Arthritis Due to *Staphylococcus epidermidis* in a Prosthetic Knee Joint of an 82 Year-Old Woman With Secondary Gout Produced by Diuretics

To the Editor: It is estimated that between 0.5% and 2% of joint prosthesis will suffer an infection,[1] especially in the first year.[2,3] The incidence of prosthesis related septic arthritis is approximately 40-68/10^5/year, almost 10 times more than the general incidence of infectious arthritis.[3-5] In more than half the cases, prosthetic infections affect patients who are older than 70,[5] most of them with chronic underlying diseases in addition to predisposing factors that can mask their manifestations. In this sense, joint infections in patients with microcrystalline arthritis are especially difficult to identify, both because of their scarce frequency as by the similarity in their clinical manifestations.[6-11]

Coagulase negative staphylococci, especially *Staphylococcus epidermidis,* are the main cause of implant and joint prosthesis infection.[12-14] However, only 1 case associating urate monosodium arthritis and *S epidermidis* infection has been described on a native joint,[10] and we have considered it interesting to present a patient with gout secondary to thiazide diuretics who developed an infection by *S epidermidis* on a prosthetic joint.

An 82-year-old woman consulted us due to pain, swelling and loss of function of the left (prosthetic) knee. Symptoms had started 5 weeks prior during a hospitalization and were accompanied by low-grade fever during the afternoons (axillary temperature 37.4 °C to 37.8 °C). Among her history there was a surgery for carpal tunnel syndrome and she was hypertensive, controlled with enalapril (20 mg/day) and hidroclorothiazide (50 mg/day) for more than 10 years. During the past 5 months she had presented hyperuricemia between 9.5 and 15 mg/dL and, for the past 6 months before her visit to our clinic she had presented episodes of bilateral podagra and oligoarthritis with affection of the left ankle and tarsus. Two years before she had been implanted with a left knee prosthesis due to massive osteoarthritis. For the trimester previous to the consultation she had been treated at another center due to acute additive arthritis of the first metatarsophalangeal joints as well as the left tarsus and ankle. The synovial fluid study, aspirated from the left ankle, had allowed the identification of birrefringent crystals with a negative elongation compatible with urate monosodium. Although her response to diclofenac (50 mg/8 h) was excellent, resolving the joint inflammatory process in 5 days, she developed congestive heart failure that conditioned her readmittance for a 13-day period, suffering several superficial thrombophlebitis in the forearms and fever. There was isolation of *S epidermidis* in 1 of the 3 blood cultures and the culture of an intravenous catheter, but it was not treated with antibiotics.

For the next 4 weeks the patient persisted with fever and progressive inflammation and loss of function of the right (prosthetic) knee appeared, with no improvement despite rest, paracetamol (1 g/8 h) and diclofenac (75 mg/24 h). Upon examination there was an axillary temperature of 37.5°C, pitting edema in both lower extremities and a massive effusion of the right knee. The rest of the joints were free of effusion or synovitis. Arterial pressure was 160/70 mm Hg. The cardiopulmonary examination showed a protomesosystolic ejection murmur in the aortic valve and a reduction in the ventilation and vocal vibrations in both bases.

The hemogram showed a normochromic, normocytic anemia with a hemoglobin of 94 g/L; 11.2×10^9 leukocytes/L with 89% polymorphbnuclear neutrophils. The analysis showed: ESR (112 mm/ first hour), C-reactive protein (61 mg/L), urea (138 mg/dL), creatinine (2.4 mg/dL), uric acid (9.9 mg/dL), albumin (28 g/L), and creatinine clearance (62 mL/min). The following parameters were normal or negative: glucose, total cholesterol, triglycerides, transaminases, gammaglutamiltranspeptidase, sodium, potassium, calcium, phosphorus, lactatodehydrogenase, amylase, alkaline phosphatase, billirrhubine, total proteins, immunoglobulin's, and complement (C3 and C4), rheumatoid factor (latex), and antinuclear antibodies. The 3 blood cultures were negative. An arthrocentesis of the left (prosthetic) knee was performed and 25 mL of purulent fluid with 52 000 leukocytos/μL was found, 92% neutrophils and with a glucose of 32 mg/dL. Polarized light microscopy showed birrefringent positive crystals with negative elongation in and outside the leukocytes that were compatible with urate monosodium. The Gram stain identified abundant gram-positive cocci, which were later grown in culture and were identified as *S epidermidis* resistant to methylcillin. The chest x-ray only showed an increase of the cardiopericardic silhouette. In the feet x-ray we found some erosions with sclerotic borders in the first metatarsophalangeal joint. The left-knee x-ray manifested signs of prosthetic loosening (Figure).

Intravenous antibiotic therapy with vancomycin (500 mg/8 h) for 6 weeks was administered, adding oral riphampicin (600 mg/day). A posterior intervention was carried out to retrieve the left knee prosthesis and change the tibial component that was clearly loose.

