Emergence of Stenotrophomonas Maltophilia Sepsis - A Case Series and Review of Literature

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ABSTRACT

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Stenotrophomonas maltophilia is an emerging nosocomial pathogen that causes fatal infections in critically ill or immunocompromised patients. S.maltophilia bacteremia (SMB) is a rare condition and is assosciated with morbidity and mortality, and its optimal management remains ill defined. The aim of the current study is to review the management of S.maltophilia bacteremia1. We described five cases of S.maltophilia bacteremia in immunocompromised patients over a period of 6 months from September 2019 to February 2020. In the current review, a few cases had undergone surgical intervention prior to the onset of bacteremia. Prolonged antibiotic therapy (eg carbapenam), healthcare exposure , and prior surgical procedures were the major risk factors associatd with S. maltophilia infection in healthcare settings. Optimal therapy is based on antimicrobial sensitivity , and the trimethoprim-sulfamethoxazole based combination has been shown to be successful.

Keywords: SMB, Stenotrophomonas maltophilia, Nosocomial pathogen

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INTRODUCTION

Stenotrophomonas (Xanthomonas) maltophilia is an aerobic nonfermenting multidrug resistant Gram-negative bacillus that ubiquitously inhabits the environment. The organism is considered the third-most frequent nosocomial pathogen among nonfermentative bacteria, following Pseudomonas aeruginosa and Acinetobacter spp.[1]

Stenotrophomonas maltophilia was first isolated in 1943 and , at that time, was named Bacterium booker. It was later classified within the genus Pseudomonas, then Xanthomonas, and then finally Stenotrophomonas in 1993. S.maltophilia is the only species of Stenotrophomonas known to infect humans. It is frequently isolated from soil, water, animals, plant matter and hospital equipment. It has inherent ability to adhere to foreign materials and form a biofilm, rendering protection from host defences as well as antimicrobial agents. This bacterium is increasingly recognized as an emerging global opportunistic pathogen, causing hospital acquired infections such as bacteremia, pneumonia, endocarditis and meningitis as well as urinary tract, ocular, bone, skin and soft tissue and gastrointestinal infections.[2] It is occasionally associated with septic shock in critically ill and immunosuppressed patients. Its management is challenging due to resistance of S.maltophilia to multiple antimicrobial agents and different antimicrobial susceptibility among different strains.[3]

CASE PRESENTATION

Case one

A 28-year-old male with no known comorbidities presented with alleged history of road traffic accident, with multiple parenchymal injuries of liver and fractures of ribs, underwent emergency laprotomy and cholecystectomy and was on mechanical ventilator. 3 days following the procedure, he developed fever. Two blood samples were sent for culture and patient was empirically started on intravenous meropenem (2g every 8 hrs) and colistin (3 million units every 8hrs). Growth was later identified as S. Maltophilia by conventional methods and automated system Vitek-2, which also showed the organism was only sensitive to trimethoprim-sulfomethoxazole. Therefore, his treatment was modified on 7th day of illness, and accordingly Intravenous meropenem was stopped. Colistin was continued and trimethoprim-sulfamethoxazole (15mg/kg/day in

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3 divided doses) was added. The patient was extubated after 10 days of modified therapy. His repeat cultures was negative with significant clinical improvement.

Case two

A 68-year old female known case of Diabetes Mellitus, hypertension presented with complaints of constipation and breathlessness , was admitted with a diagnosis of subacute intestinal obstruction. On the 3rd day of illness, she developed lower respiratory tract infection followed by urosepsis and acute kidney injury. Blood and urine samples were sent for culture and analysis. Growth was detected in blood by BACT-ALERT . Gram stained smear showed gram negative bacilli which was identified as S.maltophilia from both blood and urine. However she was empirically started on metronidazole and piperacillin-tazobactam, which was later modified to intravenous Trimethoprim-sulfamethoxazole (15mg/kg). She improved clinically and repeat cultures after 10 days of treatment was sterile. On surveilence, growth of S.maltophilia was found in the humidified water. Since it is an environmental pathogen we recommended cleaning the room and changing the water sources.

Case three

A 25year-old primi at 17weeks and 2 days gestation with generalised bodyache, fever, chills and cough was diagnosed to have upper respiratory tract infection. She was started empirically on Azithromycin. However due to persistent fever, blood samples were sent for culture. She was started empirically on Azithromycin. On the 5th day of illness, blood sample showed gram negative bacilli, which was later identified as S.maltophilia and her therapy was modified to Trimethoprim-Sulfamethoxazole and she showed good recovery after 7 days of therapy. Growth of S.maltophilia was found in the humidified water and whole batch of humidified water was discarded.

Case four

A 50 year old, female, known case of hypothyroidism, Carcinoma Ovary, status post cryoreductive surgery (TAH+BSO with bilateral pelvic lymph node dissection), who was on palliative chemotherapy, presented with recurrent episodes of vomiting and loose stools, underwent percutaneous transhepatic biliary drainage (PTBD) and biliary stenting. She was started on metronidazole and piperacillin-tazobactem. After 4 days of procedure, she developed 2 fever spikes and antibiotics were changed to Linezolid and Meropenem intravenously. Blood sample was sent for culture and culture showed no growth. However fever persisted and ultrasound was suggestive of intrahepatic collection, followed by which bile was sent for culture and sensitivity, which again showed no growth. On post-operative day 8, EJV cannulation was removed and re-canulated. Repeat Blood culture was sent and growth was gram negative bacilli, which was sensitive to Ciprofloxacin and Cotrimoxazole, which was identified as S.maltophilia. Meropenem was stopped and Trimethoprim-Sulfamethoxazole was added intravenously. After 25 days of illness, she was recovered clinically and repeat blood cultures was found to be negative.

