

An unusual site of heterotopic calcification

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Heterotopic calcification may occur following paralysis from spinal cord injury, most commonly affecting the hips. This case demonstrates a bone scan on a T5 paraplegic patient showing an unusual site of heterotopic calcification in the paravertebral musculature in addition to the hip regions. Subsequent CT scanning confirmed the presence of calcification in the erector spinae musculature.

Key words: heterotopic calcification, paraplegia, paravertebral musculature

INTRODUCTION

BONE SCINTIGRAPHY is recognized as a sensitive means of detecting heterotopic calcification.^{1,2} Paralysis from spinal cord injury is known to predispose to this condition.^{1,2} In this report, we present a patient with paraplegia, in whom bone scintigraphy demonstrated heterotopic calcification at usual sites around the hips, as well as at an atypical location in the paravertebral musculature.

CASE REPORT

The patient was a 71 year old man with T5 paraplegia following a fall 4 months previously. A CT scan performed at that time revealed fractures involving the bodies of the T3, T4 and T5 vertebrae with fractures of the posterior elements on both sides and marked encroachment on the spinal canal by bone fragments. His clinical course was complicated by recurrent pneumonia and recurrent methicillin resistant *staphylococcus aureus* septicemia. Despite being on intravenous broad-spectrum antibiotics, he subsequently developed a painful, swollen and erythematous left wrist with persistent neutrophilia. Blood biochemistry showed mild elevation of serum alkaline phosphatase (153 U/l; normal range is 25-110 U/l). The serum calcium (total and ionized), phosphate and creatinine levels were normal. Bone scin-

tigraphy was requested to evaluate for the presence of osteomyelitis.

One thousand MBq Tc-99m methylene diphosphate was injected intravenously and dynamic images acquired of the wrists. Delayed whole body sweeps as well as spot views of the wrists were obtained 2 hours later. The dynamic and delayed images of the left wrist did not support the diagnosis of active infection. The posterior whole body sweep identified intense uptake around both hips, more marked on the right, in a pattern characteristic of heterotopic calcification. Intense accumulation was also noted extending longitudinally within the paravertebral musculature extending from the lower thoracic to the mid-lumbar vertebral level (Fig. 1). There was increased osteoblastic activity at the fracture sites involving the upper thoracic vertebrae. Focal uptake involving several ribs were probably due to fractures.

A CT scan of the lower thoracic and lumbar spine performed the next day confirmed the presence of heterotopic calcification within the erector spinae musculature (Fig. 2). The upper thoracic region was not evaluated at this time although CT of the thoracic region was performed two and a half weeks prior to the bone scan and showed no evidence of soft-tissue calcification at the fracture sites. Knowing the temporal relationship of heterotopic calcification to the time of injury as discussed below, any heterotopic calcification, if present, would have formed by this time and be visible on the thoracic CT.

DISCUSSION

Heterotopic calcification can be associated with a wide variety of pathological entities. It can occur as a rare

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Fig. 1 Whole body posterior sweep which identified intense uptake of Tc-99m MDP around both hips, more marked on the right, in a pattern characteristic of heterotopic calcification. Intense accumulation is also noted extending longitudinally within the paravertebral musculature from the lower thoracic to the mid-lumbar vertebral level. Increased uptake is present at the fracture sites involving the upper thoracic vertebrae. Focal changes within several ribs may be due to fractures.

progressive congenital form³ but, on the other hand, complicates total hip arthroplasty in 53% of cases.⁴ It is also commonly seen following direct muscle trauma and as a complication of paralysis from spinal cord or brain insults.^{1,2} Since in the latter conditions in particular, clinical manifestations include swelling with erythema without any evidence of radiographic bone formation, bone scintigraphy has been useful in distinguishing between early ossification and cellulitis, thrombophlebitis or haematoma formation.¹ Heterotopic calcification has been reported to begin approximately 17 days following injury or neurologic insult, with soft tissue uptake in bone scintigraphy evident at 24 days and radiographic calcification being visible about one week later.¹

In many, there may be progression to heterotopic bone formation, the formation of hydroxyapatite crystals within the foundation of a collagen matrix.² The aetiology is uncertain but is believed to result from transformation of primitive mesenchymal derived cells present in soft tissue into bone forming cells in response to a variety of stimuli.⁵

In terms of biochemical indices, the serum alkaline

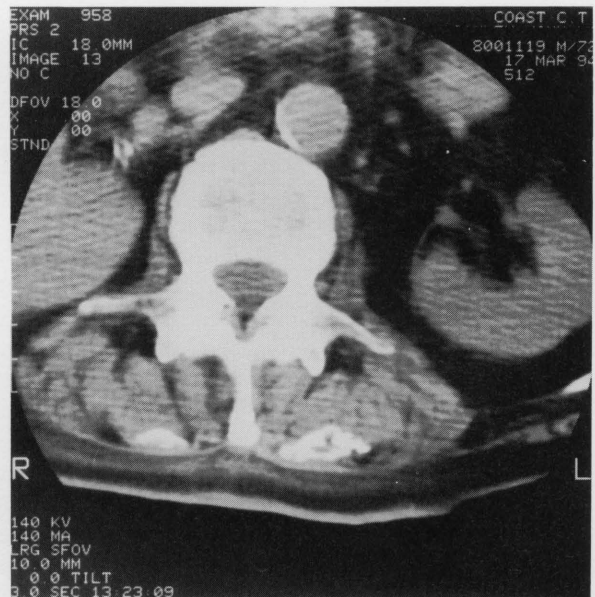


Fig. 2 CT scan of the spine with a single transaxial image at the level of L3 confirming heterotopic calcification within the rector spinae musculature.

phosphatase has been reported to be normal in heterotopic calcification.⁶ However, latter studies have demonstrated that it is invariably elevated at the time of radiographic appearance of soft-tissue calcification.^{7,8} Indeed, Orzel showed that the serum alkaline phosphatase is a sensitive indicator of heterotopic bone formation, often rising well in advance of any symptoms or radiographic soft tissue calcification.¹ However, it is not specific as it may be confounded by healing fractures as in this circumstance.¹ The serum calcium shows a less consistent pattern in heterotopic calcification and has been reported to be normal, elevated or depressed.¹

In this patient, the bone scan demonstrates the characteristic extensive and intense accumulation in extra-osseous sites around the hips. It is well known that the hip and knee demonstrate the highest incidence of heterotopic calcification in patients in which it occurs after spinal injury but it may also occur in the shoulder and elbow.² However, the paravertebral site of additional calcification, identified with the bone scan as fairly avid and linear accumulation, is very unusual.

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