

Skeletal Scintigraphy in Meniscus Tear of the Knee*

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＝ 국문초록 ＝

슬관절 반월판 파열의 골신티그래피

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이제까지 슬관절 파열의 진단에는 관절조영술이나 관절경검사가 주로 이용되어 왔다. 저자들은 골스캔을 이용해서 슬관절 반월판 파열의 진단을 시도하였다. 슬관절 조영술이나 관절경검사로 확진된 반월판 파열 환자 7명에 대해 $^{99m}\text{Tc-MDP}$ 와 $^{99m}\text{Tc-PYP}$, 20 mCi를 주사해서 동적, 정적영상 및 바늘구멍 조준기를 이용한 영상을 얻었다. 그 소견은 1) 동적영상에서 반월판 손상부위의 혈류가 국소적으로 증가되었고, 2) 정적영상 및 바늘구멍 조준기를 이용한 영상에서 손상부위의 경골과(tibial plateau)를 따라 특징적으로 얇은판 모양의 방사능 집적을 관찰할 수 있었다.

슬관절의 골신티그래피는 반월판 파열의 유용한 진단 방법으로 사료된다.

INTRODUCTION

The present study has been undertaken to evaluate the possibility of the application of skeletal scintigraphy in the diagnosis of meniscus tear of the knee (MTK).

MATERIALS AND METHODS

A series of knee joint scintigraphy was made using either $^{99m}\text{Tc-MDP}$ (in 4 patients), or $^{99m}\text{Tc-PYP}$ (in 3 patients) in 7 patients with proven diagnosis of MTK by arthrography or arthroscopy.

Scintiangiogram as well as blood pool images were obtained immediately and 2 minutes after intravenous injection of 20 mCi of radionuclide and static imaging followed 2-4 hours thereafter.

Posterior and both oblique scintigrams of the both knee joints were obtained with the patient in prone position using multihole and pinhole collimators.

RESULTS

The scintigraphic findings were correlated with arthrographic and/or arthroscopic findings (Fig. 1).

There was increase in the blood flow as well as in the blood pool at the site of meniscus tear. The static images showed a characteristic plate-like radionuclide accumulation localized sharply to the tibial plateau (subchondral portion) along with rather diffuse radionuclide accumulation in opposing femoral condyle on the affected side (Fig. 2).

DISCUSSION

The overall specificity and accuracy of scintigraphy was superior to arthrography in the diagnosis of

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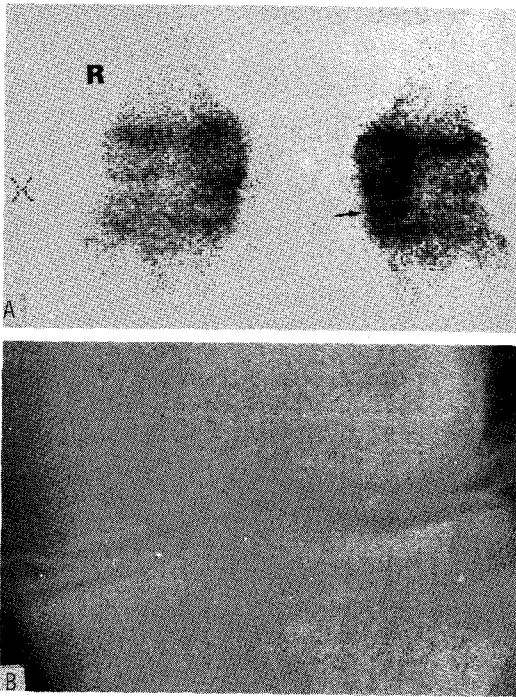


Fig. 1. Posterior pinhole image (A) of the knee showing plate-like radionuclide uptake along the medial tibial plateau with diffusely increased activity in the opposing femoral condyle of the left knee. Arthrogram (B) showing a vertical tear of the medial meniscus.

MTK and the scintigraphic finding was linear or small, discrete focus of increased activity in the joint space, according to Marymont, JV¹⁾. Linear area of increased activity was also the principal scintigraphic finding in our cases. Besides this static scintigraphic finding, blood flow was increased on the affected joint space in the recently damaged cases, that suggests increased vascularity during reparative period of MTK.

