



# Enfermedades Infecciosas y Microbiología Clínica

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## Scientific letters

### *Corynebacterium striatum* prosthetic joint infection<sup>\*</sup>



#### Infección de prótesis de rodilla por *Corynebacterium striatum*

*Corynebacterium* spp. is a Gram-positive bacilli classically considered to be an opportunistic pathogen which colonises the skin and mucous membranes. It has recently been found to be involved in respiratory infections and endocarditis, and it is an emerging causal agent of prosthetic joint infections.<sup>1,2</sup> We describe a case of knee replacement infection.

This was an 85-year-old woman with no known drug allergies. She had a previous medical history of hypertension, chronic atrial fibrillation, asthma and breast cancer treated in 1998. Her surgical history consisted of bilateral total knee replacements. She had knee replacement surgery for primary knee osteoarthritis in the right knee in 2000 (Zimmer<sup>®</sup> NexGen) and in 2009 had further surgery for a new replacement knee (Zimmer<sup>®</sup> LCCK) due to aseptic loosening. In September 2016, the patient went to Accident and Emergency (A&E) with suspected infection of her artificial knee. On examination in A&E: knee swollen, diffusely painful since July 2015, with flexion limited to 90°. She had inflammatory signs of CRP 10.93 and leucocytes 6300, with 74.1% neutrophils. X-ray showed loosening of the prosthesis. As the alpha-defensin test (Synovasure<sup>®</sup>) was positive, joint fluid samples were taken for culture. Gram-staining showed abundant polymorphonuclear cells and in cultures from the arthrocentesis, *Corynebacterium striatum* was isolated from the enrichment culture at five days. However, this was reported as the usual flora of the skin because it was only one sample.

In October, the patient had another alpha-defensin test, which was also positive, and new samples were taken for culture in the operating theatre.

*C. striatum* was isolated in all the intra-operative samples, as well as in the prosthesis and the joint fluid. Some of the samples were isolated only from the enrichment culture, but in others it was isolated from the original plate. All grew in blood and chocolate agar. The patient was started on treatment with IV vancomycin 1 g/12 h and IV ceftazidime 2 g/8 h for five days. With the results of the antibiogram, the treatment was changed to IV linezolid 600 mg/12 h for nine days.

In December, the patient had a second knee replacement operation (Zimmer LCCK). New samples were taken for culture which came back negative. The patient had been prescribed vancomycin 1 g/8 h for nine days pending the culture results.

The patient is currently making good progress, with infection markers (CRP) falling and no signs of infection.

Identification was performed by mass spectrometry and antibiotic sensitivity by E-test (bioMérieux<sup>®</sup>) in Mueller-Hinton blood incubated at 35 °C. The isolate presented the following MIC: resistant to penicillin (0.5 µg/ml), ciprofloxacin (>32 µg/ml), levofloxacin (>32 µg/ml), gentamicin (>256 µg/ml), tetracycline (16 µg/ml), clindamycin (>250 µg/ml), rifampicin (128 µg/ml), ceftriaxone (4 µg/ml), trimethoprim-sulfamethoxazole (6 µg/ml); and sensitive to vancomycin (0.25 µg/ml) and linezolid (0.5 µg/ml). *C. striatum* was classified as sensitive or resistant based on the criteria defined by the CLSI (Clinical & Laboratory Standards Institute).<sup>3</sup>

*C. striatum* is a microorganism which forms part of the normal flora of the skin and mucous membranes. In recent years it has been described as an emerging pathogen, especially in immunocompromised patients, patients undergoing surgery or patients with some type of prosthesis.<sup>4,5</sup> Infections such as endocarditis, meningitis, osteomyelitis, respiratory infections, ulcer infections, peritonitis, pancreatic abscesses, pneumonia, urinary tract infections and septic arthritis have recently been reported.<sup>4,6–8</sup>

Antibiotic sensitivity is very variable. An antibiogram has to be performed, as *C. striatum* generally has high resistance to antibiotics, and nosocomial outbreaks have been reported in some cases.<sup>1,9</sup> It tends to remain sensitive to vancomycin and linezolid.<sup>10</sup>

*C. striatum* is difficult to identify. There are several diagnostic methods available based on biochemical tests and gene sequencing. However, the species of just 65–85% of clinical isolates of *Corynebacterium* spp. can be identified using the API Coryne system. We used the MALDI-TOF mass spectrometry (MS) system, which is fast and cheap and effectively identifies the species.<sup>9</sup>

This case adds to the growing importance of *C. striatum* as a pathogen, although some laboratories continue to have difficulty with correct identification. With the introduction of new technologies such as MALDI-TOF MS, it will become easier to diagnose infections with this microorganism.

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## Skin lesion and lymphangitis in an immunocompetent patient<sup>☆</sup>



### Lesión cutánea y linfangitis en paciente inmunocompetente

This was a 42-year-old patient with no relevant medical history who came to the hospital with a skin lesion on the left leg and feeling shivery. He reported the appearance, two months earlier, of a non-pruritic, scaly erythematous plaque on his left knee. On examination, an infected rounded plaque with desquamating borders was found on the lateral aspect of the left knee with several abscessed points, as well as signs of cellulitis and lymphangitis in the thigh (Fig. 1). Several hard, mobile and painful enlarged lymph nodes were found in the left inguinal region. The patient lived in the country in contact with cows, goats and horses, and reported falling off a horse onto brambles. After prescribing IV treatment with amoxicillin-clavulanic acid, the patient was admitted to the



Fig. 1. Infected left knee lesion with desquamating borders.

infectious diseases unit with a differential diagnosis of mycobacterial infection vs nocardiosis. A biopsy of the lesion was taken for histological and microbiological study. A small desquamative erythematous lesion was also found in the right pretibial area, but without signs of infection. The patient was discharged 48 h after admission with amoxicillin-clavulanic acid and cotrimoxazole.

### Outcome

After 7–10 days of incubation, the pure growth of a filamentous fungus forming creamy cerebriform colonies was observed in the cultures of exudate, abscess and biopsy from the patient's knee lesion in chocolate agar medium and blood agar at 37 °C (Fig. 2). The antibiotic treatment was therefore discontinued and treatment with oral terbinafine was prescribed. Days later, growth was observed in Sabouraud medium with chloramphenicol and gentamicin at 30 °C. Microscopic examination showed hyphae with chandelier appearance, absence of macroconidia and microconidia, and the presence of long chains of compacted chlamydoconidia suggestive of *Trichophyton verrucosum* (Fig. 3). The histological study showed an inflammatory process in the dermis with follicular destruction and presence of PAS-positive rounded structures, compatible with Majocchi granuloma. After six weeks of treatment, the lesion on the right tibia progressed to cellulitis with small pustular lesions and signs of lymphangitis. In the culture of one of the lesions, *T. verrucosum* was isolated again, with identification confirmed by the sequencing of the ITS region of the rRNA. Finally, after 12 weeks of treatment with terbinafine 250 mg/d, the lesions had



Fig. 2. Cerebriform colonies of *T. verrucosum* in chocolate agar after 10 days of incubation at 37 °C.

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