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Case Report

Propionibacterium acnes as a cause of shoulder osteoarthritis after three shoulder arthroscopies: a case report and review of preventive action

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ABSTRACT

We report a case of postoperative osteoarthritis infection caused by *P. acnes* after shoulder arthroscopy, and review possible preventive action. A right-handed 24-year-old man presented an anterior instability of the left shoulder. The patient underwent an anterior stabilization by the latarjet procedure. Stabilization failed, requiring a second and third surgery. The patient returned 10 months later for suspected septic arthritis of his left shoulder. An arthroscopy lavage with bacteriological and anatomo-pathological sampling was carried out. The bacteriological results revealed a positive *P. acnes* culture. The patient was treated using antibiotherapy for 12 weeks with a combination of clindamicin and moxifloxacin. C-reactive protein (CRP) was negative two months after the onset of antibiotherapy. *P. acnes* is a anaerobic, non-sporulated, gram-positive bacillus. This commensal germ is part of the normal cutaneous flora and causes acne, but has also been recognized as a causative pathogen in osteoarticular infections since the 1990s, as described by Coden**.** Treatment is achieved via surgical debridement and intravenous antibiotics. We insist on preventive action in the form of a preoperative patient preparation protocol. Previous literature has underlined the important role of chlorhexidine or alcoholic iodinated polyvidone in the prevention of these infections. As *P. acnes* is a commensal germ of the patient's skin, prophylaxis should be reinforced by the thorough preparation of the surgery and surgical site. Clindamycin antibioprophylaxy specific to this germ should be administered for this surgery. To my knowledge, there is no specific antibioprophylaxy for shoulder surgery to date.

Keywords: *Proprionibacterium acnes*, Arthroscopy, Shoulder, Osteoarthritis, Togo

INTRODUCTION

Although *Propionibacterium acnes* (*P. acnes*) is commonly found on human skin, it is an uncommon pathogen in postoperative infections of the shoulder after arthroscopy. The clinical symptoms may resemble those observed after uneventful arthroscopic surgery, raising diagnostic challenges.[1] The clinical presentation is usually insidious and nonspecific, yet a *P. acnes* infection could be an occult cause of postoperative shoulder pain.[2] The presence of this organism can be overlooked because its discreet appearance may not seem worthy of diagnosis by culture or because, in contrast to many orthopaedic infections, multiple tissue samples and weeks of incubation are often necessary to recover this organism.[3] We report a case of postoperative osteoarthritis infection caused by *P. acnes* after shoulder arthroscopy, and review possible preventive action.

CASE REPORT

A right-handed 24 year old man presented at the orthopaedic service for an anterior instability of the left shoulder. An injected arthroscanner revealed a lesion of

the anterior inferior labrum and a Hill-Sachs/Malgaine lesion on the humeral slope as shown in Figure 1. The patient underwent an anterior stabilization of the left shoulder by anteglenoid stop in October 2009 as shown in Figure 2. After renewed instability caused by a fall, examination by arthroscanner revealed the failure of the abutment through pulling as given in Figure 3. A second arthroscopic stabilization was performed in June 2010, with reattachment of the labrum. The patient's condition had remained unstable, requiring a third procedure for iliac abutment as seen in Figure 4. The patient's condition remained stable during postoperative recovery, although he continued to experience pain, and the shoulder was stiff. The patient returned 10 months later for suspected septic arthritis of his left shoulder. No fever or discharge had been experienced since the previous operation. An arthroscopic lavage with bacteriological and anatomo-pathological sampling was carried out in November 2011. The bacteriological results revealed a positive culture with *P. acnes* (4 out of 6 deep samplings). The patient was treated using antibiotherapy for 12 weeks with a combination of clindamicin and moxifloxacin. C-reactive protein (CRP) was negative two months after the onset of antibiotherapy.

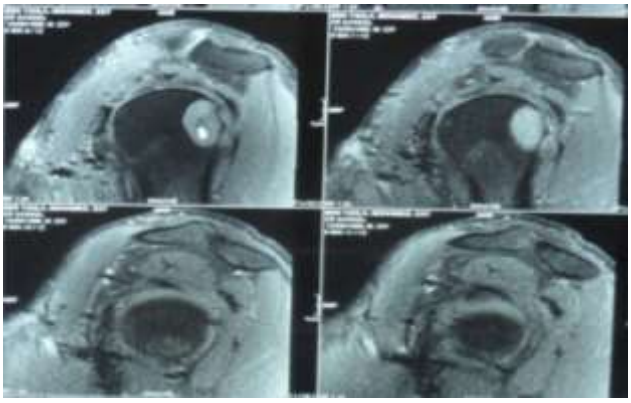

Figure 1: Arthroscanner showing bone and labral ligament lesions.

