

SCANNING AND RADIOLOGY OF THE CARPAL SCAPHOID BONE

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The value of isotope scanning in patients with suspected fracture of the scaphoid bone of the wrist was examined. For this purpose comparable examinations were made of 50 patients using both radiography and isotope scanning. With a normal scan, the suspicion of fracture or other bone diseases can be excluded. Increased focal activity corresponding to the region of the scaphoid bone indicates the possibility of a fracture, even if a fracture cannot be seen on the initial X-rays.

Key words: isotope scanning; radiology; scaphoid bone fractures.

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In obvious cases the diagnosis of a fracture of the scaphoid bone of the wrist does not cause any difficulty either clinically or radiologically. Occasionally there may be tenderness, but on conventional X-rays it may be difficult or impossible to see any fracture. It is often necessary to take supplementary X-rays in different positions or complete the examination with magnification radiography or tomography (Russe 1960). Some patients may also need a repeat X-ray examination. After the first X-ray examination, Mazet & Hohl (1963) found doubtful fractures in 10 per cent, 75 per cent of which could be confirmed at a later examination. We have performed scintigraphy on 50 patients with clinically suspected fractures of the scaphoid bone, in order to increase the accuracy and shorten the time before a correct diagnosis is made.

PATIENTS AND METHODS

The material consists of 50 patients suspected of having a fracture of the scaphoid. The average age was 43 years, ranging from 13-84 years. There

were 23 men and 27 women. In the first instance, a radiological examination was performed. With evident fracture, a circular plaster was applied; the rest of the patients were given a dorsal splint. The latter group was re-examined radiologically on the 10th day. If the new X-ray showed a fracture, a circular plaster was applied, while those with an unchanged negative X-ray were given a new dorsal splint.

Following a third examination on the 20th day patients with normal radiological and clinical results were excluded from further examination.

All 50 patients underwent scanning of both wrists on the 10th day. Bone scintigraphy was performed using ^{99m}Tc methylene diphosphonic acid complex [^{99m}Tc (MDP)] (Pendergrass 1973). Three hours after intravenous injection of 10 mCi ^{99m}Tc MDP, scintigraphy of both wrists was performed using a Siemens scintimat 2G rectilinear scanner, equipped with a 433 v Tc collimator.

The clinical, radiological and scintigraphic examinations were performed independently by three of the authors.

RESULTS

In 22 patients, a fracture of the scaphoid bone could be diagnosed radiologically, 16 at

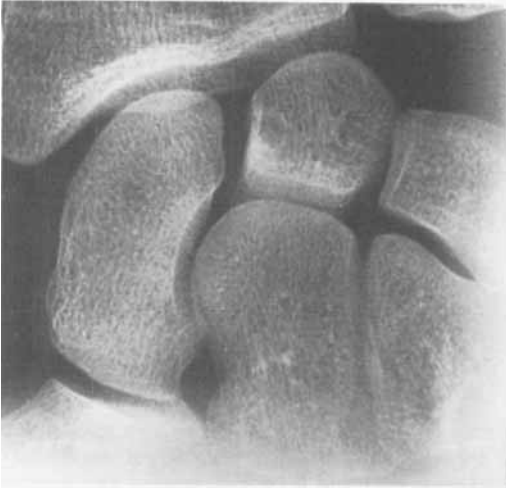


Figure 1. Radiography showing a fracture of the scaphoid bone of the wrist.

the first examination, four on the 10th day and two on the 20th day. Three scintigraphic pictures in the group with fractures dis-



Figure 2. A scan of the same patient demonstrates increased uptake radially due to the fracture.

covered on the first day could not be evaluated due to the newly fitted plaster. In the remaining 13 cases the radiographic and scintigraphic findings corresponded well (Figures 1 & 2). Positive scintigraphic uptake was also seen in the group with fractures diagnosed on the 10th and 20th days with the exception of a 13-year-old child in whom the increased activity was due to unfused epiphyseal lines. Increased focal activity was seen in ten patients and was caused by wrist fractures not located in the scaphoid bone.

Eighteen patients had no fractures at all. In ten patients, a normal scintigraphy was seen, while the picture in one patient could not be evaluated because of a wet plaster. Increased activity in the region of the wrist was seen in seven patients. In three cases, no explanation for this could be found. Of the four remaining patients, one was the child with unfused epiphyseal lines, one patient had a cyst in the capitate bone and two patients had arthrosis or halisteresis.

DISCUSSION

It is important to make a correct and early diagnosis of a scaphoid fracture in order to prevent later non-union which might necessitate bone grafting or an arthrodesis (Böhler et al. 1964, Herness & Posner 1977, Törngren & Sandqvist 1974, Eddeland et al. 1975).

Our material shows that scintigraphy with ^{99m}Tc is a valuable supplementary examination in the diagnosis of fractures of the scaphoid bone. This examination is of particular help in those cases in which the fracture does not become radiologically apparent until a week or more has passed. If the uptake is normal, fracture can be excluded. With a diffuse or focally increased uptake, radiological examination can be used to ascertain the presence of a fracture in the scaphoid bone or in the surrounding areas, or other bone diseases.

Scintigraphy is of lesser value in older patients with arthrosis or halisteresis and in

children with unfused epiphyseal lines. Furthermore, scintigraphy should be performed before a plaster is applied.

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