IJID Regions 9 (2023) 117–119

Contents lists available at ScienceDirect

IJID Regions

journal homepage: www.elsevier.com/locate/ijregi

Case Report

Kocuria kristinae neuroinfection in an immunocompetent patient: a case report and review of the literature

Mauricio Alejandro Saldaña-Ruiz[1,*], José Marcelino Chávez-García[2], Federico Ortiz-Alonso[1], Cindy Sharon Ortiz-Arce[3], Jaime Eugenio Espinosa-Mora[4], José Remedios Cortés-Cárdenas[5]

[1] Coordinación Hospitalaria de Donación, Unidad Médica de Alta Especialidad No. 25, Instituto Mexicano del Seguro Social, Nuevo León, México
[2] Director Médico, Unidad Médica de Alta Especialidad No. 25, Instituto Mexicano del Seguro Social, Nuevo León, México
[3] Jefe de División de Investigación, Unidad Médica de Alta Especialidad No. 25, Instituto Mexicano del Seguro Social, Nuevo León, México
[4] Departamento de Infectología, Unidad Médica de Alta Especialidad No. 25, Instituto Mexicano del Seguro Social, Nuevo León, México
[5] Jefe de servicio de Neurocirugía, Unidad Médica de Alta Especialidad No. 25, Instituto Mexicano del Seguro Social, Nuevo León, México

ARTICLE INFO

Keywords:
Kocuria
Neuroinfection
Immunocompetent

ABSTRACT

Few cases of disease by *Kocuria kristinae* have been reported, some in immunocompetent patients but mainly in immunocompromised. The current case report describes a 28-year-old female with an initial diagnosis of pituitary macroadenoma. After the initial surgery, the patient was readmitted due to tension pneumocephalus and cerebrospinal fluid (CSF) fistula. Cultures showed *K. kristinae* in the CSF and Candida albicans in the urine. The patient died after multiple complications. This is the first case of neuroinfection by *K. kristinae* in the American continent as reviewed. It was not determined as the main cause of death due to the sudden herniation, however, with active infection derived from the identification in two different samples, for this reason, we consider that it could be useful to take it as a cause of disease and a probable cause when the studies for detection of the most common pathogens have been negative.

Introduction

Kocuria kristinae bacteria, initially described as opportunistic because they are saprophytes of the skin, oropharynx, and mucous membranes of humans and other mammals. They have also been found in soil, their main reservoir [1] and recently proposed as an emerging pathogen [2].

The genus Kocuria, originally classified within Micrococcus [3] and reclassified as *K. kristinae* according to subsequent chemotaxonomic and phylogenetic analyses [4].

There are some cases reported in the world literature about infections caused *by K. kristinae*, mainly in immunocompromised patients due to different causes such as peritoneal dialysis use, prolonged catheter use, urinary tract infections, acute cholecystitis, and chronic diseases [5–9]. In addition to this, they are underdiagnosed as they are considered saprophytes in humans, in recent years there have been reported cases in immunocompetent patients, mainly causing endocarditis [1,7]. As for neuroinfection, to the knowledge of this research, there are six reports, either by case reports or detection in cerebrospinal fluid (CSF) samples [10–14].

Case report

A 28-year-old female patient with no history of immunosuppression. One year ago, she presented amaurosis of the right eye, hemianopsia of the left eye, and intermittent frontal headache, and 5/10 on a visual analog scale; 6 months later magnetic resonance imaging diagnosed pituitary macroadenoma, treated surgically with partial resection (50%) without complications. One month before her admission, the residual lesion was resected, and a right frontal ventriculoperitoneal shunt valve was placed; she was discharged with hormone replacement therapy (levothyroxine 100 mcg every 24 hours, prednisone 5mg every 24 hours, desmopressin 150 picograms every 24 hours).

She was readmitted 8 days later with dysphagia, dysarthria, dyspnea, tachypnea, productive cough, febrile peaks, and psychomotor agitation, with saturation of 90% on room air, respiratory rate 22, heart rate 90, blood pressure 100/85 mmHg, temperature of 38.1°C, Glasgow Coma Scale of 14 with tendency to somnolence and disoriented, lung fields with adequate respiratory movements, and discrete rales, without hemodynamic compromise, antigen test for SARS-COV2 negative; leukocytosis of 22,310, 90% neutrophils and 7% lymphocytes, hydroelectrolyte imbalance with sodium of 161 mmol/dl and creatinine of 2.2 mg/dl; CSF xanthochromic, 57 cells/mm^3, glucose 85

* Corresponding author.
E-mail address: mauriciomgrr14@gmail.com (M.A. Saldaña-Ruiz).

https://doi.org/10.1016/j.ijregi.2023.10.006
Received 1 August 2023; Received in revised form 14 October 2023; Accepted 16 October 2023

Table 1
Main characteristics of the studies included in the review.

