ORIGINAL ARTICLE

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Quantification of human splenic blood flow (Quantitative measurement of splenic blood flow with $H_2{}^{15}O$ and a dynamic state method: 1)

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Positron emission tomography (PET) by means of a dynamic state method and $H_2{}^{15}O$ was performed to quantify splenic blood flow in 20 patients who had no hepatic functional disorders. Non-linear regression analysis was applied to determine splenic blood flow. In calculating arterial input function for the spleen, our original **exponential method** was used to facilitate computerization. Mean splenic blood flow per 100 g of spleen (SBF) was 168.0 m*l*/min/100 g with a standard error (SE) of 12.4 m*l*/min. The mean spleen-blood partition coefficient for water (ρ) was 0.767 with a SE of 0.020. Significant correlations were noted between the values for SBF obtained by the **exponential method** and **linear method** in which individual increasing values for arterial ^{15}O concentration were used rectilinearly ($r=0.96$, $p<0.005$) and also between the values for ρ obtained by the two methods ($r=0.95$, $p<0.005$). In order to validate the application of a one compartment model to an organ with a large blood volume such as the spleen, a further experiment was performed with a water flow model simulating splenic circulation.

We succeeded in quantifying regional splenic blood flow by PET. It was thought that the quantification of splenic blood flow by our method would be beneficial in the study of splenic circulation, which is expected to be altered under conditions of portal hypertension, liver dysfunction and shock, etc.

Key words: splenic blood flow, PET, $H_2{}^{15}O$