Multidrug-Resistant *Acinetobacter baumannii*
Infection Following Para-Articular Steroid Injection in the Knee
A Case Report

Stefano Artiaco, M.D., Ph.D., Giuseppe Cicero, M.D., Franco Bellomo, M.D., and Pasquale Bianchi, M.D.

Abstract

*Acinetobacter baumannii* is an emerging gram-negative nosocomial pathogen that rarely causes infections in orthopaedic patients. We report a case of imipenem-resistant *Acinetobacter baumannii* para-articular infection of the knee occurring in a healthy patient following one ambulatory steroid injection for the treatment of quadriceps tendinopathy. The infection was reduced by early surgical debridement of infected tissues, abscess drainage, and prolonged antibiotic therapy with colistin. To our knowledge, this is the first case in the literature reporting such an infection following single steroid injection in orthopaedic patients.

*Acinetobacter baumannii* is an emerging gram-negative nosocomial pathogen responsible for an increasing number of infections, especially among intensive-care-unit patients.1,3 This pathogen may be part of common skin flora; however, *Acinetobacter baumannii* is rarely seen on normal human skin except in a nosocomial environment. During the past decade, *Acinetobacter baumannii* was rarely observed in joint infections,4,5 but this pathogen began to gain some notoriety when it was recognized in many cases of wound contamination and osteomyelitis occurring in soldiers involved in military operations.6,7 Most strains of *Acinetobacter baumannii* appeared initially sensitive to carbapenems, but the use of these antibiotics in the healthcare environment lead to a progressive antibiotic resistance due to carbapenem-hydrolyzing beta-lactamases. In clinical practice, this resistance may constitute a challenge because *Acinetobacter baumannii* multidrug-resistant infections have a worse prognostic course and are associated with a higher rate of complications.8

We report a case of imipenem-resistant *Acinetobacter baumannii* para-articular infection of the knee observed in a patient who received in a non-nosocomial environment one steroid injection for the treatment of quadriceps tendinopathy. To our knowledge, this is the first case in the literature reporting such kind of infection following single tendon injection.

Case Report

In March 2010, a 72-year-old Caucasian woman was referred to the Bone and Joint Infection Unit of our orthopaedic department for a suspected para-articular infection of the right knee. The patient was immune-competent, and her medical history was unremarkable. There was no history of musculoskeletal infections, local trauma, or previous knee disorder. Before the injection, the patient was presenting with a short-lasting patellar pain resistant to anti-inflammatory drugs, attributed to quadriceps tendinopathy. Symptoms occurred two weeks after the patient underwent an ambulatory procedure for a steroid injection performed in a local outpatient clinic at the superior pole of the patella, near to the site of insertion of the quadriceps tendon. The patient reported only minimal antiseptic skin cleaning performed before the injection. Clinical examination in our department revealed hyperthermia, local pain, swelling, and redness above the right knee. The range of joint motion was slightly limited, and there was no knee joint effusion. Laboratory tests showed increased levels of white blood count, erthocyte...
sedimentation rate, and C-reactive protein. Indium labeled leukocyte scintigraphy confirmed the septic process, and Magnetic Resonance Imaging (MRI) localized the lesion in the deep subcutaneous tissue adjacent to the quadriceps tendon and knee joint capsule (Fig. 1).

No initial antibiotherapy was administered since early surgical intervention was scheduled. The operative procedure allowed draining the para-articular fluid abscess detected at the MRI and a local debridement of the subcutaneous tissues and outer surface of the quadriceps tendon. The sample of septic fluid punctured for microbiological cultures showed the growth of *Acinetobacter baumannii* multidrug-resistant strains non susceptible to imipenem. Such microbiological results induced the initiation of a specific antibiotic therapy with daily doses of colistin 800 mg, prolonged for 30 days.\(^9\) The surgical site healed regularly within 3 weeks, and after surgical debridement and antibiotic therapy, the symptoms resolved rapidly. During the postoperative period, the patient experienced no further symptoms at the right knee and returned to normal daily life activities. Periodical reviews scheduled up to 1 year after surgical debridement did not show clinical signs or laboratory evidence of persistent infection.

**Discussion**

Infection after local corticosteroid injection is an uncommon complication. In a large French study, the risk of sepsis after the procedure was estimated to be 1 in 21,000 cases with the use of a non-sterile-packaging drug and 1 in 162,000 cases with a sterile-packaging injection.\(^{10}\) The literature provides poor information regarding the exact procedure that should be followed to prevent septic arthritis after steroid injection of the knee, and in clinical practice numerous, precautions are commonly taken. A survey demonstrated the safety of sterile or complete aseptic techniques, but it often happens that no gloves, sterile towels, or new needles are used before the injection.\(^{11}\)

In the present case, a patient who did not suffer from any immune disorder experienced a para-articular *Acinetobacter baumannii* imipenem-resistant infection of the knee after a single local steroid injection performed with a non complete aseptic technique.\(^{12}\) To our knowledge, only one infection of the knee joint due to *Acinetobacter baumannii* has been described to date in the literature, but this case involved a patient with gout and a long history of alcohol consumption and self administration of acupuncture for relief knee pain.

The clinical history of our patient demonstrated that prompt surgical debridement and appropriate prolonged antibiotic therapy may heal local sepsis induced by *Acinetobacter baumannii*. Adequate aseptic technique should be always used before tendon and joint injection.

**Disclosure Statement**

None of the authors have a financial or proprietary interest in the subject matter or materials discussed, including, but not limited to, employment, consultancies, stock ownership,
References