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Radiolabeled Immunoglobulin Scintigraphy for the Diagnosis of Spondylodiscitis

TO THE EDITOR: Datz et al.'s article on the efficacy of ^{111}In-polyclonal immunoglobulinG (IgG) to detect infection and inflammation (*1*) contains one case of spondylodiscitis in which scintigraphy with ^{111}In-IgG yielded a positive result. Another five true-positive results have been obtained with this tracer in cases of spondylodiscitis caused by various organisms (*2*).

Labeled leukocytes have difficulty establishing the diagnosis of spondylitis/spondylodiscitis (*3–5*). Uptake of ^{67}Ga is aspecific. Therefore, polyclonal IgG potentially could be useful for this diagnosis. However, since no other spinal diseases have been included in the above mentioned series, questions about the specifity of this method for the diagnosis of spondylodiscitis still need to be addressed.

Results obtained with ^{99m}Tc-IgG have been less encouraging. In one study using iminothiolane-derived IgG, three cases of spondylitis were found false-negative with ^{99m}Tc-IgG (*6*). Another study using DTPA conjugated IgG, reported one false-negative and two true-positive results (*7*). Our own experience with ^{99m}Tc-IgG for the diagnosis of spondylodiscitis is summarized in Table 1. Images were obtained at approximately 5 and 24 hr after injection of 555 MBq ^{99m}Tc-IgG labeled via its iminothiolane derivative.

From these cumulative data, it would appear that ^{99m}Tc-IgG lacks sensitivity for the diagnosis of spondylodiscitis, perhaps unlike its ^{111}In-labeled counterpart. Differences between the biodistribution of ^{111}In- and ^{99m}Tc-IgG have also been observed in animal models of focal infection (*8*). Technetium-IgG radiolabeled via the hydrazino nicotinamide derivative is known from animal studies to behave more like ^{111}In-IgG (*9*).

In conclusion, although radiolabeled IgG may hold promise for the diagnosis of infectious spondylitis, further studies in more extensive patient groups are required to define its specificity and sensitivity in this respect, as well as the radiolabel and radiolabeling method of choice.

TABLE 1
Technetium-99m-IgG Imaging in Six Patients with Suspected Spondylodiscitis

Sex	Age	Location	Verification procedure	Imaging
M	77	L4–L5	CT, MRI, culture (*Candida parapsilosis*)	TP*
F	47	L1L2	CT, MRI	FN
M	47	L4L5	Ziehl staining of surgical specimen	FN
F	32	L3L4, L4–L5	Follow-up	TN†
F	41	L5S1	MRI	TN
F	24	Lumbar spine	Follow-up	TN

*Abscess with extravertebral extension.
†Previous spondylodiscitis due to *Pseudomonas aeruginosa*.
TP = true-positive; FN = false-negative, TN = true-negative.

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REPLY: There are a number of problems with using radionuclide infection imaging agents for diagnosing osteomyelitis/discitis of the spine, especially in postoperative patients.

Indium-111-leukocytes detect most musculoskeletal infections with reported sensitivities ranging from 83% to 100%. Several recent studies, however, have shown that ^{111}In-leukocytes are less sensitive for spine infections. In 22 patients with biopsy proven osteomyelitis/discitis, Whalen et al. found that the leukocyte scan had a sensitivity of only 13% (*2*). Palestro et al. studied 71 patients with suspected vertebral osteomyelitis and found only 39% had increased activity. A total of 7% had normal studies and 54% had photopenic defects (*3*). Unfortunately, photopenia on leukocyte scans is not specific for osteomyelitis. Cold defects have been described in tumor, radiation, fracture, Paget's disease, degenerative arthritis and following surgery (*4*).

It is unclear why labeled leukocytes do not detect vertebral infections as well as other musculoskeletal infections. A pathophysiologic explanation has been offered by Palestro (*5*). Vertebral osteomyelitis likely originates as a septic embolism that lodges in a metaphyseal artery. Retrograde propagation into the metaphyseal anastomosis circumferentially around the vertebral body may involve other metaphyseal arteries, with the development of sequential septic infarcts. Occlusion of such a large number of vessels may impede white cell migration to the site of infection. Lower sensitivity in spine infections may be partially explained by the difficulty in detecting cold defects compared to hot lesions. The timing of the scan may also be important. At the