Value of Gallium-67 Citrate Scanning in Crohn's Disease: Concise Communication

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A frequent problem in Crohn's disease is the distinction between exacerbated inflammation of the bowel, which can be treated medically, and intra-abdominal abscess, a common complication that requires surgical management. We present evidence that the gallium scan is of value in making this distinction. From a series of 11 studies, negative gallium scans correctly excluded abscess in over half. All patients were symptomatic at the time of the scan. Most patients with active Crohn's disease do not have abnormal gallium uptake and in these patients the gallium scan is useful to exclude the possibility of abscess.

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Since the report of Edwards and Hayes in 1969 (*1*), the scope of clinical whole-body scanning with gallium-67 has been enlarged to include tumor searches (*2,3*), infections (*4,5,*), and inflammatory lesions (*6,7*). Although a single patient with inflammatory bowel disease is found in each of two large series of patients (*8,9*), it was not until recently (*10,11*) that two detailed case reports describing positive scans in active inflammatory bowel disease were published.

Clinicians are often faced with the difficult differential diagnosis of whether a right lower-quadrant (RLQ) mass in a patient with Crohn's disease and fever is due to an abscess or caused by an inflamed mass of bowel. The therapy for an abscess is generally surgical, whereas the treatment of inflammation usually involves steroids, which may be contraindicated if an abscess is present. Therefore, any test that will aid this diagnosis would be helpful.

Gallium scans have been used in the past to study intra-abdominal abscesses, with an overall rate of detection around 90% (*5,9,13*). However, no series has reported the use of this technique in the presence of inflammatory bowel disease. This study reports the results of gallium scanning in ten patients with this clinical problem.

METHODS

Between September 1975 and March 1977 ten patients from the University of Alabama Medical Center, with proven diagnoses of Crohn's disease, had gallium scans. One patient had two scans 5 mo apart. The patient population is described in Table 1; all but one (G.W.) were on steroid therapy. A scan was done in each case to rule out an abscess as the cause of abdominal pain, fever, and RLQ mass in patients in whom the diagnosis was clinically uncertain. Patients were scanned 6 and 72 hr after administration of 5 mCi of Ga-67 citrate, without bowel preparation, usually with a whole-body scanner.* All studies were reviewed by two expe-

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TABLE 1

Patient	Presentation	Confirmation
G.W.	Wh. female, age 30. Tender RLQ mass. Possible appendiceal abscess on B.E.	Inflammatory terminal ileum removed at surgery.
M.P.	7/75: Bl. male, age 21, with previous ileotransverse colostomy for Crohn's. Fever, ^{E} WBC, signs of psoas abscess.	Ileal disease at colonoscopy. Acute illness resolved on medical treatment.
A.D.	11/75: Recurrence similar to above. Bl. female, age 30, with active Crohn's and tender RLQ mass.	Right psoas abscess at surgery. Responded to prednisone.
B.P.	Wh. female, age 27, with previous resections for Crohn's. Recurrent fever and right mid-abdomen tenderness.	Resolved on prednisone.
C.G.	Wh. female, age 53, with inactive Crohn's except RLQ pain.	Resolved without change in treatment.
J.S.	Wh. female, age 24, with 7-yr history of poorly controlled Crohn's. Now fever, tender RLQ mass and diarrhea. Total colon and terminal ileum involved on radiograph.	Masses of matted and inflamed bowel at surgery. Total colonic involvement.
W.T.	Wh. female, age 26, with 5-yr history of Crohn's. 4 mos recurrent fever. 4 days RLQ pain, mass and tenderness. Fever with leukocytosis.	Resolved on prednisone and azathioprine.
P.T.	Wh. female, age 25, with known Crohn's. Several weeks RLQ mass, fever and severe diarrhea. Fever responded to steroids but mass remained.	Intramesenteric abscess, diseased terminal ileum, right colon and transverse colon found at surgery.
F.E.	Wh. male, age 45, with 15 yr recurrent Crohn's and multiple resections; now midabdominal mass with fever, tenderness and diarrhea. Small-bowel obstruction on radiograph.	Resolved on medical management.
R.M.	Wh. male, age 18, with active Crohn's and continued disability.	Acute illness resolved. Small pararectal abscess at surgery 3 mo later.

rienced nuclear medicine physicians without knowledge of the clinical history.

RESULTS

The results of review (without clinical history) by the two observers are shown in Table 2. They were asked to grade the abdominal uptake from 0 to 4+ and to state whether the configuration of any observed activity was compatible with an abscess. On this scale a value of 1+ was considered within normal limits. Values of 3+ or 4+ were definitely abnormal, and 2+ was borderline. The results were usually unequivocal in the sense that each observer rated only a single case as borderline. Both abscesses were successfully identified. Although abscesses could not be distinguished reliably from inflamed bowel, in over half of the cases studied the scan successfully ruled out abscess.

