CASE REPORT

Primary septic arthritis of metatarsophalangeal joint of the great toe

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Introduction

Septic arthritis is a medical emergency and diagnosis must be established at the outset to institute early treatment to avoid articular damage and subsequent sequelae.

Mode of acquisition may be haematogenous spread from a distant source, local extension from an adjacent focus of infection or direct inoculation into the joint at the time of trauma. Large weight bearing joints of the lower extremity are most at risk. Although any joint may be involved, isolated primary septic arthritis of the metatarsophalangeal joint is rarely reported.

Case report

A 13-year-old girl fell from a horse and hurt her left foot. She was able to walk immediately after the accident but presented to the Emergency Department 3 days later with inability to bear weight on the left foot, especially the ball of the great toe. On examination there was no swelling or warmth around the great toe but active and passive movements at the metatarsophalangeal joint of the great toe were painfully restricted. Clinical examination of the remaining foot and the ankle were normal. There were no signs of any disruption of the skin over the foot. Radiographs of the foot and the ankle did not show any bony injury. The patient was diagnosed to have a soft tissue injury and was discharged on antiinflammatory analgesics. The girl again presented to the Emergency Department after 6 days, this time with increasing pain and swelling around the great toe of the left foot. On clinical examination she was afebrile. There was diffuse redness and warmth around the metatarsophalangeal joint. Movements of the great toe, especially plantar flexion was very painful. There was no history, no signs of an infective focus in the ears, nose, and throat, genitourinary or gastrointestinal system. There was no associated conjunctivitis or skin rash and no other joints were involved. The haematological investigations revealed that the total white cell count was mildly raised to 12.2 x 10^3 with 66% neutrophils. The C-reactive protein and erythrocyte sedimentation rate were elevated to 34 and 57, respectively. Serum uric acid was within the normal range. An attempt was made to tap the joint but no fluid could be aspirated. A presumptive diagnosis of cellulitis/tenosynovitis of extensor hallucis longus was made and she was admitted for intravenous antibiotics. After 48 h the redness and swelling decreased and became localised to the metatarsophalangeal joint but the
movements of the great toe were still painful. She was taken up for an arthrotomy and the metatarsophalangeal joint was opened using a medial incision. No pus was found until the sesamoid compartment of the joint was opened with an artery forceps. Two to three milliliters of yellowish purulent material was evacuated and sent for microbiological evaluation and culture. The joint was thoroughly washed with copious saline. The patient improved clinically after the decompression and joint lavage. The inflammatory parameters regressed towards normal the next day (C-reactive protein 12 and white cell count $8.2 \times 10^3$). The intraoperative swab culture grew staphylococcal aureus, sensitive to flucloxacillin. The patient was treated with the same antibiotic for 4 weeks. At the last follow up after 6 months, she was symptom free with no residual disability. The radiographs of the foot were normal with no signs of articular damage or degenerative changes involving the metatarsophalangeal joint.

**Discussion**

Gout is the most common cause when non-traumatic acute monarthritis involves the metatarsophalangeal joint of the great toe.1,5,17 The involved joint is exquisitely tender and painful, considerable swelling and erythema are also generally present.12 When accompanied by fever and leukocytosis, it may not be possible to distinguish gouty arthritis from septic arthritis or cellulitis unless joint aspiration is performed and synovial fluid is analysed for urate crystals.14 Nonetheless gout more commonly affects middle aged men and is less likely to be the possible cause in a child.

Other important causes of acute monarthritis are septic15,17 and tubercular arthritis.1,5 Acute calcific periarthritis,9 cellulitis and tenosynovitis4 also may mimic the clinical presentation of an acutely inflamed joint.

Septic arthritis produces intense inflammation followed by irreversible destruction of the cartilage and bone which makes early diagnosis imperative. It is well known that gram positive cocci are the most common cause of non-gonococcal bacterial arthritis, Staph aureus being responsible for 60% of all joint infections.4 Any joint of the body may be involved with special predilection for the large weight bearing joints of the lower limb. To the contrary, isolated primary bacterial septic arthritis of the metatarsophalangeal joint has been reported rarely and that too in association with atypical organisms like Brucella17 and Pasteurella multocida15, cases associated with more common typical organisms are not mentioned in the literature.

Non-gonococcal septic arthritis is most commonly secondary to haematogenous spread from a distant focus,4 but in most of the cases reported, it seems to involve the metatarsophalangeal joint secondarily, especially as a complication of deep pedal ulcers in diabetic7 and leprosy patients,13 after failed surgery at the hallux complicated by infection14 or after penetrating foot trauma.8,10 There was no underlying contiguous focus of infection or history of penetrating trauma in our patient and the exact source of infection could not be identified.

Classical presentation of pain, swelling and erythema often help clinch the diagnosis but it may be difficult to do so if the presentation is subacute, as in our case which usually results from a number of organism and host factors.5 Radiographs are inconspicuous early on and show soft tissue swelling and synovial distension which may not be appreciable in small joints. Arthrocentesis and evaluation of the synovial fluid is the key diagnostic study and should be considered in the evaluation of any monarthritis,5 but the same may be difficult in a small joint particularly in children and the volume obtained may not be sufficient enough to obtain cell counts.16 An attempt to aspirate the joint did not yield any fluid in our patient. The same may be attributable to the localisation of the infection to the sesamoid compartment and the relative sparing of the remaining joint.

Tuberculous arthritis should be kept as a possibility if signs of inflammation are mild and constitutional symptoms are absent. Trauma is thought to play a role in some patients with tubercular arthritis. Synovial biopsy is usually required to establish the diagnosis as smears have a low yield and synovial cultures are positive in only 60–70% of the patients.1,5

Pain and swelling at the first metatarsophalangeal joint can also be caused by acute calcific periarthritis, an inflammatory condition resulting from deposition of hydroxyapatite crystals in the periaricular tissues. The condition can usually be diagnosed by the characteristic soft tissue calcification on radiographs.9

Other diagnostic possibilities in our patient were cellulitis and tenosynovitis of the extensor hallucis longus. They usually subside after the intravenous antibiotics are instituted.

**Conclusion**

Any persistent clinical symptoms and signs in spite of intravenous antibiotic therapy, even in the absence of negative aspiration warrant a surgical intervention, especially in small joints, keeping in mind the possibility of primary septic arthritis.
References