Septic arthritis caused by *Staphylococcus caprae* following arthroscopic meniscus tear repair in a patient without any foreign device

Artritis séptica causada por Staphylococcus caprae *tras reparación artroscópica de menisco en paciente sin material protésico*

Staphylococcus caprae is a commensal coagulase-negative staphylococci (CoNS) originally isolated from the skin and mammary glands of goats, species in which it causes mastitis.[1,2] *S. caprae* is also an infrequent commensal of human skin and has been associated with different syndromes, mainly acute otitis externa, bacteraemia and bone and joint infections (BJIs) in patients carrying orthopaedic devices.[1] Herein, we report a case of septic arthritis caused by *S. caprae* following an arthroscopy for internal meniscus tear repair in a patient without any foreign device implantation.

A 35-year-old healthy male underwent a knee arthroscopy for internal meniscus tear repair, with partial meniscectomy. The procedure was performed uneventfully and no drug, suture or foreign device was used during surgery. Patient was discharged on the same day of surgery. His knee had been operated 17 years before for an osteochondritis dissecans by arthroscopy.

One week after surgery the patient was addressed to the Emergency Department due to severe knee pain and swelling. Neither fever nor other systemic symptoms were observed. Physical examination revealed joint effusion and arthrocentesis yielded 140 mL of sero-hematic joint fluid which was sent for analysis and culture. The diagnosis of septic arthritis was established according to the findings of joint fluid and blood analysis (Table 1).

Arthroscopic lavage was performed and intraoperative sample of joint fluid was taken for culture nine days after index surgery. Empiric antimicrobial therapy was started after surgery, with 1 g vancomycin IV every 12 h and 750 mg ciprofloxacin orally every 12 h.

Culture of the two joint fluids were processed according to the Infectious Diseases Society of America guidelines and both were positive to *S. caprae*.[3] Gram stain of both samples was negative and the microorganisms only grew in the blood culture bottle and thioglycollate broth sub-cultures after 48 h. Identification and antimicrobial susceptibility testing of both isolates was performed by Vitek 2 system (bioMérieux, Marcy l'Etoile, France) and the results were interpreted according to Clinical and Laboratory Standards Institute guidelines.[4] The identification was confirmed by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry, yielding both a 1.74 score (Microflex™; Bruker Daltonik GmbH, Bremen, Germany). The isolates were susceptible to all antimicrobial tested. Five days after surgery, at hospital discharge, an oral regimen of amoxicillin/clavulanic acid 875 mg/125 mg every 8 h was started. Treatment was maintained for 3 weeks, until C-reactive protein (CRP) reached the normal range (3.6 mg/L). Clinical evolution was satisfactory, complete range of motion and absence of pain and swell were observed after 3 weeks follow-up from the arthroscopic lavage. In the third-month follow-up CRP levels remained low (0.9 mg/L) and the good outcome was confirmed also at the 12-month follow-up.

S. caprae has been reported as a human pathogen since 1983. Nevertheless, until now, only 69 cases of BJIs by this bacteria were described, and just 11 (15.9%) were non-associated to foreign-devices, including five cases of osteitis, two cases of diabetic foot infections and four single cases of arthritis, spondylodiscitis, recurrent osteomyelitis and chronic osteitis.[1,2]

Septic arthritis after knee arthroscopy is a very uncommon complication with a low incidence rate (0.009–1.1%), mainly caused by *S. aureus* and CoNS.[5,6] Although patients' skin, can be colonized by *S. caprae*, the relationship between BJI and nosocomial *S. caprae* infection is difficult to probe.[1,7] Nevertheless, the authors of the only previous report of an intra-articular *S. caprae* infection following knee arthroscopy suggested that inoculation of the microorganism into the joint could be iatrogenic.[8] In this regard, herein we present the second case with similar features in which the hypothesis of patient's skin as the origin of the infection is strongly suspected. In both cases, no device was implanted into the joint of the patient and symptoms appeared one week after primary surgery. *S. caprae* is usually susceptible to all most antimicrobials for Gram positive bacteria and clinical evolution of our patient was satisfactory with amoxicillin/clavulanic acid treatment.[1,8] However, when device-associated *S. caprae* BJIs occur, foreign device removal is often necessary due to repetitive infection recurrences with more conservative management.[1,9] The presence of foreign device and the biofilm formation could facilitate the virulence of *S. caprae* and explain the poor response to treatment in these cases.[9]

The study here described contributes to demonstrate once again the ability of *S. caprae* to develop BJIs, including non-device-associated infections. We would like to highlight the importance of proper skin disinfection before surgical interventions, in order to avoid infections by bacteria from the skin microbiota. Furthermore, the relevance of obtaining deep samples or joint fluid should be remarked, as well as the importance of the inoculation in BC bottle and/or enrichment broth to establish the etiologic diagnosis of this kind of infections.

