

Arthroscopic Management of Septic Arthritis of the Wrist

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KEYWORDS

- Arthroscopy • Arthroscopic • Wrist • Septic arthritis
- Infection

Septic arthritis occurs in 2 to 5 per 100,000 individuals in the general population, but it is more common in certain groups (38 per 100,000 individuals with rheumatoid arthritis, and 70 per 100,000 individuals with a prosthetic joint).¹ Septic arthritis is a joint-threatening emergency and is associated with considerable morbidity and mortality.^{2,3} Septic arthritis occurs in the lower extremity 80% of the time, and the most commonly involved joints are the knee (50%) and the hip (20%). When septic arthritis occurs in the upper extremity, it is estimated that 25% of cases involve the wrist.

Bacterial septic arthritis is classically divided into gonococcal and nongonococcal arthritis. In young sexually active individuals infected with *Neisseria gonorrhoeae*, this is a common cause of septic arthritis. However, outside of this population, *Staphylococcus aureus* is the most common causative organism.⁴ Other organisms may also cause septic arthritis, including streptococcal species, gram-negative rods, mycobacteria, or fungal species. Septic arthritis is most commonly initiated by a hematogenous spread in patients with bacteremia, although direct joint inoculation from trauma or adjacent spread from a nearby infection, such as osteomyelitis, bursitis, or cellulitis, is also common.

Immunosuppression is an important risk factor for septic arthritis and is commonly seen in association with medications, such as disease-modifying antirheumatic drugs, corticosteroids, and chemotherapy; or with medical comorbidities, such as

diabetes, HIV/AIDS, intravenous drug abuse, and end-stage renal disease. Increased patient age; the presence of a prosthetic joint; joint instrumentation; and any disease that affects the integrity of the articular surfaces, such as osteoarthritis, rheumatoid arthritis, and gout, are also risk factors.

DIAGNOSIS

The diagnosis of septic arthritis is made by history and physical examination and is supported by laboratory studies and imaging. Patients typically present with a swollen, erythematous, and painful joint with marked limitation of motion. Passive joint motion or axial loading of the joint is exquisitely painful. Systemic complaints include fever (90% of patients), chills, and sweats.⁵ In cases of direct joint inoculation, there will be a history of surgery, recent joint injection, or penetrating injury. In cases of hematogenous spread, evidence of a distant infection, such as a urinary tract infection or endocarditis, should be sought.

Plain radiographs are generally nonspecific. They may be normal or show a widened joint space caused by effusion. Depending upon the duration of the septic arthritis, there may be joint space narrowing or destruction. In severe or untreated cases, there may be radiographic evidence of osteomyelitis. Osteoarthritis, rheumatoid arthritis, gout, and other arthritides are risk factors for septic arthritis, and changes consistent with chronic underlying arthritis are often seen in

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patients with acute septic arthritis. Ultrasound and computed tomography scan are not particularly useful in the diagnosis of septic arthritis. Magnetic resonance imaging (MRI) may aid in differentiating between septic arthritis and transient aseptic synovitis of the hip in children, but it has not been demonstrated to be useful in diagnosing septic arthritis of the wrist. Appropriate treatment should not be delayed while awaiting an MRI in patients with suspected septic arthritis of the wrist.

Serology will often demonstrate leukocytosis (60% of patients), and an elevated erythrocyte sedimentation rate or C-reactive protein may be seen.^{5,6} It should be noted, however, that the white blood cell (WBC) count may be normal or leucopenia may even be present in immunosuppressed patients.⁷ Because other inflammatory processes, such as gout and rheumatoid arthritis, can mimic the history and findings of septic arthritis, arthrocentesis should be performed. Synovial fluid should be sent for gram stain, cultures, sensitivities (aerobic, anaerobic, fungal, and mycobacterial), cell count with differential, and crystal studies. A gram stain that is positive for organisms followed by a positive culture is confirmatory for septic arthritis. However, the gram stain is often negative in patients with septic arthritis, and cultures may not demonstrate a causative organism in up to 40% of cases.^{2,8-10} The absence of crystals is supportive of the diagnosis of septic arthritis. However, gout and pseudogout are both risk factors for septic arthritis, and the presence of birefringent crystals does not rule out septic arthritis. With the exception of severely immunosuppressed patients, an elevated synovial fluid WBC count with left-shift (>75% neutrophils) is seen. A synovial WBC count of greater than 50,000 cells/mm³ is considered highly suggestive of septic arthritis, and treatment should be initiated if the history and examination are consistent with septic arthritis. However, it should be noted that a synovial WBC count of greater than 50,000 cells/mm³ can be seen with other diseases, such as gout, and a synovial WBC count of less than 50,000 cells/mm³ may be seen in up to one-third of patients with confirmed septic arthritis.¹¹

TREATMENT

Effective treatment of septic arthritis involves emergent irrigation and debridement (I&D) of the joint, combined with appropriate intravenous antibiotics. In the wrist, I&D is commonly performed in an open fashion.^{8,12,13} However, in other joints, such as the knee, hip, and shoulder, arthroscopic I&D of septic arthritis is well described.¹⁴⁻¹⁸ There are several potential advantages to arthroscopic

I&D of the wrist, including smaller incisions, limited disruption of the dorsal wrist ligaments and capsule, less pain, superior visualization of the articular surfaces, and no open contaminated wound requiring dressing changes. Furthermore, a recent study by Sammer and Shin⁷ provides evidence that arthroscopic I&D may be associated with fewer operations and shorter hospital stays in patients with isolated septic arthritis of the wrist.

In this study, patients with septic arthritis of the wrist treated by open or arthroscopic I&D over an 11-year period at a single institution were reviewed. The primary outcome measurements were the number of I&Ds required to treat the infection, the length of hospital stay (LOS), and perioperative mortality. Thirty-six patients (40 wrists) were included in the study. Seventeen patients (19 wrists) were treated with open I&D, and 19 patients (21 wrists) were treated arthroscopically. Overall, there was no difference between the open and arthroscopic cohorts in terms of the number of I&Ds required to treat the infection or the hospital LOS. However, when the investigators evaluated patients with isolated septic arthritis of the wrist, and excluded patients with multiple sites of infection, a significant difference between the two cohorts was found. Patients who underwent open I&D required an average of 3 operations to successfully treat the infection, whereas patients who underwent arthroscopic I&D were all successfully treated with a single operation ($p = .001$). Furthermore, those who underwent open I&D had an average hospital LOS of 16 days, compared with 6 days for those treated arthroscopically ($p = .04$). Ninety-day perioperative mortality was high in both groups: 18% in the open cohort and 21% in the arthroscopic cohort.

ARTHROSCOPIC IRRIGATION AND DEBRIDEMENT

Although arthroscopic I&D can be performed for most cases of septic arthritis of the wrist, several contraindications exist. Postoperative wrist infections usually require open I&D because the infection involves not only the joint but also the soft-tissue planes and any hardware, fracture, or osteotomy that may be present. Prior incisions and scarring make arthroscopy more difficult and are a relative contraindication. Osteomyelitis is also a relative contraindication. Although small areas of osteomyelitis can be debrided arthroscopically if they are accessible from the joint, more extensive osteomyelitis requires open debridement. In addition, some wrist joints are inaccessible with an arthroscope, either because of small size (such as that of an infant or small child)

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