COMPARISON OF TECHNETIUM-99m-LABELLED HUMAN POLyclONAL IMMUNOGLOBULIN SCINTIGRAPHY WITH CONVENTIONAL BONE SCINTIGRAPHY IN PATIENTS WITH RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS


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ABSTRACT

The ability of technetium 99m labelled polyclonal human immunoglobulin G (99mTc-IgG) scintigraphy and conventional bone scintigraphy with technetium 99m labelled hydroxymethylene diphosphonate (99mTc-HDP) to detect and to differentiate between the different degrees of arthritis activity was studied in 24 patients with rheumatoid arthritis (RA) and 10 patients with osteoarthritis (OA). The patients with RA were divided into 4 groups based upon clinical and radiological observations: 1: non-erosive, in remission (n=5); 2: non-erosive, active (n=5); 3: erosive, in remission (n=7); 4: erosive, active (n=7). The patients were scored for joint pain, swelling and uptake of the radiopharmaceutical on a 4-point scale. The mean joint scores of 99mTc-IgG scintigraphy in RA patients with active disease was significantly (p<0.001) higher than of patients with inactive disease. The mean joint scores were also higher in patients with erosions compared to patients without erosions but the difference was less significant (p<0.05). For 99mTc-HDP scintigraphy no significant differences were found between the mean scores of these patient groups. When 99mTc-IgG scintigraphy is regarded as a test to detect arthritis as defined by joint swelling, this test has a sensitivity that ranged between 64 and 100% for the different joints. Comparison of scintigraphic results between patients with RA and OA revealed that the mean joint score of 99mTc-IgG scintigraphy was significantly (p<0.001) higher in the patients with RA than in patients with OA whereas for 99mTc-HDP scintigraphy this difference was not significant.

This study shows that 99mTc-IgG scintigraphy, in contrast to, 99mTc-HDP scintigraphy is a sensitive and specific method to detect synovitis and differentiates between the different degrees of disease activity in RA.
INTRODUCTION

Rheumatologists continue to seek improvement in accurate assessment of disease activity in rheumatoid arthritis (RA). There is no golden standard to quantify arthritis activity. The availability of an objective parameter to evaluate disease activity in RA would be of great value in patient management and in the examination of therapeutical effects. $^{99m}$Tc-IgG scintigraphy has been suggested as a reliable objective method to detect arthritis activity in RA.

AIM OF THE STUDY

This study was performed to ascertain the following:

- How does $^{99m}$Tc-IgG scintigraphy compare to $^{99m}$Tc-HDP scintigraphy in the detection of arthritis activity?
- Can $^{99m}$Tc-IgG scintigraphy detect different degrees of arthritis activity?

For this purpose, 24 patients with RA selected for various levels of disease activity or joint destruction and 10 patients with osteoarthritis (OA) were investigated with both $^{99m}$Tc-IgG- and $^{99m}$Tc-HDP scintigraphy.

PATIENT AND METHODS

Twenty-four patients (7 males, 17 females) with RA, and 10 patients (2 males, 8 females) with clinical and radiological features of primary OA, were studied. The mean age of the patients with RA was 55 years (range 20-80 years) and they had a mean disease duration of 7 years (range 0-21 years). The patients with RA were divided into 4 groups based upon clinical and radiological observations: 1: non-erosive, in remission (n=5); 2: non-erosive, active (n=5); 3: erosive, in remission (n=7); 4: erosive, active (n=7). The mean age of the patients with OA was 67 years (range 56-80 years) and they had a mean disease duration of 6 years (range 1-21 years). Imaging was performed 4 hours after $^{99m}$Tc-IgG injection and 2 hours after $^{99m}$Tc-HDP injection. The period between the 2 scintigraphic investigations was between 2 and 7 days. Anterior and posterior total body views and anterior spotviews of the joints were obtained. The following joints were investigated: shoulder, elbow, wrist, 5 separate metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints, 4 distal interphalangeal (DIP) joints, hip, knee, ankle and forefoot. All joints were scored for pain, swelling and radiopharmaceutical uptake on a 4 point scale. CRP, ESR levels and X rays of the hands, wrists and feet were obtained.

RESULTS

The group of patients with active RA had, in contrast to patients with RA in remission significantly higher scores for joint pain, swelling, CRP and ESR. The mean joint scores of $^{99m}$Tc-IgG scintigraphy in RA patients with active disease (8.14) was significantly ($p<0.001$) higher than of patients with in remission disease (2.58), whereas such differences were not significant for $^{99m}$Tc-HDP scintigraphy (active RA 9.96; RA in remission 6.67). The group of RA patients with erosions had a significantly higher mean joint score with $^{99m}$Tc-IgG scintigraphy when compared to