

critique and comparison of various noninvasive methods of determining the efficacy of an intervention in limiting infarct size, and I believe that this is the major importance of their work.

I don't feel that "infarct sizing" is ready yet for general clinical application, but await with interest further developments in this very important field.

HAROLD E. WEINER  
Southern California Permanente  
Medical Group  
Los Angeles, California

#### REFERENCES

1. POLINER LR, BUJA LM, PARKEY RW, et al: Comparison of different noninvasive methods of infarct sizing during experimental myocardial infarction. *J Nucl Med* 18: 517-523, 1977
2. PAGE DL, CAULFIELD JB, KASTOR JA, et al: Myocardial changes associated with cardiogenic shock. *N Engl J Med* 285: 133-137, 1971
3. SEHAPAYAK GK, WATSON JT, CURRY GC, et al: The late development of intractable ventricular tachycardia after acute myocardial infarction. *J Thorac Cardiovasc Surg* 67: 818-825, 1974

#### Inexpensive EKG Gate for Computer-processed Cardiac Motion Study

It came to my attention that a pull-up resistor was not shown in the accompanying figure for my recent paper (1). A 1K resistor between the output pin of the comparator (LM 311) and the 5-volt power supply will serve the function as pull-up resistor and ensure proper voltage swing for the following stage.

MICHAEL KAN  
Scripps Memorial Hospital  
La Jolla, California

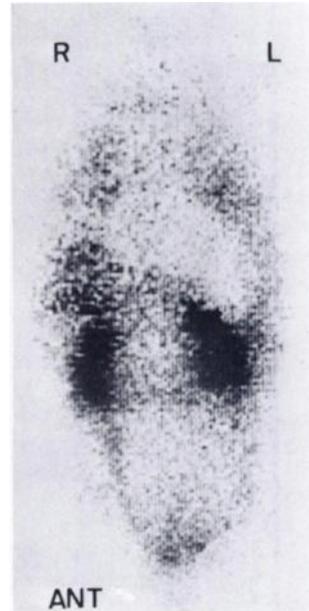
#### REFERENCE

1. KAN MK: Inexpensive EKG gate for computer-processed cardiac motion study. *J Nucl Med* 19: 320-321, 1978

#### Lung Uptake of Indium-111 Chloride

In-111 chloride has been used to visualize the bone marrow or tumors (1-6). Its uptake in the lungs, however, has not been reported in the literatures. We have encountered two cases showing pulmonary retention of this tracer.

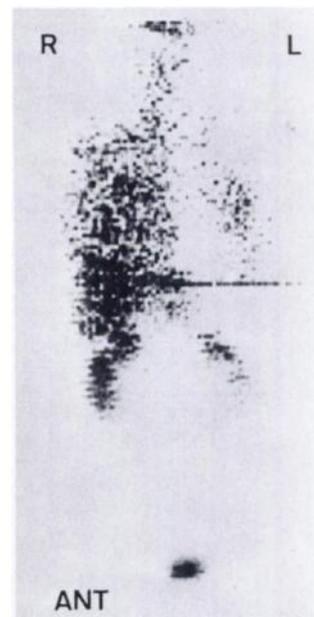
**Case 1.** A 53-year-old male was referred to our hospital for treatment of leukemic lymphoblastic lymphoma. Seven cycles of combined chemotherapy were performed, including vincristine, cyclophosphamide, adriamycin, and prednisolone. The patient then developed leucopenia. To evaluate the bone-marrow distribution, whole-body scanning was performed starting 48 hr after the administration of 2 mCi of In-111 chloride, using a whole-body scanner equipped with a 5-in. high-energy collimator. Settings were as follows: 20% window centered around 247 keV, intensity setting 750, scanning speed 360 cm/min, line spacing 4 mm, minification on the film 1:3. The scintigram showed no tracer activity in the bone marrow but increased uptake in the kidneys and lungs (Fig. 1). Conventional chest radiographs, on the other hand, showed no abnormalities. Clinical examination of the respiratory system was considered nor-



**FIG. 1.** Anterior whole-body scan, showing unusual In-111 uptake in both lungs and kidneys.

mal. During the subsequent 12 mo he has fully recovered and no pulmonary complications have occurred.

**Case 2.** A 65-year-old female was admitted to our hospital suffering from cervical tumors. Clinical examination revealed stage III diffuse histiocytic lymphoma. She was treated with total nodal irradiation (2,000-4,000 rads) and combined chemotherapy, including vincristine, procarbazine, cyclophosphamide, and prednisolone. Pancytopenia developed. In-111 whole-body scanning was performed. The scintigram showed increased tracer activity in the kidneys



**FIG. 2.** Anterior torso scan, showing unusual In-111 uptake in both lungs and kidneys.

and lungs, but none in the bone marrow (Fig. 2). Chest radiographs showed no abnormalities. Shortly thereafter there was massive and fatal tumor regrowth. Autopsy revealed no pathologic changes in the lungs.

In-111 chloride has been found to concentrate in the erythroid system, and is used to visualize bone-marrow distribution (3-6). Normally, In-111 scanning shows the bone marrow and liver. The kidneys are visualized when the ion-binding capacity becomes saturated (4,5). In-111 lung uptake, however, has not been reported. In our two cases with In-111 lung uptake, no abnormalities were found in the respiratory system by either clinical or pathologic examination.

Although the exact mechanism is unknown, In-111 has been found to concentrate in tumors (1,2). Gallium-67 citrate, a tumor-seeking agent, has also been reported to accumulate diffusely in the lungs in patients with bleomycin toxicity, sarcoidosis, carcinomatosis, or opportunistic infection such as *Pneumocystis carinii* (7-10). In our cases, however, these conditions were neither proven nor considered possible. The cause of the In-111 lung uptake therefore remains unclear. Further investigation is desirable in order to determine its clinical value.

