Prosthetic valve endocarditis due to Kocuria varians

S Shivaprakasha, K Radhakrishnan, P Kamath, C Jayaprakash, T Shailaja, P Karim

Citation

S Shivaprakasha, K Radhakrishnan, P Kamath, C Jayaprakash, T Shailaja, P Karim. *Prosthetic valve endocarditis due to Kocuria varians*. The Internet Journal of Microbiology. 2008 Volume 6 Number 1.

Abstract

Gram positive cocci were isolated from the blood culture of a 39 year old man with prosthetic valve endocarditis . He had a past history of aortic valve replacement 8 years ago and was now admitted to the hospital with a two week history of fever. The isolate was identified as Kocuria varians, an organism seen as a colonizer on the skin surface and formerly classified as Micrococcus species. To the best of our knowledge this is the first case report of prosthetic valve endocarditis due to Kocuria varians. Despite aggressive treatment, the patient died of neurological complications.

INTRODUCTION

Kocuria is a member of the Micrococcaceae family. [1] Their role as pathogens, when isolated from clinical specimens, can be difficult to determine. Since early reports of endocarditis caused by gram-positive cocci did not reliably differentiate between micrococci and coagulase-negative staphylococci, the frequency of micrococcal endocarditis and related genera is difficult to ascertain and might be underestimated. [2] Though several cases of endocarditis due to M.lylae, M.luteus, K.sedentarius and unspecified micrococci have been reported, documented cases of infections due to Kocuria species are limited. [2,3] Hence, we report, K.varians infection causing prosthetic valve endocarditis.

CASE REPORT

A 39 year old man was admitted with history of fever for two weeks duration. His past history revealed that he had undergone aortic valve replacement with Starr Edwards prosthesis 8yrs ago. On physical examination he was conscious, well oriented, febrile 102 F, pulse rate 90/min, blood pressure 120/80mmHg, clubbing was present, there was palpable spleen. Laboratory investigations revealed neutrophils 85.4%(37-80%), lymphocytes 9.32%(10-50%), RBC count 4.93 M/uL (4.04-6.13), platelet count 416K/uL(150-450), ESR 30mm/hr (8-20mm/hr), Blood glucose 95 mg/dl, Blood urea 24mg/dl, Serum creatinine 1.3 mg/dl. Liver function tests were within normal limits. Echocardiogram showed a large vegetation on the prosthetic valve and valve dehiscence. Patient was started on parenteral ampicillin 2gm, fourth hourly and gentamicin 60mg, eighth hourly. On third day of admission, he complained of headache and vomiting and the next day he developed tremors of right hand and imbalance of gait. CT scan brain done on tenth day of admission revealed subacute/old infarct in right middle cerebral artery territory and small lesion at right cerebellar hemisphere. He was started on conservative treatment by the neurologist. Repeat echocardiogram done on 11 th day of admission revealed multiple small vegetations on prosthesis and on availability of the sensitivity report he was started on parenteral vancomycin 1gm 12 th hrly and oral rifampicin 600mg once a day. On 16 th day of admission he developed sudden respiratory arrest and remained unresponsive. He was intubated and ventilated. He was reviewed by neurologists and neurosurgeons. He had no elicitable brain stem response with normal cardiac activity. Repeat CT scan brain showed a large haematoma in the cerebellar hemisphere with intraventricular extension and obstructive hydrocephalus. On 19 th day of admission he developed asystole with no recordable blood pressure and succumbed to death.

A total of six blood cultures (BACTEC), three aerobic and three anaerobic bottles were collected at an interval of 1hour from different sites, prior to start of antibiotics. After 48hours one aerobic bottle flagged positive and smear revealed gram positive cocci in tetrads, pairs and small groups. Subsequently the other two aerobic bottles also grew gram positive cocci. All three anaerobic bottles did not grow any organism. Subculture was done on MacConkey agar,

blood agar and chocolate agar plates. After 72hrs of incubation, small, lemon yellow, wrinkled colonies appeared on blood agar. MacConkey agar showed no growth. Colony gram smear showed gram positive cocci arranged in tetrads and small groups. The isolate was catalase positive, oxidase positive, coagulase negative, Bacitracin (0.04U) sensitive, reduced nitrates, indole negative, urease negative, VP negative and argininine negative. Based on the colony morphology and biochemical reactions the organism was identified as K.varians. [5]

Antibiotic susceptibility was performed by disc diffusion method recommended for Staphylococci by Clinical Laboratory Standards Institute(CLSI). [6] The isolate was sensitive to oxacillin, gentamicin, vancomycin, rifampicin, linezolid, co-trimoxazole and resistant to penicillin. It was -lactamase negative. MIC value of Penicillin was 4 g/ml.

DISCUSSION

Kocuria varians is an unusual cause of prosthetic valve endocarditis . This patient was a 39 year old male with a past history of aortic valve replacement. Members of the genus micrococcus and related coccal genera Kocuria and Kytococcus are generally considered to be harmless saprophytes that inhabit or contaminate the skin, mucosa and perhaps the oropharynx. They can be opportunistic pathogens in certain immunocompromised patients. [1] Despite their low virulence, these organisms may become pathogenic, colonizing the surface of heart valves. [2] The reported infections in literature are endocarditis, arthritis, central nervous system infection, pneumonia, peritonitis, hepatic abscess and nosocomial blood stream infections. [6] In addition, strains identified as Micrococcus species have been reported recently in infections associated with indwelling intravenous lines, continuous ambulatory peritoneal dialysis fluids, ventricular shunts and prosthetic valves. [3,7]

