0.515. In a case of liver cirrhosis, transit times widely distributed from beneath 2.5 sec. up to 50 sec., but the mean transit time was 7.38 sec. The extraction ratio was 0.219. This value indicated that about 50 per cent of intrahepatic shunt should be evaluated.

Studies on the Liver Circulation in Hepatic Diseases with Radio-isotopes
5. Liver Circulation During Excercise

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In the past four meetings of this Society we reported the results of our studies on changes in the liver circulation brought about by altering postures and during exercise, and we placed special emphasis on such changes in liver diseases, including liver cirrhosis where we already find disturbance in the hepatic circulation.

This time we will present our findings obtained with aid of radiohepatograms using radio-isotopes on the subjects in the supine posture and during or after exercise. For exercise we used an ergometer and for recording the radiohepatograms we employed a portable scintillation detector devised by us. The subjects were made to ride on the ergometer at speed of 60 revolutions per minute, which was equivalent of 15 km/hr of the surface speed. Methods: We injected 10 μ Ci ^{198}Au-colloid to each subject early in the morning with empty stomach in the supine posture, took the record of radiohepatogram. Subsequently, the subject was made to take a preliminary exercise on the ergometer for 5 minutes, then 10 μ Ci ^{198}Au-colloid were injected and again exercised for 10 minutes. Following this the subject was kept at the supine position for 20−30 minutes, again asked to take exercise on the ergometer, and took the radiohepatogram to ascertain the plateau. The blood pressure and the pulses were measured before and during the exercise. As a result it was confirmed that the changes in these measurements were insignificant.

The subjects of our study were composed of 10 normal controls, 7 cases definitely diagnosed as of chronic hepatitis, and 7 cases of liver cirrhosis to the total of 24 individuals. On taking the liver accumulation coefficient (KL), it was found to be 0.200±0.041 and 0.190±0.038 in the control group; 0.176±0.043 and 0.177±0.036 in the chronic hepatitis group; and 0.150±0.023 and 0.136±0.028 in the liver cirrhosis group at supine position and during exercise respectively, revealing a slightly decreasing tendency according to the severity of diseases. As for the alteration ratio, it was −4.52±12.83% in the control group; +2.23±16.49% in the chronic hepatitis group; and −10.0±5.37% in the liver cirrhosis group, indicating also no marked difference among them. Contrary to our expectation, we did not observe any appreciable decrease in KL of the liver cirrhosis group after the exercise as compared with normal controls. This, we assume to be due to the following factors: 1) The number of subjects was too small to yield reliable results; 2) the weight of detector itself and the exercise with the detector attached to subjects of severe liver cirrhosis; and 3) we asked the cooperation in this work only outpatients who were of mild case of liver cirrhosis having undergone sufficient recompensation. These factors seem to have made it very difficult to estimate accurately the disturbance of hepatic circulation in the cases like severe liver cirrhosis.