

Three Cases Demonstrating the Role of Gallium Scanning in Relapsing Hodgkin's Disease and Non-Hodgkin Lymphoma

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Restaging of Hodgkin's disease and non-Hodgkin lymphoma for chemotherapy traditionally requires chest radiograph and abdominal computerized tomogram (CT) for routine follow-up examination. Although gallium scanning has had a poor record in the past, recent studies suggest that improved techniques have given this method high sensitivity. We present three cases in which gallium correctly staged lymphoma that had been missed or misinterpreted by chest radiographs and abdominal CT. Gallium imaging is useful in follow-up of lymphoma patients especially when the CT scan is difficult to interpret.

J Nucl Med 28:1611-1615, 1987

Gallium-67 (^{67}Ga) scanning has not been widely used to stage lymphoma patients due to a reported high false-negative rate (1). Recent literature suggests that

gallium's accuracy has improved with higher dosage, use of the triple peak Anger scintillation camera (2), and use of single photon emission computed tomography (SPECT). Imaging with SPECT technique has been shown to be more sensitive than planar imaging alone (3). As scintigraphic techniques continue to improve, gallium may play an increasingly important role in restaging patients with both Hodgkin's lymphoma (HL)

Received Sept. 8, 1986; revision accepted May 11, 1987.

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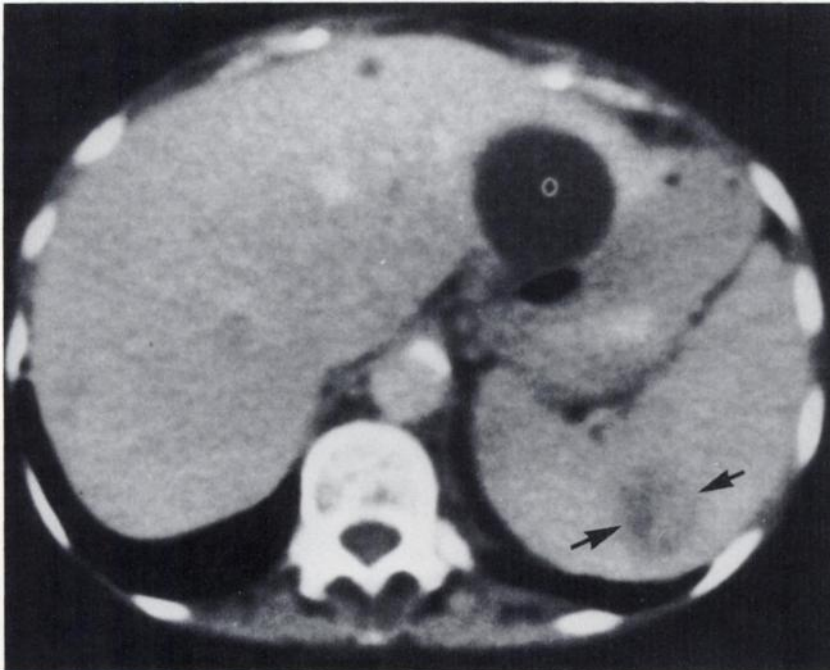


FIGURE 1

Case 1: CT of the upper abdomen demonstrates a 2.5-cm heterogeneous lesion in the spleen (arrows). Multiple liver cysts are evident.

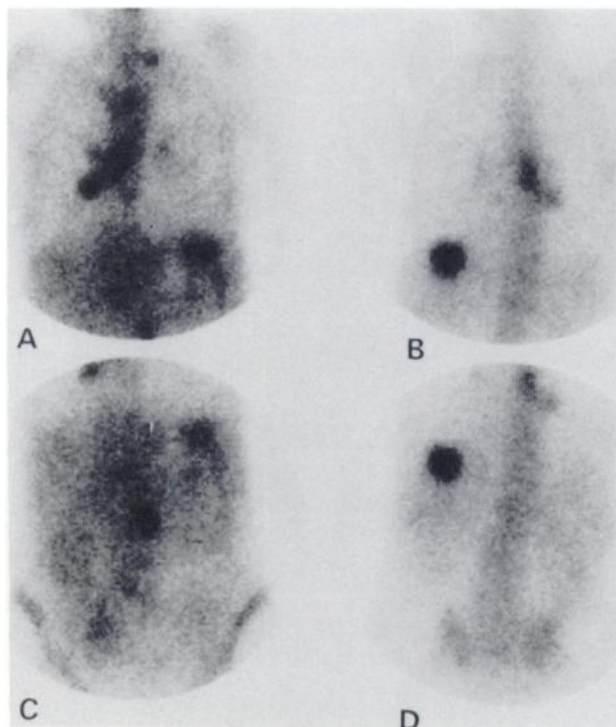


FIGURE 2

Case 1: Multiple views of the chest (upper row: A: anterior; B: posterior) and abdomen (lower row: C: anterior; D: posterior) of a gallium scan obtained 72 hr following injection. A focus of intense increased uptake of gallium is seen in the spleen. Multiple foci of increased uptake are also seen in the mediastinum.

and non-Hodgkin lymphoma (NHL) following treatment. We report three unusual cases of lymphoma in which gallium imaging significantly altered staging of the disease.