The genus Micrococcus has been dissected into six genera Micrococcus (containing the species M.luteus, M.lylae and newly described M.antarcticus), Kocuria (containing the former species M.roseus, M.varians and M.kristinae), Kytococcus (the former M.sedentarius), Nesterenkonia (the former M.halobius), Dermococcus (the former M.rishinomiyaensis), and Arthrobacter (the former M.agilis). Members of the genus Micrococcus are gram-positive cocci (1-1.8 m in diameter), occurring mostly in pairs, tetrads and irregular clusters. They are obligate aerobes. Micrococci and staphylococci have been confused with one another for more than a century on the basis of their similar morphologies, gram staining results and positive catalase activities. By the mid 1960's, a clear distinction could be made between staphylococci and micrococci on the basis of their DNA base composition. Members of the genus staphylococcus have a G+C content of 30-39 mol%, whereas member of the micrococcus and related genera have a G+C content within the range of 66-75mol%. [1]

The genus Kocuria accommodates Kocuria rosea (the type species), Kocuria kristinae and Kocuria varians. Reports of infections caused by Kocuria species are limited. K.rosea and K.varians have been reported to cause catheter-related bacteremia. [7] Our patient had no recent history of dental manipulation or intravenous drug administration. Endocarditis in this case was probably caused by haematogenous spread. The most common organisms responsible for prosthetic valve endocarditis are S. epidermidis, S. aureus, Viridans streptococci and enterococci. [7] Medline search did not reveal endocarditis caused by Kocuria varians and other Kocuria species. This is because earlier reports did not differentiate these different species. Recently, Edmond et al have reported a case of Kocuria kristiniae causing acute cholecystitis and Fevzi et al have reported a case of K.rosea causing catheter related bacteremia. [3,4]

At present there are no recommended standard methods by CLSI, for antibiotic susceptibility testing and interpretive criteria for organisms belonging to Micrococcus and related genera. [8,9] There is a need to develop standard guidelines for such less frequently encountered organisms. A report in the literature on 219 strains of Kocuria and Micrococcus shows that most strains are sensitive to doxycycline, ceftriaxone, cefuroxime, amikacin, and amoxicillin with clavulanic acid, but most are resistant to ampicillin and erythromycin. [3] This isolate was also resistant to penicillin. The duration of therapy in general depends on site and severity of infection. However, this patient died before completion of treatment due to neurological complications. Common neurological complications from endocarditis are stroke, encephalopathy and retinal emboli.

Attempts should be made for complete identification of such unusual pathogens and reporting of such infections serve to increase our awareness about these organisms causing infections.

References

1. Murray PR, Baron EJ, Jorgensen JH. Manual of clinical Microbiology 2003. Chapter: 28

2. Basma Mnif, Ines Boujelbene, Fouzia Mahjoubi, Radouance Gdoura, Imen Trabelsi, Sana Moalla. (2006) Endocarditis due to Kytococcus schroeteri: Case report and review of the literature. Journal of Clinical Microbiology, 44: 1187-1189.
3. Edmond SK Ma, Chris LP Wong, Kristi TW Lai, Edmond CH Chan, WC Yam, An Chan. (2005) Kocuria Kristinae infections associated with acute cholecystitis. BMC Infect Dis, Available from BioMed Central ltd. Accessed July 19,5.
4. Fevzi Altuntas, Orhan Yildiz, Bülent Eser, Kürsat Gündogan, Bulent Sumerkan and Mustafa Çetin (2004) Catheter-related bacteremia due to Kocuria rosea in a patient undergoing peripheral blood stem cell transplantation. BMC Infectious Diseases, 4, doi:10.1186/1471-2334-4-62, Biomed central limited.
5. G.I.Barrow, R.K.Afeltham: Cowan and Steel's manual for the identification of medical bacteria 1993. Chapter: 6
6. Ronen Ben-Ami, Shiri Navon-Venezia, David Schwartz and Yehuda Carmeli. (2003) Infection of a ventriculoatrial shunt with phenotypically variable Staphylococcus epidermidis masquerading as polymicrobial bacteremia due to various Coagulase-Negative Staphylococci and Kocuria varians. J Clin Microbiol, 41: 2444-2447.
7. NCCLS, 2004. National Committee for Clinical Laboratory Standards. Performance standards for antimicrobial susceptibility testing, document M100-S13, Wayne, PA.
8. M Goodfellow: Topley and Wilson Microbiology and Microbial infections1998. Chapter: 22.
9. Karsten Becker, Jorg Wullenweber, Hans-Jakob Odenthal, Michael Moeller, Peter Schumann, Georg Peters (2003) Prosthetic valve endocarditis due to Kytococcus schroeteri. Emerg Infect Dis availablefrom:URL:http://www.cdc.gov/ncidod/EID/vol9no11/02-0683.htm.

Author Information

Shashikala Shivaprakasha, M.D (Microbiology)
Dept. of Microbiology, Amrita Institute of Medical Sciences

Kavitha Radhakrishnan, M.D (Microbiology)
Dept. of Microbiology, Amrita Institute of Medical Sciences

Prakash Kamath, D.M (Cardiology)
Dept. of Cardiology, Amrita Institute of Medical Sciences

Chitra Jayaprakash, M.D (Microbiology)
Dept. of Microbiology, Amrita Institute of Medical Sciences

T.S. Shailaja, M.D (Microbiology)
Amrita Institute of Medical Sciences

P.M. Shamsul Karim, M.D (Microbiology)
Amrita Institute of Medical Sciences