Author	Setting	Study design	Participants (N)	Participants characteristics	Clinical presentation	Findings
Ali et al. [10]	Iraq	Cohort study	1	Patients between 10-79 years old	No data	One isolation from 4399 samples
Tajane et al. [11]	India	Cohort study	1	Newborns between 1-28 days	No data	One isolation from 265 samples
Amina et al. [12]	Tunisia	Case report	1	13-year-old, man	Meningitis and cranial nerve palsies	First reported case of sphenoid sinusitis simultaneously complicated by both meningitis due to Kocuria kristinae and ocular nerve palsy
Biswal et al. [13]	India	Cohort study	3	Pediatrics	No data	Patients responded well to the therapy
Kumar and Chougale [14].	India	Case report	1	35-year-old, man	Meningitis	First reported case of meningitis in an adult

mg/dl and protein 15 mg/dl; ceftriaxone 1 gram IV every 12 hours was started. Chest X-ray without alterations, computed tomography (CT) scan of the brain with effacement of sulci and fissures, subdural space, and ventricular system with abundant gas, diagnosing tension pneumocephalus and CSF fistula. Right frontal craniotomy, pericranial plasty, nasal endoscopy, removal of ventriculoperitoneal shunt, and placement of right frontal ventriculostomy, then admitted to the intensive care unit.

Leukocytosis of 18,820 with predominance of neutrophils 86%, lymphocytes 6%, and platelets 125,000; at that time without evident infectious focus, polyculture was performed, and treatment was modified to ceftriaxone 2 grams intravenous (IV) every 12 hours and vancomycin 1 gram IV every 12 hours.

On the 4th day of stay, elective extubation was performed without complications. Leukocytosis of 11,390, neutrophils 74%, lymphocytes 16.9%, platelets 99,000, and fibrinogen 384 mg/dl; creatinine 0.6 mg/dl and sodium 158 mg/dl. She maintained a good evolution, for which the following day it was decided to discharge her to the neurosurgery ward.

During her second day on the ward, he presented fever of up to 38.5°C and deep vein thrombosis, treated with enoxaparin 80 milligrams subcutaneously every 12 hours and changed to meropenem 2 grams IV every 8 hours.

On the third day, *K. kristinae* was reported in CSF culture and bronchial secretion, in addition to *Candida albicans* in urine. The infectious diseases department indicated vancomycin 1 g IV every 12 hours for 7 days, ceftazidime 2 g IV every 8 hours, fluconazole 400 mg IV every 24 hours for 7 days, and Foley catheter replacement.

Two days later he presented somnolence, puffy facies, vomiting, and purulent fluid secretion by ventriculostomy. Skull CT scan with right frontal encephalomalacia and generalized edema displacing from right to left 6.8 millimeters, asymmetric ventricular system with frontal ventriculostomy over the lateral ventricle, pneumocephalus and subgaleal collection of 3 millimeters in diameter, ventriculostomy was urgently repositioned draining hematic CSF with high opening pressure plus air bubble output with xanthochromic output. At 24 hours post-surgery bilateral mydriasis of 5 mm and irreversible areflexia were observed, CT showed subfalcine and tonsillar herniation with severe cerebral edema, sedation was suspended to perform panangiography. Leukocytosis with 18480, neutrophils 92%, lymphocytes 3.9%, and procalcitonin 0.32 ng/ml.

The following day panangiography was performed with absence of arterial flow, parenchymogram, and cerebral venous return, evaluated by the neurology service, who diagnosed encephalic death.

Discussion

No specific treatment has been defined to date [15]. Resistance to nitrofurantoin and furazolidone has been reported, as well as sensitivity to beta lactams, quinolones, lincosamides and cotrimoxazole. In this case, the patient received beta lactams with a poor outcome.

Although it could not be determined as a direct cause of death due to the sudden herniation event that led to severe cerebral edema and subsequent encephalic death, the infection was active at that time, derived from the isolation in two different samples, as well as not having a defined clinical behavior of pathogenicity, it could be of little relevance as a cause of disease and risk of death even in immunocompetent patients.

More isolations and/or cases of neuroinfection by this pathogen have been reported in immunocompetent patients [12,14], so it is considered useful to analyze more cases in which this pathogen is found and to pay attention to those in which there is no precise diagnosis and the studies for detection of the most common pathogens have been negative.

A review of the literature mentioned seven isolations of *K. kristinae* in CSF, of which none in the American continent or immunocompetent patients; therefore, as reviewed in this research, it is the first case of neuroinfection by *K. kristinae* in the American continent reported (Table 1).

It is of vital importance to begin to consider this pathogen as a possible cause of disease in immunocompetent patients and at the same time to study it to establish a specific treatment.

Conclusion

K. kristinae infection can cause disease, mainly in immunocompromised patients, however, due to the increasing number of cases reported in immunocompetent patients, it is important to recognize its pathogenic potential when isolated from a sample, in addition to this, the removal of the same devices to prevent the spread of the microorganism to other systems. In addition, it is prudent to give specific treatment, as reported in the antibiogram.

Declarations of competing interest

The authors have no competing interests to declare.

