Comparison of ^{99m} technetium nanocolloid scintigraphy with ^{99m} technetium human immunoglobulin G scintigraphy in the differentiation of inflammatory joint disorders in patients with joint pain

Sirs,

Musculoskeletal pain is a common health problem in the western countries. There is interest in diagnostic tools which may aid in identifying the individuals with arthritis among the patients suffering from joint pain. However, ultrasonography is operator-dependent and magnetic resonance imaging (MRI) is expensive. Bone scintigraphy is a sensitive method for detecting synovitis, but it is often also positive in osteoarthritic joints (1). The utility of ^{99m} technetium-labelled human immunoglobulin G (HIG) in the assessment of arthritis is well documented (1-5), and it can be considered the gold standard scintigraphic method in the assessment of arthritis.

In the present study, we compared ^{99m}technetium-labelled nanocolloid (NC, Nanocoll®, Nycomed Amersham Sorin, Saluggia, Italy) with HIG (Technescan HIG®, Mallincrodt Medical BV, Petten, Holland) in outpatients with recent-onset joint symptoms. The study involved 43 adult patients admitted to the Division of Rheumatology at Oulu University Hospital due to musculoskeletal pain and a suspicion of arthritis. They gave informed consent to the study, which had been approved by the Ethics Committee of Oulu University Hospital. The patients' diagnoses rested on clinical decision-making during a follow-up of 3-6 months, and were classified as arthritis (n=24) or soft tissue rheumatism (n=19). Joint swelling score (range 0-44), erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were used as classical measures of disease activity. All patients received an intravenous injection of 370 MBq HIG and 555 MBq of NC. Static images (128x128 matrix, 10 min. acquisition time) of all joints were acquired 1 hour and 4 hours later in the NC and HIG studies, respectively. The scintillation camera was equipped with a low-energy general-purpose collimator. Scintigraphy of the two tracers was performed sequentially at a time interval of 48-72 hours between the studies. Forty-four joints in each scan were scored for activity on a four-point scale by two blinded nuclear medicine physicians.

The median [interquartile range (IQR)] values of the total HIG and NC scintigraphy scores for the patients with and without arthritis were 5.5 (1.25, 13) *vs*. 0 (0, 0) and 6.5 (1, 17) *vs*. 0 (0, 1), respectively. In the group of patients with arthritis, the total scintigraphic scrores were closely associated with the joint swelling score; r 0.68 (p<0.001) for HIG and 0.69 (p<0.001) for NC scans, while the correlations with ESR and CRP were non-significant. When the scintigraphic findings of individual joints were classified as normal and abnormal, the two scintigraphic methods showed marked convergence; Kappa coefficient (95% CI) 0.86 (0.86 to 1.00). The interclass correlation of the total scintigraphic activity scores between the methods was 0.95 (95% CI 0.73 to 0.99). There was moderate agreement between total scores of HIG and NC scintigraphies (Fig. 1).

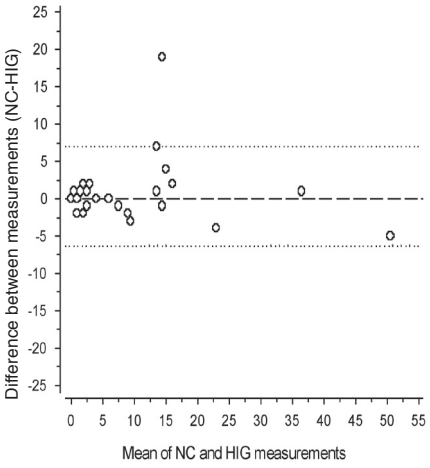

Fig. 1. Bland-Altman plot. The difference of the total scores of ^{99m} technetium-labelled human immunoglobulin G (HIG) and ^{99m}technetium-labelled nanocolloid (NC) scintigraphies plotted against their means for each patient. The dotted lines show 95% limits of agreement.

Our results show that NC scintigraphy is comparable to the HIG method in its ability to differentiate between cases with and without arthritis. This is in accordance with two earlier studies (6, 7). Our results are also in concordance with those of Adams *et al*. (8) and Attia *et al*. (9), who reported a close correlation between clinical findings and NC scintigraphy in patients with peripheral joint pain divided into groups with and without active joint inflammation. We have earlier shown that the activity of synovitis assessed by quantitative NC scintigraphy of the wrist joint is closely related to that documented by contrast-enhanced dynamic and static MRI (10).

The rapid blood clearance of NC is an advantage over HIG. It makes early imaging possible one hour after the injection. In our experience, the target-to-background ratio in NC scans one hour after tracer administration is often visually better than in HIG scans obtained four hours after the injection.

In conclusion, our results support the usefulness of NC scintigraphy in the early screening of patients with joint pains and suspicion of artritis.

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