

# BLOODSTREAM INFECTION DUE TO STREPTOCOCCUS DYSGALACTIAE SUBSP EQUISIMILIS IN A HEMODIALYSIS PATIENT

## HEMODİYALİZ HAŞTASINDA STREPTOCOCCUS DYSGALACTIAE SUBSP EQUISIMILIS'E BAĞLI KAN DOLAŞIM ENFEKSİYONU

CASE REPORT  
OLGU SUNUMU

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ABSTRACT  
ÖZET

Catheter-related bacteremia is a frequent complication in patients undergoing hemodialysis. We report the first case of catheter-related bacteremia with *Streptococcus dysgalactiae* subsp. equisimilis in a patient on hemodialysis. The organism was isolated from both the hemodialysis catheter and blood of the patient. Although the hemodialysis catheter was removed and ceftriaxone was given, the patient died of a subarachnoidal bleeding complicating end-stage renal disease.

**Key words:** Bacteremia, Hemodialysis, *Streptococcus dysgalactiae*

Kateter ilişkili bakteriyemi hemodiyaliz hastalarında sık görülen bir komplikasyondur. Burada bir hemodiyaliz hastasında *Streptococcus dysgalactiae* subsp. equisimilis'in etken olduğu ilk bakteriyemi olgusu sunulmaktadır. Mikroorganizma hastanın hem kateterinden hem de kan kültüründen izole edildi. Hastanın kateteri çıkarıldı ve seftriakson tedavisi uygulandı ancak hasta son dönem böbrek yetmezliğine bağlı subaraknoid kanama nedeniyle kaybedildi.

**Anahtar kelimeler:** Bakteriyemi, Hemodiyaliz, *Streptococcus dysgalactiae*

### Introduction

Human isolates of group C and G streptococci that form large colonies belong to the subspecies *Streptococcus dysgalactiae* subsp. equisimilis. They are pyogenic streptococci similar to *S. pyogenes* with respect to virulence traits (1). They can cause a wide array of serious infections including pharyngitis, bacteremia, meningitis, endocarditis and septic arthritis but these infections are very rare (1-4).

Access site infection is one of the most frequent complications in patients undergoing hemodialysis. Access infections are usually staphylococcal and may lead to sepsis and/or endocarditis. A MEDLINE search revealed no report of catheter-related bacteremia due to the Lancefield group G beta-hemolytic *S. dysgalactiae* subsp. equisimilis complicating hemodialysis.

### Case Report

The patient was a 53-year-old female with a past medical history of membranoproliferative glomerulonephritis for seven months. She was admitted to the emergency room with difficulty in breathing and edema. Admission laboratory investigations revealed serum albumin 2.6 g/dl, sodium 126 mg/dl, potassium 5.2 mg/dl, chloride 95 mg/dl, glucose 188 mg/dl, Blood Urea Nitrogen 70 mg/dl, creatinine 2 mg/dl, white blood count 18.900, hemoglobin 10.4 g/dl, and platelets 483.000. Liver function tests were normal. Physical examination of the patient revealed hepatosplenomegaly, pulmonary edema, tachycardia, and bilateral lower extremity edema. The patient was sent to the Department of Nephrology of the Medical Faculty of Erciyes University with the diagnosis of acute renal failure.

Hemodialysis was performed via femoral catheterization. On the fourth day of catheterization, she developed fever. She was given vancomycin empirically. Her femoral catheter was removed and sent to the Bacteriology Laboratory for culturing. Before catheter removal, blood cultures were taken both from the catheter lumen and from a peripheral vein.

Blood samples were inoculated into BacT/Alert FAN Aerop bottles (Bio Merieux, France) and incubated in BacT/Alert 9240 incubator (Bio Merieux, France) until they flagged. At the end of the first day of incubation gram positive cocci in chains were seen on gram stains. Subcultures were made onto sheep blood agar and incubated in 35°C for 18-24 hours. The five-millimeter proximal end of catheter was rolled on the surface of sheep blood agar as described by Maki (5). Agar plate was incubated in 35°C for 18-24 hours and at the end of incubation, more than 15 colonies were identified.