In the described clinical context, we consider that *S epidermidis* reached the left knee in the course of a bacteremia which had started 5 weeks prior, during a hospitalization, and the infection of an intravenous catheter as the most likely entry point. Therefore, even when 60%-95% of the prosthetic joint infections occur during surgery

due to environmental contamination or direct inoculation during manipulation, almost all of the infections present during the second year are acquired through an hematogenous pathway.[1,12] Bacteremia is a well documented cause of a late prosthetic infection[5,12] and the knee is its main localization.[12,13]

The 70%-80% of the prosthetic infections are due to a single microorganism.[1] Staphilococci are the cause of approximately 70% of the infections on knee prosthesis. In the past 2 decades, attention has been centered on coagulase negative staphylococci which cause 30%-40% of cases and whose main representative *S epidermidis*.[13,14] In our center, half of the isolates of this grampositive and facultative anaerobebacteria are resistant to methylcillin. *S epidermidis* possesses surface proteins such as SSP-1, SSP-2, and AtlE autolysin, which give it the capacity to adhere to polyesterene and other synthetic materials. Protein Fbe is also of pathogenic importance, capable of binding to chain β of fibrinogen, teichoic acid of the wall which facilitates its fixation to host fibronectin, as well as the secretion of a polysaccharide with adherent activity (PS/A), which covers its colonies as an impermeable barrier known as *slime,* preserving them from the host defenses and antibiotics.[15,16] *S epidermidis* also synthesizes proteins with a local osteolytic capacity, implicated in the loosening of prosthetic joints.[15] On the other hand, the environment of prosthesis and implants is scarcely vascularized and some component of the cements makes the phagocytic activity of leukocytes difficult.[17] These characteristics confer to *S epidermidis,* in spite of it reduced virulence with respect to *S aureus,* a noticeable capacity to colonize implants and prosthesis, especially in patients with nutritional deficits, alcoholism, diabetes mellitus, neoplasia,[17] chronic debilitating illness, connective tissue diseases, immunodeficiency, or immunosuppressant treatment.[1,16]

Although the late infection of a joint prosthesis can present with lack of function or loosening, it is difficult to differentiate from other causes.[18] Any prosthetic loosening must lead to the search for an infectious cause, and the simplest way of achieving this is through a synovial fluid culture or a prosthetic lavage.[18,19] Some significant clinical elements, such as fever and leukocytosis, are only present in 50% of the patients with late prosthetic infections[1,12] and in one third of those who simultaneously suffer microcrystalline and septic arthritis.[11] The clinical similarity of infectious and microcrystalline arthritis, next to the difficulty in differentiating them from a radiological viewpoint,[20,21] make the systematic synovial fluid study, including the systematic culture of the fluids of inflammatory aspects in spite of the observation of microcrystals[7-9,11] a necessity. This practice allowed us to diagnose the case described above.

Although there is a lack of consensus, a protocol for prophylactic antibiotic therapy in prosthesis-bearing patients who undergo manipulation in which bacteremia can occur, such as dental procedures, genital or urinary tract instrumentation or digestive tract endoscopy, has been proposed.[5,22] Kaandorp et al[5] have estimated that this could help patients avoid blood-borne infections of the joint prosthesis and reduce the incidence of septic arthritis up to 8%.

Once the prosthesis infection is established, medical treatment with antibiotics and joint lavages only achieves a 15% success rate. Therefore it is necessary to combine antibiotics and surgical measures.[12,19,23] Vancomycin is the antibiotic of choice against the majority of *S epidermidis,* but because its penetration into bone tissue is poor (only 14% of the serum concentration), its concomitant use with riphampicin is recommended. Due to the speed with which *S epidermidis* can become resistant to riphampicin, this should never be employed as monotherapy. Teicoplanine is a glucopeptide with a microbial specter similar to vancomycin and achieves a rate of clinical remission close to 80%. However, there are some strains of coagulase negative staphilocci that are resistant to teicoplatinin. The duration of antibiotic therapy oscillates between 12 and 24 weeks, and in no case can be of less than 6 weeks duration.[12,19] Surgical measures include the

Figure. *Lateral radiographic projection of the left knee where an irregular radiotransparent line can be seen in the interphase between the cement and the metal of the tibial component (septic loosening).*

debridement and, frequently, the prosthetic exchange in 1 or 2 sessions; this last one with better results.[19,21] In patients with an unfavorable progression and without the possibility of a prosthesis exchange, arthrodesis is an option, which, in spite of its bad functional results, is followed by a high rate of bacteriological resolution. In relapsing cases, which threaten the life of a patient, dearticulation or amputation are the only alternative.[1,12,19]

We have read about only one other patient with microcrystalline and infectious arthritis on a patient with a joint prosthesis.[11] It presented in a 46-year-old male with a knee prosthesis infected by *S aureus* which was resistant to oxacyllin and who required an arthrodesis. We consider that, because prosthesis are more susceptible to infectious complications than native joints,[5,12] this possibility must be the first one to be investigated when faced with pain and inflammatory signs, even in patients with a history of microcrystalline arthritis.

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Septic Bursitis Due to *Eggerthella lenta*

To the Editor: Septic bursitis fundamentally affects superficial bursae (olecranon and prepatellar). Usually it is due to microorganisms that penetrate through trauma because both localizations are exposed to it, be it by accidental puncture or, less frequently, due to intrabursal infiltration with steroids. More than 80% of cases of septic bursitis are produced by *Staphylococcus aureus* and the rest by *Streptococcus* spp, gramnegative bacteria, micobacteria and fungi, and anaerobes are infrequently isolated. On the contrary, cases of arthritis due to anaerobes have been described.[1-4]

We present the case of olecranon bursitis due to *Eggerthella lenta* in a 70-year-old male with a history of stroke, hypertension, hyperuricemia, mild chronic renal failure due to nephroangiosclerosis, ischemic heart disease, bilateral carotid stenosis, treatment resistant rheumatoid arthritis, and receiving steroids and etanercept and chronic olecranon bursitis of a mechanical origin. The patient presented rheumatoid nodules on both olecranon bursae for which he had been operated years before. He came to the clinic due to right olecranon swelling, without any fever or chills. A bursocentesis was performed and an inflammatory synovial fluid was obtained, without any evidence of crystals under polarized light microscopy. The samples were sent for culture in blood culture media (Bact-Alert, Organon-Technika), resulting negative after 5 days