

A case report of *Kocuria Rosea* a potentially lethal opportunist: we only diagnose what we know

Volume 13 Issue 3 - 2023

Gloria Caterine Perez Mingan,¹ Luis Martinez,² Jairo Gonzalez,³ Rolando Toro,⁴ Carlos Javier Perdomo⁵

¹Internal Medicine Resident, Universidad de Cartagena, Colombia

²General Practitioner, Universidad Tecnologica de Pereira, Colombia

³Rotating Neurology Intern, Universidad Tecnologica de Pereira, Colombia

⁴Critical Medicine Resident, Universidad Tecnologica de Pereira, Colombia

⁵Neurologist, Hospital Universitario San Jorge, Colombia

Correspondence: Gloria Caterine Perez Mingan, Internal Medicine Resident, Universidad de Cartagena, Colombia, Tel 3132526310, Email Gloria.perezmi77@gmail.com

Received: July 13, 2023 | **Published:** July 21, 2023

Introduction

The genus *Kocuria* defines gram-positive bacteria belonging to the family *Micrococcaceae* and includes 18 species that are mostly strict aerobes. *Kocuria spp.* are part of the microbiota of the skin and oropharynx and are widely distributed in nature; however, five of these bacteria behave as opportunistic pathogens, highlighting *K. rosea*, *K. kristinae*, *K. rhizophila*, *K. varians* and *K. marina*. In the literature there are few reports of infections associated with these microorganisms, however, it is well recognized that they can cause cholecystitis, urinary tract infection, bacteremia, endocarditis, meningitis and brain abscess, which usually develop in immunocompromised individuals.^{1,2} We present the case of an adult patient with bacteremia, meningitis and endocarditis with positive isolation for *Kocuria rosea*.

Case description

74-year-old woman with a history of coronary heart disease, hypertension, osteoporosis, bipolar affective disorder and rheumatoid arthritis under immunosuppressive treatment. She initially consulted for acute confusional symptoms of multifactorial origin due to hydroelectrolyte disorder and urinary tract infection with two series of positive blood cultures for *Kocuria rosea*; the result was interpreted as contamination, so antibiotic therapy was not directed to this germ; during hospitalization she presented adequate clinical evolution and was subsequently discharged from the hospital.

One month after hospital discharge, the patient consulted again due to functional deterioration associated with fever, jaundice, mutism, asthenia, hyporexia and insomnia; Physical examination revealed nuchal rigidity and positive Brudzinski's sign, with lumbar puncture reporting xanthochromic cerebrospinal fluid, with marked pleocytosis at the expense of neutrophils, hyperproteinorrachia and hypoglycorrhachia with glycorrachia/glycemia index 0.19 (Table 1) and negative meningitis/encephalitis panel. With the diagnosis of meningitis, broad-spectrum antibiotic treatment was started and the patient was transferred to the intensive care unit. A simple cranial tomography was performed, which showed extensive hypodensity in the region of the left middle cerebral artery with vasogenic edema, confirming by contrasted cerebral resonance imaging that it was a vasculitic process associated with neuroinfection (Figure 1).

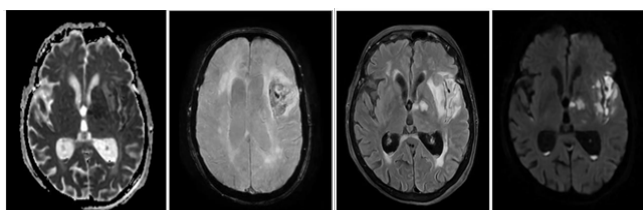


Figure 1 Brain MRI: axial section at gangliobasal level: (A) Flair, frontoparietal and left-sided internal capsule hyperintensity; (B) SWAN, small areas of hypodensity in relation to hemorrhagic foci in the lesion; (C) ADC, predominant restriction in left internal capsule due to ischemic compromise; (D) DWI hyperintensity in the same region described in the previous image indicating acute lesion.

