Journal of Research in Clinical Medicine

J Res Clin Med, 2022, 10: 25
doi: 10.34172/jrcm.2022.025
https://jrcm.tbzmed.ac.ir

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Case Report

Elizabethkingia meningoseptica: An emerging pathogen causing septicemia in an Immunocompromised patient

Pallaavi Goel[1], Ekadashi Rajni[2*], Puneet Rijhwani[1]

[1]Department of General Medicine, Mahatma Gandhi University of Medical Science & Technology, Jaipur, Rajasthan, India
[2]Department of Microbiology, Mahatma Gandhi University of Medical Science & Technology, Jaipur, Rajasthan, India

Article info

Article History:
Received: February 9, 2022
Accepted: May 10, 2022
e-Published: December 4, 2022

Keywords:
Bacteremia, Elizabethkingia meningoseptica, ICU

Abstract

Elizabethkingia meningoseptica is a rare, gram-negative bacterium, which is known as the causing agent for hospital-acquired infections, especially in immunocompromised patients and those with indwelling devices. *E. meningoseptica* is resistant to the most of the antibiotics making the treatment procedure a difficult task, because of which this bacterium is considered as an emerging cause of high mortality in critically ill patients. Herein, we describe a case of *E. meningoseptica* causing bacteremia in a young chronic kidney disease (CKD) patient who was successfully managed with an appropriate use of suitable antimicrobials. The case highlights the importance of constant and active interaction between the clinician and the microbiologist to handle such novel organisms.

Introduction

Elizabethkingia meningoseptica is a non-motile, non-fermentative, oxidase positive, gram-negative bacillus described by Elizabeth O. King in 1959.[1] This bacteria is widely distributed in nature but not known to exist in human body. The organism resides in sink basins, taps, ventilator circuits, etc. and can become a potential source of infection in the hospital environment. It is known for causing hospital acquired infections (HAIs) like pneumonia, meningitis, and sepsis, especially in immunocompromised hosts.[2] *E. meningoseptica* is resistant to many broad-spectrum and frequently used antibiotics like beta-lactams, carbapenems, aminoglycosides and colistin, making treatment a difficult task. Moreover, the antimicrobial susceptibility data on this pathogen remains limited.[3] The current study reports a case of *E. meningoseptica* bacteremia in a young, chronic kidney disease (CKD) patient successfully managed with the help of timely and appropriate use of antimicrobials. Increased awareness amongst the microbiologist and clinician, and timely and accurate diagnosis can help to reduce the mortality associated with these bugs.

Case Report

A 28-year-old hypertensive male, resident of Ajmer, a confectioner by occupation, was admitted with complaints of shortness of breath, loss of appetite, nausea and vomiting for 3 days. He was a known case of CKD diagnosed 3 years back and was on hemodialysis for 1 month. His urea, creatinine, potassium and total leukocyte counts (TLC) were 162 mg/dL, 9 mg/dL, 6.3 mmol/l and 12 800, respectively. On admission, and urine output was 150 mL in 24 hours. Considering his condition, he was shifted to intensive care unit (ICU) and urgent dialysis was performed. Thereafter, he underwent a series of dialysis and showed considerable clinical improvement. After being stabilized, he transferred out of ICU, but on day 4, he developed a fever, shortness of breath, and was unable to maintain the saturation on room air, because of which he was transferred back to the ICU and urgent dialysis was performed again. His TLC level was increased to 16 700/mm^3 with 91% polymorphs. The patient had continuous fever spikes even after round the clock treatment with antipyretics. The symptoms persisted with increasing TLC counts, anaemia and thrombocytopenia with raised procalcitonin level to 11 ng/mL (normal < 0.15) which was suggestive of sepsis. Two sets of blood cultures were drawn from different sites; one from central line and the other from peripheral line. Additionally the urine sample was sent to culture. The patient was started on IV piperacillin/tazobactam 2.25 g IV 8 per hour and IV antipyretics. The result of the urine culture was sterile, whereas paired blood culture showed the growth of a gram-negative bacillus. Further identification and antimicrobial susceptibility testing were done using Vitek 2 (Biomerieux system) and the organism was found to be *E. meningoseptica.* This isolate of *E. meningoseptica* was found to be resistant to piperacillin/tazobactam, third

