

# <sup>198</sup>AU LIVER SCANNING IN HEPATIC AMEBIC DISEASE

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During the past decade liver scanning has emerged as an outstanding tool in hepatic disease. Much experience has already been accumulated on its use to detect space-occupying lesions of the liver including hepatic tumors (1-7), cysts (8,9) and parasitic infections (10-14). Of great interest has been the evaluation of its use in diagnosing and managing hepatic amebic disease, which is fairly common in the lowlands of tropical and subtropical countries. In Colombia where the incidence of intestinal amebiasis has been estimated as between 20 and 67% of the population, amebic abscess is also seen frequently (15), particularly among the inhabitants of rural areas where malnutrition favors invasion of the liver by amebic trophozoites. This prompted us in 1963 to undertake a program designed to evaluate the usefulness of liver scanning for this condition. This paper deals with the results obtained in 46 patients affected with hepatic amebic disease from a group of 140 individuals studied by using liver scanning.

## METHODOLOGY

Patients with the clinical suspicion of amebic abscess were referred to our laboratory after being studied in the medical wards. These studies included in most cases x-ray examination (both fluoroscopic and radiographic) of lower thorax and upper abdomen, stool examination and/or rectosigmoidoscopy in search of intestinal amebiasis, white-blood-cell counts and, in the majority of cases, liver-function tests including bromsulphalein retention and serum alkaline phosphatase as well as pyruvic and oxaloacetic transaminase determinations.

We used a commercial rectilinear scanner\* with either a 2- or 3-in. scintillation crystal, a 19† or 61‡-hole, honey-cone, lead focusing collimator, a pulse-height analyzer and mechanical printing. Scan-

ning was started 10-15 min after intravenous injection of 400-900  $\mu$ c of a suspension of radioactive colloidal gold (<sup>198</sup>Au\*) at the time when the liver uptake curve of the isotope had leveled off. Counts were always taken with the analyzer window centered in the 0.41-Mev gamma photopeak of the <sup>198</sup>Au with a window width of 100 volts. Doses were selected according to age of the patient and type of collimator used; the 61-hole collimator required the larger doses. Counting rates were always in the range of 500-1,500 cpm. Scanner speed was set at 3.5 mm/sec. Anatomical markings were made during and after the completion of the scanning procedure; these included the horizontal mammillary line, the tip of the xiphoid process, the costal margin and the umbilicus. One anteroposterior (AP) projection was obtained in all cases; this was supplemented, in most of the patients, with a lateral (LAT) and, in a few selected cases, with a postero-anterior (PA) projection.

## RESULTS AND COMMENT

Table 1 groups the main clinical and scanning data for the 46 patients studied. It can be seen that there were 33 space-occupying lesions at scan interpreted as amebic abscesses; these were confirmed in 29 patients by drainage performed either through laparotomy or through a needle inserted in the thoraco-abdominal wall, followed by microscopic examination of the pus content. In four patients drainage was not performed because they improved rapidly with medical treatment which consisted of emetine injections followed by chloroquine administration per os.

Regarding the localization of the space-occupying lesions (Fig. 1), it can be seen that 30 (91%) were located in the upper, central, inner or lower right lobe, with only three abscesses located in the left

\* Nuclear-Chicago Model 1700-A.

† Nuclear-Chicago Model DS-201.

‡ Nuclear-Chicago Model T5S.

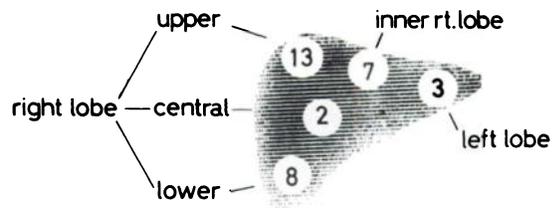
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\* Aurcoloid, Abbott Laboratories.

lobe of the liver. This is in agreement with what has been reported by other authors (10,13-15). In our series only one patient (Fig. 2) reported elsewhere (11) had an amebic abscess of the posterior right lobe which could not be detected in the AP scans. In about half of the cases radioactivity profile curves were also obtained at different horizontal levels using the technique suggested by MacIntyre *et al* (2); these profiles were especially useful in confirming the presence of abscesses located in the left hepatic lobe where the space-occupying lesions were ill-defined. In these cases the PA projection was also quite informative (Fig. 3).