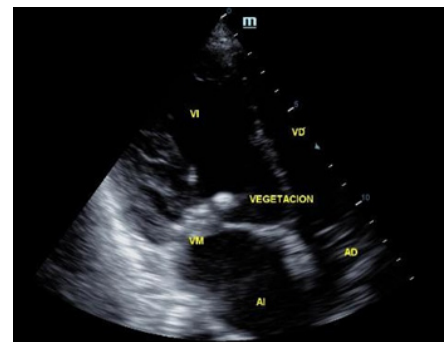


Figure 2 vegetation in the anterior mitral leaflet.

She underwent evaluation by the infectious diseases department considering neuroinfection by *Kocuria rosea* associated with a history of bacteremia by this microorganism, so antibiotic management was adjusted with ceftriaxone at a dose of 2 grams intravenous every 12 hours until six weeks. However, due to the torpid clinical evolution with significant neurological deterioration and the need for mechanical ventilation, a new lumbar puncture was performed, which showed a decrease of more than 90% of leukocytes and reduction of proteinorrachia (Table 1), which did not explain the clinical deterioration of the patient.

During hospitalization, clinical signs suggestive of infective endocarditis (Janeway lesions) were documented and an echocardiogram was performed, which found vegetations in the anterior mitral leaflet and right coronary leaflet (Figure 2), confirming

the suspected diagnosis. Despite pharmacological management, the patient progressed to septic shock with no response to the measures implemented in the intensive care unit and died 48 hours later.

Table 1 Initial and control CSF report

LCR	Initial	Control
Appearance	cloudy	Of course
Leukocytes	5121 mm ³	53 mm ³
Neutrophils	90%	30%
Lymphocytes	10%	70%
Erythrocytes	80 mm ³	3 mm ³
Glucorraquia	20 mg/dL	20 mg/Dl
Glycorrachia/glycemia index	0,19	0,29
Proteinorraquia	1179 mg/dL	103 mg/dL
Gram	Negative	Negative
KOH	Negative	
Film array	Negative	Negative
Cultivation	Negative	Negative

Discussion

Kocuria rosea is a gram positive, obligate aerobic, catalase positive, coagulase negative and nitrate reductase negative bacterium; it belongs to the family Micrococcaceae of class Actinobacteria and its main habitat is the skin, oropharynx, soil and water. This bacterium is usually of low virulence and is considered a harmless commensal; however, it has been described as an opportunistic germ, responsible for different infections both in pediatric population and in adults in a state of immunosuppression. Meningitis, brain abscess, endocarditis, cholecystitis, necrotizing fasciitis and septic arthritis are common and potentially lethal presentations of *Kocuria rosea*.³⁻⁵

To date, the real prevalence of this bacterium as a cause of infections is unknown, since it is frequently confused with coagulase-negative *Staphylococcus* and when it is identified in cultures it is erroneously interpreted as a potential source of contamination. There are limited reports of cases of infections generated by bacteria of the *Kocuria* genus; however, infections by *K. kristinae* are more frequent than by *Kocuria rosea* and it should be noted that those affected usually have active neoplasia, chronic renal disease, metabolic disorders, pharmacological immunosuppression or advanced age.^{2,6-9}

The access route for the development of most of the infections described in the literature is usually hematogenous, being this the key route to cause endocarditis and infections of the central nervous system. It is necessary to mention that in 2014 a strain of *K. rosea* called BS1 was identified that has been shown to be able to generate an exopolysaccharide known as Kocuran which is associated with immunosuppression, inhibition of cell proliferation and inhibition of complement-mediated hemolysis; which would explain the multisystemic involvement and the severity of the infection if it is not identified and treated in a timely manner.¹⁰

