

Failure of Gallium-67 Scintigraphy to Identify Reliably Noninfectious Interstitial Nephritis: Concise Communication

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Gallium-67 scintigraphy has been reported to be useful in the diagnosis of noninfectious interstitial nephritis. We studied 12 patients with Ga-67 citrate that were diagnosed as having noninfectious interstitial nephritis on renal biopsy. Only seven of the twelve patients with interstitial nephritis on biopsy were scan-positive. Gallium-67 scintigraphy may not reliably identify noninfectious interstitial nephritis.

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A diagnosis of noninfectious interstitial nephritis is frequently considered, especially with the widespread use of drugs that have been implicated in its pathogenesis (1). A recent re-examination of patients on hemodialysis in North Carolina has shown that a majority could have had drug-induced interstitial nephritis as the exacerbating factor in their renal failure (2). Such a diagnosis is important because withdrawal of the offending agent will usually result in rapid improvement. Short of a kidney biopsy, however, there is no reliable test to differentiate between glomerular and interstitial disease. Various reports (1-4) have suggested that Ga-67 scanning may be useful in the diagnosis of interstitial nephritis. Linton et al. (1), after observing intense Ga-67 uptake in the region of the kidneys in one patient with interstitial nephritis, subsequently studied nine comparable patients and six with acute renal failure. Excellent correlation was found between the intensity of Ga-67 uptake and interstitial nephritis. Wood et al. (3) also studied three patients and suggested that Ga-67 citrate scans may be useful for diagnosis and follow-up of interstitial nephritis. Because our experience did not support these conclusions, we undertook a study to define the usefulness of Ga-67 citrate scintigraphy in the diagnosis of noninfectious interstitial nephritis.

MATERIALS AND METHODS

From June 1980 to May 1982, 20 patients routinely scheduled for renal biopsy were studied with Ga-67

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within three weeks of biopsy. Forty-eight and 72 hr after the injection of 5-6 mCi of Ga-67 citrate, spot posterior abdominal scintigrams were obtained on a large-field-of-view camera with a medium-energy, parallel-hole collimator. Three 20% windows were set for 93, 184, and 296 keV. Renal uptake was compared with the adjacent hepatic uptake and rated on a scale as follows: +3 = uptake intensity greater than in liver, +2 = intensity equal to liver, +1 = intensity less than in liver, and 0 = no renal uptake. Within a 1-wk period before performing the renal biopsy, 24-hr urines were also obtained from all patients for creatinine clearance and total protein.

A diagnosis of noninfectious interstitial nephritis was based on the histologic examination of the renal biopsy, together with absence of laboratory evidence of infectious disease. On histologic examination there should be infiltration of the interstitium, predominantly by lymphocytes and plasma cells, with some polymorphonuclear and eosinophilic leukocytes. Varying degrees of fibrosis can be present, and in most of our series this was moderate. Any abnormality of the glomeruli caused rejection, even if the other criteria were met (2/20). This corresponds to accepted descriptions of noninfectious interstitial nephritis (5).

RESULTS

Twelve of the 20 patients demonstrated noninfectious interstitial nephritis on biopsy. Table 1 lists all the prescribed medications the patients were receiving at the time of the gallium scan and renal biopsy. The cause of interstitial nephritis was unknown in most cases. Renal Ga-67 uptake in the patients with interstitial nephritis,



FIG. 1. Renal activity of Ga-67 greater than liver activity (+3). Three of 12 patients had +3 activity.



FIG. 2. Renal activity of Ga-67 equal to liver activity (+2). Four of 12 patients had +2 activity.