In 13 patients accurate data could be obtained from the surgeons concerning the volume in milliliters of the purulent material evacuated from the abscesses. In these patients we have attempted to compare the diameter of the space-occupying lesion in the AP scans in centimeters with the content of the abscesses in milliliters. It can be seen (Fig. 4) that the points follow an approximately linear distribution, the smaller diameters corresponding to the smaller volumes and vice versa. Calculations give a +0.85 correlation coefficient for this relationship. In our experience the smallest abscesses detected by the scanning procedure were two 2.5-cm lesions located next to the gall-bladder region in the anterior edge of the liver; these abscesses were found to have a pus content of 20 ml each (Fig. 5).

Thirteen patients exhibited scan pictures corresponding to normal livers which in two cases were



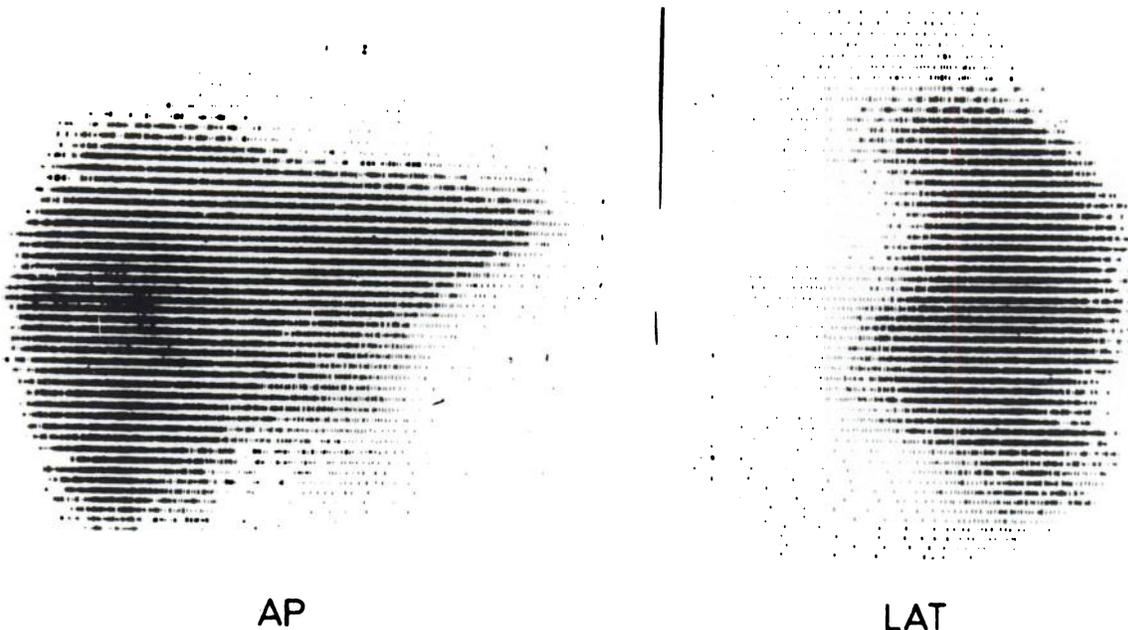
TOTAL RIGHT LOBE: 30

TOTAL LEFT LOBE: 3

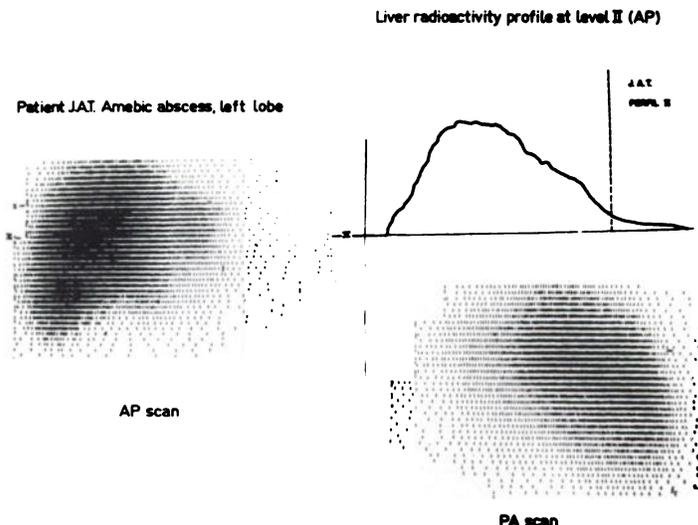
**FIG. 1.**  $^{198}\text{Au}$  liver scanning in amebic abscesses: liver localization of space-occupying lesions in 33 patients with confirmed amebic abscesses.

