

Leukocyte Scintigraphy to Assess Disease Activity in Inflammatory Bowel Disease

TO THE EDITOR: We read with interest the article by Charron et al. (1), who found ^{99m}Tc -HMPAO leukocyte scintigraphy to be an excellent technique for the detection of inflammatory bowel disease (IBD) in pediatric patients. Besides establishing which bowel segments are involved, a knowledge of the current clinical activity is an important factor in the follow-up of IBD patients. Accordingly, efforts are made to calculate the scintigraphic activity by using ^{111}In or ^{99m}Tc -HMPAO-labeled leukocytes. Activity indices are based on quantitative analysis of the bowel-to-bone marrow ratio by using the SPECT technique (2) or semiquantitative scoring of the leukocyte uptake of each bowel segment relative to the bone marrow or liver uptake (3–6).

In the article by Charron et al. (1), which agrees with the findings of Schölmerich et al. (4), the highest segment score was used as an indicator of the scintigraphic activity. We do not agree with the use of this score because we investigated a large number of adult IBD patients with ^{99m}Tc -HMPAO leukocyte scintigraphy and, based on our findings, we suggest using the sum of the segment scores (6). We found significant correlations between the scintigraphic activity and the Best index, the alpha2-globulin level, the fibrinogen level, the fS iron level, the sedimentation rate, the leukocyte count and the platelet count in ulcerative colitis patients (6). When the highest segment score was used to reflect the scintigraphic activity in the same patients, the scintigraphic activity correlated only with the fibrinogen level ($r = 0.35$, $p < 0.02$) and the fS iron level ($r = -0.39$, $p < 0.02$) (unpublished data). Other investigators, finding correlations between the scintigraphic activity and the clinical activity indices or CRP, also prefer to use the sum of the segment scores (3,5).

We wish to emphasize that our results relate to adult IBD patients only; nevertheless, we presume that the summed score technique can be adapted to the examination of pediatric IBD patients as well. The summed score seems to characterize the whole inflamed bowel mass better compared to the highest segment score, which is indicated by its greater correlation with the laboratory and clinical activity parameters.

To summarize, in contrast with Charron et al. (1), we consider that the sum of the segment scores is a more suitable choice to represent scintigraphic activity in IBD patients.

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REPLY: We agree with Dr. Papos that the sum of the segment scores is preferable for quantifying disease activity. We recently reported a correlation of sum-of-the-segment scores with the clinical score (1) as defined by Lloyd-Still and Green (2) to be 0.62, whereas the correlation of the erythrocyte sedimentation rate with the clinical score was only 0.24. The aim of our initial publication was not to evaluate the accuracy of different scoring systems. We have now studied over 100 children and we suspect the sum of the segment score will indeed be the most accurate.

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Strontium-89 Injected Through Implanted Ports

TO THE EDITOR: There has been extended discussion in the past regarding the use of ^{89}Sr -chloride in patients who have poor venous access. In particular, patients who have undergone prior chemotherapy and have limited venous access usually rely on an implanted port for blood withdrawal and administration of intravenous pharmaceuticals.

We undertook a simple experiment to determine if the radiation exposure to the patient following injection of ^{89}Sr -chloride through implanted ports.

Two types of implantable port systems were evaluated: the MRI Port and Dome Port. Both were attached to catheters with a three-way Groshong valve system.

Each implantable port/catheter system was filled with 1.3 mCi ^{89}Sr -chloride per 1.8 ml saline solution (volume capacity was determined by manufacturer's [BARD] guidelines and multiple saline infusions).

The activity of ^{89}Sr -chloride was determined based on the manufacturer's (Amersham) calibration time and date. The port/catheter was placed in a dose calibrator and a calibration factor was determined based on the known activity injected into the catheter. This calibration factor was then used to measure the residual activity in the catheter following a 20 ml saline flush.

Bremsstrahlung imaging of the filled port/catheter systems was performed on a single-head gamma camera using a medium-energy collimator. Photopeaks were set at 80 keV and 167 keV with 50% and 20% windows, respectively.

After imaging was complete, each system was flushed with 20 ml saline solution. Following one system flush, no residual activity was measurable in the catheter. Post-flushing images confirmed complete clearance of the port/catheter activity.

Strontium-89-chloride can be safely injected through implantable intravenous port systems as an alternative to the standard peripheral intravenous injection. If proper flushing is performed following admin-

istration, there will be no added radiation dose to the soft tissues surrounding the port.

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Disseminated Intravascular Coagulation in Metastatic Prostate Cancer

TO THE EDITOR: The article by Leong et al. (*J Nucl Med* 1994;35:1662-1664) merits further discussion of the factors to consider in selecting patients who will receive ^{89}Sr therapy for palliation of pain from osseous metastases.