TABLE 1. SUMMARY OF TWELVE PATIENTS WITH THE DIAGNOSIS OF NONINFECTIOUS INTERSTITIAL NEPHRITIS*

Patient	Other medical diagnosis	Creatinine clearance (crest/min)	24-hr protein excretion (g)	Ga-67 citrate scintigraphy	Medications [†]
1.	analgesic abuse	10	3.4	+3	basogel, calcium carbonate, vit C multivitamins
2.	none	16	4.2	0	prazosin hydrochloride, furosemide, basogel, calcium carbonate
3.	sarcoid	47	2.3	0	
4.	Sjögren's and primary hypothyroidism	dialysis	—	0	levothyroxin, basogel, dioctyl sodium sulfosuccinate, vit C folic acid
5.	none	dialysis	—	+2	vancomycin, multivitamins
6.	chronic obstructive pulmonary disease and arterosclerotic vascular disease	50	3.2	+2	cephalothin, aminophylline
7.	recurrent pyelonephritis	36	1.6	+3	dioctyl sodium sulfosuccinate, furosemide, calcium carbonate, vasaljel multivitamins, calcitriol
8.	none	20	2.8	+3	
9.	chronic obstructive pulmonary disease	30	1.6	+2	basogel, multivitamins
10.	none	24	2.3	0	basogel, calcium carbonate, multivitamins
11.	none	40	3.0	+2	dioctyl sodium sulfosuccinate, multivitamins
12.	high blood pressure	40	2.6	0	

* Diagnoses based on renal biopsy.

[†] Medications taken during the period when renal biopsy and gallium scan were performed.

[†] This medication was taken at the time of gallium scan, but had been stopped when renal biopsy was performed.

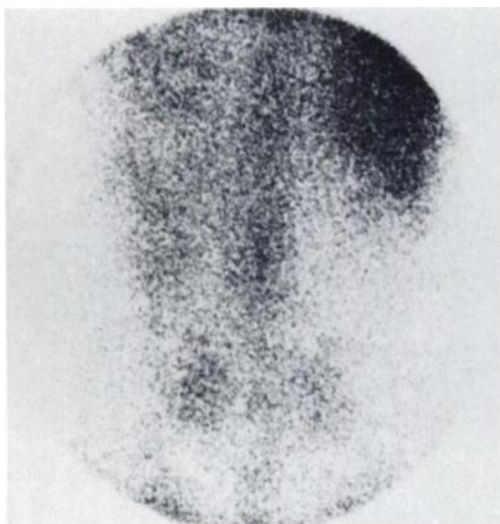


FIG. 3. No renal activity demonstrated on gallium-67 citrate scintigraphy. Five of 12 patients diagnosed with noninfectious interstitial nephritis showed no accumulation of Ga-67 in kidney area.

as shown in Table 1, varied from no uptake in five patients to intense uptake in three. The sensitivity of Ga-67 citrate scintigraphy was 58% (7/12). Only three of the seven scans showed the intense Ga-67 uptake reported as specific for interstitial nephritis (1). Five of the twelve (42%) scans were falsely negative. The degree of renal Ga-67 uptake in patients with interstitial nephritis did not correspond to creatinine clearance or 24-hr urinary protein excretion.

These findings conflict with the findings previously cited (3). This discrepancy could not easily be explained by the level of renal function or the 24-hr urinary protein excretion. Previous studies, however, have emphasized

patients in the acute clinical settings, whereas in this study all biopsies were obtained from patients with chronic renal insufficiency. Our disagreement with previous observations may therefore be related to the duration of the disease studied. In addition, noninfectious interstitial nephritis has many possible causes, which we did not separate out in our series. Although histologically these insults to the kidney result in a similar response, perhaps the lesion's avidity for gallium would be variable.

In conclusion, we find Ga-67 renal uptake to have limited usefulness in the diagnosis of noninfectious interstitial nephritis.

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REFERENCES

1. LINTON AL, CLARK WF, DRIEDGER AA, et al: Acute interstitial nephritis due to drugs. *Ann Intern Med* 93:735-741, 1980
2. GONWA TA, HAMILTON RW, BUCKALEU VM, JR: Chronic renal failure and end-stage renal disease in Northwest North Carolina. *Arch Intern Med* 141:462-465, 1981
3. WOOD BC, SHARMA JN, GELMANN DR, et al: Gallium citrate Ga-67 imaging in noninfectious interstitial nephritis. *Arch Intern Med* 138:1665-1666, 1978
4. KUMAR B, COLEMAN RE: Significance of delayed ⁶⁷Ga localization in the kidneys. *J Nucl Med* 17:872-875, 1976
5. HEPTINSTALL RH: Pathology of the Kidney. Boston, Little Brown & Co, 1974, pp 821-827