**Imaging Findings and differential diagnosis of septic arthritis**

Septic arthritis is a medical emergency associated with high rates of morbidity and mortality, especially when the diagnosis is delayed or the treatment is suboptimal. The large joints of the hip and the knee are most commonly affected but any joint can be involved. The differential diagnosis of an acutely painful joint is broad and includes crystalline and inflammatory arthritides, trauma, neoplasm, and infection (1). Patients with septic arthritis classically present with fever, chills, and a warm, erythematous, swollen, and painful joint. However, variation in patient presentation necessitates a high clinical suspicion for septic arthritis. Many risk factors like bacteremia, old age, Rheumatoid arthritis, immuncompromised state predispose patients to septic arthritis. Coexisting primary rheumatologic disorders have been reported in as many as 50% of patients with bacterial arthritis (2). Imaging plays a vital role in diagnosis, assessment of the extent of involvement, guiding diagnostic and therapeutic interventions, treatment planning, and follow-up of musculoskeletal infections. Imaging can aid evaluation of osseous structures and surrounding soft tissues. Radiographic findings are usually normal in early septic arthritis or may reveal periarticular osteopenia. More advanced infections may depict soft tissue swelling, obliteration, and displacement of fat planes, and if present, findings of bone and joint infections (3). Positive CT findings include joint capsule and bursal distensions and periarticular soft tissue collections. CT and MRI can aid in assessment of difficult-to-access joints such as sacroiliac joint; furthermore, CT can aid in joint fluid aspiration. MRI can reveal a joint effusion or deep soft-tissue infection as well. Nonspecific bony erosions, marrow edema, and articular cartilage destruction can be seen with septic arthritis. Because of its sensitivity to soft tissue and bone marrow pathology, has high accuracy in diagnosing infection, including septic arthritis, osteomyelitis, pyomyositis, and discitis, and could be considered as the initial imaging study (4). Ultrasound can help detect joint effusion by detecting elevation of the joint capsule with anechoic or complex fluid effusion, as well as the presence of synovial thickening and hyperemia (5).

In conclusion infection can affect musculoskeletal system and different tissue planes with various depth and extent of involvement. Imaging appearances are variable depending on the degree of infiltration of the infectious process into different tissues and bony structures and bone marrow. Knowing the radiological findings can help in the early accurate diagnosis and choosing the appropriate treatment that lead to a significant decrease in the morbidity and mortality.

References:

1. Ross JJ. Septic arthritis of native joints. Infect Dis Clin North Am 2017; 31:203–218
2. García-Arias M, Balsa A, Mola E. Septic Arthritis. Best Pract Res Clin Rheumatol. 2011;25(3):407-21.
3. Alaia EF, Chhabra A, Simpfendorfer CS, Cohen M, Mintz DN, Vossen JA, et al. MRI nomenclature for musculoskeletal infection. Skeletal Radiol. 2021;50(12):2319–47.
4. Sabir N, Akkaya Z. Musculoskeletal infections through direct inoculation. Skeletal Radiol. 2024 Jan 30. doi: 10.1007/s00256-024-04591-w.
5. Turecki MB, Taljanovic MS, Stubbs AY, Graham AR, Holden DA, Hunter TB, et al. Imaging of musculoskeletal soft tissue infections. Skeletal Radiol. 2010;39(10):957–71.