Table 1
Findings of joint fluid and blood analysis.

Joint fluid	74,562 leukocyte/μL (95% polymer-phonuclear) Glucose: 15mg/dL Proteins: 5.67g/dL No crystals
Blood	10,600 leukocyte/μL (73% neutrophils, 14% lymphocytes, 12% monocytes) C-reactive protein: 208mg/L

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Conflict of interests

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Ulcerative keratitis due to *Kocuria palustris*: An emerging pathogen

Queratitis ulcerativa por Kocuria palustris*: un patógeno emergente*

Species from the genus *Kocuria*, earlier belonging to the genus *Micrococcus*, have been described as the causative agents of bacteremia, endocarditis, peritonitis, cholecystitis, urinary tract infection, brain abscesses and keratitis.[1] The increased clinical cases reported recently demonstrate the expanding spectrum of human infections caused by these microorganisms. *Kocuria palustris* was first described in 1999[2] and reported together with *Rothia mucilaginosa* as the etiologic agent of an ulcerative keratitis case in 2014.[3] We describe the first case of a *K. palustris* infection in pure culture.

A 68 year old woman was admitted to our hospital with suspicion of corneal ulcer in the left eye. She had been operated from cataract 10 years ago and had suffered from several swelling episodes. The patient underwent trabeculoctomy six months before the day of the admission. She had been using her monthly soft contact lenses until 2 days before the admission, when the first symptoms were present. She referred inflammation and swelling in the left eye. She showed epiphora and visual loss. Her left eye presented an erythematous conjunctiva, chemosis and opacification together with a central fluorescein-positive ulcer of approximately 1.4 mm–2.6 mm depth. In the fundus ultrasound of the left eye, vitreous opacities were observed. Suspicion of sub-scleral fissure was then suggested. However, no other signs of endophthalmitis or systemic infection symptoms were observed. Her right eye was unsuspicious. The final diagnosis was an ulcerative keratitis in the left eye possibly associated to the incorrect use of contact lens.

A corneal scraping and a corneal ulcer smear of the left eye were performed in order to identify the etiologic infectious agent. The patient started therapy with topical levofloxacin (5 mg/ml) and gentamicin (5 mg/ml) eye drops every hour, plus dexamethasone (1 mg/ml) eye drops twice daily. The corneal ulcer scraping sample was cultured in a thioglycolate broth at 37 °C. The 16s ribosomal RNA PCR performed from the smear sample was positive. The gene sequence analysis revealed *K. palustris*. After 4 days of incubation, the thioglycolate demonstrated microbial growth. A creamy colony grew on the blood agar plate subculture after 24 h of incubation at 37 °C. *K. palustris* identification was confirmed using MALDI-TOF. Susceptibility testing was performed following the European Committee on Antimicrobial Susceptibility Testing (EUCAST) standardized methodology. The MIC for different antimicrobial agents using the Etest method were as follows: penicillin G 0.125 μg/ml; clindamycin 0.125 μg/ml; vancomycin 0.38 μg/ml; gentamicin 0.19 μg/ml; moxifloxacin 0.5 μg/ml; rifampicin 0.016 μg/ml and linezolid 0.75 μg/ml. On the day 5, the patient was discharged with a significant clinical improvement and the treatment was adjusted to topical levofloxacin (5 mg/ml) eye drops four times daily for the three following days. On the follow-up visit, one month later, the patient showed no signs of infection.

Isolates belonging to the former genus *Micrococcus* are usually regarded as normal flora from skin and mucous membranes. *Kocuria* species have been isolated from the environment and clinical samples forming complex biofilms together with a variety of other microorganisms.[4,5] The clinical significance of *Kocuria* species overall is frequently ignored, as clinical microbiology laboratories consider it a contaminant due to its ubiquitous presence in the human microbiota.[6] However, the reports of *Kocuria* spp. clinical cases in the last years have highlighted its significance as a potential and invasive pathogen especially in neonates and immunocompromised patients.[1,7]

Ocular infections due to *Kocuria* spp. have been also described, including cases of keratitis,[3,8] keratoconjunctivitis[9] and canaliculitis.[10] This rare infection showed an unpredictable clinical course with frequent serious complications. As in the case described here, there is usually a previous history of an eye disorder. The infection management could require evisceration, keratoplasty and amniotic membrane graft treatment in complicated cases; and involved treatment with antimicrobials in all of the cases. Due to its susceptibility pattern, *Kocuria* spp. is generally covered in the empiric or initial directed antibiotic treatment with broad spectrum antibiotics. However, resistances to ampicillin, tetracycline and quinolones have been described.[1,8]

The present report implies that *Kocuria* spp. should be taken in consideration when isolated from corneal ulcer samples, especially in patients with a previous history of eye disorders.

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