

# Burkholderia Cepacia: A Rare Cause of Bacterial Meningitis

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## ABSTRACT

**Introduction:** Burkholderia cepacia gram-negative bacillus is an opportunistic environmental pathogens that can be found in soil, water and contaminated antiseptic solutions and parenteral medications causing infections in immunocompromised individuals with a significant mortality rate.

**Case report:** We report a 70-year-old-man diabetic, fisherman by occupation with signs and symptoms of meningitis and later diagnosed with *Burkholderia cepacia* meningitis. Patient was successfully treated with intravenous Meropenem and recovered to normal state of health. *Burkholderia cepacia* is an emerging cause of meningitis with limited antibacterial treatment options. However, trimethoprim/sulfamethoxazole remains an effective agent which is an excellent alternative therapy.

**Conclusion:** Burkholderia cepacia is a rare cause of meningitis as shown in this case. Burkholderia cepacia is commonly isolated in immunocompromised patients. Burkholderia cepacia is known to show complex antimicrobial susceptibility profile in conjunction with its ability to evade multiple antimicrobials makes its management quite complicated.

**Keywords:** Burkholderia Cepacia, Bacterial Meningitis

## INTRODUCTION

Burkholderia cepacia is an aerobic, glucose non-fermenting, gram-negative bacillus. Burkholderia cepacia is an opportunistic environmental pathogens that can be found in soil and water, primarily associated with causing infections in patients with cystic fibrosis, chronic granulomatous disease.<sup>1</sup>

## CASE REPORT

70-year-old male known case of Diabetes Mellitus, fisherman by occupation presented with complaints of fever, headache and vomiting. On central nervous system signs of meningeal irritation were present, rest of the examination was not remarkable. Patient was evaluated accordingly. A lumbar puncture was performed and CSF analysis was done, cerebrospinal fluid was colorless and slightly hazy, cell count 64 cells, cell type neutrophils 70% lymphocytes 30%, glucose 88 mg/dL, and proteins 244 mg/dL. Patient received empiric intravenous ceftriaxone 2gm since CSF features were compatible with bacterial meningitis. Within the next 48 h, a gram-negative rod, later identified as Burkholderia cepacia grew in both CSF and blood culture and sensitivity (BACTEC). As per the culture sensitivity reports antibiotics was upgraded to Meropenem. Patient completed a total of 14 days of intravenous Meropenem.

## Investigations

Hematological profile showed leucocytosis with neutrophilia (table-1).

Parameters	Values	Reference values
HB	12.5g/dl	12.5-16g/dl
TC	16000cells/cu.mm	4000-1000cells/cu.mm
DC		
Neutrophils	89%	40-60%
Lymphocytes	6.8%	20-40%
Eosinophils	0%	1-6%
Monocytes	3.4%	2-10%

**Table-1:** Hematological parameters

CSF analysis	
Appearance : Turbid	CSF Glucose : 88mg/dl
Cell count : 64 cells	CSF Protein : 244mg/dl
Cell type : Neutrophils : 70%	CSF Chloride : 115mmol/l
Lymphocytes : 30%	

**Table-2:** Cerebrospinal fluid analysis

Antibiotics	Sensitivity/Resistance
Meropenem	Sensitive
Imipenem	Sensitive
Co-trimoxazole	Sensitive
Piperacillin-Tazobactam	Resistance

**Table-3:** Antibiotics sensitivity and resistance pattern

Cerebrospinal fluid analysis showed elevated cell count with predominate cells being neutrophils with elevated protein levels which were suggestive of bacterial meningitis<sup>1</sup> (table-2). CSF culture grew Burkholderia cepacia complex. Antibiotic sensitivity and resistance showed sensitivity to carbapenems and co-trimoxazole and resistance towards piperacillin-tazobactam<sup>1,2</sup> (table-3).

## DISCUSSION

This case illustrates Burkholderia cepacia as a rare cause of bacterial meningitis.

Burkholderia cepacian is a motile, nonfermenting, aerobic Gram negative rod that is ubiquitous in the environment. It is commonly found in water, soil, and various plants.

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Burkholderia cepacia is almost always a colonizing organism rather than an infecting organism, but it may be important when isolated from body fluids that are ordinarily sterile.<sup>1</sup>

Burkholderia cepacia management is challenging due to its ability to overcome the action of multiple antimicrobials through various resistance mechanisms. Those mechanisms include the production of  $\beta$ -lactamases, carbapenemases, and antibacterial drug efflux pumps as well as the ability to decrease the number of membrane porins, modify bacterial lipopolysaccharide structure, and mutate antimicrobial binding targets.<sup>2-4</sup> These resistance mechanisms have limited antimicrobial against Burkholderia cepacia infections, certain isolates have shown susceptibility to beta-lactams including meropenem, and piperacillin. Trimethoprim and sulfamethoxazole (TMP/SMX) have been considered as alternative therapy. Moreover, beta-lactams can be used as a treatment option when patients have an intolerance, allergy, or resistance to TMP/SMX.<sup>2,5</sup>

In this case CSF culture and sensitivity showed sensitivity to Meropenem, hence patient was treated with the same, patient improved with Intravenous meropenem for 14 days.

## CONCLUSION

Burkholderia cepacia is a rare cause of meningitis as shown in this case. Burkholderia cepacia is commonly isolated in patients with Cystic fibrosis and Chronic granulomatous disease. Its complex antimicrobial susceptibility profile in conjunction with its ability to evade multiple antimicrobials makes its management quite complicated. Trimethoprim and sulfamethoxazole remains useful in the management of meningitis since it provides excellent penetration into the CSF and retains activity against Burkholderia cepacia.

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