Septic Arthritis of the Shoulder in a Dental Patient

A Case Report and Review

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ABSTRACT

Septic arthritis of the glenohumoral joint is rare following dental procedures, comprising approximately 3% of all joint infections. Septic arthritis following bacteremia from dental procedures is uncommon and generally occurs in prosthetic joints. Predisposing causes may include immunocompromising diseases such as diabetes, HIV infection, renal failure and intravenous drug abuse. We report a rare case of unilateral glenohumoral joint septic arthritis in a 60-year-old male patient (without a prosthetic joint) secondary to a dental procedure. The insidious nature of the presentation is highlighted.

Septic arthritis infections, though rare, require a high level of clinical suspicion. Vague symptoms of shoulder pain may mask the initial diagnosis, as was the case in our patient. Incision and drainage via surgical intervention are often required, followed by parenteral antibiotics.

Pneumococcal septic arthritis, or acute pyogenic arthritis, is diagnosed when *Streptococcus pneumoniae* is isolated from the synovial fluid or purulent joint fluid.[1] An imaging study showing sacroiliitis—inflammation of one or both of the sacroiliac joints which connect the lower spine and pelvis—or a Gram staining showing the presence of the bacteria is necessary to confirm this diagnosis.[2] In some cases there may be a high sensitivity of elevated polymorphonuclear leukocytes in the joint fluid. Elevation of erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) has also been documented, but both are considered nonspecific indicators of the infection.[3]

Most cases of septic arthritis occur in the weight-bearing joints of the lower extremities, with involvement of the glenohumeral joint occurring in only 3% of patients.[2] However, it has been reported to have occurred in as many as 12% of cases, which would place it as the third most common site following the knees and hips.[4]

Septic arthritis following bacteremia from dental procedures is uncommon and generally occurs in patients with prosthetic joints.[5-8] It is documented that septic arthritis is 15-times more common in prosthetic joints than in native joints.[9] Previous reports have shown that septic arthritis in a normal joint following a dental procedure has occurred in both the hand and knee.[5,7,8]

This report describes a case of septic arthritis of the shoulder in a patient following a dental procedure. It is important to be aware of this potential complication and to be able to advise the patient on how to receive the proper care.

Case Report

A 60-year-old male presented to New York University College of Dentistry for dental treatment. His last dental exam was 15 years prior. The patient denied any history of dental infections. Periodontal probing was performed, and appropriate radiographs were taken as part of the comprehensive examination. The patient was diagnosed with generalized severe chronic periodontitis.

The patient's past medical history consisted of prior tobacco use (1ppd for 6 years) and a history of a duodenal ulcer 15 years ago. The patient indicated that he drank rarely.

Two days after the periodontal examination, the patient presented for a full-mouth debridement. At this appointment, the patient said he had discomfort in his left shoulder. One of the first signs of septic arthritis is an inability to use a limb. He said he thought he had torn a ligament in his left shoulder. The evening after the full-mouth debridement, the patient reportedly developed severe sweats.

Two days later, the patient presented to a hospital emergency department with pain and heat emanating from his left shoulder. Radiographs were taken and read as negative, and he was prescribed hydrocodone/acetaminophen for pain relief. He had no relief from the narcotic analgesic and presented to an emergency department at a nearby hospital two days later with the chief complaint of "I have sharp throbbing pain down to the bone" on his left shoulder. At that time, the patient said he had developed a fever four days ago, which coincided with an increase in the pain level in his left shoulder.

Examination revealed a decreased range of motion; and the shoulder was tender to palpation. He had a body temperature of 38.8 degrees C (101.8 degrees F). A computed tomography (CT) scan was taken that revealed myositis and a septic joint (Figure 1). Blood lab results showed an elevated sedimentation rate of 107 (reference range 0-20 mm/hr), an elevated white blood cell count of 12.7 K/uL (reference range 3.4- 11.2 K/uL) and an elevated CRP of 42.85 mg/dL (reference range <1.00 mg/dL). Additionally, the examination revealed a heart murmur. The patient's blood glucose was elevated, ranging from 152 mg/dL to 178 mg/dL (reference range 74-118mg/dL), and HgbA1c was 6.7%. The remainder of the examination was normal, with no evidence of other infectious sources.

Aspiration of the joint with a large needle revealed frank pus. The presence of pus in the joint, in addition to the patient being febrile and having limited and painful range of motion, were indications for an arthroscopic incision and drainage procedure. The final diagnosis given was uncomplicated Type 2 diabetes, a new heart murmur and a septic left shoulder joint.