CASE REPORTS

Case 1

A 68-yr-old woman with Stage II diffuse histiocytic lymphoma (DHL) was diagnosed 5 yr prior to the present admis-

sion when she presented with a left retroperitoneal mass and hydronephrotic kidney. On the present admission she showed anemia, weight loss, and lesions of herpes zoster. Computerized tomographic examination (Fig. 1) revealed a complex splenic mass, hepatic cysts, and no adenopathy. Gallium scan (Fig. 2) using 10 mCi of ^{67}Ga revealed foci of increased uptake in the spleen, mediastinum, and perihilar region. Chest radiograph was interpreted as normal. Splenic biopsy, performed under CT guidance, revealed recurrent DHL, and the patient was started on chemotherapy. The follow-up CT scan revealed resolution of the splenic lesion.

Case 2

A 52-yr-old male with Stage III-B nodular sclerosing HL diagnosed and treated with chemotherapy 4 yr prior to the present admission, when he presented with cervical, splenic, and periaortic adenopathy. Two years later he presented with weight loss and an enlarged liver, which was presumed to have been caused by steroids and alcoholic cirrhosis. A liver biopsy demonstrated fatty infiltration, but failed to document recurrent lymphoma. On present admission, 4 yr later, he presented with weight loss and night sweats. Abdominal CT scan showed a slightly enlarged liver with areas of low attenuation, suggestive of fatty infiltration. Planar gallium scan (Fig. 3) demonstrated a large area of increased uptake in the right lobe; however, gallium scan with SPECT (Fig. 4) demonstrated two lesions in the liver. Ultrasound examination confirmed both lesions. Open liver biopsy revealed recurrent HL. Following chemotherapy, gallium scans revealed resolution of the liver abnormalities.

Case 3

A 63-yr-old male with Hodgkin's disease was initially diagnosed 3 yr before the present admission and treated with chemotherapy. Recent symptoms included back pain, which was evaluated with a body CT scan that was initially interpreted as normal (Fig. 5). A subsequent gallium scan showed prominent right paraspinal uptake (Fig. 6) at the thoracolumbar junction posteriorly. A second abnormal area was also seen scintigraphically overlying the left pelvis. On review of the CT scan, a subtle asymmetry was noted in the left thoracolumbar paraspinal soft tissue, which on biopsy showed recurrent lymphoma.

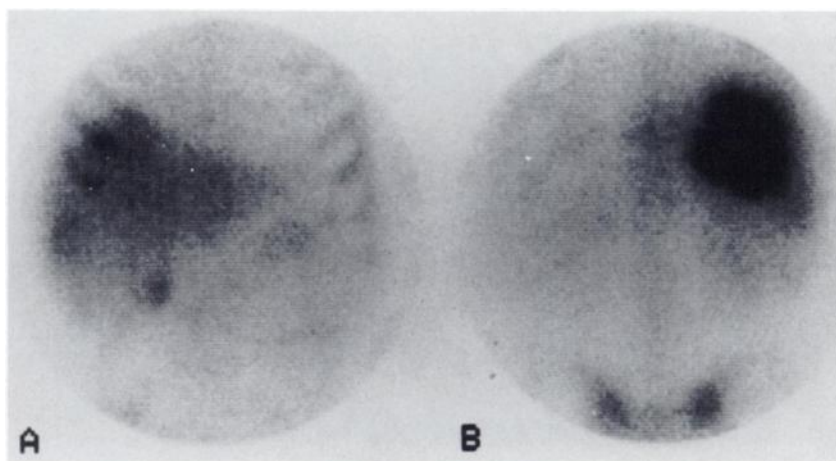


FIGURE 3

Case 2: Planar gallium scan at 72 hr. A: anterior; B: posterior views of the abdomen reveal a large area of intensely increased uptake of ^{67}Ga in the posterior part of the liver dome.

