BONE SCAN: A SENSITIVE MODALITY FOR DIAGNOSING AND PREDICTING OUTCOME FOR REFLEX SYMPATHETIC DYSTROPHY

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ABSTRACT

Reflex sympathetic dystrophy is a consequence of overactive sympathetic nervous system that results in burning pain, stiffness, swelling and discoloration of the affected limb. This case report describes the condition in a man that was diagnosed with the help of radionuclide bone scan.

Key words: reflex sympathetic dystrophy, complex regional pain syndrome, radionuclide bone scan.

INTRODUCTION

Reflex sympathetic dystrophy (RSD) or complex regional pain syndrome is a condition of burning pain, stiffness, swelling and discoloration of the affected limb (commonly hands and feet). Females are affected more commonly than males (3:1). Only one in five affected patients is able to return to a normal level of functioning[1]. It occurs from a disturbance in the sympathetic (overactive) nervous system that controls the blood flow and sweat glands. It often follows a trauma or surgery. Other causes include pressure on a nerve, infection, post-burn injury, neck disorder, stroke and myocardial infarction. Diagnosis is made on physical examination, X-rays, bone scans, CT scan, MRI and sympathetic blockade. Bone scan is highly sensitive (96%) and specific (98%)[2]. It is also a useful guide to prognosis. About 90% of patients with positive bone scan experienced a favorable response to steroid as oppose to 34% of those with negative scintigrams[3].

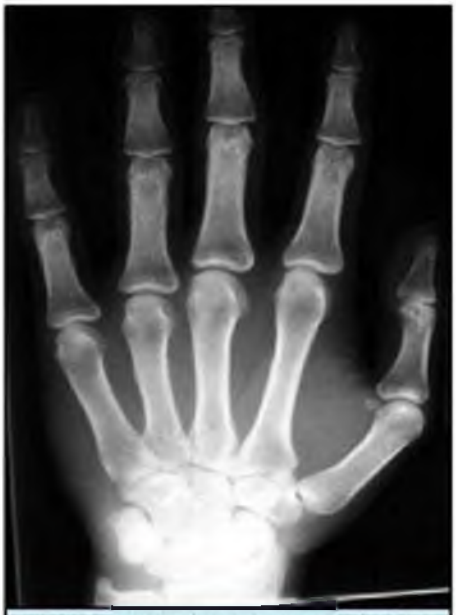

Fig 1. X-ray of left hand shows no abnormality.

CASE REPORT

This 42 years old male presented with 6 weeks history of severe burning sensation and pain in the left hand. He had a laminectomy over C5-C7 about 10 weeks back. Follow up MRI revealed no nerve compression. X-rays of the left hand was unremarkable (Fig. 1). A three phase bone scan was performed with 720 MBq of Tc-99m MDP using a large field of view digital gamma camera. Dynamic

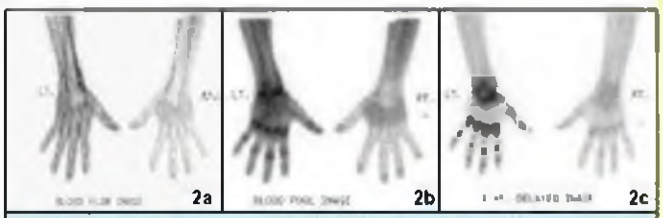

Fig 2. Three phase bone scan. (a) Blood flow image shows increased blood flow over the left forearm and hand. (b) Blood pool image shows increased blood pool activity in the left forearm and hand. (c) Delayed image shows diffusely increased tracer uptake over the wrist, carpal and small joints of left hand. Normal flow and tracer uptake is seen on the contralateral side.

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and blood pool images revealed abnormally increased blood flow over left forearm, wrist and hand (Fig. 2a and 2b). Delayed images revealed diffusely increased tracer uptake over the left wrist, carpal, metacarpo-phalangeal and inter-phalangeal joints (Fig.2c). A diagnosis of reflex sympathetic dystrophy was made. He was started on an oral steroid therapy with analgesic for 3 months and responded well to the treatment.

DISCUSSION

Reflex sympathetic dystrophy has been considered as a distinct entity since the description by Mitchel[4]. It has three clinical stages and bone scan findings will vary depending upon the phase.

Stage 1 (acute) may last upto 3 months. In this stage there will be pain, swelling, burning, excessive sweating and restricted movement of the area. Bone scan shows increased blood flow, blood pool and enhanced tracer uptake in the delayed images in the peri-articular region. Decreased flow and blood pool activity may be seen uncommonly (1-8%) particularly in young patients and hemiplegics[5].

Stage 2 (dystrophic) can last from 3-12 months. Swelling is more constant, skin wrinkles disappear, skin temperature becomes cooler and nails become brittle. The pain becomes more widespread. Bone scan shows normalization of flow and blood pool activity but increased activity on delayed images persists.

Stage 3 (atrophic) occurs from 1 year onwards. The skin of the affected area becomes pale, dry, tightly stretched and shiny. The area is stiff, pain may decrease and there is less hope of getting motion back. Flow and blood pool activity can be normal or decreased (in about 33% cases) and delayed images show normal or decreased tracer uptake. Persistent increased activity on delayed images has been reported in upto 40% patients[5]. This reduced flow in advanced RSD is may be related to amyotrophia caused by disuse.

In the evaluation of children for RSD, increased activity in all 3 phases of bone scan is seen in only 20% cases. A pattern of decreased flow, blood pool and delayed activity is more characteristically seen in children[6].

Therefore, we conclude that the three phase bone scan is a safe, non-invasive, cost effective, highly sensitive and specific modality for the diagnosis of reflex sympathetic dystrophy and also a good predictor of response to treatment as shown in this case.

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