In relation to microbiological identification, it is worth mentioning that *Kocuria* species generally grow on media such as sheep blood agar with pink, red, yellow or cream colored colonies and in microscopy are identified as Gram-positive cocci in pairs, tetrads or clusters; however, since these culture characteristics resemble those generated by coagulase-negative *Staphylococcus*, sequencing of the 16S rRNA gene is recommended as routine for the recognition of *Kocuria rosea* as a source of infection.^{5,11}

No specific pharmacological treatment has been described for infections caused by this germ, but *K. rosea* is known to be sensitive to drugs such as doxycycline, ceftriaxone, cefuroxime, amikacin and amoxicillin clavulanate; with resistance to drugs such as ampicillin, erythromycin, furazolidone and nitrofurantoin. The duration of drug therapy fluctuates according to the type and severity of infection and should be individualized.^{11,12}

Unfortunately, our patient had a torpid evolution due to systemic involvement with organ dysfunction secondary to this infection. Severe meningitis with extensive cerebral infarcts associated with vasculopathy was diagnosed, and infective endocarditis and bacteremia were also identified. Finally, he died in the context of septic shock due to *K. Rosea*.

Conclusion

Kocuria rosea behaves as an opportunistic germ capable of forming biofilms and causing multisystemic involvement; therefore, it is necessary to change the concept that it is a harmless commensal and recognize it as a potentially lethal opportunistic bacterium.

Acknowledgments

None.

Conflicts of interest

Authors declare that there is no conflict of interest.

References

- Hassan RM, Bassiouny DM, Matar Y. Bacteremia Caused by *Kocuria kristinae* from Egypt: Are There More? A Case Report and Review of the Literature. *Case Rep Infect Dis*. 2016;2016:6318064.
- Purdy S, Saranathan R, Prashanth K, et al. The expanding spectrum of human infections caused by *Kocuria* species: a case report and literature review. *Emerg Microbes Infect*. 2013;2(10):e71.
- Altuntas F, Yildiz O, Eser B, et al. Catheter-related bacteremia due to *Kocuria rosea* in a patient undergoing peripheral blood stem cell transplantation. *BMC Infect Dis*. 2004;4(1):62.
- Dotis J, Printza N, Papachristou F. Peritonitis due to uncommon gram-positive pathogens in children undergoing peritoneal dialysis. *Hippokratia*. 2012;16(3):267–268.
- Savini V, Catavittello C, Masciarelli G, et al. Drug sensitivity and clinical impact of members of the genus *Kocuria*. *J Med Microbiol*. 2010;59(Pt 12):1395–1402.
- Citro R, Prota C, Greco L, et al. *Kocuria kristinae* endocarditis related to diabetic foot infection. *J Med Microbiol*. 2013;62(Pt 6):932–934.
- Enç Y, Cinar B, Konuralp C, et al. Peripheral mycotic aneurysms in infective endocarditis. *J Heart Valve Dis*. 2005;14(3):310–316.
- Srinivasa KH, Agrawal N, Agarwal A, et al. Dancing vegetations: *Kocuria rosea* endocarditis. *BMJ Case Rep*. 2013;2013:1–2.
- Moreira JS, Riccetto AGL, da Silva MTN, et al. Endocarditis by *Kocuria rosea* in an immunocompetent child. *Brazilian J Infect Dis*. 2015;19(1):82–84.
- Kumar CG, Sujitha P. Kocuran, an exopolysaccharide isolated from *Kocuria rosea* strain BS-1 and evaluation of its in vitro immunosuppression activities. *Enzyme Microb Technol*. 2014;55:113–120.
- Gunaseelan P, Suresh G, Raghavan V, et al. Native valve endocarditis caused by *Kocuria rosea* complicated by peripheral mycotic aneurysm in an elderly host. *J Postgrad Med*. 2017;63(2):135–137.
- Takarada H, Sekine M, Kosugi H, et al. Complete genome sequence of the soil actinomycete *Kocuria rhizophila*. *J Bacteriol*. 2008;190(12):4139–4146.