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STRESS FRACTURES IN THE PAEDIATRIC AGE GROUP – A DIAGNOSTIC ENIGMA

Orthopaedics

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KEYWORDS

INTRODUCTION

Stress fractures are common in adults especially in new military recruits or those involved in strenuous sporting activities. Pediatric stress fractures however are less common to encounter, and also presents as a diagnostic challenge, since the other commonly encountered diagnosis have to be considered in the differential. A high degree of suspicion needs to be maintained, since a direct history of trauma may not be forthcoming. This may lead to a delayed diagnosis. The only presenting feature may be pain on weight bearing and activity.

The radiological features such as periosteal reaction may take 4-6 weeks to be appreciated in the x rays leading to a considerable delay in diagnosis.

The utility of radionucide bone scintigraphy in the early detection of pathologic skeletal states is becoming increasingly recognized. As interest and participation in both competitive and casual athletic activities increase, more stress-related injuries are encountered nowadays. The growth and emphasis of systematic training of children in sports has resulted in the development of overuse or stress syndrome injuries not previously recognized in the pediatric and adolescent population. The early identification of bone stress fractures may prevent more severe injury and prolonged disability. Less radical methods of treatment are adopted and cast immobilization and surgery are frequently not required. Radionuclide scntigraphy is essential for the early detection of stress-related skeletal injury.

A stress fracture represents the bone's inability to repair itself, through osteoblastic remodeling, at a rate equal to that at which repetitive microtrauma is occurring. As a result, osteoclastic breakdown outpaces the bone's natural healing process, initially leading to a stress reaction, which progresses to a stress fracture. Stress fractures generally are symptomatic well before any fracture displacement occurs, but, if not recognized and treated expeditiously, can progress to a complete, displaced fracture and impose significant morbidity upon an otherwise healthy child.

Clinical history

A 11 year old boy reported to the orthopaedic department with pain in the upper 1/3rd of rt.leg for the past 3 weeks. There was no significant history of trauma.

Pain was continuous , low grade at rest and the intensity increased on weight bearing and walking.

A provisional diagnosis of metaphyseal acute osteomyelitis was not entertained in the absence of any constitutional symptoms and an unremarkable blood picture.

Next provisional diagnosis which was entertained was to rule out an osteoid osteoma.

Thus a CT scan was deemed warranted for the same child which showed some periosteal new bone formation but no cavity or nidus to suggest either abscess or an osteoid osteoma.

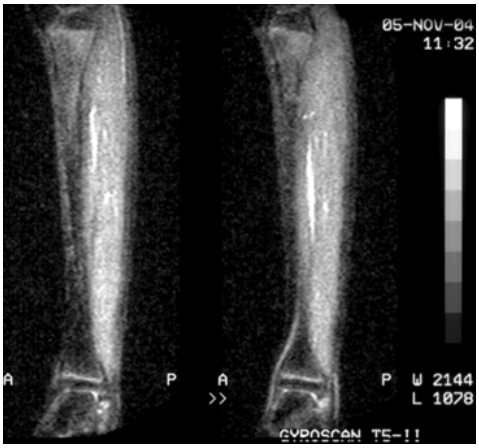
At this juncture, the next investigational modality chosen was the MRI to screen the patient which depicted marrow and juxtacortical oedema with a minimal cortical thickening.

