Correlation of perfusion defects with arteriographically proven significant coronary stenosis was good for the left anterior descending and right coronary arteries, but not so good for circumflex artery disease.

Using 20I T1 stress myocardial scintigraphy, coronary artery disease could be detected noninvasively in sensitivity of 88% (21/24), with specificity of 95% (20/21).

2) To examine the ischemia-induced left ventricular dysfunction during exercise testing in patients with effort angina, 99m-technetium radionuclide angiocardiography was performed at rest and during submaximal exercise testing.

5 normal subjects showed no regional dysfunction and each slightly increased ejection fraction (average increase, 9±5%) during exercise.

On the contrary, in 4 patients with effort angina who showed normal left ventricular ejection fraction at rest (54±7%), decreased ejection fraction (31±9%) was observed during anginal attack and ischemic ST changes.

Localization of Technetium-99m Pyrophosphate in Experimental Myocardial Infarcts—Its Relationship to Histological Findings, Regional Perfusion and Tissue Calcium Level

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We have successfully estimated the size of anterior wall myocardial infarct using technetium-99m pyrophosphate (^{99m}Tc-PYP) myocardial scintigram in eight dogs. ^{99m}Tc-PYP is reported to accumulate in necrotic myocardium. In the present study, we tried to evaluate three possible determinates of ^{99m}Tc-PYP accumulation: extent of tissue necrosis determined histologically, regional perfusion measured with thallium-201 (^{201}Tl) and tissue calcium level (Ca) measured by atomic absorption spectrometry.

Methods: Experimental myocardial infarct was produced in four dogs by ligation of left anterior descending artery. Eight millicurie of ^{99m}Tc-PYP was injected intravenously 48 hours after the ligation. 50 minutes after ^{99m}Tc-PYP injection, 300 microcurie of thallium-201 (^{201}Tl) was injected intravenously, and the dog was sacrificed 10 minutes thereafter. The left ventricle was cut into several transverse slices. One of the slices which contained grossly necrotic myocardium was divided into 10 sections, and each section was divided into two layers-endocradium and epicardium. Thus, the left ventricular slice was divided into 20 segments. These segments were weighed, placed in plastic tubes containing 10% formalin, and ^{99m}Tc radioactivity was counted within 6–12 hours after injection of ^{99m}Tc-PYP in well-type gamma counter (Thyro-net, Aloka Inc.) ^{201}Tl counts were obtained 5 days after dogs were sacrificed when samples were free of significant ^{99m}Tc activity, and corrected for radioactive decay during 5 days. The raw ^{99m}Tc counts were corrected for ^{201}Tl activity. Each segment was divided into two parts, one for histological study and the other for the measurement of Ca.

Histological section was stained with hemotoxylin-eosin, and the extent of infarction was expressed as percent of whole section.

For Ca study, myocardial samples were weighed, and then digested overnight in one millilitter concentrated nitric acid, and the digest was then diluted to 10 millilitter with deionized water. The Ca were measured by atomic absorption spectrometry (Type 308, Hitachi Inc.), and the results were expressed as parts per million per gram wet tissue.

Results: (1) Relationship between ^{99m}Tc-PYP activity and the extent of myocardial infarct: All myocardial segments which showed elevated ^{99m}Tc-PYP activity had histological evidence of infarct. However, there was no linear relationship between ^{99m}Tc-PYP activity and the extent of myocardial infarct. (2) Relationship between ^{99m}Tc-PYP activity and regional perfusion measured by ^{201}Tl: ^{201}Tl activity decreased in the segments

which showed histological evidence of infarct and elevated ^{99m}Tc activity. Yet, there was no consistent relationship between ^{99m}Tc and ^{201}Tl activity. (3) Relationship between ^{99m}Tc-PYP activity and Ca: Ca increased in the segment which showed elevated ^{99m}Tc activity. However, there was no linear relationship between ^{99m}Tc activity and Ca.

In summary, none of these three factors appears to be solo determinant of ^{99m}Tc-PYP distribution. It seems likely that not only the absolute value of Ca but also composition and physicochemical properties of tissue calcium is important for the accumulation of ^{99m}Tc-PYP. Further study is warranted to make better understanding of relationship between ^{99m}Tc-PYP accumulation and calcium kinetics in infarcted myocardium.

Technetium-99m: 3-Hydroxy 4-Formyl Pyridine: Glutamic Acid Complex. A New Rapid Cholescintigraphic Agent

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Scintigraphic imaging of the hepatobiliary system has been significantly improved with development of Tc-99m labelled compounds.

Tc-99m; 3-hydroxy 4-formyl pyridine (HFP): glutamic acid (G) is a non-toxic radiopharmaceutical that was found to undergo rapid biliary excretion in normal rabbits. A new Tc-99m-HFPG was prepared by heating an aqueous solution (PH 6.5–7.5) of HFP, G, and pertechnetate-99m for 15 min. at 100°C. The yield of Tc-99m-HFPG was in the order of 90-100%. The simple method may be applicable for a kit preparation.

A safety assessment in mices (20 g) was made using HFPG complex without added Tc. In the mice a single intravenous dose of 187 mg/kg was non-toxic and caused no gross behavier or pathologic changes. These doses represent a 1,000–2,000 times excess over the probable human dose in the intended diagnostic application. The biliary trees and gallbladder were seen within 20 min. of Tc-99m-HFPG injection and by 25 min. marked accumulation of radioactivity was noted in the gallbladder and intestinal tract. While the gallbladder was cleary visualized by 15 min using Tc-99m-HIDA, 40 min: Tc99m-pyridoxylideneglutamate (PG), 30 min: Tc-99m-pyridoxylideneisoleucine (PI). Blood clearance in the rabbits: The Tc-99m HIDA have lower blood levels than another complexes. The rabbits weighing approximately 2.5–3.0 kg were surgically prepared to allow bile samples to be collected. The cummulative per cent dose in the bile at 1 hour were 38.8% of the injected Tc-99m-HFPG, 42.2% of Tc-99m-PG, 56% of Tc-99m-HIDA, 57.8% of Tc-99m-PI.

In summary, Tc-99m-HFPG appears to be one of the suitable agent of low toxicity for the investigation of biliary tract disorder.

Effect of the Chemical Structure and Plasma Lipoprotein Binding Properties on Adrenal Accumulation of Radiohologenated Sterols

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The properties of rapid incorporation and long-term retention in adrenal make 19-iodocholesterol (CL-19-I) (Counsell et. al.) and 6β-iodomethyl-19-norcholest-5(10)-en-3β-ol (NCL-6-I) (Kojima et.al.) to be successful adrenal scanning agents. We have undertaken to prepare the following radiohalogen derivatives of cholesterol and to compare their behaviours in animal body: (1) CL-19-