***Corresponding Author:** Ekadashi Rajni, Email: ravajni@yahoo.co.in

and fourth generation cephalosporins, aminoglycosides, carbapenems and colistin. It was susceptible only to levofloxacin and cefoperazone/sulbactam. Given the resistance of this organism to the drug being instituted at the time (piperacillin/tazobactam), intravenous levofloxacin 750 mg once daily was immediately started. The patient showed outstanding response to the treatment. The vital signs improved and TLC counts reduced back to the normal levels by the third day after initiation of levofloxacin. Table 1 describes the summary of progression of laboratory parameters in thepatient. After 72 hours the results of the blood culture were sterile. Figure 1 describes the entire clinical course of the patient in the hospital. We experienced this rare pathogen for the first time in the ICU and immediately warranted strict asepsis. We followed institutional protocol to control the infection and curtail the spreading of infection. Finally, the patient was shifted to ward and discharged from hospital with a stable condition.

Discussion

Elizabethkingia meningoseptica is a gram-negative, rod-shaped bacteria extensively distributed in nature. It is an opportunistic pathogen, which causes HAIs.[4] Over the last decade there is an increase in the incidence of *E. meningoseptica*. The risk factors associated with *E. meningoseptica* infections include prolonged hospital stay, prior use of high-end broad-spectrum antibiotics, immunosuppression, presence of underlying medical conditions and indwelling devices. Infections caused by this organism have a high mortality rate due to the lack of effective therapeutic regimens and its intrinsic resistance to antibiotics used empirically for management of infections caused by gram-negative bacilli. It is paradoxically known to be susceptible to antibiotics used to manage infections caused by gram-positive bacteria i.e., rifampicin, ciprofloxacin, vancomycin and trimethoprim–sulfamethoxazole.[5]

Although *E. meningoseptica* infections in immunocompromised hosts have been recognised, but clinical data pertaining to this infection remain limited, especially from India. Khan et al have documented that previous exposure to high-end broad-spectrum gram-negative antibiotic cover like carbapenems and colistin predisposes to nosocomial infections caused by opportunistic bugs like *Elizabethkingia* spp.[6] Govindaswamy et al, studying case series on *E. meningoseptica*, reported that all the patients had a history of recent hospitalizations and were on mechanical ventilation in ICU. They also reported a high mortality to the tune of 75% in their study.[7]

In our case, a young hypertensive CKD patient developed sepsis due to *E. meningoseptica*. The time from admission in the hospital to isolation of organism was 10 days. The patient had multiple hospital admissions during the last three years and had a history of prior exposure to antibiotics, details of which could not be found. It is speculated that the usage of broad-spectrum antibiotics preceding the current admission may possibly lead to the infection with this bacterium.[8] Immunocompromised status of the patient, presence of an indwelling device (haemodialysis catheter), multiple exposure to antimicrobials in the past, and prolonged ICU stay

Table 1. Summary of progression of laboratory parameters

Day	Investigations		
	CBC- TLC/Hb/ Platelets	RFT- Urea/ Creatinine	Serum Electrolytes-Na/K
Day 1	10800/7.4/130k	161.9/9.0	136.1/5.47
Day 3	9000/6.2/110k	111/7.2	131.4/6.3
Day 4	12,500/5.4/85k	120/5.5	129.5/5.2
Day 5	16700/5.4/80k	99/7.0	128.1/5.12
Day 8	22800/6.2/110k	101/7.4	133.3/5.3
Day 11	11400/5.3/93k	98/7.2	133.1/5.3
Day 13	7900/5.9/121k	78/5.6	134.6/4.34