**TABLE 1.**  $^{198}\text{Au}$  LIVER SCANNING IN 46 PATIENTS WITH HEPATIC AMEBIC DISEASE

CLINICAL DIAGNOSIS OF ABSCESS:	
SCAN PICTURE OF ABSCESS (SPACE-OCCUPYING LESION)	
1. Anatomically confirmed by laparotomy and/or drainage	29
2. No anatomical confirmation; clinical improvement with subsequent medical treatment	4
Total cases with space-occupying lesions	33
CLINICAL DIAGNOSIS OF ABSCESS:	
SCAN PICTURE OF NORMAL LIVER	
1. Normal liver anatomically confirmed	2
2. No anatomical confirmation:	
Symptoms and signs of abscess (early treatment given to all patients)	7
Follow-up after previous drainage of an amebic abscess	4
Total cases with normal liver at scan	13



**FIG. 2.** Scans of patient with amebic abscess posteriorly located in upper right lobe. Space-occupying lesion is visible only in lateral scan; liver appears normal in AP scan.

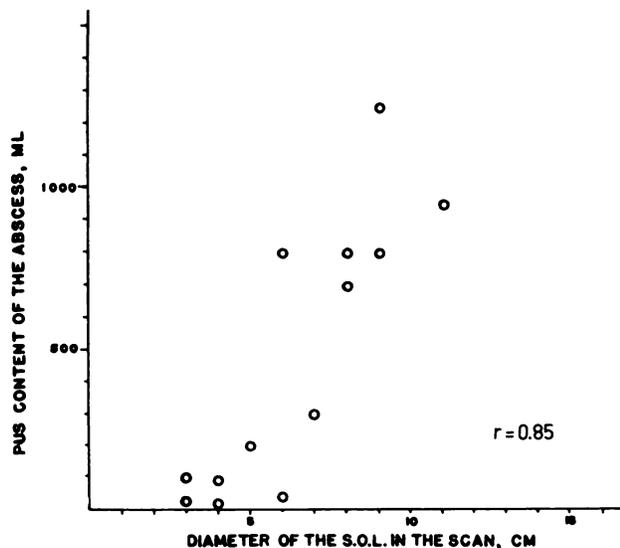


**FIG. 3.** Amebic abscess of left hepatic lobe. Depression of radioactivity profile curve around midline as well as PA scan help to clarify diagnosis.

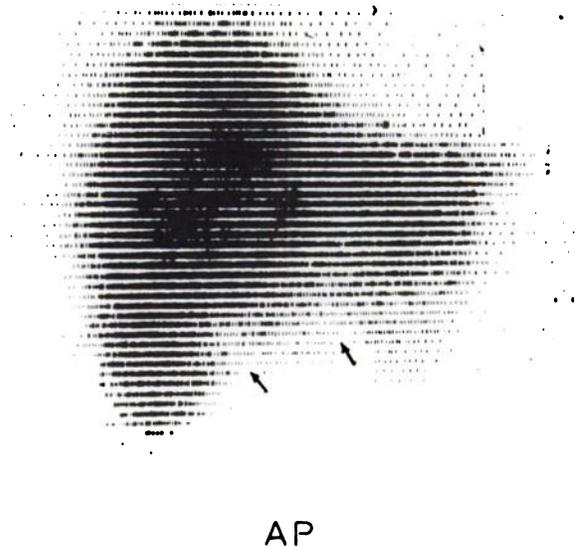
confirmed at laparotomy. Four patients in this group were scanned from one to several months after surgical drainage of an amebic abscess had been performed to rule out the possibility of recurrence. Seven other patients suffered from intestinal amebiasis and had a more or less clear clinical history of amebic abscess; all of them, however, had been given early medical treatment and were in the process of recovery when the scans were performed. Thus it is not known whether the normal scans corresponded to small abscesses, either undetectable or rapidly recovered after treatment, or were cases of the so-called "amebic hepatitis" in which there would be

invasion of the liver parenchyma by the amebic trophozoites giving a diffuse inflammatory response but without getting to the formation of an abscess.