The patient described had pre-existing anemia and thrombocytopenia, which the authors term "low-grade DIC," prior to ^{89}Sr therapy. There is no mention of the active management of the DIC with heparin and blood products in the article. No platelet levels are given between Day 10, when they were 53×10^9 per liter, or Day 31, when the first platelet infusions were given. There is no detail on the progression of the condition. The anemia was actively managed by packed red cell infusions. No evidence, however, is given of the coagulopathy being managed prior to Day 31.

In clinical trials, we have seen no evidence of suppression of the red cell series or of coagulopathy as a result of ^{89}Sr therapy. We do report thrombocytopenia and leukopenia as a result of the marrow suppression by ^{89}Sr . We previously reported two cases of DIC or consumptive coagulopathy (which is typically associated with severe infections, septic shock and advanced malignancy) in patients who were given ^{89}Sr , but this was ascribed to the underlying disease. This represents three known cases in a total of over 12,000 patients treated so far.

Although the authors concede that no causal relationship was established, this article does highlight the need for caution in patients with compromised bone marrow, as mentioned in the package insert and, importantly, emphasizes the need for active specific management of treatable hematological conditions prior to therapy.

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Bisphosphonate Effect on Bone Scintigraphy

TO THE EDITOR: We read with interest the article by Pecherstorfer et al. on the effect of bisphosphonate treatment on bone scintigraphy (1) and their reply (3) to the letter to the editor by Kayano et al. (2). Bisphosphonates are powerful inhibitors of osteoclast-mediated bone resorption. They are used not only for the treatment of hypercalcemia, but also for the treatment of Paget's disease and bone metastasis. Among various bisphosphonates, etidronate is the first generation bisphosphonate and has a unique action for bone metabolism; that is, etidronate action prevents bone resorption in a range of small amount but etidronate produces bone resorption above the threshold amount. Etidronate was reported to disturb the bone scintigraphy (4,5), but clodronate did not (1).

We recently observed that YM-175, a new bisphosphonate 7-10 times as potent as pamidronate, had no significant effect on bone scintigraphy

TABLE 1
Bone Scan Index

Patient no.	Pretreatment	4 wk	8 wk
1	$3.47 \pm 2.50^*$	2.83 ± 1.55	3.35 ± 1.58
2	3.10 ± 1.05	3.66 ± 1.79	4.03 ± 2.04
3	3.15 ± 1.79	3.17 ± 1.21	3.30 ± 1.16
4	2.66 ± 0.71	3.15 ± 1.33	2.90 ± 0.73
Average†	3.09 ± 1.58	3.16 ± 1.35	3.30 ± 1.33

*Mean value and 1 s.d. of the ratio of abnormal uptake sites and normal counterparts (5-6 sites in each patient) was shown.

†No statistical significance was detectable by ANOVA.

(6). We intended to treat the bone metastatic pain with YM-175. Some of the patients were monitored by bone scintigraphy. We administered YM-175 (at a dose of 10 mg once a week for 5 wk intravenously). Bone scintigraphy was performed at pre-, 4- and 8-wk. Quantitative bone scintigraphy was performed according to the methods of Pecherstorfer et al. (1). Briefly, a region of interest was placed on bone metastasis and opposite nonmetastatic site, and the ratio of bone metastatic site to nonmetastatic counterpart was calculated. As shown in Table 1, no statistical difference was shown between pre-, 4- and 8-wk bone scintigraphic values. Furthermore, in one patient in whom bone scintigraphy was performed just after administration of YM-175 and no change was shown. Only etidronate appears to interfere with bone scintigraphy.

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Radioiodine Therapy of the Autonomous Thyroid Nodule in Patients with or without Visible Extranodular Activity

TO THE EDITOR: The interesting paper by Clerc et al. (1) describes the outcome of 88 patients ~6 yr after radioiodine therapy (intended dose of 80 Gy) for an autonomous thyroid nodule. Forty-nine patients without scintigraphically visible extranodular activity fulfilled the criteria of scintigraphic decompensation, another 39 did not; 9 of 88 patients had nonsuppressed TSH levels (TSH > 0.1 mU/liter or TRH test > 2 mU/liter). Uptake monitoring and calculation of the doses absorbed by the autonomous thyroid nodule and the heterolateral extranodular area (in patients with and without extranodular activity) are beautifully presented. Unfortunately, the effectively measured results are disappointing in that 72 Gy (in case of extranodular activity) or 57 Gy (no extranodular activity) to the nodule are rather low doses to eradicate an autonomous thyroid nodule [a monoclonal growth due to mutations of the TSH receptor genes (2,3)], whereas doses of 8.5 Gy or 49 Gy absorbed by the extranodular area are too high to preserve full function. Thus, while late hypothyroidism is not prevented, hardly tolerable rates of therapy failures result.

As compared to our results, based on an internationally established dosimetric approach (4), 72 patients treated with 300 Gy to their auto-