Glenohumeral Joint Sepsis After Magnetic Resonance Imaging Arthrogram

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Abstract

A 65-year-old patient presented with right shoulder pain that had increased in severity over the preceding 2 days. The pain began after the patient had a gadolinium arthrogram for magnetic resonance imaging for rotator cuff evaluation. Examination and laboratory test findings were consistent with a septic glenohumeral joint and emergent arthroscopic irrigation and debridement were performed. *Streptococcus sanguinis* was isolated from the intraoperative culture, and the infection resolved after a course of antibiotics.

Glenohumeral joint sepsis is a relatively rare complication of intra-articular injections.[1-3] Comorbidities were common in patients with shoulder sepsis.[2,4,5] The most common pathogen from bacterial sepsis of the shoulder is *Staphylococcus aureus*.[4-6]

Sensitivity and specificity for rotator cuff and labral pathology are higher for magnetic resonance imaging (MRI) with arthrogram of the shoulder than for MRI without arthrogram.[6-8] The literature does not include any case reports of shoulder sepsis after gadolinium arthrograms. In a series of 1085 patients (62.2% shoulders) prospectively followed for 1 week for pain ratings after intra-articular arthrograms, there were no infections.[9]

To my knowledge, this case report is the first to detail the clinical course of a patient with sepsis of the native shoulder after MRI with gadolinium arthrogram was performed by an interventional radiologist for rotator cuff evaluation. The patient provided written informed consent for print and electronic publication of this case report.

Case Report

A 65-year-old woman injured her right shoulder while catching a falling friend. Although her pain improved since the injury, she continued to have pain with activities and night pain. Before seeking orthopedic consultation, she underwent physical therapy with little improvement. On examination, she had full active range of motion in flexion and abduction. She had a positive impingement sign, a positive Hawkins sign, 15° external rotation lag, 4/5 strength for forward flexion and external rotation, and a positive bear hug test.

After an MRI with arthrogram from an anterior approach, the patient developed mild pain that worsened over 2 days. The pain then became so severe she could not move her shoulder without pain. Acetaminophen/hydrocodone (Vicodin) offered no relief.

When the patient called my office for a stronger pain reliever, she was asked to come immediately to the emergency department. On evaluation, she had only 10° of active or passive abduction and forward flexion of the right shoulder. She had diffuse tenderness about the right shoulder. There was no erythema or drainage from the anterior injection site. Laboratory values included a C-reactive protein (CRP) level of 72.

After the patient was placed in the lateral decubitus position with 4.5 kg of traction in the standard fashion, a posterior portal was made. The arthroscope sheath was introduced into the subacromial space. A syringe was attached to the side port and no fluid was aspirated. The arthroscope sheath was next introduced into the glenohumeral joint, and 20 mL of foul-smelling, dark fluid was aspirated. The arthroscope was then introduced and joint irrigation (6 L) was performed. Diffuse synovitis was found. After synovectomy, irrigation (7 L) and subacromial bursectomy were performed, a drain was placed through the anterior portal.

The intraoperative cell count from the joint aspirate showed a white blood cell count of 129,500 with 92% polymorphonuclear leukocytes and no crystals. The intraoperative cultures grew *Streptococcus sanguinis,* a common oral bacterial flora.

The interventional radiologist, who performed the arthrogram, accessed the joint through an anterior approach under sterile technique on the first attempt. No difficulties were encountered during the procedure.

After a 2-week course of ceftriaxone, as recommended by the consulting infectious disease specialist, the patient's shoulder stiffness slowly improved with physical therapy. CRP was normal 3 weeks after surgery. The shoulder pain also progressively lessened. By the time of her last office appointment, 5 months after surgery, the patient had no restrictions in activities

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Am J Orthop. 2012;41(6):277-278.

and had range of motion, including active abduction and shoulder flexion, to 160°. Internal rotation was decreased at L1. The patient had only occasional pains in the shoulder with lifting.

Discussion

Glenohumeral joint sepsis is rare and associated with comorbidities. Eighty-seven percent of a series of 23 patients had at least 1 "serious systemic illness."[4] Furthermore, 52% had a different primary site of infection.[4] In a series of 52 upper extremity infections, 17 involving the shoulder, 54% of patients had comorbidities.[5] In a series of 19 patients treated for glenohumeral joint sepsis by arthroscopy, 13 had an underlying medical disease, in 6 cases, diabetes.[2]

According to an extensive review of the literature published between 1966 and 2006, infection was the most common complication of musculoskeletal injections.[10] A patient described in a case report developed necrotizing fasciitis after an intra-articular shoulder steroid injection and decompensated 2 days later.[1] In another case report, a patient developed a septic shoulder with *Clostridia* species and *Escherichia coli*.[3] The patient had multiple medical issues, including diabetes and liver failure.[3] In the series of 19 patients treated arthroscopically for shoulder sepsis, 15 had "needles placed in the shoulder" before the infection.[2]

Although glenohumeral joint sepsis is clearly correlated with injections before onset, to my knowledge, the literature does not include any case reports of glenohumeral joint sepsis after shoulder arthrogram for MRI. In a series of 1085 joint arthrograms (62.2% shoulder), no patients developed infections.[9]

Pain after glenohumeral arthrogram was thoroughly studied by Saupe and colleagues.[9] In their series of 1085 patients (62.2% shoulders), postarthrogram pain was tracked by visual analog scale relative to prearthrogram pain immediately, 4 hours, 1 day, and 1 week after. The authors found that patients returned to baseline pain by 1 week, that younger patients had more pain at all time points, and that mild pain peaked at 4 hours. Pain did not correlate with sex, joint type, injection volume, or radiologist experience.[9]

The ordering physician and the interventional radiologist should counsel patients as to the discomfort to be expected after a gadolinium MRI arthrogram of the shoulder and as to the signs of a septic shoulder. Expedient recognition of infection and subsequent intervention can allow for a good clinical outcome. An interventional radiology procedure like the arthrogram is unique in that the radiologist will have no follow-up with the patient. Furthermore, the patient can experience a delay in following up with the physician who ordered the MRI arthrogram for evaluation. Medical comorbidities are associated with shoulder sepsis, and the index of suspicion should be higher for patients with comorbidities. To my knowledge, this is the first report of shoulder sepsis from *S sanguinis*.

Author's Disclosure Statement

The author reports no actual or potential conflict of interest in relation to this article.

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