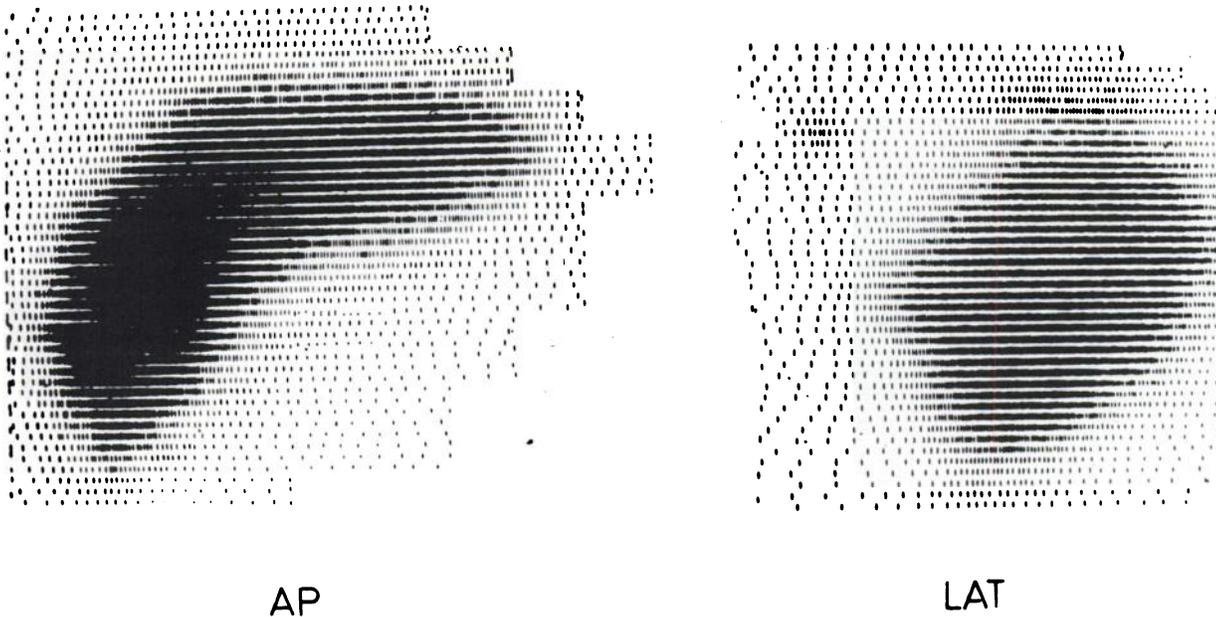
Liver scanning has also proved useful for following up patients treated medically or surgically for an amebic abscess; we have obtained these follow-up scans in 10 patients for periods of up to 8 months after treatment and have gathered the impression that total recovery of the liver takes place in 3-5 months depending on the type of treatment used as well as on the initial size of the lesion. Figure 6 illustrates the AP and LAT scans of a patient before medical treatment of an amebic abscess, and Fig. 7