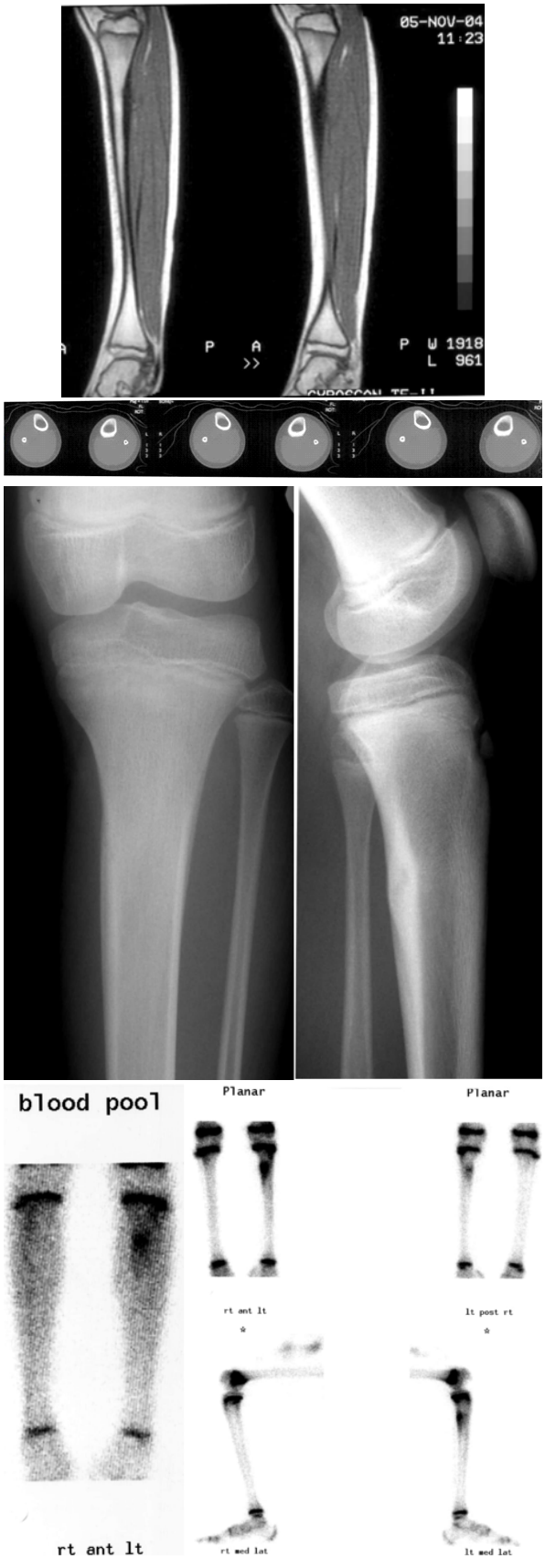
The patient was then subjected to the more advanced modality of diagnosis which was Tc bone scan or bone scintigraphy. This particular modality showed increased activity on the blood pool phase of the scintigraphy indicating local hyperaemia.

There was no evidence of any osteolytic lesion which ruled out infection.

Traditionally, radiographs fail to detect stress fracture during the acute stage and hence nuclear bone scintigraphy (bone scan) is the gold standard used to diagnose acute stress fractures. Radiographic findings, however, may take up to 3–6 weeks after symptoms appear in acute stress fractures.

Recent radiology literature has continued to provide evidence of the superiority of MRI [26,27], including its ability to detect a 'stress reaction' or 'stress injury,' characterized by the presence of an abnormal edema pattern in bone and considered to be a precursor to stress fracture [3].





Diagnosis

Having ruled out cortical abcess and osteoid osteoma and with results of bone scintigraphy, a clinical diagnosis of a stress fracture was made. Treatment Child was treated with removable long leg brace and with analgesics like ibuprofen and paracetamol.

Rest from weight bearing was advised for period of 2 weeks and controlled activity for further period of 2 weeks. The child recovered symptomatically completely after this treatment.

CONCLUSION

Stress fractures especially in children and adolescent can present with a diagnostic enigma since other orthopaedic pathological conditions take precedence in making the provisional diagnosis. Radiological features such as periosteal reactions are late to appear causing prolonged morbidity and delayed diagnosis.

Bone scintigraphy is a gold standard in diagnosis is case of suspected stress fractures. A high degree of clinical suspicion is required while investigating cases of acute stress fractures even though a history of trauma may not be forthcoming.