Case Report

Sepsis due to *Sphingomonas Paucimobilis* in a Polytrauma Patient

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Abstract

*Sphingomonas paucimobilis* is a yellow-pigmented, aerobic, glucose nonfermenting, Gram-negative bacillus, causing a rare human infection normally associated with immunocompromised host. A 47-year-old male, known diabetic and hypertensive on treatment, underwent surgical intervention and developed fever postoperatively. A positive growth was detected on BACT/ALERT 3D. Blood culture smear shows Gram-negative bacilli which was identified as *S. paucimobilis*.

Keywords

Sepsis, *Sphingomonas*, Multiple trauma

Case Report

A 47-year-old male, who is a known case of diabetes and hypertension on oral hypoglycemic agents, and antihypertensives, presented to casualty following a high velocity trauma sustaining crush injury to right foot. On examination, patient was conscious and oriented. Multiple abrasions and lacerated wound over the right forearm and elbow region, severe contusion over the right shoulder, and arm abduction were restricted. An open wound of 4×5×3 cm was seen over the dorsum of right foot, which was contaminated. X ray shows multiple fractures on the metatarsal region. Routine investigations are sent to the laboratory. Wound debridement was done after thorough saline wash. Tetanus toxoid injection and tetanus immunoglobulin was given. Proper wound dressing was done and external fixator applied along with K-wires for the metatarsal fractures. Later on, serial vacuum-assisted closure dressings were given and split skin graft done. All investigation were done within normal limits prior to the procedure. Treated with Inj. Amoxycillin-Clavulanic acid 1.2 g intravenously. Postoperatively, patient developed fever (temperature, 102°F). Total count was elevated (18,600 cells/µL), C-reactive protein also elevated (28 mg/dL), renal function test and liver function test was normal. Blood (right and left brachial) was sent to the microbiology laboratory for culture and sensitivity.

A positive growth was detected on BACT/ALERT 3D on the second day. The Gram stain smear of blood culture broth shows Gram-negative bacilli. Subcultures were done on blood agar, chocolate agar, and MacConkey agar as per the protocol. After incubation for 24 h at 37°C, the cultures showed that nonhemolytic, convex, and yellow-pigmented colonies grew on the blood agar (Figure 1) and chocolate agar, but no growth was found on MacConkey agar.

The isolate was Gram-negative, nonfermenting oxidase, and catalase positive. Indole test negative, Citrate-not utilised, urease-not hydrolysed, Methyl red negative, Voges-Proskauer negative, Nitrate-reduced, bile esculin positive. On VITEK 2 automated system, the organism was identified as *Sphingomonas paucimobilis* with 99% probability and excellent identification.

The isolates were susceptible to Cefaperazone—Sulbactam, Gentamicin, Ciprofloxacin, Cotrimoxazole, Piperacillin—Tazobactam and shows resistant to Cephalosporins, Amoxycillin-Clavulanic acid. Antibiotic was changed into Inj. Piperacillin—Tazobactam. Patient improved clinically.
Discussion

S. paucimobilis is a Gram-negative bacillus, yellow pigmented, aerobic, nonsporing that shows single polar flagellum with slow motility.\(^1\) It was named genus *Pseudomonas paucimobilis* in 1977. Based on phylogenetic data, it was reclassified in 1990 and renamed as *Sphingomonas paucimobilis*\(^2,3\). It is mostly seen in water and soil and are rare in humans. It may cause sporadic infections, like infected leg ulcers, urinary tract infection, cervical adenopathy, and abscesses in the brain and spleen. Nosocomial infections like bacteremia/septicemia are formed due to contamination of solutions like distilled water, HD fluid, and sterile drug solutions.

Diseases are mostly associated with immunocompromised hosts or patients with indwelling devices. Lipopolysaccharide components are absent in outer membrane of the cell wall, usually seen in Gram-negative organisms. They are associated with endotoxin activity. But it shows sphingolipids in the cell wall. Favorable prognosis of this organism is due to the absence of lipopolysaccharide components. The first case of *sphingomonas* is reported in an infectious leg ulcer patient in 1979. Since 1979, *S. paucimobilis* causes variety of diseases and cases are reported all over the world, including India.

Rare cases of β-lactamases-associated genes in *S. paucimobilis*’ genome were still sensitive to penicillin. Resistance patterns against fluoroquinolones and cephalosporins vary. Most of the bone and soft-tissue infections in this setup were sensitive to carbapenems, aminoglycosides, antipseudomonal penicillin, and trimethoprim-sulfamethoxazole (TMP-SMX).\(^4,5\) *S. paucimobilis* is glucose nonfermenting. Gram-negative bacillus which is yellow pigmented and aerobic. They grow on blood and chocolate agar, but no growth was found on MacConkey agar. Indole test negative, citrate negative, urease negative, methyl red negative, Voges-Proskauer negative, nitrate positive, bile esculin positive, motile. Motility occurs at 18°C to 22°C. It cannot be detected at 37°C. Moreover, in broth culture only a few bacteria are actively motile which makes it difficult to demonstrate motility.

Conclusion

*S. paucimobilis* is a nonfermenting Gram-negative microorganism that has been detected from medical instruments and water sources. It is a causative organism of nosocomial and community-acquired infections. Most of them are favorable prognosis, like bone and soft-tissue infections, diseases sometimes complicated by morbidities, especially in immunocompromised-hospitalized individuals.

Declaration of Conflicting Interests

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