitro* susceptibility to common oral agents like cotrimoxazole and ciprofloxacin similar to ours.[10]

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