INTRAVENTOUS CENTRAL CATHETER COLONIZATION BY SHEWANELLA PUTREFACIENS IN A BURNED PATIENT

COLONISATION DE CATHÉTER PAR SHEWANELLA PUTREFACIENS CHEZ UN BRÛLÉ

Tchakal-Mesbahi A.*, Metref M.

1 Department of Cellular and Molecular Biology, University of Sciences and Technology Houari Boumediene, Algiers, Algeria
2 Burns Center, The Military Hospital M.S Neckkache, Algiers, Algeria

SUMMARY. Shewanella putrefaciens is an opportunistic pathogen rarely responsible for human infection. However, it has been reported that it causes skin and soft tissue infections and bacteremia in immune-compromised patients, such as cellulitis, abscesses, bacteremia, and wound infection. It is an oxidase and catalase-positive non-fermenter gram-negative rod that produces hydrogen sulfide. We report the case of a 90-year-old woman, who presented an invasive infectious burn wound associated with Shewanella putrefaciens bacteremia. She was admitted into the burn center of the military hospital M.S Nekkache of Algiers, suffering from 40% TBSA with a history of diabetes. After one week of admission, the patient complained of a high fever. Microbiological culture of the catheter tip was positive and showed pale colonies on the MacConkey agar, non-lactose fermenting plate. Nutritive agar medium culture showed red pale tan colonies with a concentration >10³ CFU. Identification and antibiotic susceptibility were obtained by the Phoenix system (Becton-Dickinson, USA) as Shewanella putrefaciens. This was confirmed by standards and semi-automated microbiological techniques. Gram stain showed Gram-negative bacilli with positive oxidase and catalase reactions. Production of hydrogen sulfide was confirmed by the semi-automated API 20NE method (biomerieux, France). The isolate was resistant to gentamicin, amikacin, ceftazidime, aztreonam, amoxicillin- clavulanic acid, cefepime, trimethoprim/sulfamethoxazole, and nitrofurantoin. In our case, S. putrefaciens was found in a mixed culture with Klebsiella pneumoniae. No earlier exposure of the patient to marine water had been noticed. Blood culture indicated colonies growth of Acinetobacter baumannii. No further isolation of this bacteria was noticed after treatment. The patient was given imipenem, vancomycin and colistin. Despite our best efforts, the patient could not be saved because of sepsis and renal function failure.

Keywords: Shewanella putrefaciens, rare, opportunistic infection, burns, bacteremia

RÉSUMÉ. Shewanella putrefaciens est une bactérie opportuniste, rarem ent responsable d’infections hum anes. Elle a toutefois été rapportée comme cause d’infections de la peau et des tissus mous (cellulites, abcès, surinfections de plaies) et de bactériémies chez des patients immunodéprimés. C’est un bacille à Gram négatif non fermentant, oxydase et catalase +, producteur de sulfure d’hydrogène. Nous présentons le cas d’une patiente diabétique de 90 ans ayant subi une bactériémie d’une surinfection de brûlure à Shewanella putrefaciens. Elle était hospitalisée dans l’hôpital militaire MS. Nekkache d’Alger à la suite d’une brûlure touchant 40% SCT. Une fièvre élevée a été constatée à J7. La culture de l’extrémité distale du cathéter montrait, sur gélose de McConkey, des colonies pâles non fermentantes. Sur milieu enrichi, on observait >10³ CFU rouge pâle, identifiées à Shewanella putrefaciens par le système Phoenix (Beckton-Dickinson), identification confirmée par les techniques microbiologiques standard et semi-automatiques. La coloration de Gram était négative, les réactions catalasique et oxydasique étaient positives. La production de sulfure d’hydrogène était par API 20NE semi-automatique (BioMérieux). La bactérie résistait à gentamicine, amikacin, ceftazidime, aztréonam, amoxicilline- acide clavulanique, céfepime, triméthoprime- sulfaméthoxazole et nitrofurantoïne. Shewanella putrefaciens était associée à Klebsiella pneumoniae et les hémocultures poussaient à Acinetobacter baumannii. Il n’y avait pas de notion d’exposition antérieure à l’eau de mer. La bactérie n’a pas été retrouvée après traitement par imipénème, vancomycine et colimycine. La patiente est toutefois décédée de sepsis et insuffisance rénale aiguë.

Mots-clés : Shewanella putrefaciens, infection opportuniste rare, brûlés, bactériémie

*Corresponding author: Asma Tchakal-Mesbahi. Email: asmamatchak@yahoo.fr
Manuscript: submitted 09/01/2023, accepted 12/01/2023
Introduction

According to the literature, two Shewanella species were implicated in clinical cases: S. algae and S. putrefaciens. The isolation of this rare organism from clinical specimens has long been merely colonization rather than an active infective agent. The organism generally resides in marine and aquatic environments. Indeed, this is the first case, to our knowledge, of such isolates in Algeria. A 90-year-old woman was admitted to our burn center after accidental thermal burns at her residence, with a raw area involving her arms, leg, breast, perineum and face. The cultured catheter specimen had determined colonies identified as Shewanella putrefaciens.

Here we report the first case of catheter colonization by S. putrefaciens in a burn patient among a mixed culture with Klebsiella pneumoniae. Many cases of human infections due to Shewanella species are reported in countries with warm climates, like the USA, Australia, South Africa, and Southern Europe. It has been implicated in many conditions such as skin and soft tissue infections, bacteremia, intracranial abscess, peritonitis, ventilator-associated pneumonia, and ear infections. The importance of this bacteria, initially classified as Pseudomonas spp., in human pathology has become evident in the last few years as reports of different kinds of infection have increased.

Discussion

Automated systems do not include S. algae in their database. Presumably for this reason, most Shewanella infections reported in recent years have been attributed to Shewanella putrefaciens. Correct identification is only possible by routine clinical microbiological methods based on morphological and biochemical characteristics and antimicrobial sensitivity. Based on the different antimicrobial tolerance to colistin (polymyxin) between the two species of Shewanella, and its efficacy on our strain, we can confirm that the species identified is S. putrefaciens and not S. Algae. Our findings showed that our isolate was susceptible to carbapenems and quinolones and, contrary to the literature, resistant to aminosides. Susceptibility to cephalosporins is variable, with more isolates being susceptible to third and fourth-generation cephalosporins, but in our case, S. putrefaciens is resistant to both antibiotic classes. The epidemiology and clinical symptoms of Shewanella species infections are similar to those of infections involving Aeromonas and halophilic Vibrios. Serious infections such as bacteremia have also been described in immune-compromised patients. Most treatment options include β-lactams, aminoglycosides and quinolones, but it is important to note that Shewanella can show resistance to imipenem by secreting an oxacillinase. Might this bacteria need to be in a polymicrobial environment to be able to cause infection? Is this species responsible for bacteremia, or does it enhance the infection caused by other bacteria? Is catheter use a risk factor for colonization/infection by Shewanella putrefaciens?

Conclusion

In our study, the isolation of S. putrefaciens occurred in polymicrobial infection, but according to the patient’s circumstances, we cannot discard the pathogenicity of the isolate. However the clinical significance of this organism is unclear. It needs to be explained because of its occurrence as a part of mixed bacterial flora, and it is mostly considered a colonizer or a component of mixed bacterial flora. Moreover, this infection can be due to long-term catheter use, as reported by previous studies. We think that this kind of rare pathogen must not be discarded as such; even Shewanella is generally susceptible to antimicrobial agents, and early diagnosis and prompt treatment can reduce morbidity and mortality among immune-compromised patients, according to the latest reported cases of Shewanella infection worldwide.
BIBLIOGRAPHY