TABLE 2. SCAN INTERPRETATION BY TWO EXPERIENCED OBSERVERS

	Observer No.	
	1	2
True +	2	2
False +	2	3
True −	7	6
False −	0	0

Examples of the gallium scans are presented in Figs. 1-3. Figure 1 (P.T.) shows intense gallium uptake in a right lower-quadrant abscess, later confirmed at surgery. Figure 2 (J.S.) shows abnormal uptake in the right lower quadrant, but at surgery it proved to be only inflamed bowel; this we consider a convincing false positive. Figure 3 (F.E.) shows a scan that, though it was abnormal and was counted as a false positive, we now believe should not be interpreted as an abscess. It shows abnormal accumulation of activity over a large, diffuse region in the right abdomen, perhaps representing accumulated fecal material behind a partial obstruction. We believe on the basis of our experience to date that abnormal activity should be interpreted as a possible abscess only if more focal in distribution than it was in this case (F.E.).

DISCUSSION AND CONCLUSIONS

The results have shown successful use of the gallium scan in ruling out abscess among a small group of patients having active Crohn's disease. Since inflammatory bowel disease itself sometimes

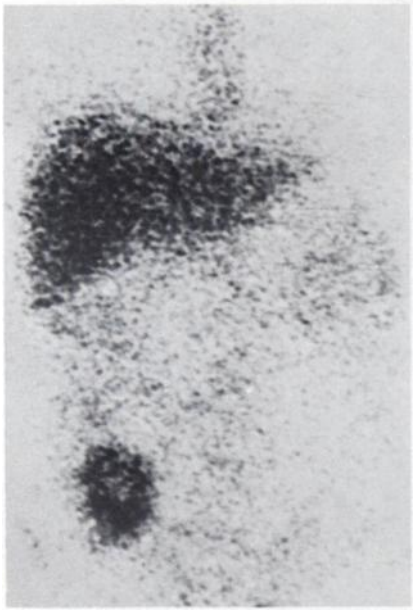

FIG. 1. Right lower-quadrant abscess, surgically confirmed (patient P.T.) Anterior Ga-67 scan 72 hr after injection.

FIG. 2. Inflamed bowel in right lower quadrant, surgically confirmed (J.S.), anterior view 6 hr after injection. Activity was still present at 72 hr.

causes abnormal gallium uptake (*10,11*), a positive scan may be inconclusive. An example is shown in Fig. 2, which both observers thought likely to represent abscess. In retrospect, we now believe the region of activity in Fig. 3 to be too diffuse to indicate an abscess, but such findings can also be confusing. On the other hand, patients with symptomatic inflammatory bowel disease often have a scan completely within normal limits. This occurred in over half of our patients, and in them the scan was useful to exclude the possibility of an abscess. When abnormal activity is seen, an abscess must

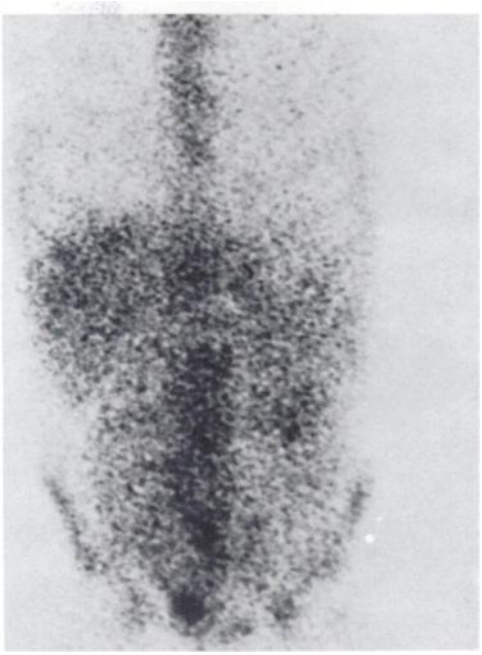

FIG. 3. Abnormal Ga-67 accumulation in right abdomen (F.E.). Partial small-bowel obstruction on contrast series; symptoms resolved on medical therapy. Anterior view, 72 hr after injection. At 6 hr, abdominal activity was less intense but similar in distribution.

be suspected, the degree of suspicion increasing with increased intensity and sharpened localization of the abnormal uptake. The two abscesses in this series both showed abnormal gallium uptake, as expected from the reported low incidence of false-negative gallium scans in intra-abdominal abscess (*13*).

There has been some debate about the relative merits of 6-hr as opposed to 24- to 72-hr scans when gallium is used to detect abscesses. Although our experience has not been contrary to that in the literature (*12,13*), we prefer to get both, if only for the added confidence of having two studies that usually agree with each other. We note the result of the 6-hr study on the chart, so that it is available if needed for immediate intervention, but we delay the final report until confirming views are obtained.

In conclusion, the gallium scan appears useful in deciding the clinical question of whether a patient with Crohn's disease has developed an abscess. An important distinction should be made between those scans that are read as positive for abscess and those that are read as negative for abscess; the focal nature of an abscess can be of value in distinguishing it from inflamed bowel. A completely negative scan excludes abscess, and is expected in about half of the patients studied. The interpretation of a positive scan may be less reliable.

FOOTNOTE

*Cleon, Union Carbide, Norwood, MA

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