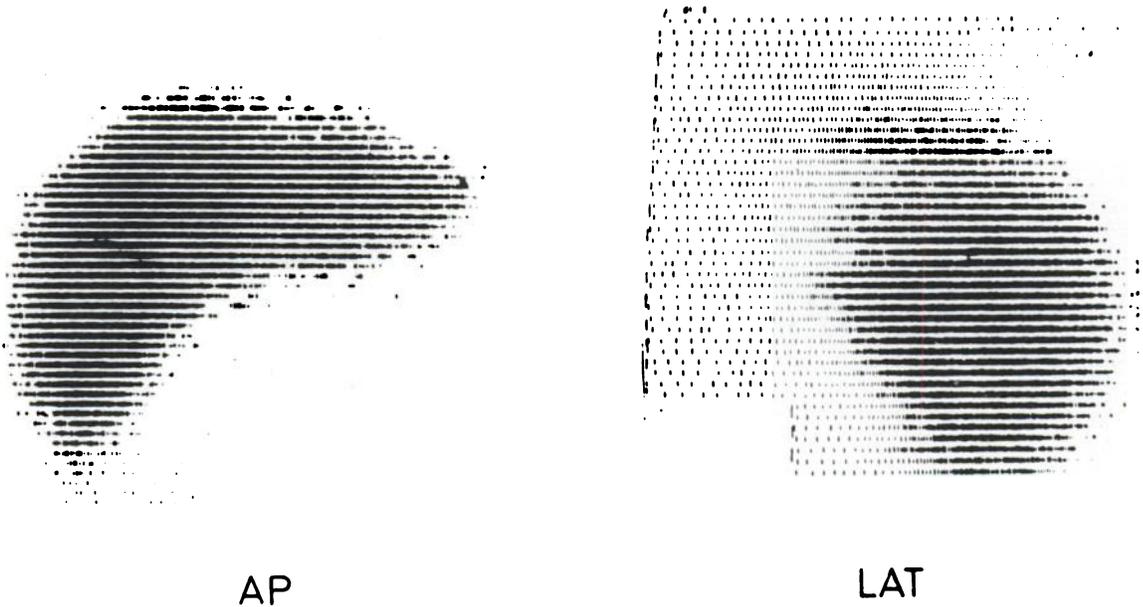
**FIG. 4.** <sup>198</sup>Au liver scanning in 13 surgically confirmed areas of amebic abscess. Correlation is shown between pus contents of amebic abscesses and diameter of lesions in AP scans.



**FIG. 5.** Small amebic abscesses (arrows) near gall-bladder region in anterior edge of liver. These abscesses were found to have a pus content of 203 ml each.



**FIG. 6.** Amebic abscess occurs in upper right lobe. Figure shows initial scans made before treatment.

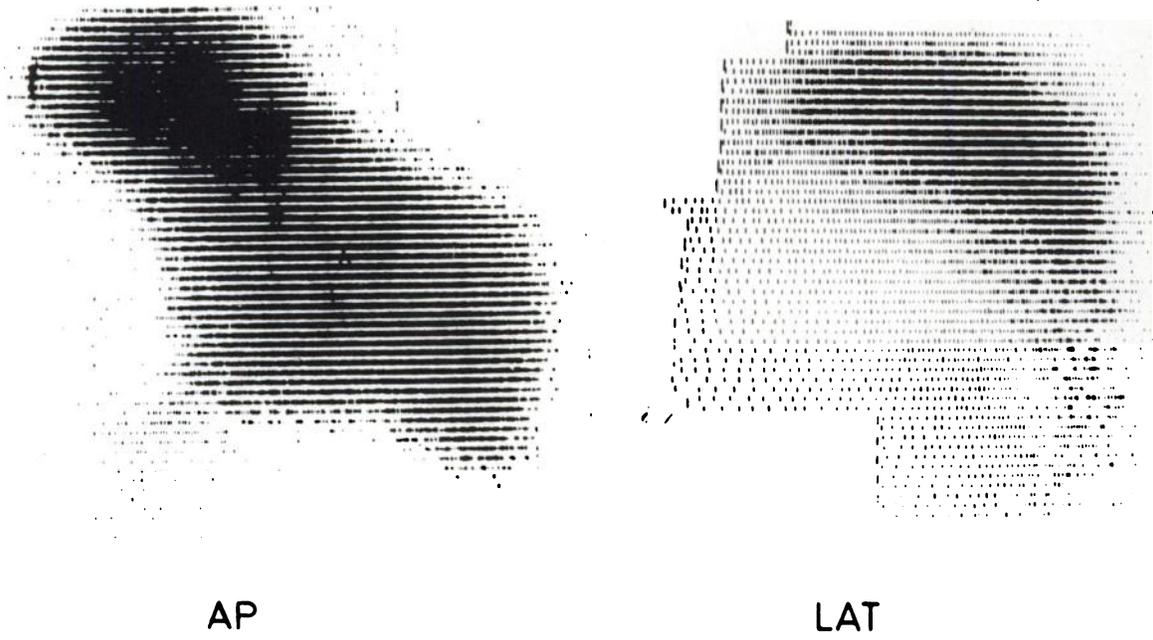


**FIG. 7.** Follow-up scans of patient in Fig. 6 were made 1 month after medical treatment. Patient was asymptomatic at time.

