

The Liver-Spleen Uptake Ratios with I-131 Labelled Microspheres

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In the abdominal scintigram with radioactive colloids, the size and density of the spleen image is considered as a good index of the liver pathology. The pathological transition of liver disease, such as hepatitis and cirrhosis, could roughly be estimated by this index. The method of quantitating the size and density of the spleen image was described in the previous report. The liver-spleen uptake ratio was applied in this report, and the simple method of its calculation with using I-131 labelled microspheres and Au-198 colloids was described. The calculation of the liver-spleen uptake ratio is as follows. Twenty to thirty minutes after the intravenous injection of 200 μ Ci of I-131 labelled microspheres, the mechanically dotted scintigram of the liver and spleen is made by a

two-opposed-detector scanner in the addition-count mode. The dots of each liver and spleen area are optically counted and the ratio is calculated. Two to 3 weeks later, the same procedure is made with Au-198 colloids. Digital computer scintigrams were used in some cases for summing the counts of each liver and spleen area. The mean values of the liver-spleen uptake ratio with I-131 labelled microspheres are, 4.0 for normal liver, 3.0 for hepatitis, and 0.6 for cirrhosis. The values with Au-198 colloids are, 26.6 for normal liver, 17.7 for acute hepatitis, 9.7 for chronic hepatitis, and 3.7 for liver cirrhosis. The standard deviations in each group of diseases seem to be better in Au-198 colloids.

Comparison of Hepatic Isotope-Accumulation Curves in Liver Disease

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Recently, a combined technique of γ -camera with data-analyzing apparatuses offers a means of recording dynamic radioisotope studies of the liver. The hepatic isotope-accumulation curves in liver diseases were obtained by the use of the combined RI analyzing instrument for the aid of clinical diagnosis of liver disease. ^{198}Au and $^{99\text{m}}\text{Tc}$ colloidal suspensions were injected intravenously and the radioactivity above the liver measured continuously as a function of time at 1 min. intervals for 20 min. after the injection (^{131}I -BSP at 5 min. intervals for 60 min.). The

digital data were fed into the magnetic tape operating in the memory unit of the instrument. The activity in the interested areas in the right and left lobes on the regenerated hepatic image on CRT was counted at the time intervals to make hepatic isotope-accumulation curves. The isotope accumulation both in right and left lobes of healthy liver proceeded with high speed until 4 min. after the injection. On the other hand, the initial increase-rate of the curves was lowered in damaged livers. In the case of the cirrhotic subjects, the activity of isotope uptake into the

right and left lobes of the livers was also different at the stage of cirrhosis. The isotope-accumula-

tion curves above the spleen were also examined in cirrhotic subjects.

¹³¹I-BSP Loading Studies in Infancy and Childhood

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0.26–0.66 mg (80–200 μ Ci) of ¹³¹I-BSP was given intravenously to 56 infants and children with liver diseases (1 month–12 years)

The following studies was performed simultaneously.

1) The retention ratio at 30 minutes. 2) The disappearance curve from 1 ml of peripheral blood day by day. 3) Liver scintiscanning immediately after injection to 5 hours, and 24 or 48 hours, then the case the liver image could be seen, to 14 days was carried out. 4) In infants, both stool and urine were calculated in counts min by Well type scintillation counter during one week.

The result was follows.

1) In normal infants and children, the time of ¹³¹I-BSP excretion from liver cell was much longer compared with adults and in infants it was not mean abnormal if the gall bladder could not be seen. 2) Both the case the liver image after 24 or 48 hours remained and not were seen, while the retention ratio or the disappearance curve was normal. 3) In conclusion, ¹³¹I-BSP loading studies showed the different liver function in several liver diseases of infants and children including acute or chronic hepatitis infantile hepatitis, congenital biliary atresia and so on.

Binding Capacity Between ¹³¹I-BSP and Serum Protein in Liver Disease by Methode of Single Radial Immunodiffusion

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It is said that Sulfobromophthalein. Indocyaninegreen and other organic anions used as the test of liver function are bound to albumin and α_1 -lipoprotein in blood. Binding Capacity between ¹³¹I-BSP and sera of the patient suffered from acute hepatitis, chronic hepatitis and liver cirrhosis were studied by the method of single radial immuno diffusion using specific Antisera of 27 kinds.

Method: The antigen plate was made by the method that solution mixed 0.2 ml of serum with 0.1 ml of ¹³¹I-BSP was added 1.5 gr of agarose diluted with phosphate buffer pH 7.4. 30 wells, 2 cm in diameter were made by in-

spiration. Into the wells of these plates specific antisera of 27 kinds were put. After incubation for 48 hours, diameter of precipitated rings were measured, then the plates were washed by saline for 48 hours. After dried the plates autoradiography was carried out on X-Ray film for 4 to 6 hours.

Results: Immunodeffusion test by ¹³¹I-BSP-antisera plate showed that ¹³¹I-BSP was bound markedly to alubmin, pre-alubmin (pre), haptoglobin (Hp), B-lipoprotein (B-Lipo), α_2 -HS glycoprotein (α_2 -HS) and γ -Mglobulin (γ -M), and partly to α_1 -lipoprotein, α_1 -acid glycoprotein (α_1 -AG), α_2 -Macroglobuline (α_2 -M) and transferrin.