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Comparison of Tc-99m MDP, Tc-99m HSA and Tc-99m HIG uptake in rheumatoid arthritis and its variants

Murathan SAHIN,* Irem BERNAY,* Tarik BASOGLU* and Ferhan CANTURK**

*Departments of *Nuclear Medicine and **Physical Therapy and Rehabilitation, Ondokuz Mayıs University Faculty of Medicine, Samsun, Turkey*

Tc-99m polyclonal immunoglobulin-G has been shown to be a successful agent in the depiction of active inflammation in rheumatoid arthritis (RA). The objective of this study was to compare the uptake behaviors of Tc-99m HIG and Tc-99m MDP in RA and variants of rheumatoid arthritis (VRA). Seventeen patients with RA and 8 patients with VRA presenting with active inflammation were included in this study. Ten subjects with well-diagnosed degenerative joint disease constituted the control group. All joints in patients were also imaged with Tc-99m HSA to evaluate the vascularization status of the joints. Tc-99m HIG and HSA scans were obtained at 2, 4 and 24 hours after the injection of 555 MBq Tc-99m HIG and 296 MBq Tc-99m HSA. Conventional bone scans were performed 4 hours after the injection of 740 MBq Tc-99m MDP. Target-to-background (T/B) ratios were obtained exclusively over the joint regions. Tc-99m HIG T/B ratios of the active joints in RA were significantly higher than those of the non-active joints and the control group ($p < 0.05$). Tc-99m HIG T/B ratios in active joints showed a progressive increase between 2 and 24 hour images ($p < 0.05$). In contrast, Tc-99m HSA T/B ratios decreased in all active joints significantly ($p < 0.05$) except the ankle joint region ($p > 0.05$). The T/B ratios in Tc-99m MDP bone scans were higher in all active joints than in non-active RA joints and joints of controls but significantly differences were only detected in wrist and elbow joints. All clinically active joints in VRA patients accumulated Tc-99m HIG and HSA, and showed increased Tc-99m MDP uptake. These joints had a very similar Tc-99m HIG retention pattern to the RA joints. The detection rate of active joint inflammation with Tc-99m HIG was much higher than that with Tc-99m MDP. The increasing Tc-99m HIG uptake ratio between 2 and 24 hours in contrast to Tc-99m HSA indicates the presence of other binding mechanisms besides increased vascularity in RA.

Key words: arthritis, technetium-99m polyclonal immunoglobulin G, technetium-99m albumin, technetium-99m methylene diphosphonate