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CASE REPORT

Drug eruption secondary to vancomycin-laden spacer in the shoulder: a case report

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Prosthetic joint infections (PJIs) after shoulder arthroplasty range from 0.98% to 5%, most commonly due to *Staphylococcus aureus*, coagulase-negative staphylococcus, and *Propionibacterium acnes*.[4,7,18,23,29,30] Treatment options include débridement and intravenous (IV) antibiotics, single-stage revision, resection arthroplasty, and 2-stage revision.[28] Two-stage revisions, involving prosthesis explantation, thorough débridement, and implantation of an antibiotic-impregnated cement spacer with a course of IV antibiotics followed by a revision arthroplasty, have become a standard treatment in PJIs.[5,28] Antibiotic-impregnated cement spacers containing aminoglycosides or vancomycin are commonly used with a success rate of >90%.[5,10,18]

Whereas the use of antibiotic spacers is generally considered safe, there have been previous reports of a diffuse desquamating rash from vancomycin-laden cement and 2 cases of hypersensitivity syndrome/drug reaction with eosinophilia and systemic symptoms (HSS/DRESS) after concurrent use of systemic vancomycin and vancomycin-laden bone cement in the hip and knee.[5,9,31,33] We report the first case of a drug eruption caused by parenteral vancomycin in combination with a vancomycin-impregnated spacer inserted for a shoulder PJI.

Case report

The patient is a 69-year-old, 78-kg man with a previous known allergy to angiotensin-converting enzyme inhibitors. The patient had a primary diagnosis of rotator cuff arthropathy with significant limitation in forward flexion and radiographic findings consistent with a massive irreparable rotator cuff tear and superior humeral head migration. He underwent a right reverse total shoulder arthroplasty in December 2012 at an outside hospital. In November 2014, the patient underwent a revision surgery secondary to loose hardware and a broken baseplate screw. No culture specimens were taken at the time of the revision surgery despite the lack of baseplate osseous integration.

The patient continued to have significant pain and was subsequently identified to have a *P. acnes* infection on aspiration in the early postoperative course. As a result, the patient underwent an initial irrigation and débridement with retention of implants and was prescribed a 60-day course of doxycycline. Six weeks later, the patient was noted to have significant wound site drainage (Fig. 1). He was given a peripherally inserted central catheter line, through which he received multiple infusions of vancomycin 1000 mg during the course of 2 weeks without any adverse reactions. When that failed to eradicate the PJI, he underwent explantation of the prosthesis with

This is a case report and needs no Institutional Review Board/Ethical Committee approval. The patient gave informed consent and permission for this publication.

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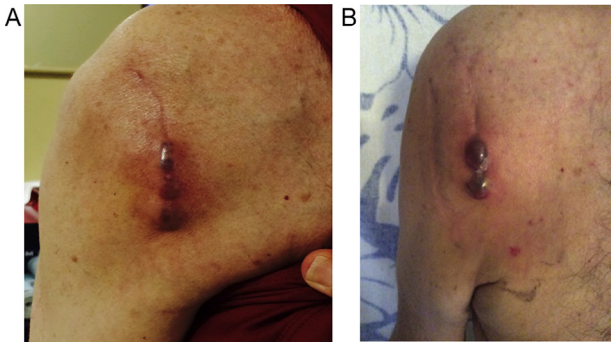

Figure 1 (**A** and **B**) Right shoulder surgical site.

placement of a vancomycin-impregnated bone cement spacer at the same outside hospital. He also received vancomycin 1250 mg every 12 hours starting on postoperative day 1. On postoperative day 4, he noticed swelling of his right arm, forearm, and hand (Fig. 2). During the next 48 hours, he developed an erythematous, pruritic, maculopapular rash that spread to his entire torso and extremities. In this initial phase, he remained afebrile. A week later during a follow-up visit, the vancomycin was switched to clindamycin. Within several hours, he noticed early signs of angioedema with swelling of his lips along with dysphagia and dyspnea. His symptoms improved once clindamycin was discontinued.

Three days later, the patient presented to the treating hospital's emergency department and was admitted to the intensive care unit with a temperature of 38.4°C and an erythematous rash with macules and papules that coalesced into plaques, predominantly seen on the upper extremities, trunk, and lower left extremity (Fig. 3). His surgical shoulder incision had linear pustules but no secretions or active drainage. In addition, edema of his cheek, lips, and neck with desquamation of his oral mucosa was appreciated. Initial laboratory tests showed no detectable vancomycin levels. Leukocytosis with neutrophilia was present, but eosinophil levels were not significant. Aspartate transaminase and alanine transaminase were twice the upper limit. A skin biopsy specimen was obtained of the lesion and revealed a dermal-epidermal junctional inflammatory infiltrate with a superficial perivascular infiltrate with eosinophils. In addition, focally necrotic keratinocytes were noted along with areas of pigment incontinence within the dermis, consistent with drug eruption (Fig. 4). Anaerobic, fungal, urine, and blood cultures were negative.

Figure 2 Edema of right hand.

The patient was taken to the operating room, where his vancomycin spacer was removed and a gentamicin spacer was implanted. Subsequently, he was treated with systemic steroids as well as topical steroids with gradual resolution of his rash and normalization of laboratory values. Throughout the sequence of events, his other medications did not change, and he reported no previous or subsequent issues with them. The patient was discharged a week later in stable condition with a steroid taper and IV antibiotics. He completed 6 weeks of IV antibiotic therapy and ultimately completed an additional 6 weeks of amoxicillin without any issues.

At his most recent orthopedic follow-up, the patient had improved forward flexion to 90° and was able to demonstrate good internal and external rotation strength. His wound was noted to have no signs of drainage or erythema, and he had no complaints of systemic issues including fevers or chills. The patient had minimal discomfort and declined additional discussion about removal of the antibiotic spacer with implantation of a reverse total shoulder replacement.

Discussion

Shoulder arthroplasty has seen an increase in popularity in the past decade and is projected to grow faster than total hip and knee arthroplasties.[6,16] Whereas infection rates remain low, the increasing number of shoulder arthroplasties performed points to the importance of appropriate medical and surgical management of infections when they do occur.

P. acnes is a gram-positive anaerobic bacillus that is found in the sebaceous glands, commonly around the shoulder and axilla, and is responsible for up to 59% of PJIs after shoulder arthroplasty.[12,21] There is a higher incidence of *P. acnes* infections in men, possibly because of increased hair and perspiration in men.[21] *P. acnes* is susceptible to a broad range of antibiotics, including beta-lactams, clindamycin, quinolones, and rifampin, although there is increasing resistance to clindamycin.[1] Treatment requires both surgery and antibiotics to successfully eliminate the bacteria.[1]

Antibiotic-impregnated bone cement spacers are considered part of the standard treatment for patients with chronic PJI.[5,10] These spacers allow a high concentration of local antibiotics at the infected site and have a success rate of >90%.[18] In vitro and in vivo studies have shown the elution of antibiotics from bone cement spacers to occur in 2 phases: a rapid initial release, followed by a slower, more sustained release during the course of days and weeks.[2,17,19,25] Many other factors influence antibiotic elution, including dose and type of antibiotic used, type and composition of cement