



Primary haematogenous septic arthritis of the wrist in immunocompetent healthy patients : A report of four cases

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Primary haematogenous nontraumatic arthritis of the wrist is uncommon. We report four such cases. All had a spontaneous onset with a delay in diagnosis. Treatment consisted of an open debridement and systemic antibiotics. Outcome appeared to be related to the delay between onset and treatment.

Keywords : wrist ; septic arthritis ; haematogenous ; non-traumatic.

INTRODUCTION

Primary haematogenous nontraumatic septic arthritis of the wrist is rare. In most reported cases, wrist infection is caused by penetrating trauma, surgery or intra-articular injections. The haematogenous spread from a systemic or distant infection is associated with predisposing factors such as age, immunosuppressive therapy, systemic or rheumatoid disease, drug or alcohol abuse, posttraumatic degenerative disease and decreased immunity (4).

We report four cases of septic arthritis with spontaneous onset.

CASE SERIES

Case 1

A 47-year-old male presented with left sided wrist pain. One year before, he complained of progressive pain following a mild blunt trauma of

the left wrist. Treatment with NSAID, chondro-supplements and oral steroids gave only partial remission of the complaints. There was no history of fever, systemic symptoms or infectious foci elsewhere in the body. He was in overall good health. White blood cell count was normal and rheumatological investigations were negative. Physical examination at presentation showed synovitis and pain on mobilisation. Grip force on the left side was 24 kg, compared to 60 kg on the opposite side. Carpometacarpal joints 2 and 3 were painful. Watson's scaphoid shift test was painful. Radiographs showed mild degenerative changes (Fig. 1a). On MRI synovitis, a cystic lesion and bone marrow oedema in the os lunatum were seen on fat suppressed sequences (Fig. 1b). On bone scan a slightly increased uptake at the level of carpometacarpal joints 2 and 3 was seen. An intra-dermal tuberculine test was negative.

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Fig. 1. — a. Case 1. Radiograph of the wrist at presentation ; b. Case 1. MRI Fat-suppressed image of synovitis and cystic lesion in the lunatum ; c. Case 1 : Radiograph of the wrist 8 months after debridement. Overall carpal degeneration can be seen.

An open biopsy of the synovium was proposed. The wrist was explored through a dorsal approach. There was an extensive synovitis with purulent synovial fluid. A thorough debridement and irrigation was performed. Wound cultures grew coagulase negative *Staphylococcus*. The pathology examination showed a chronic synovitis with lymphoid aggregates and follicles, matching psoriatic or rheumatoid arthritis.

Oral antibiotics were administered (oxacilline 500 mg 4/d). Six weeks postoperatively, there was a clear improvement of pain and swelling. Mobility and strength remained weak, with a decreased grip force. Despite physiotherapy, pain persisted. There was no recurrence of synovitis.

Radiographs showed a progressive destruction of the radiocarpal joint (Fig. 1c). A radiocarpometacarpal arthrodesis was eventually done 14 months after the debridement. There was a satisfactory outcome in terms of pain and function, with a grip force of 36 Kg (preoperatively 11 Kg).

Case 2

A 48-year-old woman complained of pain in her right wrist. There was no history of trauma. There was no evidence for rheumatoid or metabolic disorders. She was in general good health. She presented to her general practitioner with a painful, swollen

wrist, without systemic symptoms. He treated her with NSAID and a brace. Because of persistent pain a cast was applied after three weeks. Eventually an MRI scan was performed, showing evidence of osteomyelitis of the right distal radius with a septic arthritis and a contiguous infection of the proximal carpal row on T2 sequences. Radiographs showed radiocarpal degeneration and subluxation of the lunatum (Fig. 2). At that time clinical examination showed a diffuse swelling of the wrist, with redness and elevated temperature, suggestive for an infection. On bone scintigraphy an increased uptake suggested osteomyelitis. Blood analysis showed increased inflammatory parameters (CRP 7.1 mg/dL, WBC 11.300/mm³).

The wrist was surgically explored through a dorsal approach. There was marked synovitis, but no purulent effusion. A thorough debridement was done and an external fixator was applied to immobilize the wrist. Cultures grew *Staphylococcus aureus*. Intravenous antibiotics (floxapen 1 g, 6/d) were started for 17 days. There was a good clinical and biochemical evolution. Oral antibiotics, (oxacilline 500 mg, 3 × 2/d) were continued for 4 weeks. Physiotherapy was started with a good evolution of mobility and strength. At one year follow-up she had a reasonable function and no pain (extension 40°, flexion 5°, radial deviation 5° and ulnar deviation 30°). Infectious symptoms did not recur.



Fig. 2. — Case 2. MRI image of osteomyelitis of distal radius and lunate. Radiographs show joint space narrowing and subluxation of the lunate.

Case 3

A 20-year-old plumber reported a fall on his left elbow causing a superficial skin wound. A few days later he developed a superficial infection, treated with local antiseptics. Two weeks later he presented with pain and swelling of the left wrist. Radiographs were normal. No treatment was started.

Because of persistent pain and fever (38.5°) he was hospitalized elsewhere for administration of intravenous antibiotics. Aspiration of the wrist was negative. There was a good clinical and biochemical response to antibiotics, so he was discharged home after two weeks with oral antibiotics. He discontinued the oral therapy after two weeks; shortly thereafter, the complaints recurred.