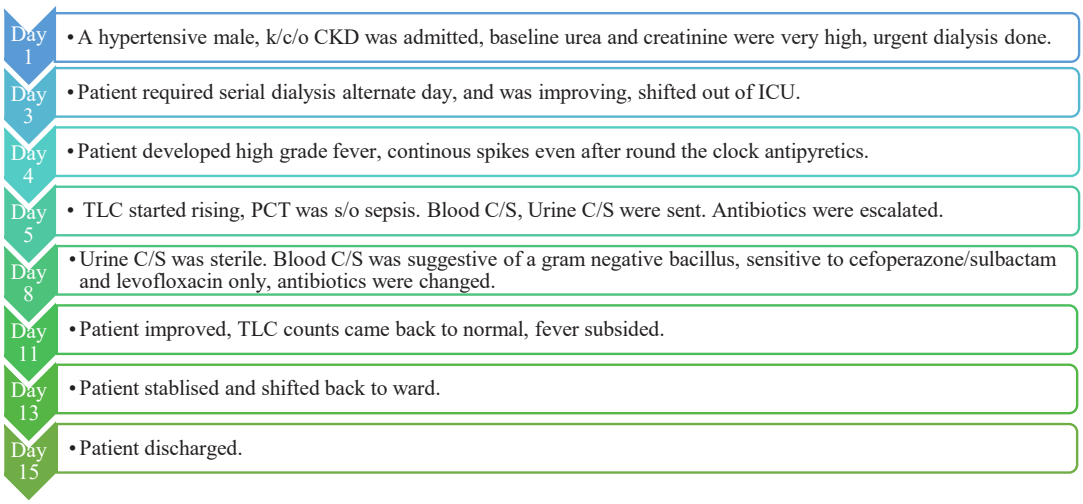

Figure 1. Clinical course of the patient in the hospital

are the risk factors for development of sepsis with this infrequently reported pathogen. In an earlier multicentric study from Greece, *E. meningosepticum* was found to be the second mostly common cause of gram-negative infections in a dialysis unit.[9] Isolation from paired blood cultures and rapid response to the antimicrobial therapy tailored according to the antimicrobial susceptibility report is conclusive evidence of etiological role of this organism. Various cases reported in literature have shown poor prognosis,[10] whereas our patient recovered fully and was discharged. *E. meningoseptica* has unusual resistance patterns and mechanisms. It is important to make a prompt diagnosis and perform sensitivity testing along with strengthening the standard infection control measures to prevent outbreaks.

Conclusion

Elizabethkingia meningoseptica is an important emerging pathogen, especially in immunocompromised hosts with indwelling devices. This organism is resistant to antibiotics commonly prescribed for treating gram-negative bacterial infections, thereby proving to be a serious challenge for the treating physician. Early diagnosis and treatment are vital for a better patient outcome. Through this case report, authors intend to highlight the importance of constant and active interaction between the clinician and the microbiologist in handling novel organisms.This kind of understanding and team effort is also essential to design effective infection control policies and antibiotic stewardship programmes.

Acknowledgments

The authors appreciate the patient for granting an informed consent for the study.

Author Contributions

Conceptualization: Ekadashi Rajni.
Data Curation: Pallaavi Goel.
Formal Analysis: Ekadashi Rajni.
Investigation: Ekadashi Rajni.
Methodology: Ekadashi Rajni.
Project Administration: Pallaavi Goel.
Resources: Ekadashi Rajni.
Supervision: Puneet Rijhwani.
Validation: Puneet Rijhwani.
Visualization: Ekadashi Rajni.
Writing—Original Draft Preparation: Pallaavi Goel.
Writing—Review and Editing: Ekadashi Rajni.

Funding

No source of funding declared.

Ethical Approval

No ethical committee approval required. Informed consent was obtained from the patient to publish this case.

Conflict of Interests

Authors declare no conflict of interest in this study.

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