CASE REPOSITORY

Propionibacterium Acnes Infection of a Metacarpophalangeal Joint Arthroplasty

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Neglected and underestimated in the past, *Propionibacterium acnes* is currently the most prevalent organism associated with deep prosthetic infections around the shoulder. Surprisingly, it has never been reported as a cause of infection in the hand. Here we report a case of a late presentation of a *P. acnes* infection in a metacarpophalangeal joint replacement, resulting in chronic low-grade pain with movement. The patient underwent a 2-stage revision, with initial removal of the prosthesis. Positive cultures for *P. acnes* required 15 days of extended incubation. The patient subsequently had 6 weeks of oral antibiotics followed by a second-stage revision with a Silastic implant. *(J Hand Surg Am. 2017;■(■):1.e1-e6.*

Key words *Propionibacterium acnes*, infection, arthroplasty, metacarpophalangeal joint, revision.

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PROPIONIBACTERIUM ACNES IS A gram-positive, non–spore-forming, anaerobic and aerotolerant bacillus that resides preferentially within sebaceous follicles of the face, upper thorax, and axilla.[1,2] Although it has been commonly recognized as a skin commensal bacteria, more recent studies within the shoulder literature, have reported that *Propionibacterium acnes* is the most prevalent pathogen involved in postoperative prosthetic shoulder infections, often associated with a high morbidity.[3,4] *Propionibacterium acnes* is a fastidious slow-growing organism that is often difficult to detect and associated with insidious and nonspecific clinical presentations.[5] Microbiological detection of *P. acnes* requires incubation for at least 13 days, in anaerobic and aerobic culture conditions.[1,6]

Infections around the hand usually involve fast-growing gram-positive cocci bacteria such as *Staphylococcus aureus* or *Streptococcus* sp.[7] Consequently, in the setting of postoperative hand infections, especially prosthetic infections, routine bacterial cultures of tissues and fluids are usually discarded after 5 days of incubation by most microbiological laboratories.[2]

Here we describe a rare case of an insidious metacarpophalangeal (MCP) joint periprosthetic infection due to *P. acnes*. In this report, we aim to raise awareness among hand surgeons about potential *P. acnes* infections following surgery around the hand.

CASE REPORT

A 69-year-old right-handed retired man was referred to G.P.'s institution for evaluation of persistent low-grade pain, swelling, and stiffness of his middle finger MCP joint. He had previously had a cemented unconstrained metal on polyethylene MCP arthroplasty (SR MCP, Small Bone Innovations, Inc., Morrisville, PA) for primary osteoarthritis performed

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The investigation was performed at the Melbourne Orthopaedic Group and Department of Orthopaedics, Dandenong Hospital, Monash University, Australia.

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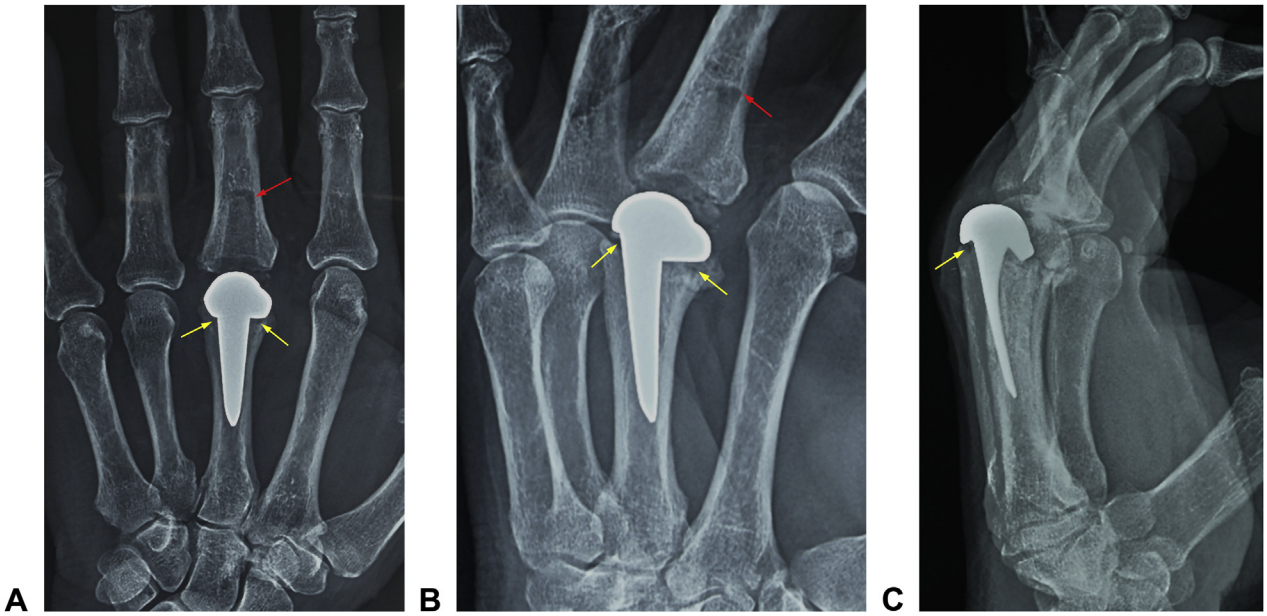