At that time he presented to our department. On physical examination a diffuse swelling of the left wrist was seen. Mobilising the fingers was extremely painful. CRP increased to 7.3 mg/dL, WBC was 10.800/mm³. Radiographs revealed osteolysis of the carpus with osteomyelitis (Fig. 3). On bone scan with Tc^{99m} an increased uptake in the wrist was seen, suggestive for osteomyelitis.

An open debridement under general anaesthesia was performed. There was a severe synovitis and a

septic necrosis of os capitatum and hamatum. This was extensively debrided and irrigated. An external fixator was applied for seven weeks.

Cultures grew *Staphylococcus aureus* and intravenous antibiotics were started (oxacillin 1 g, 6/d for thirteen days and gentamycine 320 mg 1/d for ten days). There was a good clinical and biochemical evolution. CRP decreased to < 0.6 mg/dl. Pain disappeared. Oral therapy with antibiotics for another two weeks was given. Outcome was satisfactory for pain, but mobility of the wrist was decreased postoperatively (flexion 10°, extension 10°, ulnar deviation 10°, radial deviation 10°). No recurrence of infectious symptoms was reported.

Case 4

A 34-year-old man was referred to our department with a history of swelling and pain of his right wrist. The pain started spontaneously 5 days earlier. Four months earlier he had a carpal tunnel release with a noninfectious wound complication. One month earlier he had a dental infection, treated with extraction. Physical examination at presentation showed a red painful wrist joint with increased temperature. Blood analysis showed an inflammatory



Fig. 3. — Case 3. Extensive necrosis of the lunatum, scaphoid and capitatum.



Fig. 4. — Case 4. Radiograph of the wrist after debridement and a short course of antibiotics.

status (CRP 82.1 mg/dL, WBC 16.400/mm³). He had no fever.

An open debridement of the wrist was performed. There was a severe synovitis and purulent effusion. An external fixator was applied for 4 weeks.

Cultures grew *Neisseria gonorrhoea*. Examination for urethritis was negative. He received intravenous antibiotics for six days (rocephine 2 g/d). There was a good response to antibiotics. Antibiotic treatment was discontinued after six days on advice of the infectious disease department (Fig. 4). He had a good function (flexion 30°, extension 40°, ulnar deviation 10°, radial deviation 10° and grip force 30 pounds) and no pain.

DISCUSSION

Primary or haematogenous septic arthritis of the wrist is rare. Three large series of septic wrist arthritis were reported in literature. Raskhoff *et al* (5) saw 29 cases of septic arthritis over a ten-year period. Trauma was the most common aetiological factor (17 patients). The causal pathogen was *Staphylococcus aureus* in 19 of 29 cases. Treatment consisted of a prompt open debridement and intravenous antibiotics. Range of motion exercises were started early. Follow-up during six months to nine years showed no recurrences. Ten wrists had a good or

excellent outcome, while 13 had a fair or poor result. A long delay between diagnosis and treatment was the most important factor for a poor outcome. All patients with a poor result had a delay of more than sixteen hours. The number of procedures performed was also a bad prognostic factor.

Kelly (1) identified 141 cases of bacterial arthritis at the Mayo clinic. The wrist was involved in only 5 cases. He also stated that early recognition and treatment were the most important factors for a good outcome.

Murray (4) in his review article also identified *Staphylococcus aureus* as the most common causative pathogen for septic arthritis of the hand and wrist. This is confirmed by other studies (2). The aetiology was found to be mostly a penetrating trauma. He also identified other bacteriae occurring less frequently in specific clinical settings: *Streptococcus* species, *Haemophilus influenzae*, *Pseudomonas aeruginosa*, *Serratia species*, *Neisseria gonorrhoea*, *Pasteurella multocida*, *Eikenella corrodens*, and *Mycobacterium marinum*. He concluded that a delay in diagnosis was the most important factor for a poor outcome. The explanation for this poor outcome in delayed diagnosis is the destruction of articular cartilage by bacterial toxins.

Septic arthritis of the hand and wrist was also described by Meier and Lanz (3). Ten cases were

seen in a ten year period ; six of them had an iatrogenic origin, 4 were primary cases. *Staphylococcus aureus* was the most common pathogen, cultured in four out of ten cases. In our caseseries, *Staphylococcus aureus* was the pathogen cultured in two cases, coagulase negative *Staphylococcus* in one and *Neisseria gonorrhoea* in one. All *Staphylococcus* species were responsive to oxacilline. The diagnosis in spontaneous septic arthritis is difficult, due to the atypical presentation. Red, swollen joints without systemic involvement raise suspicion of an inflammatory or degenerative cause.

Surgical debridement is the mainstay of treatment, in combination with antibiotics. There was no recurrence of infectious symptoms after this treatment regime. As illustrated by the third case the administration of intravenous antibiotics alone is insufficient to cure the infection. The longer the delay in treatment, the worse the outcome. The more prolonged presentation in our first case and

the delay to a correct diagnosis, caused an extensive destruction of the carpus.

The cases reported here are unusual because there was no penetrating trauma or open injury. The patients were in good health and immunocompetent, and a focal infection at a distance was not present.

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