Negative Bone-scan in Acute Hematogenous Osteomyelitis

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Introduction

Acute Haematogenous Osteomyelitis is essentially a clinical diagnosis in children. In cases presenting at early stages, when clinical examination suggests the diagnosis of bone infection radionuclide scan will often pin point the infection of bone [1]. Radionuclide scan with 99Tc-MDP has been found to be highly sensitive for early detection of the infection even before the radiological changes are visible. In (95%) patients the bone scans becomes positive within 24-48 hrs of onset of clinical symptoms [2]. This test has sensitivity and specificity of 94% and 79% respectively when done in three-phase radionuclide scan. However, in 2-5% of cases of Ac Haematogenous Osteomyelitis there may be a "cold scan".

Very few cases of Ac Osteomyelitis with cold scan have been reported in Orthopaedic literature [3]. We report a case of Ac Haematogenous Osteomyelitis in a 12 year old girl with negative bone scan.

Case History

12 year old girl presented to command hospital with pain over the left thigh, difficulty in bearing weight on left leg and gave h/o intermittent low grade fever of 4 days duration. There was no history of any trauma. Clinical examination revealed swelling over lower third of thigh with moderate tenderness and local rise of temperature. There was no bony thickening or irregularity. There was no effusion into knee, movement were painful and restricted terminally but movements of the hip joint were full and painless. Patient was admitted with clinical diagnosis of Acute Osteomyelitis left femur and started on injectable antibiotics, AK POP slab, and other supportive measures. Investigation revealed Hb-9 gm%, TLC-8600/MM3, DLC – P70, L24, M4 & E2. Radiograph of the femur was normal and Bone scan showed no evidence of increased uptake or any acute infective pathology involving the left femur. Pain aggravated and extended to hip with restriction of movements and low-grade persistent fever.

USG left hip and colour Doppler showed DVT of external iliac vein and femoral vein, anticoagulants were started and oral antibiotics continued. After 2 weeks of admission patient developed knee effusion and aspiration fluid was WNL. She also developed chicken pox during this time. Pain in the thigh and hip continued. As the clinical diagnosis was not clear MRI hip and knee joint was done. It showed soft tissue swelling and hip joint effusion suggestive of tubercular aetiology. Hip aspiration was done which showed pus with Gram positive cocci and arthrotomy of hip was done to let out the pus. Radiograph of femur done after 24 days showed changes of Osteomyelitis. Patient was again started on injectable antibiotics for 2 weeks and oral antibiotics thereafter for 4 weeks. Repeat colour Doppler and USG shows recanalization of iliac and femoral vein. The limb was immobilized in hip spica and patient discharged after two months of admission.

Discussion

Though the diagnosis of Ac. Haematogenous Osteomyelitis is clinical, it is essential to diagnose the condition within 24-48hrs for favourable outcome of the disease. The commonly used investigations are bone

Fig. 1 : Bone scan of the patient

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Fig. 2 : X-ray showing extensive osteomyelitis after 1 month

Fig. 3 : X-ray after 2 month showing extensive osteomyelitis consolidating

aspiration, blood culture, CRP, Bone scan, MRI. The radionuclide bone scans can help in early diagnosis; the radioisotopes used are Technetium-99 MDP (99Tc-MDP), Gallium-67 Citrate (67Ga), Indium-111 labelled leukocyte scan (111In). The conventional bone Scan is performed by 99 Tc-MDP as it is cheap, widely available and report is available within 2-4hrs with minimal radiation. The increased uptake in the bone is due to increased blood flow, osteoblastic activity and inflammation and not due to infection. The three-phase study of the isotope is more reliable in diagnosis of osteomyelitis because the specificity increases from 74% to 94% [4]. The delayed phase scan done after 2-hrs of isotope injection is seen as an area of increased uptake or as "hot spot" which is seen in 95% of the patients. To get a hot spot the vasculature of the bone has to be intact. If the nutrient artery is thrombosed, compressed because of the oedema of the soft tissue, vasospasm or by subperiosteal pus formation a "cold scan" may be seen [5]. The presence of 'cold scan' in suspected case of Acute Osteomyelitis indicates extensive involvement of the bone and warrants urgent surgical decompression [6]. However, unlike adults the role of radionuclide scan in diagnosis of the neonatal osteomyelitis is highly unreliable. The scans have found to be negative in 60% of these patient with bone and joint infection [7]. If the bone scan is negative further investigation with 67Ga or 111In labelled leukocyte scan is recommended to confirm or to rule out the diagnosis. As the gallium is concentrated by the leukocytes this has a sensitivity of 100% and specificity of 96% [8]. However, with arrival of the MRI the diagnosis can be

made in such negative scan with sensitivity of 90%-96% [9].

In conclusion, bone scan is a highly sensitive investigation in the early diagnosis of Acute Haematogenous Osteomyelitis. Negative bone scan in 2-5% of cases necessitates that the diagnosis and treatment should be guided by the clinical presentation.

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