ing at 83±1°C of 3% albumin buffer solution for 20 min. was proven to produce the most suitable AA solution for RES study with good reactivity to 131I or 125I. (3) Using AA carrier prepared by the same way to the labelled AA, mean value of maximum phagocytic capacity was measured as 0.340 mg/kg min. from 10 control cases (cm. previously reported as 1.07 mg/kg min.). (4) Sample handling was simplified using tannic acid reagent precipitation method. (5) Using this modified method several cases with viral hepatitis did show marked increase in this capacity. No significant decrease was observed in RES capacity in cases with viral hepatitis. Four among 13 cases with viral hepatitis even showed more than twice increase in hepatic RES capacity. Four cases with liver cirrhosis did not show any significant change in RES capacity.

Studies on the “Stream Line” Phenomena in the Portal Vein in Man and Dog Using 131I Labelled Macroaggregated Albumin (MAA)

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The possible existence of segregated stream of blood in the portal vein (“Stream line” phenomena in the portal vein) and their subsequent distribution to definite parts of the liver is of interest and was studied by many investigators. Although the portal streamlining was proven in the dog, it could not be confirmed in man.

In this work “Stream line” phenomena in the portal vein was reconfirmed in the dog and was found for the first time in man.

One hundred μc (dog) or 300μc (man) of 131I labelled macro-aggregated albumin (MAA), ranging 20—50 μ in size, dissolved in 1.0-1.5ml saline solution, was employed as the indicator. Eleven cases of human subjects, having normal hepato-portal circulation, and 11 dogs were studied. After laparotomy 131I labelled MAA was injected into different radicles of the portal vein of the dog and man. For infusion 2 minutes were taken in order not to disturb the stream line. The ultimate localization of 131I labelled MAA in the regional capillaries of the liver was observed using scanning method for man externally and for the dog after removal of the liver.

Scanning of the liver after the injection of 131I labelled MAA into tributaries of portal vein showed the segmental distribution of 131I labelled MAA in all these cases.

From the above findings the existence of “Stream line” phenomena in the portal vein was proven not only in the dog but also in man.

Detection of Hepatic Shunts by 131I MAA Scintigram (III)

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The principle of this new method is as follows: Since adequately prepared MAA with the particle size ranging from 20 to 100 μ is completely trapped by the capillary net work where it is first delivered, MAA can not reach the post capillary blood stream unless there is a by-pass route whose diameter is large enough to permit passing of
MAA. Consequently, MAA injected into the spleen is trapped in the hepatic sinusoids in normal subject and can not appear in the pulmonary system without the presence of portal systemic shunts. By performing the scintiscanning over the liver and lung, we can see the accumulation of MAA exclusively in the liver and spleen in normal subjects. On the other hand, in cases with portal systemic shunts, some amount of MAA which has by-passed the liver, is finally trapped by the lung capillary visualizing the lung scintigram. And the degree of the appearance of radio-activity in the lung can be used as an indication of the shunted blood flow.

Fourteen cases among 16 cirhotics showed the presence of the collateral circulation of a spleno-portal system. Three hemolytic anemias, 4 hepatitis and 2 cirhotics showed no accumulation of radioactivity in the lung indicating the absence of shunts. The simultaneous record of the radioactivity accumulation curve over the liver and lung provided us with more detailed information about the portal circulation than the previous isotopic splenoportography. The initial tall hump of the liver curve recorded in some cirrhotic cases with marked accumulation of MAA by scintigram, suggested the possibility that MAA introduced into the liver via portal vein, passed through intra-hepatic shunts.

The MAA appearance time to the liver after splenic injection was almost same between cirrhotic cases and non cirrhotics, while the lung appearance time through collateral veins ranged widely in case to case.

¹¹¹I-MAA was concluded to be the suitable and useful pharmaceuticals for the study of portal circulation in liver cirrhosis, too.

Variation of Liver Blood Flow Index According to the Location of Scintillation Detector

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External counting method for the measurement of hepatic blood flow index using colloidal radiogold is useful in clinical examination.

In our study, variation of liver blood flow index (Kn) according to the location of scintillation detector over liver was studied in 21 patients. And variation of liver blood flow index calculated by different examiners was also studied in 2 patients.

Methods

2-4 scintillation detectors were placed on different parts over the liver in a patient at the same time. Then 55 accumulation curves in 21 patients were recorded.

And also liver blood flow indexes of 6 accumulation curves in 2 patients were calculated by different 188 examiners and compared.

Results

Some patients have a marked variation in Kn according to the location of scintillation detector. (Ex.: K₁ 0.108, K₂ 0.147, K₃ 0.100, Mean 0.117, Ex.2: K₁ 0.141, K₂ 0.187 K₃ 0.147, K₄ 0.187, Mean 0.166)

On the other hand, in other patients liver blood flow index varies only a little. (Ex. 3: K₁ 0.124, K₂ 0.120 Mean 0.122, Ex.4: K₁ 0.114, K₂ 0.122 K₃ 0.117, Mean 0.118)

In former group of patients, 2nd decimal number of liver blood flow index varies easily according to the location of scintillation detector. And even in latter group of patients, third decimal number varies according to the location of detector.

It was also found in our investigation that