It is uncertain whether the accumulation site of MDP or PYP is in the torn meniscus itself or adjacent bone. The presumed mechanisms of soft tissue uptake of the ^{99m}Tc-phosphate compounds are adsorption to the pathologic calcification, increased vascularity, altered capillary permeability, alterations in cellular calcium metabolism, binding to newly synthesized collagen, and abnormal binding to phos-

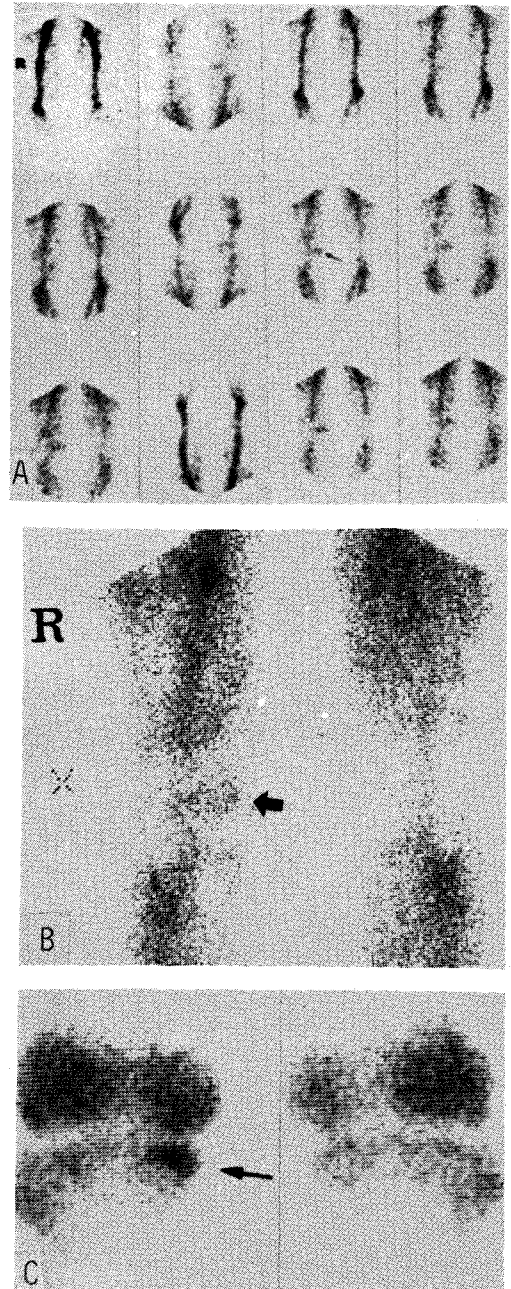


Fig. 2. Scintiimages showing blood flow increase in the medial aspect of the right knee joint space on the scintiangiogram (A) and 2 mins blood pool image (B). Static knee joint scintigram (C) showing radionuclide accumulation localized sharply to the medial plateau with diffusely increased activity in the opposing femoral condyle of the right knee.

phatase enzymes²). Arnoczky et al³) showed with microinjection techniques that the depth of peripheral vascular penetration is 10% to 30% of the width of the medial meniscus and 10% to 25% of the width of the lateral meniscus. These peripheral meniscal blood supply is capable of producing a reparative response, similar to that observed in other connective tissues⁴). Noble, J. & Hamblen, DL⁵) showed that calcification is twice as common in those menisci with degenerate tear (26.5%) as in those without (12%). When a meniscus has been injured, capsular and ligamentous structures as well as the articular surfaces often have also been injured⁶). So accumulation of bone scan agents in the region of meniscus tear was presumably due to 1) increased vascularity and/or calcification in the torn meniscus during the repair period and 2) reactive new bone formation in the adjacent tibial plateau and femoral condyle.

Taking into account the fact that ^{99m}Tc-PYP has a lower bone to soft tissue ratio than ^{99m}Tc-MDP, Marymont, JV et al¹) used PYP to evaluate meniscus tear. But there was no difference in the diagnostic

efficacy between PYP and MDP in our study.

CONCLUSION

It was concluded that skeletal scintigraphy of knee is useful in the diagnosis of meniscus tear.

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