Lancefield group G beta-hemolytic *S. dysgalactiae* subsp. equisimilis was isolated from both blood cultures and the catheter. Identification was carried out using Streptococci grouping kit (Binding site, UK) and rapid API Strep (Bio

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Submitted/Geliş Tarihi  
28.06.2010

Accepted After Revision  
Düzeltilme Sonrası Kabul Tarihi  
10.01.2012

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Merieux, France). Antibiotic susceptibility testing was performed on Mueller-Hinton agar with 5% sheep blood using Kirby-Bauer disc diffusion method and interpreted according to the The Clinical and Laboratory Standards Institute (formerly National Committee for Clinical Laboratory Standards) breakpoints (6). All strains had the same susceptibility pattern. They were susceptible to penicillin G, ceftriaxone, vancomycin, teicoplanin, chloramphenicol, ofloxacin and resistant to erythromycin and clindamycin.

The patient was successfully treated with ceftriaxone but she died on the 30<sup>th</sup> day of admission due to subarachnoidal bleeding which is a complication of end-stage renal disease.

## Discussion

Infectious complications are the leading causes of morbidity and mortality in hemodialysis patients and the vascular access is the major risk factor for infection and bacteremia (7). The incidence of infection caused by the hemodialysis vascular access is highest when it is a central venous catheter and is lowest when it is a native arteriovenous fistula (8). The risk of bacteremia caused by temporary catheters differs according to duration of use and site of insertion. Oliver et al. (9) suggested that internal jugular catheters may be left in place for up to three weeks without a high risk of bacteremia, but femoral catheters should be removed after one week. Their findings have supported the recommendations of The National Kidney Foundation Dialysis Outcomes Quality Initiative guidelines (10). In the present case the femoral catheter should be the major risk for bacteremia on the fourth day of catheterization.

The majority of bacteremias complicating hemodialysis are caused by staphylococcal organisms that are also associated with high rates of mortality, recurrence and serious metastatic complications (7). Less frequently, some other microorganisms can cause bacteremia in hemodialysis patients. Herewith we report the first case of bacteremia due to *S. dysgalactiae* subsp. *equisimilis* in a patient undergoing hemodialysis.

The Lancefield group G beta-hemolytic streptococci consist of *S. dysgalactiae* subsp. *equisimilis*, *S. milleri*, *S. canis*, and *S. intestinalis*. *S. dysgalactiae* subsp. *equisimilis* is the large-colony-forming species which is believed to be more virulent and to have a clinical spectrum similar to that described for *S. pyogenes*. The natural reservoirs of this species are humans. It has been reported that diabetes mellitus, malignancy, cardiovascular disease, bone and joint diseases, and cirrhosis are the major underlying diseases in patients with group G beta-hemolytic streptococcal bacteremia (11). Most of the cases of group G beta-hemolytic streptococcal bacteremia are community-acquired and most infections are probably endogenous. Acquisition of infection in hospital is known to be a poor prognostic factor for the patients (12). In the present case the bacteremia was hospital-acquired but the source could not be found. The overall mortality rate is reported to be 15% for these bacteremias (12). Although the patient died in our case, death was not related to bacteremia.

When tested for antimicrobial susceptibility most isolates of *S. dysgalactiae* subsp. *equisimilis* are found to be susceptible to penicillin G, cephalosporins, erythromycin, clindamycin, and vancomycin (12). However, resistance to macrolides has been increasing

all over the world (13). Sunaoshi et al. (14) found that the rate of macrolide resistance was 10.3% among their clinical *S. dysgalactiae* subsp. *equisimilis* strains and the most dominant mechanism was efflux pump due to *mef* (A) gene. In the present case the strain was resistant to erythromycin and clindamycin. Resistance to these antibiotics is usually due to target modification through the acquisition of *erm* (erythromycin resistance methylase) or efflux pump (*mef*(A)) genes. However, the mechanism for macrolide resistance was not investigated in this case.

In conclusion, although *S. dysgalactiae* subsp. *equisimilis* is an uncommon cause of bacteremia, it is important to identify the species and the factors that determine the outcome for patients with group G streptococcal bacteremia and to test antimicrobial susceptibility of the strains to be able to treat patients.

## Conflict of interest

No conflict of interest was declared by the authors.

**Authors' contributions:** Conceived and designed the experiments: ND. Performed the experiments: ND, MY, KO. Analyzed the data: ND. Wrote the paper: ND, KO. All authors read and approved the final manuscript.

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