L. Digestive Tracts (Liver and Biliary Tract)

BASIC AND CLINICAL STUDIES ON ^{99m}Tc-PYRIDOXYLIDENE GLUTAMATE AND ^{99m}Tc-PYRIDOXYDENE-ISOLEUCINE

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Scintigraphic imaging of the hepatobiliary system has been significantly improved with the development of ^{99m}Tc-labeled compounds. Among them ^{99m}Tc-Pyridoxylidene glutamate (PG) played the important role as one of the most promising agents. We developed a new kit method using a small quantity of stannous resin particles, with which the labeling procedure is simplified (autoclaving for only 5 min at 120°C), and the results of basic and clinical evaluation were presented at the Symposium of the 16th General Assembly of the Japanese Society of Nuclear Medicine, Kurume, 1976. Recently a new potential ^{99m}Tc-labeled agent, ^{99m}Tc-Pyridoxylidene isoleucine (PI) was reported by Kato et al of Nihon Medi-phisics Co., Ltd., and became to be commercially available. These two radiopharmaceuticals, PG and PI, have been compared in mice and the clinical usefulness of PI for various hepatobiliary diseases was investigated.

PI was shown to be a superior cholescintigraphic agent to PG in that the former had better hepatic uptake and lower urinary excretion than those of the latter in both animal and human studies. In studies of jaundiced patients involving extrahepatic obstruction and cholestatic hepatitis, however, increasing amount of PI was excreted into urine instead of being taken up by the liver. This provented a kinetic study using a blood disappearance curve.

Nevertheless, a rate constant obtained from hepatic excretion curve was revealed to be a useful index of various hepatobiliary diseases.

A more reasonable ^{99m}Tc-labeled agent similar to BSP in the chemical structure having bifunctional cholate, ^{99m}Tc-PC is now under study and clinical trial.

STUDY OF ORGAN DISTRIBUTION OF Tc-99m-PYRIDOXYRIDENEISOLEUCINE(PI) IN NORMAL RATS, BILE-DUCT-LIGATED RATS AND DIFFUSE PARENCHYMAL LIVER DISEASE RATS

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PI is newly developed Tc-99m complex for hepatobiliary tract imaging. The purpose of our study is to investigate (1) organ distribution (O.D.) of PI in normal rats, (2) O.D. of PI in jaundiced rats with common bile duct ligated and (3) O.D. of PI in rats with diffuse parenchymal liver disease induced by carbon tetrachloride. In experiments (1) and (2), comparative studies with I-131-BSP(BSP) were done.

(1) In normal rats, biliary excretion of PI was more rapid than that of BSP. At 30 min. post-injection excretion into the intestine was approximatery 66.5% in PI and 44.5% in BSP, while urinary excretion was 10% in PI and only minimal (less than 1%) in BSP. (2) In the group of common bile ligation (immediately, 1 week and 2 weeks after ligation), the radioactivity of the liver within 60 min. after administration of PI was low about 6 to 12%, but that of BSP was high about 40 to 90%. About 40 to 50% of PI was excreted to urine within 60 min., but little (less than 1%) of BSP was seen in urine. (3) In diffuse parenchymal liver disease, degree of liver damage was histologically classified into four grades. In severely damaged rats, excretion of PI from the liver to the intestine was low and percentage of urinary excretion and radioactivity of the blood correlated well with th the degree of liver damage.

Thus the results of our experiments show that by measurement of radioactivity of the blood and urine the diffuse parenchymal liver damage can be graded in severity and furthermore distinguished from obstructive liver disease.

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