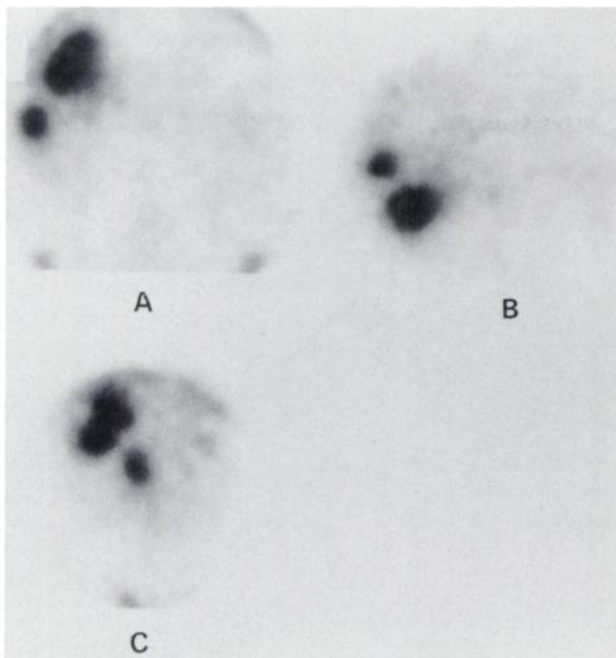


FIGURE 4
Case 2: SPECT images taken at the same time as Figure 3, in coronal (A), transaxial (B), and sagittal (C) projections show two foci of increased uptake in the liver. The largest, in the dome, measured 7 cm in diameter.

DISCUSSION

Staging for treatment is important in the management of patients with lymphoma. Seventy-seven percent of patients with Stage I, IIA and B, and Stage IIIA Hodgkin's disease may be treated by radiation therapy alone, with a mean 10-yr interval before first relapse (4). Stage I abdominal NHL (5) and Stage I and II

thoracic NHL (6) are treatable by radiation alone. Lymphoma in all other stages requires systemic chemotherapy in addition to radiation treatment. Patient's with Hodgkin's disease generally have chest radiographs, abdominal CT, and lymphography (LAG) if the CT scan is negative as part of their initial work-up. Follow-up is performed with CT or LAG (1). A similar imaging strategy applies for patients with NHL, with the addition of chest CT in patients with untreated Stage I and II disease, untreated patients with abnormal chest radiographs and no extrathoracic disease, and patients with nonspecific abnormalities on chest films who are being evaluated for chemotherapy (6,7). In a recent review of pediatric patients with both types of lymphoma, the authors recommend routine chest radiographs and abdominal and chest CT scans in all patients at the time of initial presentation (8).

Historically, ^{67}Ga detected 75% of all HL and histiocytic lymphomas and 50% of all lymphocytic or mixed lymphomas (9). Lesions less than 1 cm in diameter have not been detected at all by this method, and 75% of tumors <2 cm have been missed, as well. Tumors larger than 5 cm may be missed because they are likely to have necrotic centers that do not take up gallium. The accuracy of gallium detection of mediastinal disease is high (96% specificity, 80% sensitivity), whereas, a specificity of 60% has been reported for abdominal and pelvic sites (9). The sensitivity of detection of splenic and hepatic involvement is low (38% liver, 52% spleen) due to normal uptake of gallium by these organs (9). It should be noted that these data are derived from older studies in which small doses of ^{67}Ga (2–3 mCi) and older imaging devices (e.g., rectilinear scanner) were used.

A recent review reports a sensitivity and specificity

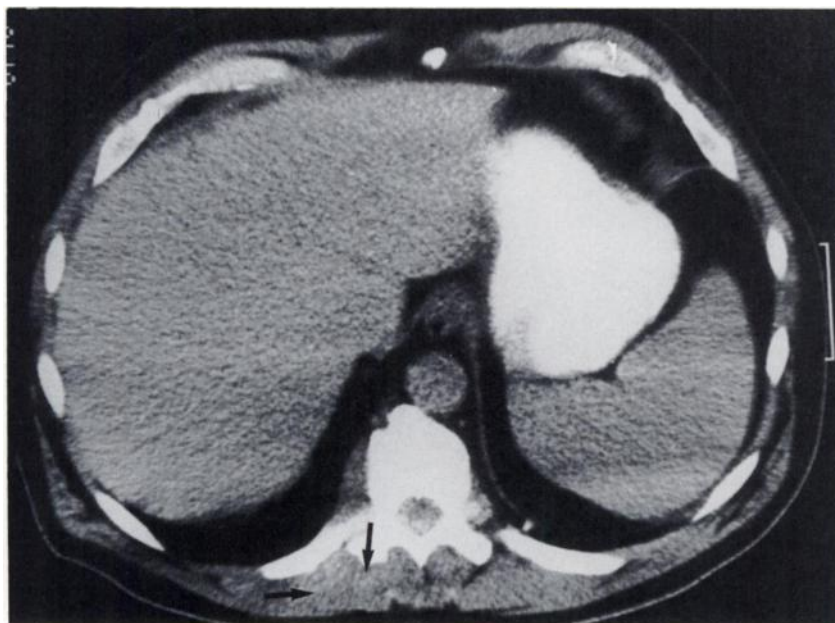
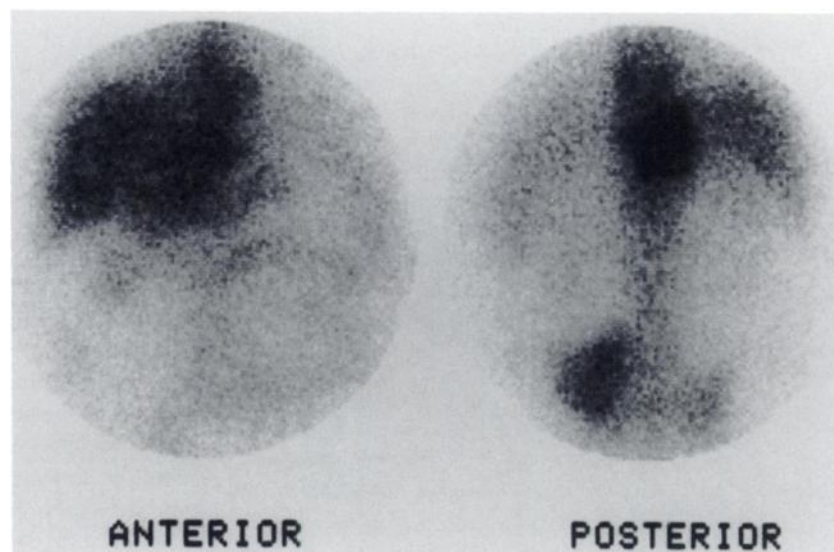


