to our own (*7*).

Although we have had several personal communications with other workers involved in indium-oxine labeling of platelets, we have yet to achieve satisfactory results using the saline labeling technique. We believe the divergence in results described merits careful attention by proponents of this method with a view toward clarifying any ambiguity or unidentified pitfall in the procedure that prevents others from obtaining favorable results. Concluding that the problem can be attributed to the handling of delicate blood components, as did Welch et al. in their previous letter (*8*), does not necessarily provide the answer. If the method is to enjoy wide use, an explicit procedural outline is needed.

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Increased Specificity in the Diagnosis of Pulmonary Embolism

In the April issue of the *Journal*, Dr. Ahmad et al. (*1*) reported an increase in specificity for pulmonary embolism from 74 to 93% by the addition of radionuclide venography to lung scanning. Although we appreciate the use of radionuclide venography followed by perfusion lung scanning for the diagnosis of thromboembolism in clinical routine, we somehow doubt that it is possible to achieve a specificity of 93% for pulmonary embolism by this method only. By Bayes's theorem it is logical that in cases of established thrombosis, the diagnostic value of the perfusion lung scan for pulmonary embolism would be improved.

Nevertheless the value of radionuclide venography for the diagnosis of deep-vein thrombosis is quite different in the pelvis and thigh region in comparison with the lower legs. Radionuclide venography fails to detect thrombosis in the calves, which in our experience (confirmed in the literature), is the most frequent location of thrombosis. We found thrombi in the calf in 55% of all thromboses of the legs. In our institute we have performed about 2,000 fibrinogen uptake tests since 1972, and about 700 radionuclide venographies (*2*) followed by perfusion lung scanning. Perfusion defects were found in 69% of patients with thrombosis, but also in 43% of patients without thrombosis, thus giving a specificity for pulmonary embolism of only 57%. Using additional assessment criteria—such as clinical findings, radiographs, ECG, evaluation of the shape of the defects and of temporal changes of the perfusion pattern—the number of false-positive findings could be reduced to 11%, giving a specificity of 89%. A real improvement of specificity to 95%, which is comparable to that cited by Dr. Ahmad et al., could be achieved only by additional ventilation scanning either with xenon-133 or krypton-81m. By use of combined ventilation-perfusion scintigraphy we found an embolism rate of 57% in patients with established thrombosis (n = 105) and only three false-positive findings (4.7%) in patients lacking thrombosis (n = 64), thus giving a specificity of 95%; this compares well with angiography without carrying the risks of this invasive method (*3,4*).

Although we consider radionuclide venography followed by perfusion lung scanning a very useful method for the detection of thromboembolism, we consider the fibrinogen uptake test a necessary tool for detection of thrombosis of the calves—the most frequent thrombus location. We therefore suggest the combination of fibrinogen uptake tests, radionuclide venography, and ventilation-perfusion lung scanning in order to achieve optimal diagnosis of thromboembolism in clinical routine.

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Reply

We agree with Koehn et al, that the lower leg is the most frequent site of thrombosis. While controversy exists over the potential of calf-vein thrombosis for propagation (*1*), the ileofemoral segment is recognized as the site of the most clinically significant thrombi (*2*) and is the area where radionuclide venography has the greatest sensitivity. Although we do not know precisely what type of patient population Koehn et al. were working with, almost all of our patients gave strong clinical suspicion of pulmonary emboli; though 20 patients were admitted with a primary diagnosis of thrombophlebitis, pulmonary emboli were suspected clinically.

Even after the standard assessment criteria, including temporal changes, some of the perfusion studies were indeterminate. A xenon-133 ventilation study either could not be performed or was not helpful. When we applied our Criteria 2 more rigidly [positive test if: (a) lung scan indicates high probability of pulmonary embolus, or (b) if the emission venogram was positive in a patient with abnormal lung scan but indeterminate for pulmonary embolus], our data showed the expected directional change in sensitivity and specificity. Our criteria for the interpretation of emission venograms were also strict: (a) venous occlusion with or without collaterals; or (b) intraluminal defects only in ileofemoral segment, with stasis distal to the partially occluded segment. We agree that with the emission venogram alone and the criteria we used, the sensitivity of thrombus detection is going to be lower, but we feel that in the management of suspected pulmonary embolus, when there is no demonstrable abnormality in the ileofemoral segment, it is reassuring to believe that a major pulmonary embolus is unlikely.

