

Pinhole Bone Scintigraphic Appearances of Osteoid Osteoma*

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유골골종의 바늘구멍 조준기 골스캔

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유골골종(osteoid osteoma)은 특징적으로 직경 약 1cm미만의 원형 또는 타원형의 유골질제부(nidus)가 병소의 중심부에 있고, 그 주위는 반응성골질로 둘러싸여 있다. 그러므로 반응성골질 병소에서 제부의 확인은 유골골종의 진단에 매우 중요하다. 더우기 유골골종의 치료는 반드시 제부를 제거하여야 하기 때문에, 제부의 위치를 정확히 아는 것이 중요하다.

그러나, 유골골종의 제부는 단순 X-선 촬영상에서 잘 안나타나는 경우가 많아 진단에 어려움이 있다. 또한 골스캔도 유골골종의 진단에 많이 이용되고 있으나, 단순 신티그램에서 제부의 정확한 위치 파악은 어렵다. 이에 저자들은 바늘구멍조준기 골스캔을 시행하여 유골골종 제부에는 아주 진한 동위원소 집적이 보였고 주위의 반응성 골질 부위에는 제부보다 약한 동위원소 집적이 보여 특징적인 '이중 농도 집적' 소견을 얻었기에 바늘구멍조준기 골스캔이 유골골종의 진단에 매우 유용한 검사로 사료되어 보고하는 바이다.

the surrounding bony sclerosis.

INTRODUCTION

The cortical osteoid osteoma is seen as a small lucent area (nidus) surrounded by a dense, compact sclerosis on plain radiograph. It is important to localize the nidus for the definitive diagnosis and the surgical removal. Bone scanning is an useful test for the detection of nidus especially when plain radiograph fails to reveal the nidus. We found that pinhole bone scintigraph can distinctly reveal the nidus and

CASE REPORTS

Case 1

An 11-year-old boy presented with limping gait for 2 years. Plain films revealed markedly cortical thickenings with severe sclerosis at the medial aspect of left femur (Fig. 1). But the nidus could be difficult to localize. After the intravenous injection of 15 mci ^{99m}Tc-MDP, bone scan was performed. Routine spot scintigram of pelvis showed focal increased uptake at the medial aspect of left proximal

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Fig. 1. Left femur AP showed markedly cortical thickenings with severe sclerosis at the medial aspect of left proximal femur (white arrows).

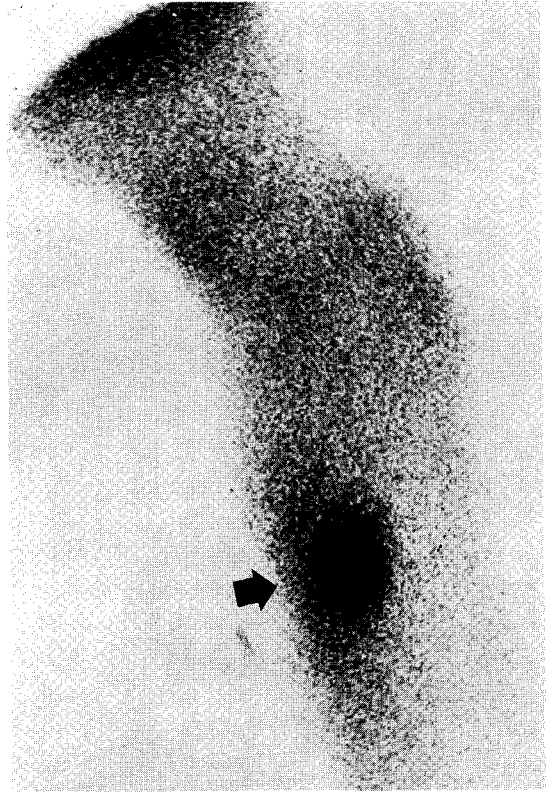


Fig. 2. Pinhole bone scintigram of left proximal femur showed discrete hotter spot within hot area (black arrows).

femur. To evaluate the focally increased uptake of left proximal femur, we performed pinhole bone scintigraphy. Pinhole bone scintigram of left proximal femur showed discrete hotter spot within hot area (Fig. 2).

Case 2

A 13-year-old boy presented with discomfortness of the right knee for a week. Plain radiogram showed localized periosteal reaction at the medial aspect of the right proximal tibia with slight sclerosis of underlying bony lesion (Fig. 3). The nidus could be difficult to localize in this periosteal osteoid osteoma on plain radiograph.

We also performed routine bone scintigraphy and noted focally increased uptake area at the medial

aspect of the right proximal tibia with a suspiciously focal hotter area within focally increased uptakes. For further evaluation we also obtained pinhole bone scintigram of right proximal tibia. Pinhole bone scintigram of right proximal tibia revealed more discrete hotter spot within hot area than routine spot scintigram (Fig. 4).