FIGURE 1: Plain radiographs demonstrate a third MCP prosthesis with discrete periprosthetic radiolucency. **A** Posteroanterior, **B** oblique, and **C** lateral views show osteolysis located between the head-neck junction of the metacarpal component and the bone (yellow arrows). **A**, **B**, Bone erosion is seen around the volar-radial cortex of the phalanx (red arrows).

3 years earlier at an outside institution. His only significant past medical history included type 2 diabetes for which he was taking metformin.

Despite a seemingly uneventful recovery from the index surgery, the patient never experienced complete symptomatic relief and stated that the swelling around the MCP joint never completely resolved. He also reported recurrent swelling with use of the finger and activity-related pain. Clinical examination demonstrated a well-healed surgical scar over the dorsal aspect of the MCP joint of the middle finger. The skin was not erythematous and there were no signs of an acute infection. The MCP joint was mildly swollen and his range of motion was 10° to 45° with moderate irritability at the end ranges. He had normal proximal and distal interphalangeal joint motion.

X-Rays of the middle finger demonstrated periprosthetic loosening of the metacarpal component, particularly around the head-neck junction (Fig. 1). The phalangeal component appeared to be well-fixed, but there was suggestion of slight erosion of the radiopalmar cortex of the proximal phalanx. Given the likelihood of either aseptic loosening or low-grade periprosthetic infection, a bone scintigraphy using single-photon emission computed tomography scan was performed. This investigation combines a technetium-99m–labelled methylene diphosphonate bone scan with a computed tomography scan for bony localization. On dynamic-flow images, the bone scan showed increased vascularity with focal hyperemia surrounding the proximal and distal aspect of the MCP joint prosthesis corresponding to an increased osteoblastic activity displayed on the delayed images (Fig. 2). Inflammatory markers were performed; however, these did not demonstrate any increase in white cell count, C-reactive protein or erythrocyte sedimentation rate.

Given the clinical history and the imaging findings, in particular the increased osteoblastic activity surrounding the joint replacement, a low-grade deep periprosthetic infection was considered the most likely cause of the ongoing symptoms. Consequently, the patient underwent a 2-stage revision of this MCP joint replacement. During the first-stage procedure, when entering the MCP joint, the surrounding tissue and the joint capsule appeared indurated and oedematous. However, no evidence of pus was noted. Multiple swabs and tissue specimens were obtained for microbiological analysis. The prosthesis was then removed. The metacarpal component was explanted without much effort; however, the phalangeal component, which was well-fixed, required the use of flexible osteotomes to mobilize the prosthesis. The surrounding cement mantle was also removed with the use of osteotomes. Of note, when the metacarpal component was removed, note was made of a thin film that lined the intramedullary canal. This was curetted and also sent for microbiological analysis. Special note was made to have the period of cultures