We have followed these patients up to 3 yr, with repeat studies performed when indicated, and have observed (a) that pulmonary embolus patients with nonoccluding extensive thrombi in the ileofemoral segment have higher mortality; (b) that patients with documented ileofemoral thrombi had recurrent emboli, whereas emboli could not be documented by perfusion studies in subsequent episodes in those patients who initially had normal emission venograms that remained normal; and (c) that patients who on follow-up studies showed evidence of a continuing thrombotic process superimposed on chronic venous disease (collaterals and venous insufficiency) required anticoagulant therapy indefinitely to prevent emboli.

The study can be performed without significant additional radiation exposure, in a relatively short time, and a repeat study can be performed to demonstrate temporal changes. The fibrinogen uptake and emission venogram are complementary, but in the diagnosis and management of patients with pulmonary emboli we consider emphasis on follow-up study more helpful than adding another test.

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Pulmonary Hydatid Cyst Evidenced By Ga-67 Citrate Scan

Since the report of Edwards and Hayes (*1*), Ga-67 citrate has been widely used to locate neoplastic tissues. It has also successfully detected inflammatory lesions, particularly when an abscess is present (*2-4*). In the case to be described, it located an echinococcus cyst.

A 39-year-old white male presented with a 15-day history of progressive left-side thoracic pain, productive cough with blood-stained sputum, anorexia, and a 5-kg weight loss. Vital signs were normal. There was a mild temperature elevation (37.5°C), which subsided after 2 days in the hospital. Physical examination revealed a thin, well-oriented white male in moderate distress. There were no positive physical findings. The only abnormal laboratory data were ESR 86, Tyne test negative, Boyden test positive at 1:200 dilution, and numerous polymorphs in sputum on several analyses.

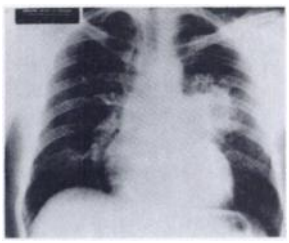

FIG. 1. (Left). Chest radiograph showing presence of 7-cm mass in parahilar region.

FIG. 2. (Right). Anterior gallium scan demonstrating circumscribed area of homogeneous uptake.

Chest radiographs showed a left anterior parahilar mass, 7 cm in diameter with irregular outline (Fig. 1). Bronchography was not performed because the patient was allergic to the contrast medium. Bronchoscopy revealed extrinsic compression of the left superior lobar bronchus without signs of wall infiltration or endobronchial mass. On the sixth hospital day, Ga-67 citrate was administered intravenously as a single dose of a 3 mCi. Scanning was carried out 48 and 72 hr later. A rectilinear scanner was used, equipped with a 3 in. NaI crystal and a coarse-focus 19-hole collimator. A window setting of 140-360 keV was used to encompass the two middle Ga-67 peaks. The scans showed an oval area of homogeneous uptake in the left anterior parahilar region, corresponding to the radiographic findings (Fig. 2). A left thoracotomy was performed on the tenth hospital day and a hydatid cyst with surrounding inflammatory tissue was excised. The pathology report described the cyst as completely enclosed by an area of marked inflammation. Polymorphonuclear leukocytes were especially abundant around the periphery within the pericystium and also within the perivesicular space, as shown in Fig. 3. The postoperative course was unremarkable, with discharge on the 25th hospital day.

The interpretation of circumscibed areas of high gallium uptake is often difficult. In particular, it is not always possible to differentiate between the two conditions in which positive gallium uptake is most common: neoplasm and abscess. Moreover, other radiologic and instrumental investigations, including invasive procedures, are not always diagnostic. Our patient's area of homogeneous uptake, more evident anteriorly, posed a difficult diagnostic problem. A neoplastic process was more likely since there were few clinical signs consistent with abscess. The operative finding of an echinococcus cyst was surprising, even considering the high incidence of hydatid disease in Sardinia. In fact, we almost ruled out the possibility of such a cyst because of the borderline positivity of the Boyden test, the absence of calcifications, and air-fluid levels

FIG. 3. Cyst wall is separated from pulmonary tissue by a thick fibrous capsule with marked inflammatory infiltration. H & E ×40.