MAKATO KONDO  
HIDEKAZU MASAKI  
SHIGERU KOSUNDA  
YUTAKA ANDO  
YAEKO TAKAGI  
ATSUSHI KUBO  
SHOZO HASHIMOTO  
Keio University  
Tokyo, Japan

## REFERENCES

- HUNTER WW JR, RICCOBONO XJ: Clinical evaluation of  $^{111}\text{In}$  for localization of recognized neoplastic disease. *J Nucl Med* 11: 328-329, 1970 (abst)
- GOODWIN DA, GOODE R, BROWN L, et al:  $^{111}\text{In}$ -labeled transferrin for the detection of tumors. *Radiology* 100: 175-179, 1971
- LILIEN DL, BERGER HG, ANDERSON DP, et al:  $^{111}\text{In}$ -chloride: A new agent for bone marrow imaging. *J Nucl Med* 14: 184-186, 1973
- MCNEIL BJ, HOLMAN BL, BUTTON LN, et al: Use of indium chloride scintigraphy in patients with myelofibrosis. *J Nucl Med* 15: 647-651, 1974
- MCNEIL BJ, RAPPEPORT JM, NATHAN DG: Indium chloride scintigraphy: An index of severity in patients with aplastic anaemia. *Brit J Haem* 34: 599-604, 1976
- GILBERT EH, EARLE JD, GLATSTEIN E, et al:  $^{111}\text{In}$  indium bone marrow scintigraphy as an aid in selecting marrow biopsy sites for the evaluation of marrow elements in patients with lymphoma. *Cancer* 38: 1560-1567, 1976
- RICHMAN SD, LEVENSON SM, BUNN PA, et al:  $^{67}\text{Ga}$  accumulation in pulmonary lesions associated with bleomycin toxicity. *Cancer* 36: 1966-1972, 1975
- HESHIKI A, SHATZ SL, MCKUSICK KA, et al: Gallium 67 citrate scanning in patients with pulmonary sarcoidosis. *Am J Roentgenol* 122: 744-749, 1974
- BAND PR, LENTLE BC, AMY R, et al: Radiologically occult pulmonary lymphangitic carcinomatosis detected by  $^{67}\text{Ga}$ -citrate scintiscan. *Ann Intern Med* 85: 476-477, 1976
- LEVENSON SM, WARREN RD, RICHMAN SD, et al: Abnormal pulmonary gallium accumulation in *P. carinii* pneumonia. *Radiology* 119: 395-398, 1976
- RICHMAN SD, LEVENSON SM, JONES AE, et al: Radionuclide studies in Hodgkin's disease and lymphomas. *Semin Nucl Med* 5: 103-118, 1975

### Diffuse Peritoneal Uptake of Ga-67 in Pancreatic Disease: A Possible Prognostic Indicator

The role of radiogallium (Ga-67) accumulation in the diagnosis of pancreatitis has been discussed recently. Tanaka and coworkers (1) documented uptake of radiogallium by the acutely inflamed pancreas, and we have shown the spread of pancreatitis to the pararenal space (2). In addition to these two patterns we have encountered a more diffuse distribution of radiolabel during pancreatitis, which is documented in the present letter.

**Case 1.** An unconscious 37-year-old man was brought to the emergency room. His relatives provided a history of his having severe abdominal pain and profuse sweating for 3 days. There was a history of "heavy drinking" for 23 years. The patient was cyanotic, body temperature 39°C, blood pressure unobtainable, and pulse 130/min. Respirations were labored, the abdomen tense. Serum amylase was 360 units (normal > 150), alkaline phosphatase 122 (normal > 70), and LDH 263 (normal = 120). The hematocrit was 33%, and the white blood cell count 23,500 with a shift to the left. Blood gases were consistent with metabolic acidosis (pH = 6.98, bicarbonate = 7.5,  $\text{P}_a\text{CO}_2$  = 32,  $\text{P}_a\text{O}_2$  = 98). Laparotomy revealed acute hemorrhagic pancreatitis with bloody fluid throughout the peritoneal cavity. No bowel perforation was found. Several surgical drains were placed and a feeding jejunostomy was established. During the postoperative period, cultures of the drainage fluid grew *Klebsiella*; antibiotics were administered. The abdomen was soft. The patient developed the adult respiratory distress syndrome and was placed on a respirator. Chest roentgenograms demonstrated varying patchy densities and perihilar edema during this period. A gallium-67 citrate study was begun on the fourteenth day after the operation (Fig. 1). There were no physical findings of peritonitis. The patient signed out, against medical advice, on the thirtieth day. He was readmitted a week later in gram-negative sepsis, and died.

**Case 2.** A 54-year-old woman was admitted because of three attacks of right upper quadrant pain, not apparently related to meals. Past history was noncontributory. Temperature was 37°C, pulse 80, respirations 20, and blood pressure 150/80. There were no pertinent physical findings. The hematocrit was 41, white blood cell count 5,400 with a normal differential. An oral cholecystogram did not visualize the gallbladder. At surgery, cholecystectomy, removal of a common-duct stone, and a cholangiogram were performed. The surgically removed gallbladder was reported as showing cholecystitis and cholesterosis. Postoperatively



**FIG. 1.** Anterior abdominal rectilinear scan in Case 1, obtained 24 hr after i.v. administration of Ga-67 citrate. Negative defect to viewer's left (upper) corresponds to hepatic area. Peritoneal cavity is outlined by radiotracer.