

indices calculated by Huff's method were as follows: PID $T_{\frac{1}{2}} 39 \pm 25$ (Mean \pm S.D.) min., Percent RCU $95 \pm 8\%$, PIT 1.14 ± 0.66 mg/kg/day and RIT 1.08 ± 0.65 mg/kg/day. Percent RCU in cases with myelofibrosis was found to be lower than in cases without myelofibrosis. In the culture of marrow cells from patients with polycythemia vera, the addition of erythropoietin did not increase ^{59}Fe incorporation into heme in the erythropoietin absent control marrow culture from patients was quite higher than that of the same marrow culture from normals. This finding may have anything to do with the finding of the increase PIT. After the injection of ^{59}Fe , the longitudinal as well as transverse linear scans were performed at the intervals, at 6 hours, 24 hours, 5th day and 10th day. The distribution patterns of ^{59}Fe at 24 hours in patients with polycythemia vera, which reflect the erythropoietic marrow distribution, were divided into 3 patterns, that is, normal pattern, the pattern of marrow expansion and pattern

of extramedullary erythropoiesis. Among patients with polycythemia vera, 4 had normal pattern, 4 had the pattern of marrow expansion and 7 had the pattern of extramedullary erythropoiesis. As for the correlation between splenomegaly and the pattern of marrow distribution by ^{59}Fe in patients with polycythemia vera, there exists a significant correlation between the presence of splenomegaly and the pattern of extramedullary erythropoiesis. The mean red cell life span in patients with polycythemia vera was normal with DF^{32}P , while short with ^{59}Fe . Moreover, most of patients with polycythemia vera showed ^{59}Fe retention in spleen at 10th day after ^{59}Fe injection. These findings suggest the existence of short lived red cell population in polycythemia vera. The studies of erythropoietic marrow distribution pattern with the whole body linear scans was useful in differentiating polycythemia as well as for the assessment of the state of the erythropoietic marrow distribution.

The Parameter of Dependency of Red Cell Destruction on the Spleen Derived from Destruction Rate of Cr-51 Labeled Red Cells, Cr-51 Accumulation Index of the Spleen and the Liver and Splenic Scintigraphy by Multi-variate Analysis

Y. TAKAHASHI and K. AKASAKA,

Hematology Division, Tenri Hospital.

T. UCHIDA and S. KARIYONE

The 1st Division of Internal Medicine, Kyoto University.

Information concerning the sites of red cells destruction obtained with external counting technique using Cr-51 labeled red cells in their survival study should be considered to be semi-quantitative in nature, since counting

efficiency of radiochromium accumulated in the organ, especially the spleen, differs with variety of its size. We have previously reported to assess the spleen size quantitatively by scintigraphy.

Then the purpose of this report is to find out the more precise parameter of the dependency of red cell destruction on the spleen using the destruction rate of the labeled cells and the spleen size in addition to the external counting data with the aid of multi-variate analysis.

Thirty-two cases of hereditary spherocytosis, H.S., and 18 studies in 15 cases of acquired autoimmune hemolytic anemia, A.H.A., were the subjects of this study.

The predictor variables were, 1) fractional rate of disappearance of the labeled cells at zero-time, the time when the mixing of the cells was almost complete without noticeable destruction, 2) apparent half survival time, $T-1/2$, 3) increment of the spleen-precordium ratio from $t=0$ to $T-1/2$, 4) that of the liver, 5) ratio of 3) to 4) and 6) splenic volume assessed by scitigraphy.

There was no significant difference in the splenic increment of Cr-51 between H.S. and A.H.A. groups therefore this parameter could not be assumed as a reliable discriminant one. As a single parameter, the increment ratio of the spleen to liver was the more discrimi-

nating index.

In H.S. group, a close relationship was observed between the splenic volume and red cell destruction rate, $r=0.777$. There was also a negative correlation between the volume and the Cr-51 increment of the spleen. The principal component analysis disclosed the first component which implies the rate of splenic red cell destruction with the factor loading value of 0.912, indicating that H.S. group could be assumed to be a homogeneous one in almost absolute dependence of red cell destruction on the spleen.

Among the parameters indicating the destruction dependency on the spleen, i.e., the second factor derived by P.C.A., that by factor analysis with vari-max axis rotation in the pooled group, the standard normal deviate from H.S. center and discriminant function value derived from Baysians comparative deviate method, the last one yielded, the minimal misclassification probability of A.H.A. as H.S., so far as the destruction sites of red cell were concerned. Therefore this parameter should be taken as the most strict indicator to predict the effect of splenectomy.

Spleen Scintigraphy with ^{99m}Tc -labeled Red Cells

T. UCHIDA

*The First Division of Internal Medicine, Kyoto University and
Center of Shiga Adult Diseases*

S. KARIYONE, G. WAKISAKA

The First Division of Internal Medicine, Kyoto University

and K. NAKAJIMA

Central Radioisotope Clinic, Kyoto University Hospital

We reported the spleen scintigraphy using heated red cells labeled with ^{99m}Tc (Jap. J. Nuc. Med. 10:79-89, 1973). However, a minor modification was necessary for the

red cell labeling and exclusive uptake by the spleen. Our improved method are reported here in comparison with ^{51}Cr heated red cell technique.