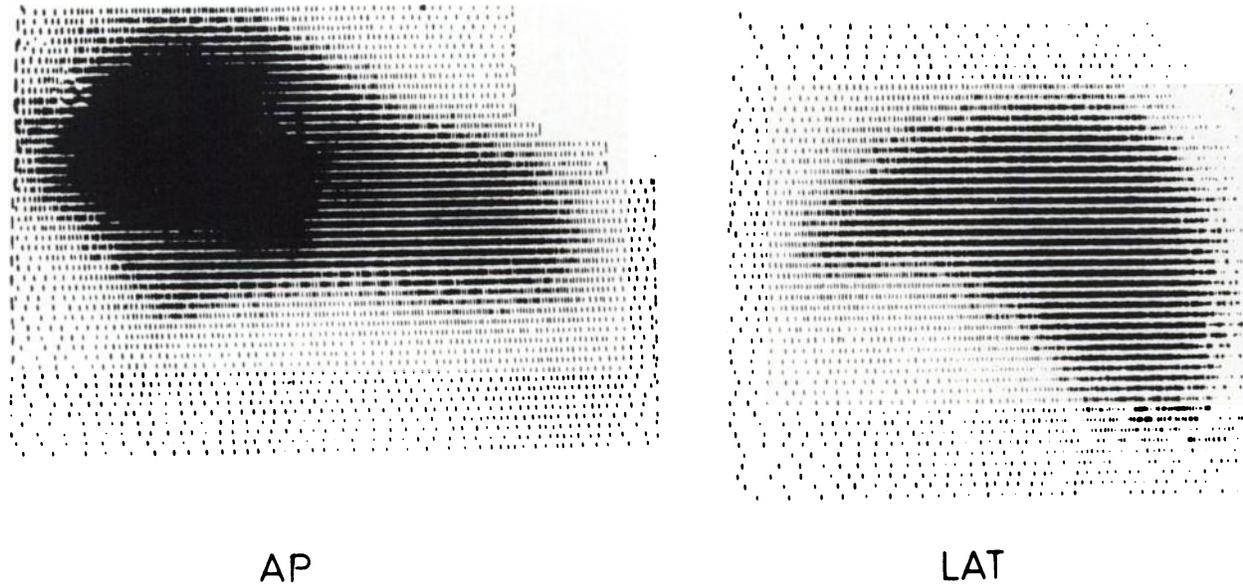
shows those scans made 1 month later after medical treatment; it can be seen that the space-occupying lesion persists, although it is smaller, in spite of the complete clinical recovery of the patient. Figure 8 shows the scans of a patient before and Fig. 9 shows the patient three months after surgical drainage combined with medical treatment of a large amebic abscess of the lower right lobe; the space-occupying lesion still persists at this time in spite of the fact that by then the patient was completely asymptomatic.

**SUMMARY AND CONCLUSIONS**

Liver scanning has revealed the presence of amebic abscesses in 33 patients, 29 of which were anatomically confirmed. Because there were no false negatives in this group, the diagnostic accuracy of the method can be considered close to 100%. In seven patients out of 13 who exhibited scan pictures of normal livers, clinical symptoms and signs of hepatic



**FIG. 8.** Large amebic abscess of lower right lobe is shown. Figure contains initial scans made before treatment.



**FIG. 9.** Follow-up scans of patient in Fig. 8 were made 3 months after surgical evacuation and medical treatment. Patient was free of symptoms at this time.

amebic disease had been present but had subsided rapidly after early medical treatment; doubt persists as to whether these were cases with small undetected abscesses or with diffuse "amebic hepatitis." Follow-up scans in 10 patients with space-occupying lesions have revealed that liver recovery takes place rapidly after treatment, but that the space-occupying lesion may persist for up to 5 months,

depending on its initial size and on the type of treatment (medical, surgical or combined) used.

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