Specificity of ^{99m}Tc-Ciprofloxacin Imaging

TO THE EDITOR: We have read with interest the letters by Das et al. (*1*) and Pauwels et al. (*2*) regarding the characteristics of ^{99m}Tc-ciprofloxacin imaging for detection of infections. The above correspondence cites our previous work, and the latter group was "surprised to hear that only 40% specificity was obtained using scintigraphic data after 4 h, because this information has never been included in reports by the London group and puts a different complexion on the reliability of previously published clinical data."

We would like to correct the inaccuracy in referring to our original data (*3*). Our work shows that in patients with hip prosthesis infections, the specificity of ^{99m}Tc-ciprofloxacin imaging was 41% at 1-h imaging, 68% at 4-h imaging, and 95% at 24-h imaging—for a sensitivity of 100%. Our data are thus in good agreement with previously published clinical data, and the citation of a 41% specificity after 4 h may have inspired Pauwels et al. to a more subjective interpretation than one allowed by the results of our original study.

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REPLY: We read with interest the letter by Larikka et al. referring to our reply to a letter to the editor (*1,2*). In this reply, we expressed our surprise when Das et al., referring to data by Larikka et al. (*3*), mentioned "an increase in specificity from 41% to 95% when a 24-h image was combined with a 4-h image. . . . " From the present letter by Larikka et al., we understand that the real specificity at 4 h amounts to 68% instead of 41% as reported by Das et al., who cited the work in the wrong way and put us on the wrong track. Therefore, we appreciated that Das et al., in an erratum published 2 mo after the publication of our reply, corrected their inaccuracy (*1*). Nevertheless, also in the abstract by Larikka et al., this information was not clearly stated since it is written "In 13 (59%) of the non-infected patients, non-specific uptake of ^{99m}Tc ciprofloxacin was found in the 1-h and 4-h images, which disappeared, however, in the 24-h images." The data of Larikka et al. are in full agreement with our preclinical observations at early intervals of injection of radiolabeled ciprofloxacin. Indeed, their and our studies pointed out that ^{99m}Tc-ciprofloxacin cannot discriminate between infectious and sterile inflammatory processes at 1 h after injection of the tracer. Although Larikka et al. demonstrated an improved accuracy of ^{99m}Tc-ciprofloxacin with extended imaging time, in our experiments there was no need to improve any diagnostic accuracy with late images since ^{99m}Tc-labeled antimicrobial peptides were already able to distinguish infections from sterile inflammations 1 h after injection of the tracer (*4*). It should be realized that in our experiments, ciprofloxacin was used as a control, as stated before (*4*). Lastly, could Dr. Larikka and colleagues (including Britton as coauthor (*3*)) demonstrate where we made a "subjective interpretation"? In their letter, they did not provide evidence for this.

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A New Role for Nuclear Medicine in Multiple Myeloma

TO THE EDITOR: We read with great interest the article by Durie et al. (*1*) and were impressed by the results they obtained in evaluating patients with multiple myeloma. In the past few years, we and others reported similar results using ^{99m}Tc-methoxyisobutylisonitrile (MIBI) (*1–5*). In particular, we found positive ^{99m}Tc-MIBI whole-body findings in 30% of patients with no evidence of multiple myeloma on a radiologic full-skeletal survey, and in the majority (76%) the scintigraphic findings were in agreement with the subsequent clinical follow-up (*2*). In addition, ^{99m}Tc-MIBI scintigraphy showed a positive predictive value of 100% and a negative predictive value of 83% in the diagnosis of active multiple myeloma and a positive predictive value of 84% and a negative predictive value of 100% in identifying advanced (i.e., stage II or III) disease. Excellent correlations were also observed between the score for ^{99m}Tc-MIBI bone marrow uptake and either plasma cell infiltration or monoclonal component (*3*). Finally, preliminary data suggested a potential prognostic role of ^{99m}Tc-MIBI scintigraphy in patients with multiple myeloma undergoing chemotherapy (*4*). Similar results were reported by other authors (*5*). Therefore, we do believe that nuclear medicine provides new and promising tools for the evaluation and monitoring of patients with multiple myeloma.

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REPLY: We agree with Pace et al. that nuclear medicine provides new and promising tools for myeloma evaluation. Before our investigations of the role of ^{18}F-FDG PET (*1*), we and others had evaluated the role of ^{99m}Tc-methoxyisobutylisonitrile (MIBI) (*2–5*). The new question is, what are the relative merits of ^{99m}Tc-MIBI versus ^{18}F-FDG PET? From an ongoing comparative analysis with serial ^{99m}Tc-MIBI scanning, a few comments can be made. Both show positive findings in 25%–30% of patients with negative radiography findings (*1–3*). Both can give helpful prognostic information. Because ^{99m}Tc-MIBI is negative for multidrug-resistant, P-glycoprotein–positive myeloma and ^{18}F-FDG PET is positive, there is differential utility in this setting. Both ^{99m}Tc-MIBI and ^{18}F-FDG PET are usually negative for monoclonal gammopathy of undetermined significance. However, ^{99m}Tc-MIBI can be positive for slow-growing, smoldering, or indolent myeloma, with the positive findings often in the form of a diffuse marrow superscan effect. ^{18}F-FDG PET is much better for detection and monitoring of focal sites of more rapidly growing active myeloma both within bone and in extramedullary sites.

The detection of lesions, especially hot-spot foci, is known to be enhanced by tomographic nuclear medicine techniques. PET offers the advantage of being a whole-body tomographic study and can often detect lesions not seen with planar (nontomographic) imaging. SPECT with ^{99m}Tc-MIBI may be helpful in selected sites when properly done.

The unpredictable gastrointestinal activity, as well as uptake in other abdominal organs, is a disadvantage for ^{99m}Tc-MIBI compared with ^{18}F-FDG PET. Our results have been more favorable with ^{18}F-FDG PET in the abdomen and pelvis.

We agree that having several techniques with excellent results gives greater flexibility in evaluating patients with myeloma. It is helpful to have 2 nuclear imaging techniques capable of providing different types of clinical information and correlations.

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