Figure 2: Anteglenoid stop.

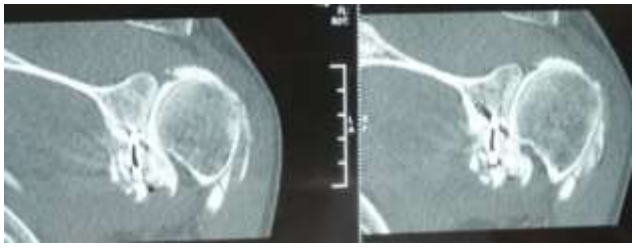

Figure 3: Arthroscanner after failure of the Latarjet procedure.

Figure 4: Iliac stop

DISCUSSION

The germ *P. acnes* is a anaerobic, non-sporulated, gram-positive bacillus. This commensal germ is part of the normal cutaneous flora and causes acne.[4,5] It is primarily known as a skin commensal. However, it can present as an opportunistic pathogen that causes invasive infections such as implant-associated infections via bacterial seeding.[6] *P. acnes* is primarily known as a contaminant, but has also been recognized as a causative pathogen in osteo-articular infections since the 1990s, as described by Coden.[7] This germ is more commonly found on the upper limbs due to the proximity to the armpit and the pilosity of the thorax, particularly in males. As a result, it is found to be responsible for five times more infections in men than in women.[8,9] The rate of skin colonization with P. acnes is high at arthroscopic portals, especially in men.[10] *P. acnes* is found to be the second germ responsible for infections of the prosthesis of the shoulder after staphylococcus aureus, and has been described in shoulder trauma, open rotator cuff repairs, shoulder instability surgery and shoulder arthroscopy.[11-16]

Clinical and paraclinical signs

The signs that should alert the surgeon are a discharge, wound dehiscence or a local erythema. In practice, the surgeon should note a shoulder that does not improve immediately or from 3 to 56 weeks after surgery.[17] In our

observation, the patient had not been well from the time of iliac abutment surgery, just after the second arthroscopic stabilization in June 2010, until the infection was diagnosed 4 months later. In the interval between performing arthroscopy and the diagnosis, the shoulder can become painful and unstable. This was the case of our patient. It is important that the diagnosis is made as soon as possible. Blood count, sedimentation rate and C-reactive protein (CRP) are barely modified or unchanged. Bacterial cultures should be monitored for a minimum of 7-14 days when P. acnes is suspected to be the cause of infection through slow growth. Samples should be retained by the laboratory for three weeks in case of suspicion.[2,14,18,19]

Treatment

Treatment is achieved via surgical debridement and intravenous antibiotics.[1] Debridement must be carried out early in the case of acute infection, and early diagnosis is essential. In the case of late diagnosis, debridement and the removal of material are performed at the same time in the case of late diagnosis, but can be carried out in two stages in the case of sepsis on arthroplasty. *P. acnes* is naturally resistant to Metronidazole but generally sensitive to penicillin and clindamycin. Intravenous antibiotic therapy should start rapidly, followed by 4 – 6 weeks of oral treatment. Clindamycin may be used in prophylactic antibiotherapy. An osteo-articular infection always has a negative influence on the outcome of surgery. Functional abilities are often decreased following treatment.

Prevention

We insist on preventive action in the form of a preoperative patient preparation protocol. Previous literature has underlined the important role of chlorhexidine or alcoholic iodinated polyvidone in the prevention of these infections.[20,21] Slow intravenous administration of antibioprophylaxis with cefazolin 2 g, as recommended by the French Society of Anesthesia and Reanimation, has a low success rate for controlling *P. acnes*.[22] Despite standard skin preparation and prophylactic antibiotics, the rate of deep tissue inoculation with P. acnes in shoulder arthroscopy is much higher than the rate of infection reported in the literature.[10,23] Some authors advocate the association of cefazolin and clindamycin, which is specific to P. acnes. The use of iodine-coated protective film (IOBAN®) is relatively efficient.[24]

CONCLUSION

As *P. acnes* is a commensal germ of the patient's skin, prophylaxis should be reinforced by the thorough preparation of the surgery and surgical site. Clindamycin antibioprophylaxy specific to this germ should be adminstered for this surgery. To my knowledge, there is no specific antibioprophylaxy for shoulder surgery to date. Early diagnosis and management are essential, with immediate treatment combining surgery and antibiotic therapy. Patient information and the training of personnel in quality care procedures should be used to reduce the risk of acute infection in shoulder surgery.

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