

18 of the patients, liver and spleen scintigrams were obtained after intravenous administration of ^{198}Au - or $^{99\text{m}}\text{Tc}_3\text{S}_7$ -colloid solutions. Renal scintiscanning was performed in 2 cases following intravenous injection of ^{203}Hg -Neohydrin or ^{203}Hg -Salylgan. In 16 cases, ^{131}I -MAA was also injected into the spleen and subsequent scintiscanning was obtained over the hepatic and pulmonary areas to estimate the distribution of the portal blood stream and to detect the amount of portosystemic shunting. Materials consisted of 5 cases of liver cirrhosis, 6 with primary splenomegalic portal hypertension, 5 with hepatic tumor, 4 with extrahepatic abdominal tumor, each one with Grawitz's tumor and with hydronephrosis, and 2 with other diseases. Diagnosis was confirmed at operation in 8 cases and at autopsy in one.

In cirrhosis of the liver, the hepatic arterial vascularity was not decreased and peripheral branches were tortuous and irregular in caliber in arteriography. Scintiscan following injection of ^{131}I -MAA into the celiac artery gave a dense shadow over the hepatic area, while scanning after an intravenous radioactive colloidal solution revealed a decreased hepatic shadow and appearance of radioactivity over the spleen. In primary splenomegalic portal hypertension, arteriogram revealed a large splenic artery and the attenuated hepatic arterial branches which appeared straightened in their course. Scintigram following injection of ^{131}I -MAA into

the celiac artery was characterized by a huge splenic shadow and very poor visualization of the hepatic area. Liver scintigram using radioactive colloidal solution revealed a considerable shadow over the hepatic area. By pulmonary scanning following intrasplenic injection of ^{131}I -MAA, it was demonstrated that the amount of blood passing through the portosystemic shunts was large. In primary cancer of the liver, intraarterial perfusion scan with ^{131}I -MAA revealed a predominant accumulation of the radioactivity in areas which showed findings of tumor vessels and tumor stains in arteriography. Radioactivity was found to be distributed in intact hepatic areas after intrasplenic injection of ^{131}I -MAA as well as intravenous administration of radioactive colloidal solution. In a case with leiomyosarcoma of the stomach, a contour of the tumor was clearly depicted by scintiscanning following introduction of ^{131}I -MAA into the celiac artery. ^{131}I -MAA introduced into the left renal artery in one case with a large Grawitz's tumor gave a picture suggesting an area of central necrosis with a poor vascular supply. In this case, functioning parenchymal tissue in an upper small area of the kidney was demonstrated by scintigram after ^{203}Hg -Neohydrin.

Combination of the procedures gave various contrasts depending on the distribution of blood stream and the degree of parenchymal tissue damage of the diseased organs.

Study on the Liver Function of the Experimental Liver Homotransplantation

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In order to study the liver function in the experimental orthotopic and heterotopic liver homotransplantation, we have used the external counting method using radioactive Rose Bengal. The scintillation detector was put over the orthotopic transplanted liver immediately after surgery. Body surface counting curve showed almost normal which was composed of uptake, equilibrium and excretion curve, whilst blood disappearance curve

which was measured from femoral artery blood simultaneously, composed of three exponential curves.

From this blood disappearance curve, we calculated intercompartmental rate constant according to three compartment system theory by Araki and Kashima. Results were as follow, intercompartmental rate constant between blood and liver decreased remarkably against controll value. This data was con-

soon as possible. Scintigrams obtained were compared with findings in arteriography. In sidered as the result of ischemia or outflow block of the transplanted liver. Next, body surface counting curve in the experimental heterotopic transplanted liver was classified into the three patterns.

The first pattern which was obtained immediately after surgery, or about one week after surgery with the use of immunosuppressive substance, showed almost normal. The 2nd pattern which was obtained about

one week after surgery without the use of immunosuppressive substance showed slow elevation at initial phase, followed by equilibrium curve which was continued 90 minutes duration and didn't show decreasing tendency. The 3rd pattern which was obtained also about one week after surgery without the use of immunosuppressive substance showed steep elevation at initial phase followed by slowly decreasing curve without showing any equilibrium. The 2nd and 3rd patterns were thought as the result of rejection.

Effects of the Highly Oxygenated Blood to the Hepatic Function

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Oxygen effects by intravascular administration of the hydrogen peroxide have been experimentally studied by means of measurement of the hepatic uptake rate of ^{198}Au colloid and of the disappearance rate of ^{131}I labelled Rose Bengal in peripheral blood before and after intravenous drop of 0.5% solution of the hydrogen peroxide.

Prior to the experiment, LD_{50} of 0.1% to 1.0% of this solution and oxygen pressure in the peripheral venous blood were also examined and it was recognized that the toxicity of the solution was very low and the oxygen

pressure has immediately elevated after starting of administration of the hydrogen peroxide and gradually decreased to the normal level after end of the drip infusion within 10 to 15 minutes.

By the hyperoxygenation, the hepatic uptake rate of ^{198}Au colloid has decreased in proportion of the H_2O_2 concentration, while, the peripheral disappearance rate of ^{131}I labelled Rose Bengal has not varied. So, it is concluded that the hyperoxygenation has made decrease of the hepatic blood flow and no conspicuous change to the hepatic function.

Studies on Hepatic Circulation in Liver Diseases with the Use of RI

IV. Alteration of Hepatic Blood Flow in Standing and Walking

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In our previous study on the liver blood circulation in hepatic diseases with use of ^{198}Au -colloid, we found that the liver accumulation indices (KL) of ^{198}Au -colloid due to the changes in the position of the body remained unaffected or increased in contrast

to its decrease in the control group and chronic hepatitis and reported that this is due to the mode of the portal blood flow. In the present study for the purpose to observe the mode of hepatic blood flow in standing and walking an attempt was made to device a