



Exit-Site Infection Caused by *Lysinibacillus Sphaericus*: Unusual Organism From A Usual Site

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ABSTRACT

Exit-site infection is an unwanted complication in patients with an indwelling catheter. However, such an infection by an uncommon organism like *Lysinibacillus* which is otherwise considered an environmental contaminant needs to be mentioned. Our report describes one such case. The patient was given antibiotic as per antibiotic susceptibility report to which he responded.

Keywords: Catheter, Exit-Site Infection, Haemodialysis, Immunocompromised, *Lysinibacillus*,

Introduction

Risk of hospitalisation for infection and death increases two to three fold in haemodialysis patients with a catheter as compared to patients with an arterio-venous fistula or graft [1]. Common complications related to haemodialysis central venous catheter use are Catheter-related Blood Stream Infection (CRBSI), Exit-Site Infections (ESI) and tunnel infections [1]. As per Infectious Disease Society of America (IDSA), ESI is defined as hyperaemia, induration and or tenderness ≤ 2 cm from catheter exit site. It may be associated with fever and purulent discharge from the exit site. It may or may not be associated with bacteremia [2]. Common organisms causing ESI are *S. aureus*, *Pseudomonas species* and *Enterobacteriaceae* [3]. The genus *Lysinibacillus* consists of Gram-positive rods ubiquitously found in environment including water and soil but are mostly non-pathogenic to humans. Occasionally, it causes sepsis in immunocompromised patients [4]. We report this out-of-the-ordinary case of ESI, a known complication by a not-so-common organism belonging to Genus *Lysinibacillus* in an immunocompromised patient and highlight the crucial importance of precise laboratory techniques in diagnosis of infections caused by unusual organism. Equally noticeable is the fact that considering the history and clinical condition of the patient, the isolate was reported and not disregarded as a contaminant. This led to the infection being treated.

Case Report

An 82-years-old male patient with chronic kidney disease on haemodialysis presented with discharge on and off for two months from exit site of placement of long-term haemodialysis catheter (permacath) in right sided jugular vein. There was no fever, chills, drop in blood pressure nor

pain, redness or swelling around that site. He is a known case of hypertension and diabetes mellitus since fifteen years and chronic kidney disease since five years. He is on oral antihypertensives and anti-diabetic drugs. He is on maintenance haemodialysis since past eight months for which he has long-term haemodialysis catheter inserted in right jugular vein. Aerobic culture and antibiotic susceptibility of the discharge from the same site was done two weeks back in our laboratory. It showed growth of organism which was identified by Vitek2/Compact system version 9.02 as *Lysinibacillus sphaericus/Lysinibacillus fusiformis* at a confidence level of 98%. Additional biochemical tests were done to confirm the species. Results were negative for indole, citrate, Voges-Proskauer test and fermentation of glucose. Hence it was reported as *Lysinibacillus sphaericus* [5]. It was susceptible to cefuroxime, cefoperazone, vancomycin, teicoplanin, linezolid, tetracycline, doxycycline and gentamicin. He was given empirical oral amoxicillin-clavulanate 625 mg twice a day for five days after which the discharge stopped temporarily but recurred again. On his current visit, he was afebrile. There was no tenderness, hyperaemia or induration around the site but yellow, non-foul-smelling discharge was present. His serum creatinine was 5.19 mg/dl and blood-urea-nitrogen was 51.6 mg/dl. Blood culture set collected from the catheter as well as peripheral vein (paired blood culture) did not show growth. Other routine investigations were normal. Swabs of discharge from the site were sent for Gram stain and aerobic culture and susceptibility test. Gram stain showed moderate number of pus cells and Gram-positive bacilli with occasional spore-bearing [Fig.1]. Sample was inoculated on 5% Sheep Blood Agar (SBA) and MacConkey agar and incubated at 37°C for 24 hours. There was no growth on MacConkey



agar. On SBA, the colonies were dry, circular, white, non-haemolytic without smell or pigment [Fig.2]. Gram stain from the growth showed Gram-positive bacilli with occasional spore bearing. Identification was done using Vitek2/Compact system version 9.02. It was identified as *Lysinibacillus sphaericus* / *Lysinibacillus fusiformis* at the same confidence level. Additional biochemical tests as above were done to identify the species and same results were obtained. Hence it was reported as *Lysinibacillus sphaericus*. Antibiotic susceptibility of the isolate was same as above. He was given oral cefuroxime 250 mg twice a day for seven days after which the discharge stopped. There was no discharge from that site or other related complaints till three months.

