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Sphingobacterium multivorum: An Atypical Bacterium in an Atypical Place

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ABSTRACT

We present the case of a 75-year-old woman admitted to hospital because of an infected pressure ulcer. Cultures revealed that the responsible bacterium was *Sphingobacterium multivorum*, which was successfully eradicated with ciprofloxacin. Over the last few years, there have been reports of new cases of infection caused by bacteria previously not thought to be harmful to humans, like *S. multivorum*. Previous cases were reported mostly in immunosuppressed patients and the present report is, to our knowledge, the first describing a pressure ulcer infected by this bacterium.

LEARNING POINTS

- Bacteria previously not thought to be harmful to humans can cause disease.
- *Sphingobacterium multivorum* should be considered a potential cause of pressure ulcer infection.
- As *S. multivorum* may be resistant to many antibiotics, complete susceptibility testing should be mandatory.

KEYWORDS

Sphingobacterium multivorum, pressure ulcer infection, comorbidity

CASE DESCRIPTION

A 75-year-old woman was admitted to hospital because of an infected pressure ulcer. Her previous diagnoses included hypertension, type 2 diabetes mellitus, ischaemic heart disease, paroxysmal atrial fibrillation, post-thyroidectomy hypothyroidism and active seropositive rheumatoid arthritis, which significantly limited her daily activities. Home treatment included omeprazole, nebivolol, levothyroxine, glargine insulin, furosemide, ferrous glycine sulfate, prednisone, acetylsalicylic acid, clopidogrel, folic acid, calcium carbonate/colecalciferol, lorazepam, atorvastatin and acenocoumarol.

The patient had previously been admitted twice in the same year to the Internal Medicine Department. The first admission was because of a post-traumatic, infected right pre-tibial haematoma where methicillin-resistant *Staphylococcus aureus* was isolated. The second one was due to a urinary tract infection where carbapenemase-producing *Klebsiella pneumoniae* was isolated. Both infections were successfully treated with antibiotics. During the second admission, a small sacral pressure ulcer was noted and the Plastic Surgery Department suggested periodic dressings be applied. However, after discharge the ulcer worsened, the patient reported pain, and obvious signs of infection (inflammatory signs and unpleasant smell) were noticed.

An exudate sample from the sacral ulcer was collected with a cotton swab and transported by means of Amies (DELTALAB). Sample processing included Gram staining, inoculation on Columbia and chocolate at 37ºC in a CO2 atmosphere, inoculation on Sabouraud at 37ºC in aerobiosis, inoculation on Schaedler at 37ºC in anaerobiosis and thioglycolate broth at 37ºC (Becton Dickinson). The cultures were reviewed every 24

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hours for 2 days. The growth of bright yellow colonies was observed. Mass spectrometry (MALDI-TOF MS, Bruker) identified the colonies as *S. multivorum* (>2 score). MicroScan WalkAway plus System panels (Beckman Coulter), an automated system used to obtain antibiograms via micro-dilution in stock, revealed sensitivity to minocycline, levofloxacin, ciprofloxacin and trimethoprim-sulfamethoxazole, and resistance to ampicillin/sulbactam, piperacillin, piperacillin/tazobactam, ticarcillin, cefotaxime, ceftazidime, aztreonam, imipenem, meropenem, gentamicin, tobramycin, amikacin, minocycline, colistin doripenem and tigecycline. Ciprofloxacin therapy (500 mg twice a day for 14 days) was followed by rapid improvement in the appearance of the ulcer and resolution of symptoms. Control cultures after treatment were negative.

DISCUSSION

Over the last few years, there have been reports of new cases of infection caused by bacteria previously not thought to be harmful to humans. We report a case of infection by *S. multivorum*, which could be included in this group of bacteria.

S. multivorum is a Gram-negative, non-fermentative and catalase-producer (but non- oxidase-producer) aerobic bacillus[1]. It appears as bright yellow colonies on blood agar[1]. The genus name *Sphingobacterium* refers to the presence of sphingolipids in its cell wall[1]. Previously in the literature, it was included among the Flavobacterium group and called *Flavobacterium multivorum* (previously CDC group IIk-3)[1]. Sphingobacterium species have significant, intrinsic antibiotic resistance to common antibiotics and can grow in several antiseptic solutions and disinfectants[1]. *S. multivorum* can produce extended spectrum beta-lactamases and metallo-beta-lactamases, which makes it resistant to third-generation cephalosporins and carbapenems, respectively[1].

Most reported cases of *S. multivorum*-related disease were nosocomial but its natural reservoir is unknown[1]. The majority of patients were immunosuppressed and had multiple comorbidities. They include a 6-year-old boy with a transplanted liver who presented with *S. multivorum* septic arthritis[2], a 57-year-old woman with non-Hodgkin's lymphoma under chemotherapy who presented with *S. multivorum* septicaemia[3], a 64-year-old woman with rheumatoid arthritis, chronic corticosteroid therapy and diabetes mellitus who presented with *S. multivorum*-related necrotizing fasciitis and septic shock[4], and a 43-year-old man with chronic kidney disease under haemodialysis who presented with *S. multivorum* septicaemia[5]. Several cases of *S. multivorum* infection in cystic fibrosis patients have also been described[6,7]. Recently, a 28-year-old healthy immunocompetent man presented with bacteraemia and community-acquired acute meningitis due to *S. multivorum* after cutaneous trauma[8], while a case of septic shock due to *S. multivorum* bacteraemia was described in an immunocompetent 67-year-old woman[9]. Most cases were treated with quinolones and/or trimethoprim-sulfamethoxazole, with good clinical outcomes. However, as *S. multivorum* may be resistant to many antibiotics, including carbapenems, correct identification and antibiotic susceptibility testing is very important[9].

Our patient was similar to previously reported patients in that she was under immunosuppressive therapy and showed a good clinical outcome after quinolone therapy. To the best of our knowledge, no previous cases of pressure ulcer infection by *S. multivorum* have been reported. This case illustrates how bacteria previously not thought to be harmful to humans can cause disease, and how recognition and adequate therapy are important for a favourable outcome.

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