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STUDIES ON PORTAL CIRCULATION BEFORE AND AFTER THE SCLEROTHERAPY OF ESOPHAGEAL VARICES BY RADIONUCLIDE ANGIOGRAPHY. S. Shiomi, N. Ikeoka, T. Kuroki, T. Kobayashi, T. Kamata, K. Kobayashi, S. Yamamoto, Y. Shimonishi, H. Ikeda, K. Hamada, H. Ochi, Y. Onoyama and T. Monna, Osaka City University Medical School, Osaka.

After a bolus injection of 10 mCi of Tc-99m phytate, scintigrams were obtained sequentially for up to 1 minute. The peak time of the kidney curve corresponded to the junction of the arterial and portal phases of the hepatic curve, and the portal component was calculated as the ratio of portal to total blood flow.

Results: 1) The portal components ranged from 64% to 76% and the mean was 71.3% in normal subjects (n=21). The mean portal component was 63.6% in CIH (n=15) and 58.6% in CAH (n=16). In the cases of hepatic cirrhosis, the mean of the portal component was 39.4% (n=121). 2) The portal component was significantly lower in the cirrhotic patients with esophageal varices than that in the patients without esophageal varices. 3) Portal components were calculated in 22 patients before and after sclerotherapy. A paired t-test showed a significant rise in the values of portal components between the measurement before and just after treatment. But it showed a significant fall in the values of portal components between the measurement just after and two months after treatment. Whereas, portal components didn't show a significant change between two months and one year after treatment.

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A NEW METHOD OF MEASURING THE RATIO OF PORTAL BLOOD FLOW TO TOTAL HEPATIC BLOOD FLOW BY HEPATIC RADIONUCLIDE ANGIOGRAPHY. M. Nogami, M. Hasegawa, K. Riu, H. Takenaka, A. Shinotsuka and T. Hishida, Department of Radiology Showa University School of Medicine, Tokyo.

A new method, referred to the improved method of Sarper and et al, for calculating the ratio of portal blood flow to total hepatic blood flow (hepatic perfusion index :HPI) from the hepatic time activity curve was performed. The analysis was as follows. Assuming that the arterial flow of the liver was similar to that of the spleen, the slope of the hepatic arterial wash out phase could be calculated by the slopes of the arterial and wash out phase of the spleen curve and the arterial phase of the hepatic curve. The slope of true portal segment was obtained by subtraction of the slope of hepatic wash out phase from that of the observed portal phase on the hepatic curve. As a result, this method could accurately estimate the portal blood flow that was underestimated by the previous method. Performing the bolus injection as rapidly as possible, the beginning point of the portal phase could be directly found on the hepatic curve. The beginning point was later than the renal peak in many cases. In point of this, the new method was more effective than the previous method. The values of HPI calculated by the new method had better correlation with the values of prothrombin time, cholinesterase and ICG and the findings of per-rectal portal scintigraphy than that obtained by the previous method.

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HEMODYNAMICS IN ESOPHAGEAL VARICES STUDIED BY RADIONUCLIDE SPLENOPORTOGRAPHY. K. Yamada, G. Uchiyama, J. Okada, K. Hayakawa, S. Hayashi, Y. Saito, T. Hihara, K. Seto, T. Araki, T. Arai, H. Fujii and Y. Yamamoto, Yamanashi University School of Medicine, Yamanashi.

The portal hypertension causes collateral vessel formation between portals and veins. Among others the esophageal varices are practically significant pathways that have influence on the patient's prognosis. A small amount of pertechnetate (Tc-99mO₄) percutaneously injected into the spleen clearly visualized esophageal varices and allowed us to analyse their hemodynamics without any physiological disturbance. Twenty three cases were so far studied without complication. The study was concentrated in evaluating the hemodynamical changes in esophageal varices after the endoscopic sclerotherapy. Using gamma fitting method, the areas under the time-activity curves of the liver and varices were calculated. Changes in the varix fractions of venous blood from the spleen before and after the sclerotherapy were well correlated with the endoscopic observation and with the decrement of serum cholic acid. The optic as well as quantitative evaluation of blood flow in the esophageal varices is a useful method of evaluating the effect of sclerotherapy.

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EVALUATION OF EFFECT OF VARIOUS LOADS FOR THE LIVER USING RADIONUCLIDE DYNAMIC CURVES. T. Kashiwagi, T. Koizumi, K. Takashi, K. Kimura, Osaka Kosei-Nenkin Hospital and Osaka University Hospital, Osaka

We have developed a new analytical method for Tc-99m phytate and Tc-99m PMT dynamic curves in the liver and heart. The curves before and after loads were analyzed by non-linear regression method according to following formulas.

Tc-99m phytate hepatic accumulation curve:

$$C(t) = C_{\infty}(1 - e^{-K_a t})$$

Tc-99m PMT hepatogram:

$$C(t) = C_0(e^{-K_{et}t} - e^{-K_{ut}t})$$

Cardiac disappearance curve:

$$C(t) = C_1 e^{-K_{dt}t} + C_2 e^{-K_2 t}$$

C: count rate, C_∞: C of time ∞, C₀: C of time 0, C₁: C of time 0 for K_d, C₂: C of time 0 for K₂, K_a: accumulation rate, K_e: excretion rate, K_u: uptake rate, K_d: disappearance rate, K₂: disappearance rate for second phase.

The loads for the liver were leg exercise, administration of meal and transcatheter arterial embolization therapy (TAE). The leg exercise was performed in supine position for 13 min on a ergometer at work loads of 25 watt. During leg exercise, K_a and K_d decreased by 26%. After meal, K_u and K_d increased by 45 and 12% respectively. On the other hand, K_e didn't show the constant tendency. After TAE, K_e in the non-tumor regions reduced markedly.