DISCUSSION

Osteoid osteoma is a benign osteoid-forming lesion¹⁾ that in many ways resembles a low-grade chronic bone abscess. About 75% of cases occur between the ages of 11 and 26 years. It is more than twice as common in males. The tibia and femur are frequent sites of involvement. The central nidus of

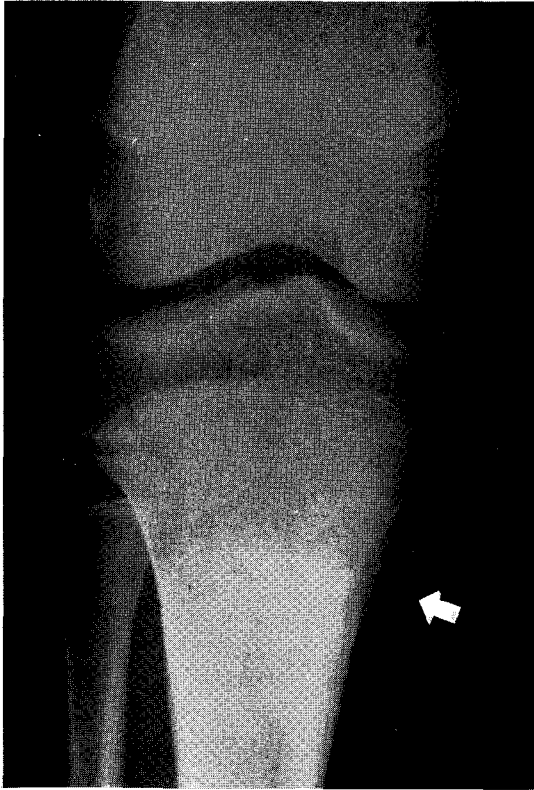


Fig. 3. Right Knee AP showed localized periosteal reaction at the medial aspect of the right proximal tibia with slight underlying sclerosis (white arrows).

tumor is 1.5 cm or less in diameter²⁾ and made up of irregular masses of osteoid in a vascular fibrous matrix.

It is important to localize the nidus for the diagnosis and treatment to facilitate removal of it. When the location of the nidus is unknown, the surgeon is forced to do a large enbloc resection of the entire sclerotic area, which can lead to significant postoperative morbidity. However, if precise localization of the nidus is known, simple curettage of the small nidus results in a much faster postoperative recovery with less morbidity³⁾.

The typical radiographic appearance is cortical sclerosis with containing a small lucency that presents the nidus. The plain radiograph is adequate,

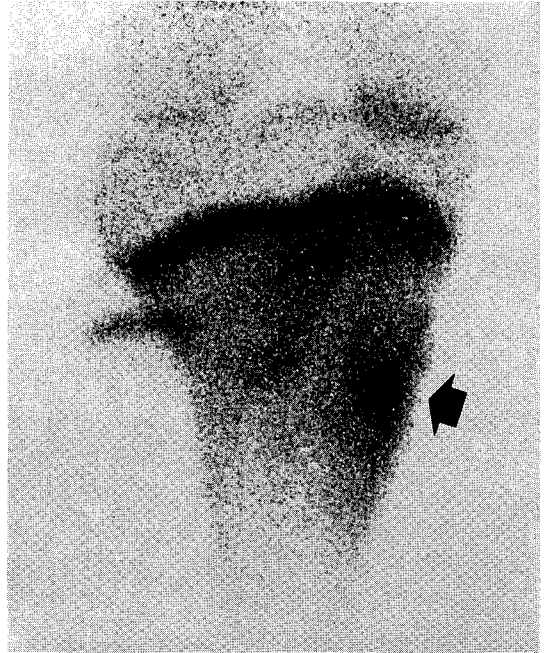


Fig. 4. Pinhole bone scintigram of right proximal tibia showed discrete hotter spot within hot area (black arrows).

permitting the correct diagnosis of 75% of cases in one series⁴⁾. Reactive bone change is usually most marked near the nidus. Therefore, any area of increased bone density should be checked closely. So adequately penetrated or occasionally overpenetrated radiographs are necessary to demonstrate the nidus. If the plain radiograph is equivocal, tomography should be directed to the area in question. Occasionally angiography or CT can confirm or rule out a nidus in some cases.

The most sensitive modality is bone scintigraphy. Bone scintigraphy provides a safe, inexpensive method of localizing osteoid osteoma, which is often difficult to diagnose and localize by other methods. The typical scintigraphic appearance of osteoid osteoma was a well localized area of avid uptake, with a focal hotter spot, representing nidus^{5,6)}.

This double-dense sign appears to be characteristic of osteoid from osteomyelitis or other bone tumor. Scintigraphy was specifically sensitive for a

nidus. But routine spot image of bone scintigraph showed indistinct focal hotter spot in many cases. In many reports, authors demonstrated the supplement methods of spot scintigraphy in detection of nidus. Smith stated that the early five-minute blood-pool image is helpful in detection of nidus. The hot spot in early five-minute blood-pool image seemed hyperemic, representing increased blood flow to the nidus, and delayed scan showed persistently an avid accumulation in this site⁷⁾.

In our cases, routine spot scintigram showed only focal increased uptakes but pinhole scintigram revealed discrete hotter spot within hot area, appearing double-dense sign.

In summary, the optimal workup for suspected osteoid osteoma would be plain radiography followed by bone scanning. If the bone scan is non-specific in the detection of nidus, pinhole magnification image should be performed.

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