

Spontaneous Bacterial Peritonitis (SBP) caused by *Bacillus Cereus* in an Alcoholic Patient: Case Report and Review of Literature

SAYAN BHATTACHARYYA¹, MOHAMMAD AFTAB ALAM ANSARI², ASIM SARFRAZ³, NITESH JAISWAL⁴, SIDDHARTH SINGH⁵

ABSTRACT

Spontaneous bacterial peritonitis (SBP) is infection of peritoneal covering of the abdomen caused by bacteria, without any known etiology. Common known predisposing factors are cirrhosis of liver and old age among others. *Bacillus cereus* is an uncommon cause of SBP and often wrongly interpreted as a contaminant. We hereby report a case of peritonitis in chronic alcoholic, elderly male patient presenting in the outpatient department. *Bacillus cereus* is often regarded as contaminant but must be carefully identified and correlated clinically in case of isolation from peritoneal fluid.

Keywords: Alcoholic, *Bacillus cereus*, Cirrhosis, Lecithinase, Peritonitis

CASE REPORT

A 55-year-old male patient, resident of Munger, Bihar, East India, presented in the General Medicine OPD of the Institute with the chief complaints of severe diffuse pain in abdomen and high grade fever since the last 10 days. On physical examination, the patient was weak and had diffuse abdominal rigidity. The patient was a chronic alcoholic (60-70 ml per day for last 10 y), non-diabetic and non-hypertensive. Based on clinical findings, a diagnosis of peritonitis was made. The patient was administered intravenous Levofloxacin (4 gm OD IV). His peritoneal fluid was aspirated before initiation of therapy and aspirated fluid was sent to the Microbiology laboratory for culture and susceptibility. Gram stain of the sample was performed, which showed plenty of pus cells and Gram positive bacilli in short chains. The sample was inoculated on 5% Sheep blood agar and Mac Conkey agar and incubated at 37°C aerobically overnight. The next day, non-lactose fermenting smooth colonies grew on Mac Conkey agar (as shown in [Table/Fig-1]), and haemolytic, flat to low convex, smooth colonies were observed on blood agar. The colonies were Oxidase positive using 1% TMPPD. Gram stain from the spreading (frontal) colonies showed Gram positive bacilli in long, interspersed chains and very occasional central spores, not bulging out from width of bacterial cell. However, Gram stain from distal end of colonies revealed Gram positive bacilli in short chains and plenty of central spores. The isolate was also motile using Hanging drop preparation, and showed slow, stately

motility. Mannitol fermentation test was positive using 1% mannitol in peptone water with 1% (v/v) Andrade's indicator. The bacterial isolate also had positive Lecithinase (phospholipase) activity on egg yolk nutrient agar (zone of haziness or precipitation around colonies), as shown in [Table/Fig-2]. A repeat aspiration was obtained before initiation of antibiotic therapy and cultured on the same media, which grew the same microorganism. An aspiration after five days of initiation of therapy showed no bacterial growth on the same media. Keeping in mind all these findings, the isolate was identified as *Bacillus cereus*. It was susceptible in vitro to Azithromycin (15 µg), Levofloxacin (5 µg), Cotrimoxazole (25 µg), Amikacin (30 µg) and Vancomycin (5 µg) and resistant to Amoxicillin-Clavulanic acid (25 µg), using Kirby-Bauer disc diffusion method on Mueller-Hinton Agar (HiMedia labs, India) as per CLSI protocol [1]. Clinical follow up of the patient was sought, and he had improved clinically with injection Levofloxacin (4 gm OD IV) and fever and pain abdomen subsided after five days.

DISCUSSION

Bacillus cereus is a Gram positive, spore-bearing aerobic to facultatively anaerobic bacillus causing a wide range of infections



[Table/Fig-1]: Dry flat non-lactose fermenting colonies (left hand quadrant) of *B. cereus* on Mac Conkey agar



[Table/Fig-2]: Haziness around colonies of *B. cereus* indicating lecithinase activity on Egg yolk agar

in humans [2]. It is usually associated with food poisoning, which is either of two presenting types, vomiting or diarrhoea [3]. Rarely, other clinical manifestations like endophthalmitis and meningitis have been reported [3]. Peritonitis, inflammation of the peritoneal covering, is occasionally caused by *Bacillus cereus* only during or after dialysis [4]. In a few occasions, it has also been reported to cause SBP along with bacteremia in cirrhotic patients [5]. SBP usually develops without any clear identifiable cause, in settings like portal hypertension due to chronic alcohol consumption and also as a complication of ascites [6]. Mostly Gram negative enteric bacteria like *Escherichia coli* and *Klebsiella pneumoniae* are incriminated in the causation of SBP, with an in-house mortality of about 20% [7]. SBP usually occurs in the settings of portal hypertension due to cirrhosis and as a complication of ascites [2]. Manifestations may include fever, malaise and worsening hepatic function, and it is particularly common in alcoholics with cirrhosis [2]. *Bacillus cereus* is an uncommon cause of SBP, being mainly associated with food poisoning, endophthalmitis and meningitis [3]. Virulence factors include 4 types of hemolysins, 3 distinct lecithinase enzymes and other putative virulence factors like pore forming enterotoxins, with the hemolysin inducing apoptosis of host Macrophages [2,8]. It is usually resistant to beta-lactam antibiotics due to presence of plasmid-borne beta-lactamases [2,3]. *B. cereus* can be disregarded as a contaminant in the laboratory unless properly identified and correlated clinically. Colonies are usually dry but may even be smooth, with distal edges showing long chains of Gram positive bacilli with infrequent sporulation [2]. Probably, as the colony spreads from the initial inoculum site, it leaves behind a number of metabolic end products, which alter the local pH and induce sporulation at distal end of colonies [2]. Identification can be ascertained by typical leisurely motility, hemolysis, lecithinase activity, absence of Mannitol fermentation and typical Gram stain morphology as described previously [9]. There are a few reports of peritonitis due to *B. cereus*, but following peritoneal dialysis [9]. It is relatively rare as a cause

of peritonitis, but can also cause relapsing peritonitis in chronic ambulatory peritoneal dialysis (CAPD) patients [10]. As far as we know, this is the first case of SBP due to *B. cereus* with smooth morphotype colonies in a tertiary care hospital in Eastern India. This finding highlights the importance of proper lab investigation and follow up for peritoneal fluid culture in such instances of isolation of *Bacillus* spp. from cases of SBP.

CONCLUSION

B. cereus is an uncommon cause of peritonitis, but should be meticulously looked for and not disregarded as a contaminant in cases of isolation from peritoneal fluid, especially in cases of cirrhosis.

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PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Microbiology, All India Institute of Medical Sciences, Patna, India.
2. Senior Resident, Department of Microbiology, All India Institute of Medical Sciences, Patna, India.
3. Senior Resident, Department of Microbiology, All India Institute of Medical Sciences, Patna, India.
4. Demonstrator, Department of Microbiology, All India Institute of Medical Sciences, Patna, India.
5. Senior Resident, Department of General Medicine, All India Institute of Medical Sciences, Patna, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Sayana Bhattacharyya,
Assistant Professor, Department of Microbiology, All India Institute of Medical Sciences, Patna-801505, Bihar, India.
E-mail: sayanda7@gmail.com

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