FIGURE 5
Case 3: CT of the abdomen was initially read as normal. In retrospect, after the gallium scan, a loss of the fat-soft tissue interfaces was noted on the CT scan in the right paraspinal region at the thoracolumbar junction (arrows). This finding is very subtle and could not be called prospectively.

FIGURE 6

Case 3: Planar gallium images of the abdomen show prominent uptake overlying the lower thoracic spine. A second lesion is also seen overlying the left sacroiliac joint.



>90% for NHL and HL when a 7–10 mCi dose of gallium was used with a multipeak Anger camera. In 52 patients studied between 1977 and 1981, using this improved protocol the false positive rate was zero and the false negative rate was 4% (2). Gallium was found to be of great value in post-treatment assessment of the mediastinum and abdominal nodal disease.

The three cases described herein support the role of

gallium imaging in routine follow-up of patients with treated Hodgkin's and non-Hodgkin lymphoma. In the first case, gallium scan detected unsuspected thoracic disease that was missed on the recommended chest films and abdominal CT follow-up. In the second case, gallium localized lesions in the liver that could not be accurately assessed by CT, either for management (biopsy guidance) or routine follow-up. In the third case, gallium scanning was more sensitive than CT for the recurrence of lymphoma within the paraspinal soft tissues. This difference between radiographic and scintigraphic techniques in detecting disease is due to the inherent difference between these modalities; although radiographic modalities have superior spatial resolution, they cannot differentiate bulky fibrosis from active neoplastic disease. On the other hand, because gallium is taken up by tumor and/or the coexistent inflammatory reaction, it has the potential to differentiate fibrosis from active disease. We encourage the use of radiogallium imaging in the follow-up of both Hodgkin's and non-Hodgkin lymphoma patients to assess recurrent disease.

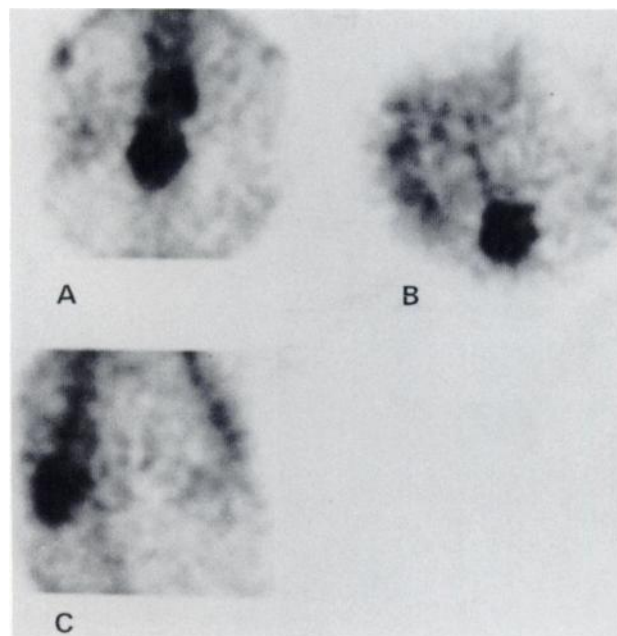


FIGURE 7

Case 3: On SPECT gallium images in (A) coronal-posterior to the spine (B) transaxial and (C) sagittal projections, the more cephalad area of abnormal gallium uptake is located in the soft tissues on the right posterolateral aspect of the lower thoracic spine, consistent with recurrence of lymphoma in the paraspinal muscles. St: sternum; sp: spine.

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