

analysis of the clearance curve by  $\beta$ -metry, the calibration for the absorption effect of  $^{85}\text{Kr}$  to the surface coating substance of the detector was needed. Details of this study

has been reported from author's department in the 5th annual meeting of the Japanese society of nephrology in 1968.

## Studies on the Lymph Circulation

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Lymphatic circulation system, which is a part of body fluid circulation, begins from tissue fluid and lymphatic capillary vessels, and so comes to venous system via thoracic duct. We call it "third circulation".

For seven years, we have studied on the lymphatic flow in thoracic duct, protein and electrolytes contents in lymph and the distribution of radioisotope (RISA,  $^{35}\text{S}$ ) in body fluid under experimental conditions and then we have thought about the dynamics of lymphatic circulation.

It is interesting to examine how the circulation of body fluid does change under the condition where blood circulation is maintained by artificial heart-lung machine. These experiments showed that greater increase in lymphatic flow is a good indicator for finding out microscopic edema of tissues and organs, and also reflects the change in microcirculation at capillary level sensitively.

Some factors are considered as follows; Osmotic pressure, hydrostatic pressure, hemostasis and permeability, which give the important influence on the increase in lymphatic flow in thoracic duct resulting from the disturbance of microcirculation.

Under inadequate perfusion sludging and microthrombus, which are still reversible, are observed under special microscope, and so disseminated intravascular coagulation and

venular junction bleeding in long-term perfusion are observed.

Under inadequate perfusion, the serial histologic studies by liver biopsies show some changes. Congestion and bleeding in sinusoids and slight degeneration of liver cells are found with pressure elevation in portal vein or inferior venae cavae, but 10 minutes later of total perfusion only the small bleeding areas are observed around the central vein of liver and so that degeneration of liver cells is becoming better. After the improvement of such degeneration of liver cells is becoming better. After the improvement of such degeneration, lymph vessels in Glisson's sheath are clearly widening, on the other hand, Hb amounts are increasing in lymph in thoracic duct.

Also, when hepatic vein is experimentally clamped and experimental pulmonary edema is made, it is examined that the lymphatic flow in thoracic duct is more increasing and the equilibrium time of  $^{35}\text{S}$  in the blood and lymph becomes longer compared with the control.

These facts indicate the important role of lymphatic circulation, which keeps well the balance between the blood circulatory system and tissue cells, and has some potentiality to repair pathophysiologically abnormal condition of tissues.