

Infective Arthritis of Hip: Role of Sonography

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Abstract: Infective Arthritis is commonly encountered perplexing problem faced by the Radiologist in a child presented with limping, pain, refusal to bear weight with or without flexion deformity. Among the various armamentarium of techniques available to the Radiologist, Ultrasound being the noninvasive, nonionizing modality is the Imaging modality of the choice, hence should be used as first line of investigation as it not only determine the presence and nature of the fluid but also to determine whether the disease is intrinsic or extrinsic.

INTRODUCTION

The most important determinant of the outcome of an infected Hip is delay between onset and treatment. A child presenting with pain, refusal to bear weight, limp and flexion deformity with or without fever, is a common diagnostic problem particularly when there is no history of trauma. These clinical features are non-specific in paediatric patients and may be simulated by a number of non-arthritis conditions. And thus under these circumstances, it is difficult to differentiate clinically whether the abnormality is intrinsic i.e. transient synovitis, infective or tubercular arthritis or extrinsic, such as Appendicitis, iliac abscess. Various techniques like Radiography, Ultrasonography, Scintigraphy and Cross Sectional Imaging i.e. C.T and MRI, have become essential components of the management of acute osteomyelitis and septic arthritis in children. The Plain Radiographs, though the first line of investigation as of today, are unreliable and insensitive to joint fluid. On Plain Radiograph an effusion is suggested when the joint space is increased or when bulging of the soft tissue is apparent. However, Radiographs also exclude other abnormalities, such as fracture, or tumour and comparison with other joint is possible but the limitation in the diagnosis as changes are seen late, by which time considerable destruction of cartilage occurs as the cartilaginous changes are not seen. Also increase joint space in neonates and infants should suggest the possibility of dislocation.⁽¹⁾ Bone scintigraphy was useful and a sensitive modality in the diagnosis of joint effusions to give information as to the state of perfusion of the femoral head and follow-up studies after aspiration can differentiate infarction from reversible ischemia³. On skeletal scintigrams, septic arthritis usually reveals diffuse, faintly increased tracer uptake on both sides of the joint, but unlike osteomyelitis, the abnormality is limited to the bony structures adjacent to the joint. The increased tracer uptake in osteomyelitis is also generally more focal and intense. However, differentiating between the two may be difficult. Increased joint fluid can interfere with epiphyseal perfusion, particularly in the hip, resulting in decreased tracer uptake in the epiphysis. Drainage usually results in reperfusion⁽²⁾

However, its other limitation is that it is not easily available and gives Radiation to the child (4 millisievert per investigation carries 0.05% risk for foetal radiographic malignancy in children, if repeat scan, risk multiplies each time). Cross-sectional imaging studies like C.T and M.R.I cannot reliably differentiate septic from nonseptic arthropathy. Joint fluid and synovial enhancement on CT scans on MR images are seen with any arthritis. The diagnosis of septic arthritis can be suggested only if there is associated osteomyelitis. However its limitation of C.T is cost and cause ionizing Radiation to the child. The greatest value of MR imaging may be in evaluating response to therapy sooner than it can be detected clinically or radiographically⁴. Although M.R.I is more informative but limitation are its availability and Cost.

In view of the limitation of other imaging techniques and easy availability of Ultrasound, The present article addresses the role of sonography in septic arthritis, its advantages and diagnostic efficacy. Also, paediatric patients are at greater risk from ionizing radiation hazards. So, we need to use these imaging modalities judiciously and prefer non-ionizing ones like sonography to radiography as and when possible.

MATERIALS AND METHODS

A retrospective study was done at our institution on 3800 children with painful Hip suspected of septic arthritis. All the children had sonography and radiography of the affected hip done and classified as positive or negative for findings suggestive of septic arthritis on these modalities. Further, the presence of any extraarticular abnormalities which could account for the symptoms was recorded. Any alternative diagnosis made on these modalities was also recorded.

Radiography

Antero-posterior radiographs of the pelvis with bilateral hips were taken with appropriate radiographic exposure factors and gonadal shielding. The assistance of the attendant was taken to immobilize the child. Appropriate shielding of the attendant during radiographic exposure was also taken care of. Presence of radiographic features such as increased joint space, soft tissue swelling, displacement of fat planes, erosions, sclerosis of articular surfaces and in severe cases, destruction of femoral head epiphysis were suggestive of septic arthritis and recorded as radiography positive cases.

Sonography

The child was placed supine with the hip and knee kept extended by the attendant. A linear array 5-7.5 MHz probe was placed along the anterior aspect of hip. An anterior longitudinal approach along neck of the femur is the simple most useful imaging plane. (Fig-1) Both Hips are examined in every case. The presence of anterior capsular distension was noted as convexity of the anterior recess and compared to contralateral normal side in equivocal cases. The capsule thickness was measured in each case. The echogenicity of the synovial fluid was also noted. The soft tissue and bony changes if any are also recorded. Presence of hip effusion was recorded as sonography positive cases.



Fig.1: Normal Sonographic Plane

Normal Sonographic Anatomy

When the presence of hip effusion is evaluated with sonography, an anterior parasagittal approach is used, paralleling the long axis of the femoral neck. Ideally, the leg should be positioned with the hip and knee in extension and the hip externally rotated. It is most important to position the two extremities symmetrically and compare the symptomatic and asymptomatic hips. Fluid tends to first accumulate in the anterior recess, where the joint capsule is most distensible. Flexion of the hip to 45° been shown to decompress the anterior recess and result in false-negative examinations.

The joint capsule is seen as a linear echogenic band like structure (2 mm thick) anteriorly along the contour of the Head and Neck. The band