Case five

A 91 year old male known case of Diabetes Mellitus, Hypertension , old CAD, presented with acute exacerbation of Bronchial Asthma developed acute on chronic renal failure, followed by which he was put on mechanical ventilator in view of sepsis. His blood sample was sent for culture on 6th day of illness, and he was started empirically on Meropenem and Colistin. On the 9th day growth showed gram negative bacilli by gram staining, which was later identified as S.maltophilia and therapy was modified based on susceptibility pattern to Trimethoprim-Sulfamethoxazole. However he developed cardiac arrest and expired.

METHODOLOGY

Bacterial culture was carried out in the Clinical Bacteriology Laboratory of the Department of Microbiology. Clinical data was noted regarding the age, immunocomprised patients, underlying diseases, length of hospital stay, presence of central venous catheters and administered antibiotics. The growth in both blood samples of all cases was signalled by BACT-ALERT. The clinical isolates were identified by conventional methods, where we found it is an is an oxidase-negative, motile, nonfermentative, gram negative bacillus appeared on Blood agar as large smooth glistening colonies with uneven edges with lavender-green to light purple pigment and on Mackonkey agar as lactose non-fermenting colonies. **Figure 1** and **Figure 2,** as Stenotrophomonas maltophilia, which was confirmed by Vitek 2 automated system.

Antimicrobial susceptibility

Antimicrobial susceptibility testing was performed by the Kirby-Bauer disc diffusion method as per Clinical Laboratory Standards Institute (CLSI 2019) guidelines. The susceptibility testing was done in Muller Hinton Agar. The organism was only sensitive to Cotrimoxazole, which was also confirmed by Vitek 2 automated system.

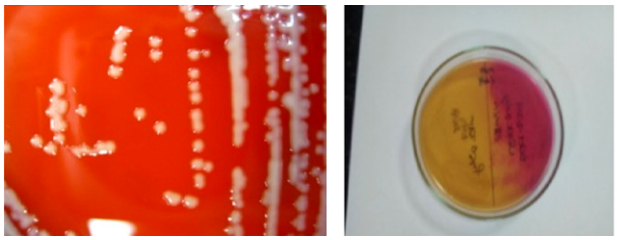

Figure 1. **Stenotrophomonas maltophilia in Blood Agar**

DISCUSSION

S.maltophilia has emerged as an important cause of morbidity and mortality in hospitalized patients, particularly in intensive care units. The risk factors included prolonged hospitalization, presence of a Central Venous Catheter, neutropenia, ICU admission, mechanical ventilation, prior antibiotic therapy, and underlying disease.[4]

Stenotrophomonas malophilia (S. Maltophilia) is an aerobic, glucose non-fermentative, Gram negative bacillus that is widely distributed in various environments and equipment, especially in hospitals. This bacterium is increasingly recognized as an emerging global opportunistic pathogen, causing hospital-acquired infections such as urinary tract infection, mucocutaneous and soft tissue infections , bacteremia, pneumonia , endocarditis, mastoiditis, osteochondritis and meningitis. Transmission of nosocomial pathogen associated with contaminated disinfectant solutions, sustained release gancicyclovir implants or hospital water has also been reported by Vartivarian et al.[5]

Therapy for infections with these pathogens is challenging because of their resistance to most antimicrobial agents and the variable antimicrobial susceptibility of different strains. Therefore, in any routine laboratory, whenever any atypical pseudomonas strain is grown, a detailed history of the case should be taken, the organism should be identified to the species level, and the source of infection must be determined.[5]

CONCLUSION

S. maltophilia is an extremely rare but emerging cause of nosocomial pathogen and is strongly assosciated with prior hospitalization , prolonged use of antibiotics, presence of devices and neurosurgical intervention. Trimethoprim-Sulfamethoxazole is the drug of choice. TMP-SMX based combination therapy depending upon antimicrobial susceptibility data is recommended for S.maltophilia in blood stream infections with good clinical outcome. The overall mortality rate of patients with S.maltophilia was low in this review.

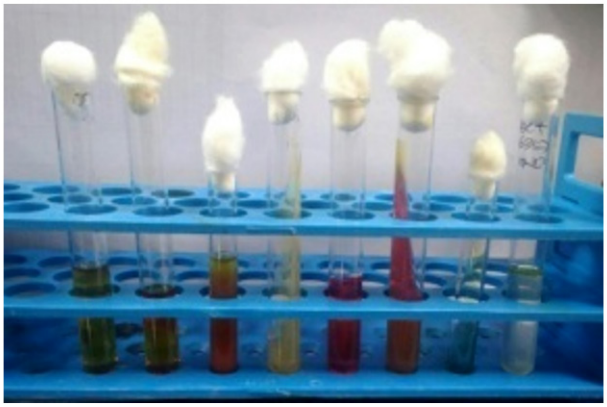

Figure 2. **Stenotrophomonas maltophilia in Mackonkey agar**

END NOTE

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Conflict of Interest: None declared

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