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Septic Arthritis of the Hand and Wrist in an 8-Year-Old Girl Not Involving the Radiocarpal Joint

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Abstract

We presentented a case of septic arthritis of the hand and wrist in an 8 year old girl due to group A streptococcus pyogenes. Important differentials are discussed along with diagnostic strategies. An unusual feature of this case is the lack of involvement of the radiocarpal joint despite involvement of the mid carpal and carpometacarpal joints.

Keywords: Septic arthritis; Paediatric; Group A streptococcus; Radiocarpal Joint

Case Reports

An eight year old girl, previously fit and well, was referred by her general practitioner to the emergency department of a district general hospital with a one week history of high fever, resolving sore throat and a two day history of worsening pain, swelling in the left hand and wrist.

On initial examination she had a temperature of 37.2 degrees, a heart rate of 150 beats/min, a respiratory rate of 25 breaths/min and oxygen saturations of 99% in air. Her blood pressure was 129/68mmHg. She had red eyes, flushed cheeks and a strawberry tongue with a red inflamed throat. She also had a diffuse rash on her abdomen. Her left wrist was swollen, warm and erythematous. She had restricted movement in all directions in her wrist and was unable to flex her digits fully due to pain. She had no neurovascular deficit.

Her full blood count showed Hb 11.8 g/L, White cell count 26.4 × 109/L, Neutrophils 25.6 × 109/L, Lymphocytes 0.5 × 109/L. Her inflammatory markers were raised with a C-reactive protein of >250 mg/L and Erythrocyte sedimentation rate of 42 mm/hr. After review by the paediatric and orthopaedic teams, she was admitted for investigation, evaluation and intravenous benzylpenicillin and flucloxacillin.

Over the next 24 hours, she continued to have temperatures up to 38.5 degrees. Her case was discussed with the consultant microbiologist and antibiotics were changed to clindamycin and co-amoxiclav to cover for suspected group A beta haemolytic streptococcus infection. Indeed, her throat swab grew scanty group A streptococcus, as did her blood cultures.

The pain, swelling and erythema intensified with blistering on the dorsum of her left hand and wrist. Radiographs showed no abnormality, with no evidence of osteomyelitis or any bony change. An ultrasound of her wrist revealed diffuse thickening of the subcutaneous fatty tissue throughout the hand and wrist with no collection. She was then referred to the regional plastic surgical team due to concerns regarding compartment syndrome or necrotising fasciitis.

After plastic surgery review, she was taken to theatre urgently. Two dorsal incisions and a volar incision were made without tourniquet and pus was found in the hypothenar eminence, mid-palmar space, midcarpal joint and carpometacarpal joints. However, unusually, the radiocarpal joint was free of pus. The hand and wrist were thoroughly irrigated. Cultures of the pus also grew group A streptococcus pyogenes. She underwent three subsequent washouts under general anaesthetic over the following 2 weeks.

The case was further discussed with the microbiology team in view of the clinical findings and samples that were sent from theatre. She completed a two-week course of intravenous benzylpenicillin and clindamycin and was discharged with a further two-week course of oral equivalent antibiotics. Early post-operative mobilisation with guidance from the hand therapists was commenced to avoid stiffness and swelling of the joint. Clinical assessment and therapy continued as an outpatient until the child resumed normal activities of daily function.

Septic arthritis is the invasion of a joint by an infectious organism, which may proceed to joint destruction if untreated. The hand and wrist joints form a delicate tool with intricate anatomy and function, thus a poorly managed infection can lead to significant morbidity and mortality. The wrist is formed by more than one joint including the distal radioulnar, the radiocarpal, the mid carpal and the carpometacarpal joints.

Literature regarding sepsis of the wrist rarely differentiates between the different joints, however the radiocarpal joint is assumed to be the focus of most studies [1,2]. Primary or spontaneous infection of the hand and wrist joints is uncommon, therefore estimating its incidence is difficult.

A 10-year retrospective observational study conducted by Mehta et al. [3] of 52 cases of septic arthritis involving the upper limb identified only 12 cases of wrist sepsis [3]. The most common cause of septic arthritis in this region is through direct joint inoculation from trauma such as an animal or human bite, through haematogenous spread in patients with bacteraemia or adjacent spread from neighbouring infection such as in bursitis, cellulitis or osteomyelitis.

Our report highlights a case of septic arthritis in a child affecting the mid carpal and carpometacarpal joints extending into the hypothenar

eminence and mid-palmar space with no involvement of the radiocarpal joint.

Time to diagnosis is a critical factor in the prognosis of septic arthritis. Diagnosis of a septic wrist in children and infants can be delayed, especially in the absence of obvious penetrating trauma. Classically, such a diagnosis is made on clinical history and physical examination and supported by laboratory studies and various imaging. The hallmark of septic arthritis is acute joint inflammation leading to erythema, warmth and swelling with stretching of the joint capsule resulting in severe pain. The pain in the affected joint usually precludes movement of the joint resulting in pseudoparalysis. Systemic symptoms such as fever and rigors are often regarded as a pre-requisite for the diagnosis of septic arthritis [4]. A lack of fever should not dissuade the clinician as some studies have shown that only 50% of confirmed paediatric septic arthritis cases were febrile at presentation [5,6].

Haematological investigations are helpful but not definitive. The definitive test for a septic joint is synovial fluid analysis. Aspirate from a suspected septic wrist should be analysed for WCC and differential, Gram staining, culture, glucose and polarising microscopy for crystals. Traditionally a synovial fluid WCC of more than 50,000/ml and a predominance of polymorphonuclear cells were indicative of septic arthritis. A study by Coutlakis et al. [7] revealed that only 47% of cases with a WCC of greater than 50,000/ml and 77% of cases with 100,000/ml or more were proven to have septic arthritis on synovial fluid culture [7].

Whilst plain radiographs have a limited role in the diagnosis of acute septic arthritis, it may reveal an effusion with widening of the joint space, soft tissue swelling and may be more useful in excluding bony abnormalities such as osteomyelitis and fractures. Ultrasonography is relatively cheap and accessible. It eliminates radiation exposure, can provide real-time analysis and can guide aspiration in deep-seated infection. Magnetic resonance imaging (MRI) is a useful imaging modality, however, in younger children, an MRI scan requires sedation, which may cause unnecessary delay and worsen outcome [8].

The signs and symptoms of septic arthritis in children can be subtle and it may not be easy to obtain a clear history or carry out a full examination on a young child. Early diagnosis and prompt management would indicate a better prognosis. Although the hip is the most commonly affected joint in children, one has to be alert to the fact that it may present in any joint. Arthrotomy and washout is the mainstay of treatment, and recurrence of infection can occur if is inadequate.

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