Author contribution

M.A. Saldaña-Ruiz helped with the conception and design of the study, acquisition of data, analysis of data, drafting the article, revising it critically, and final approval; J.M. Chávez-García helped with revising the article critically, acquisition of data, and final approval; F. Ortiz-Alonso helped with analysis and interpretation of data, drafting the article, and final approval; C.S. Ortiz-Arce helped with drafting the article, revising it critically, and final approval; J.E. Espinosa-Mora helped with acquisition of data, revising the article critically, and final approval; J.R. Cortés-Cárdenas helped with analysis of data, revising the article critically, and final approval.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval statement

Does not apply.

References

[1] Bastidas AR, Vélez CA, Gutierrez CV, Bahamón NJ. Endocarditis bacteriana por Kocuria kristinae en paciente inmunocompetente. Reporte de un caso. *Rev Colomb Cardiol* 2013;**20**:316–19. doi:10.1016/S0120-5633(13)70075-5.

[2] Napolitani M, Troiano G, Bedogni C, Messina G, Nante N. Kocuria kristinae: an emerging pathogen in medical practice. *J Med Microbiol* 2019;**68**:1596–603. doi:10.1099/jmm.0.001023.

[3] Kloos WE, Tornabene TG, Schleifer KH. Isolation and characterization of micrococci from human skin, including two new species: Micrococcus lylae and Micrococcus kristinae. *Int J Syst Evol Microbiol* 1974;**24**:79–101. doi:10.1099/00207713-24-1-79.

[4] Stackebrandt E, Koch C, Gvozdiak O, Schumann P. Taxonomic dissection of the genus Micrococcus: Kocuria gen. nov., Nesterenkonia gen. nov., Kytococcus gen. nov., Dermacoccus gen. nov., and Micrococcus Cohn 1872 gen. emend. *Int J Syst Bacteriol* 1995;**45**:682–92. doi:10.1099/00207713-45-4-682.

[5] Castilla-Agudelo GA, Velez-Arango I, Roncancio-Vilamil GE, García-Rinc ón CI, Thorrens-Ríos JG, Cataño-Correa JC, et al. Infección Diseminada Kocuria Spp.: reporte de caso y revisión de la literatura. *Enferm. infecc. microbiol.* 2021;**41**:39–44.

[6] Chavez-Valencia V, Orizaga-de la Cruz C, Aguilar-Bixano O, Huerta-Ruiz MK, Sánchez-Estrada EE. Infecciones asociadas a Kocuria kristinae: presentación de dos casos y revisión de la literatura. *Gac Med Mex* 2014;**150**:S183–5.

[7] Rojas-Molina SM, Rivera-Marín JD, Leiva-Panqueba LM. Endocarditis bacteriana por Kocuria kristinae en un paciente inmunocompetente. Reporte de caso. *Infectio* 2019;**23**:399–401. doi:10.22354/in.v23i4.809.

[8] Tewari R, Dudeja M, Das AK, Nandy S. Kocuria kristinae in catheter associated urinary tract infection: a case report. *J Clin Diagn Res* 2013;**7**:1692–3. doi:10.7860/JCDR/2013/6077.3247.

[9] Ma ES, Wong CL, Lai KT, Chan EC, Yam WC, Chan AC. Kocuria kristinae infection associated with acute cholecystitis. *BMC Infect Dis* 2005;**5**:60. doi:10.1186/1471-2334-5-60.

[10] Ali FA, Al-Daood AAK, Burhan PK, Tofiq LR, Shakur PS. The incidence of Multirsistance Kocuria spp. among different clinical samples in Erbil City. *Iraq. South Asian J Res Microbiol* 2022;**14**:62–72. doi:10.9734/sajrm/2022/v14i3274.

[11] Tajane SB, Vaidya AS, Bhalerao DS, Roushani SB, Kulkarni SG, Rajhans VV, et al. Culture positivity of cerebrospinal fluid by automated blood culture system in neonates: a cross-sectional study from Loni, Maharashtra, India. *J Clin Diagn Res* 2022;**16**:6–9. doi:10.7860/JCDR/2022/52513.15842.

[12] Amina W, Omar Y, Nesrine J, Ahmed R, Raoudha B, Mohamed K, et al. Kocuria kristinae meningitis and cranial nerve palsies secondary to sphenoid sinusitis: about a case. *Am J Pediatr* 2021;**7**:159–62. doi:10.11648/j.ajp.20210703.23.

[13] Biswal D, Kaur R, Satija S, Seth A, Rathi A, Kant L. The expanding spectrum of human infections caused by Kocuria species in paediatric patients: one year observational, prospective hospital-based study. *Int J Infect Dis* 2023;**130**:S64. doi:10.1016/j.ijid.2023.04.160.

[14] Kumar PA, Chougale RA. Kocuria kristinae (unusual pathogen) isolated from cerebrospinal fluid: a case of acute meningitis. In: Martinez-Romero A, editor. *Highlights on medicine and medical research 15*. Durango: BP Global international; 2021. p. 93–7.

[15] Savini V, Catavitello C, Masciarelli G, Astolfi D, Balbinot A, Bianco A, et al. Drug sensitivity and clinical impact of members of the genus Kocuria. *J Med Microbiol* 2010;**59**:1395–402. doi:10.1099/jmm.0.021709-0.