E. Radiopharmaceuticals

EFFECT OF BUCOLOME ON THE BILIARY EXCRETION OF Tc-99m PYRIDOXYLIDENE ISOLEUCINE(Pi)

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(Purpose):Tc-99m Pi has been used as a hepato-biliary scanning agent in nuclear medicine. However, the mechanism of Tc-99m Pi excretion into bile is not known. The purpose of the study is to obtain information with regard to the biliary excretion of Tc-99m Pi.

(Materials & Methods):SD strain rat, male, 8-10 weeks old, were used. Methods are as follows:(1) Bucolome(20mg per 100grat) or saline(for control rat) was injected intraperitoneally 20 minutes prior to the Pi injection. (2)Rat was anesthetized with nembtal and a biliary fistula was made to get bile sequentially. Tc-99m Pi(200-400uCi, 0.2ml) was injected intravenously and then 4 cummulative bile samples (5,5,10,10 minutes) were obtained. The sequential biliary excretion of Tc-99m Pi was compared between control and bucolome treated rats. Plasma clearance of Tc-99m Pi was measured with serial arterial blood sampling.

(Results):Biliary excretion of Tc-99m Pi(% of the dose) was 31.9±3.8(n=12) in control group and 41.5±5.3(n=11) in bucolome treated group in the initial 5 minutes showing a significant increase of Pi excretion by bucolome. However total biliary excretion of Tc-99m Pi for 30 minutes was 71.5±2.8 in control and 69.0±6.4 in bucolome showing no difference between 2 groups. Plasma clearance was slightly delayed in bucolome treated group compared with control group. The distribution of Tc-99m activity in organs at 30 minutes after injection showed that bucolome group had less Tc-99m activity in the urinary bladder compared with control group.

(Conclusion):Kitani reported(Gastroenterology 69: 873, 1975) that BSP excretion into bile was not enhanced by bucolome while ICG excretion was enhanced. The results of the present study showing a significant increase of Pi excretion by bucolome suggest that Pi is similar to ICG rather than BSP with regard to the effect of bucolome on its biliary excretion.

THE EFFECT OF PHENOBARBITAL PRETREATMENT ON THE BILIARY EXCRETION OF ^{99m}Tc-HIDA IN THE RAT

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^{99m}Tc HIDA has been extensively used as a biliary imaging agent in clinical medicine. However, the pharmacokinetic property of this agent has not been studied in the past. The present study was designed to characterize some of the pharmacokinetic properties of this agent.

Male SD rats (300g, 9-week-old) were pretreated with ip injection of phenobarbital solution (8mg/100g once daily for 4 days), and the study was done on the fifth day. The control rats were given an isovolumetric saline treatment. Under nembutal anesthesia, the common bile duct was cannulated with PE-10 tubing, for a bile collection. ^{99m}Tc-HIDA (0.2ml, about 200uCi) was injected iv and bile samples were collected for the following 30 min. Plasma clearance of biliary recovery of Tc activities were measured by bile and plasma samples.

Results: In phenobarbital treated rats, the bile flow rate and liver weight were significantly higher than control rats. The biliary recovery of Tc activity (% of the dose) in phenobarbital treated rats was also significantly increased in the first 5 min bile samples (control rats, 26.5±25, n=4 phenobarbital treated rats, 34.7±1.5, n=4) as well as in the 30 min total recovery (control, 61.4±4.2, phenobarbital 68.4±4.0). Plasma clearance of the Tc HIDA was also slightly accelerated by phenobarbital pretreatment.

It was concluded that repeated pretreatment with phenobarbital significantly enhances the biliary excretion of HIDA, which indicates the similarity between HIDA and BSP for their pharmacokinetic properties.