Discussion

Bacteria belonging to genus *Lysinibacillus* were previously designated under genus *Bacillus* [6]. These are aerobic or facultative anaerobic Gram-positive rods, form endospores and tolerate extremes of environment. They are omnipresent in the environment and formed in indwelling catheters and tubing in hospital settings [6,4]. Our patient had history of frequent visits to hospital and also had an indwelling catheter. These are commonly regarded as contaminants and lack pathogenicity due to lack of virulence factors [7]. Hence it was localised and did not lead to blood stream infection. But this organism was repeatedly isolated from the same site with presence of pus cells which indicated infection. In literature, *Lysinibacillus species* have been reported to cause endophthalmitis [7]. *L. sphaericus* has been reported to cause bacteraemia in children with cancer or bone marrow transplant, neonates, neutropenic patients, injection drug users and has propensity towards surgically implanted catheters and chemotherapy ports [8]. *L. fusiformis* can cause tropical ulcers, severe sepsis and respiratory illnesses in humans [9]. Other species like *L. mellitensis* have caused sepsis and panniculitis in immunocompromised [4]. In our case, the species could not be differentiated by Vitek-2 compact system probably because of the genetic similarity between the two [9]. So other biochemical tests were used for species identification. A study by Cristina Frecitas et al, 36% of their patients experienced ESI [3]. Antibiotic susceptibility to this organism has been variable. Some isolates have been reported to be pan-sensitive while another case of infection by this organism was treated by ciprofloxacin [6,8]. Majority of *Bacillus species* show susceptibility to vancomycin, clindamycin, fluoroquinolones, aminoglycosides and carbapenems while variable susceptibility is seen to penicillin and cephalosporin [6]. Treatment should be done as per susceptibility pattern for 7-14 days [1]. Our isolate was sensitive to cefuroxime which was used for seven

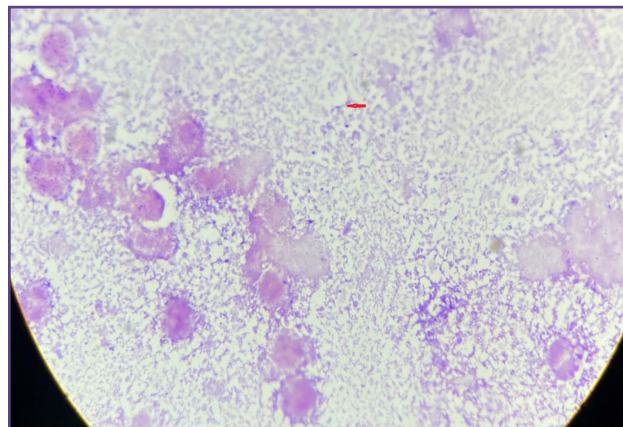


Fig. 1: Gram stain from the site showing pus cells along with Gram-positive bacilli (arrow) (100x).

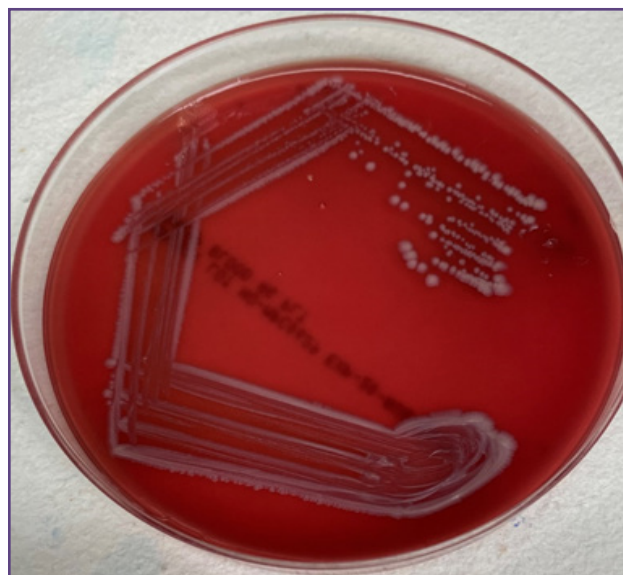


Fig. 2: Growth on 5% Sheep Blood Agar.

days. In some cases, removal of the device responsible becomes important [8]. In our case, this was not required in our case as the patient responded to treatment. There-after, there was no discharge or other related complaints till three months. In this case, though other signs of ESI were absent infection at that site was present. Currently, there was no sepsis or CRBSI but he was a known diabetic with chronic kidney disease. Hence, due to his immunocompromised status such complications could be anticipated and hence he was treated for the same.

Conclusion

To our knowledge, this is the first case reporting genus *Lysinibacillus* as a pathogen causing ESI in an immunosuppressed patient. Such a case calls attention to accurate laboratory techniques. Alongside, noteworthy

is the ability of the clinical microbiologist to recognise situations under which an organism otherwise known to be a contaminant can be moribund.

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