Approximately 5% of the hypertensive population have renovascular diseases that can be corrected surgically. Most renovascular hypertension is due to renal-artery stenosis or fibromuscular hyperplasia (*2*). Intrarenal arteriovenous fistulae are a rare cause of hypertension, and of the two types, acquired and congenital, the former is more common. These are usually due to trauma, renal surgery, postpercutaneous or open renal biopsy, infection, rupture of aneurysm, neoplastic erosion of blood vessel, polycystic kidney disease, fibromuscular hyperplasia, and severe arteriosclerosis (*5,6*). A review of the literature uncovers only two cases of the acquired type of arteriovenous fistula that were detected by radionuclide studies.

In the present patient an intrarenal vascular fistula was suspected on the basis of abnormally early increased radioactivity in the lower pole of the left kidney in the arterial phase of a renal perfusion study. Vascular tumor such as hypernephroma was considered an unlikely diagnosis based on the normal [^{131}I] hippuran renogram, i.v. pyelogram, and nephrotomogram. Although i.v. pyelography is sensitive to abnormal renal anatomy, vascular abnormalities are better delineated by radiotracer techniques, as illustrated by this case. Definitive diagnosis, however, can be made only by contrast arteriography and/or surgery.

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Toward Shorter-lived Radiopharmaceuticals for Perfusion Lung Scans

For 15 years the perfusion lung scan has greatly facilitated the diagnosis of pulmonary embolism. When a lung scan is normal, pulmonary embolism is virtually ruled out as the cause of acute chest pain or shortness of breath. Although there has been no estimate of the savings to these patients through avoidance of pulmonary angiography, they must be large in both dollars and morbidity. However, considerable difficulty is encountered in the interpretation of lung scans of patients with similar symptoms in the presence of obstructive lung disease or congestive heart failure. A normal chest roentgenogram and characteristic perfusion abnormality can be useful but may not be sufficient to make the definitive diagnosis. This diagnostic enigma is resolved to a large extent by an additional ventilation lung scan with radioactive inert gas or aerosol. An abnormal perfusion lung scan in the presence of a normal ventilation study is virtually diagnostic of pulmonary embolism, whereas in the presence of an abnormal matching ventilation scan, the diagnosis is very unlikely.

Until radioactive inert gases or aerosols with better physical characteristics than Xe-133 (*1*) are widely available, considerable operational problems remain. Should one perform a ventilation study routinely before the perfusion lung scan, at greater cost for the former procedure, or wait several hours until the injected perfusion agent has decayed sufficiently, at the loss of the benefit of a speedy diagnosis? Alternatively, a large dose of Xe-133 (20–30 mCi) may be used for a ventilation study immediately after the perfusion scan to maximize the signal-to-noise ratio between Xe-133 and the usual Tc-99m radionuclide. Another option should receive serious consideration: the use of a perfusion radiopharmaceutical with shorter half-life, so that a smaller dose of Xe-133 may be used for ventilation immediately after a perfusion lung scan. This approach not only maintains a good signal-to-noise ratio in the immediate ventilation study but may also effect savings in cost and radiation dose. In fact, the optimal half-time for a radiopharmaceutical was shown long ago to be equal to the natural logarithm of 2 times the duration of the measurement (*2*). To apply this principle to the current instrumentation, the half-time of the perfusion radiopharmaceutical should be in the range of 0.5–1 hr. The preparation of such perfusion tracers is technically feasible. Indeed, at least one commercially available kit preparation yields a Tc-99m-labeled MAA with the desired biologic half-time.

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Enigma of the "Hyperfunctioning" Thyroid Carcinoma Resolved?

It is generally agreed that the presence of a nodule showing greater concentration than surrounding thyroid tissue (hyperfunctioning) on radioiodine scintiscan virtually eliminates concern about possible thyroid carcinoma. In a series of 2,736 patients with solitary nodules, Psarras et al. (*1*) found no carcinoma in hot nodules. Nevertheless, scattered reports of carcinoma in hyperfunctioning thyroid nodules appear in the medical literature. Most such reports actually describe association of thyroid carcinoma with benign adenoma, with the carcinoma shown to be in a hypofunctioning area with two nodules palpable, or in an area of low concentration within an otherwise hyperfunctioning nodule, or