A Case of Catheter Related Septicemia Caused by *Corynebacterium jeikeium*

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ABSTRACT

Corynebacterium spp. has been gaining importance in immunosuppressive patients. This report of a 15-year-old girl with acute myeloblastic leukemia who developed catheter related septicemia with *Corynebacterium jeikeium* is presented to point out the importance of microorganisms of the normal flora, which were dismissed as contaminants in Clinical Microbiology Laboratories in the past.

Key Words: *Corynebacterium jeikeium*, Catheter related infections, Septicemia.

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INTRODUCTION

For years most gram-positive microorganisms of the normal flora have been considered harmless when isolated from patients and reported as contaminants without further identification. However, over the past decades, immunosuppression in patients presented a wide variety of microorganisms as infective agents and role of microbiology laboratories in evaluation of such cultures has been complicated.

As a probable cause of long indwelling devices, fluoroquinolone prophylaxis, high dose chemotherapy-induced mucositis and prolonged neutropenia, a shift from gram-negative bacilli towards gram-positive bacteria is observed in hematological malignancies with neutropenia. Some studies showed gram-positive bacteremia has reached up to 60-70% most of which have been streptococcal species and coagulase-negative staphylococci[1,2,3]. *Corynebacterium jeikeium* is a gram-positive coccobacillus, which has been known to colonize neutropenic patients, but it gained importance in recent years as a cause of bacteremia and sepsis with the use of intravascular catheters[4,5].

In order to revise the importance of proper identification of diphteroids, which have been for years dismissed as contaminants in the clinical microbiology laboratories, we present a neutropenic patient with long-term intravascular catheter who developed *C. jeikeium* septicemia.

CASE REPORT

A 15 years old girl with complaints of severe malaise and fever had a diagnosis of acute myeloblastic leukemia (AML)-M4 in Ankara University ‹bn-i Sina Hospital and Idarubicin + cytarabine (ARA-C) was administered for remission induction and first consolidation therapies. During both therapies, she went on empirical antimicrobial chemotherapy with amikacin, imipenem and amphotericin-B in the first consolidation because of neutropenic fever and she responded to the antimicrobials without complications. She was hospitalized for the third time and after evaluation of blood smear and bone marrow she was found to be in remission and for the second remission induction therapy ARA-C 1-3-5 was started. She appeared normal on the physical examination and a left subclavian catheter was observed. On the 8th day of the chemotherapy she had a fever of 38.7°C. She was neutropenic [polymorphonuclear leukocyte (PNL) counts < 1000/mm^3] and on physical examination redness was found at the catheter exit site. No other focus of infection was detected. Before empiric antibiotic therapy the catheter was removed and three blood cultures and catheter exit site culture as well as catheter culture was performed. Amikacin (1 g/day, iv) and imipenem (4 x 500 mg/day, iv) was started. Blood cultures were detected in Bactec 9120 system (Becton Dickinson), catheter tip culture was performed by Maki's semi quantitative technique and skin cultures were evaluated by standard methods[6]. The bacteria were identified by using BBL crystal (Becton Dickinson) system and antibiotic susceptibility tests were performed by using disk diffusion method by the technique described in National Committee for Control of Laboratory Standards. Despite amikacin–imipenem, fever did not subside, vancomycin (4 x 500 mg/day, iv) in the 48th hour and fluconazole (1 x 600 mg, iv) in 72nd hour was added to the therapy. In spite of the antimicrobials used, fever continued without further deterioriation of the patient. After the isolation of *C. jeikeium* in three blood and catheter cultures as well as skin culture, all the antimicrobials were stopped and therapy was continued with teicoplanin (1 x 400 mg/day, iv). Teicoplanin was used for 4 days but fever subsided only after the end of neutropenic period. After the increase in the granulocytes fever was not observed and after 7 days of glycopeptide therapy, the patient was discharged.

DISCUSSION

A profound shift in the documented causes of fever in febrile patients with neutropenia has been reported in the world, from gram-negative bacteria to gram-positives with the introduction of new pathogens[1]. Similar trend has been observed among hematological malignancies in our hospital and *Corynebacterium* spp. were also mentioned among gram-positive isolates[7,8]. In those reports however *Corynebacterium* spp. have been identified up to genus level. Importance of *Corynebacterium* spp. has been increasing and 2.7%-20% of the isolates in clinical microbiology laboratories were found to be real agents of infections. Being a well known coloniser of axilla, skin and rectum in patients with neutropenia, today *C. jeikeium* has become an acceptable pathogen not only colonising but causing infection among neutropenic patients[6,7]. *C. jeikeium* is becoming an important pathogen because it can survive in hospital environment and it is multiply resistant against antimicrobial agents, and the overall mortalitiy in case of septisemia is reported as 34%[4,9,10].

Various risk factors have been implicated to cause sepsis in patients with neoplastic diseases: Prolonged hospitalization, prolonged neutropenia, treatment with multiple antibiotics and distruption of the integument[10]. Prolonged catheterisation was the distinguished risk factor in our patient. Inflammation around the catheter observed even in neutropenic period seems to be significant.

The origin of the microorganism is still in discussion. Since the perineum is the primary site of colonization in most studies, it has been postulated that antibiotic resistant strains may originate in

the gastrointestinal tract and then spread through the skin. Once the colonization occurs, it usually persists for long periods. The means of transmission of *C. jeikeium* has been a subject of much debate. Some have suggested that the organism is spread within hospitals, presumably by the hand-to-hand route where others postulate that nosocomial infections with multiresistant *C. jeikeium* occur by autoinfection with selected antibiotic resistant subpopulations or possibly mutants from normal skin diptheroids[9,10]. For susceptible strains of *Corynebacterium* spp. the treatment of choice is penicillin or erythromycin. For resistant strains, glycopeptide antibiotics are the drugs of choice in the therapy.

Unfortunately, the National Committee for Clinical Laboratory Standards does not publish interpretive standards for *Corynebacterium* spp.[11]. Some investigators have used the standards reported for Staphylococci. In our study all of the antibiotics studied showed no zones around except the glycopeptides. Fever did not respond to the antibiotherapy and removal of the catheter, until the elevation of neutrophil count. This observation is also reported in some other *C. jeikeium* septicemias and because of this reason application of haematopoietic growth factors are recommended[4]. Although it was not prognostically important in our patient, glycopeptides could be prescribed at the begining of empiric antibiotic therapy because of the inflammation observed around the catheter insertion site. Evaluation of real zone diameters for interpretation of antibiotic susceptibilities of new bacteria including *C. jeikeium* should be included in NCCLS.

Corynebacterium spp. other than *C. jeikeium* also seem to stay as potential agents to cause infections in such immunsuppressive populations[12-14].

It is important for both physicians and microbiologists to be aware of the potential for any organism to cause serious infections in these patients even those organisms previously known as harmless contaminants. Clinical microbiologists in hospitals that care for severely compromised patients should be capable to identify many rarely isolated bacterial isolates up to species level.

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