Results of the arthroscopic surgery revealed Grade II changes involving about 40% of the humeral head and isolated Grade III changes involving 10% of the humeral head. Extensive synovitis in the rotator interval and fraying on the undersurface of the rotator cuff were observed. The anterior labrum had frayed as well. The surgeons established an anterior rotator into a portal, through which bacterial cultures were taken. Cultures were also taken through the posterior portal. It was noted that there was suppuration via the trocar before the arthroscopy was performed in the rotator interval. A culture was taken and all scar and syno-

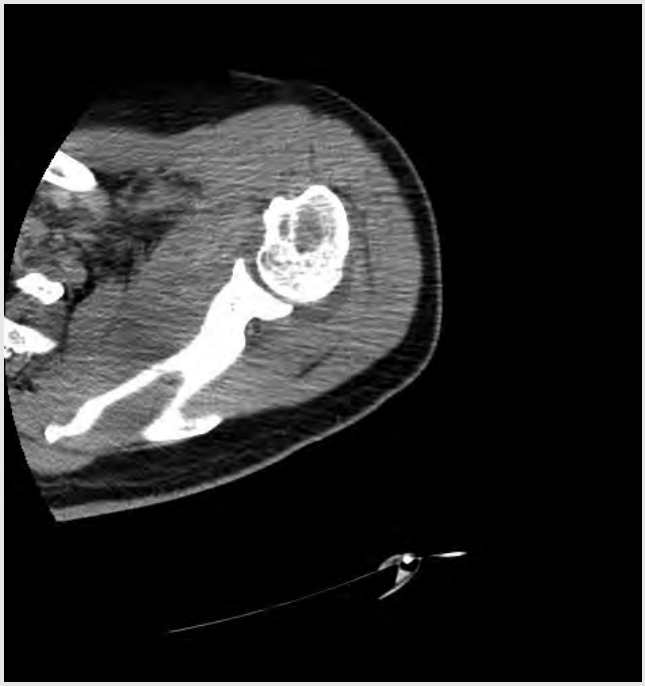

Figure 1. Glenohumeral joint effusion.

vitis was debrided. Antibiotic (gentamycin 80mL/2mL NaCl) impregnated solution was flushed through the glenohumeral joint.

The patient's blood cultures grew Gram-positive cocci in pairs and short chains, suggestive of enterococci or pneumococci. The presumed causative organism was *Streptococcus pneumoniae* sensitive to ceftriaxone. The patient was given IV ceftriaxone and IV vancomycin. After five days of intravenous antibiotics, the patient was discharged with instructions to take ceftriaxone 2g/50mL IV 1/day x 40 days.

Discussion

Septic arthritis is an uncommon complication following dental procedures, especially in normal joints via hematogenous seeding of a joint.[1] The responsible bacterial organism in this case report was *Streptococcus pneumoniae,* a Gram-positive facultative anaerobe often found in the nasopharynx of healthy individuals.[10] Approximately 70% of cases of septic arthritis are isolated through blood or joint culture. *Staphylococcus aureus* is the most common organism isolated and accounts for 44% of septic arthritis. Other common organisms include *Kingella kingae* (14%), *Streptococcus pyogenes* (10%) and *Streptococcus pneumoniae* (10%). It should be noted that each risk (age) group has its own characteristic infective microorganisms, including bacteria, fungi and viruses. However, bacteria are most important because of their invasive, destructive nature.

The knee is the most common site involved, followed by the hip and shoulder. Septic arthritis has also been identified in the ankle, elbow and wrist, but these sites are relatively uncommon.[11-13] The majority of patients diagnosed with septic arthritis have at least one serious medical condition. Comorbidities present in adult septic arthritis of the shoulder include diabetes mellitus, rheumatoid arthritis, HIV infection, alcoholism, osteoarthritis, prosthetic joints, coronary disease, IV drug use, corticosteroid use, and multiple myeloma or monoclonal gammopathy.[1,3] In this case, there was an incidental finding of Type II diabetes.

Alcohol increases the risk of aspiration and upper airway bacterial colonization, decreases pulmonary macrophage phagocytosis and alters surfactant biochemistry. Alcohol is implicated as a risk factor in up to 70% of cases of pneumococcal bacteremia.[14]

Ross et al. reported on 2,407 cases of septic arthritis. Of these, 6% were caused by *Streptococcus pneumoniae*. After reviewing 190 cases of pneumococcal septic arthritis, it was noted that one-half of the patients reviewed did not have an underlying focus of pneumococcal disease, such as pneumonia or meningitis. It was presumed that septic arthritis arose from joint seeding during transient bacteremia, with a mucous membrane source. Mortality was 19% among adults, with pneumococcal bacteremia being the strongest predictor of mortality.[1]

The temporal relationship of the infection to the dental examination and probing, the lack of other infections, trauma, arthritis in the joint and negative blood cultures suggest a transient streptococcal bacteremia following a procedure involving the oral/pharyngeal region as etiology of the infection.

Septic arthritis following dental procedures is rare and exhibits a rapidly destructive infectious process with notable systemic symptoms. It occurs through the blood from a distant septic focus. The suggested treatment is prompt surgical drainage and irrigation, as well as intravenous antibiotic administration to reduce morbidity.[5] It is important to be aware of this potential complication after dental treatment, as early diagnosis and treatment are critical to infection resolution. A differential diagnosis of septic arthritis includes patients with upper extremity joint complaints especially after dental treatment.

Drs. Dolin, Perlmutter, Segelnick and Weinberg have dedicated their paper to the memory of their coauthor Dr. Robert Schoor, their mentor and inspiration, who died in November 2012. Queries about this article can be sent to Dr. Segelnick at EperioDr@aol.com.

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