One mCi to 1.3 mCi of $^{111}In\ Cl_3$ was injected intravenously and bone marrow imaging was performed 24 hours later.

$^{111}In\ Cl_2$ was bound immediately to the transferrin in the blood. Half time of plasma disappearance of transferrin bound ^{111}In was 6.5–9.5 hours.

Five to 7% of administered $^{111}In\ Cl_3$ excreated in urine during 24 hours. Also, 5 to 6% of administered ^{111}In activity was incorporated to peripheral red cells at 7th day.

2.3×10^7 of bone marrow cells were incubated with culture medium which contained tracer amount of $^{111}In\ Cl_3$ during 6, 28, and 50 hours.

After incubation, cells were collected, washed and counted. The incorporation ratio of ^{111}In to bone marrow cell was 28%. Distribution pattern of active bone marrow obtained from $^{111}In\ Cl_2$ and ^{99m}Tc sulfur colloid in normal subject and in patient with iron deficiency anemia, polycythemia vera, AML, and CML showed a perfect similarities throughout the all portion of the skelton.

In two cases of hypoplastic anemia who showed island-like distribution of active bone marrow by ^{99m}Tc sulfur colloids.

One of them showed complete similar pattern of distribution by $^{111}In\ Cl_3$ method, but the another case did not express island-like distribution of the marrow. These above results probably indicated that transferrin bound $^{111}In\ Cl_3$ delineate more directly hematopoietic marrow.

Comparing the images of active bone marrow obtained from $^{111}In\ Cl_3$ and ^{99m}Tc-sulfur colloid, ^{111}In images seemed to be clearer than that of ^{99m}Tc in detail especially in midportion of thorax. Because, ^{111}In activity in the liver did not disturb excessively the images of surrounding area compared with ^{99m}Tc activity in the liver.

Patterns of Whole Body Linear Scans in Aplastic Anemia

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The grade and distribution patterns of the residual erythropoiesis in 19 patients with aplastic anemia (idiopathic type 16 and drug-induced type 3) were evaluated with a whole body linear scanner (Saito's ring type whole body linear scanner) using ^{59}Fe and usual ferrokinetics indices. After the intravenous injection of 10 μc of ^{59}Fe-citrate, the longitudinal as well as transverse linear scans were performed at the intervals, immediately after, 6 hours, 24 hours, 5th day and 10th day. The distribution of radioiron at 24 hours reflected the erythropoietic marrow distribution in normals and the residual erythropoietic marrow as well as storage organ uptake of radioiron in patients with aplastic anemia. The 24 hour longitudinal distribution patterns of

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^{59}Fe consists of 4 components, that is, head, thoraco-abdominal, pelvic and lower extremities segment.

Pelvis and thoracoabdominal region constitute two major bone marrow segments. The averages of the percent ^{59}Fe distribution at 24 hours after injection in 5 normal male subjects are head 10%, thoraco-abdominal segment 55%, pelvis 22% and lower extremities 13%.

The transverse linear scans at the level of liver and spleen recorded at the same intervals provided the changing patterns of ^{59}Fe distribution on spine, liver and spleen. Nineteen patients with aplastic anemia were classified into 3 groups according to their grade of erythropoietic impairment judging from the combined data of ferrokinetics indices and patterns of whole body linear scans. 1. Minimally affected group to which 2 cases belong. Percent RCU is more than 55%. 2. Moderately impaired group to which 12 patients belong. Percent RCU ranges between 30 and 55%. 3. Severely damaged marrow group to which 5 patients belong. Percent RCU is less than 30%. Longitudinal distribution patterns of radioiron at 24 hours indicated that there are two types of erythropoietic marrow impairment in aplastic anemia, that is, partial and total depression of erythropoietic marrow function. The former is further classified into two subclasses according to the degree of marrow impairment at two major marrow segments, that is, pelvic defect type and thoraco-abdominal defect type. Five patients in severely damaged marrow group all showed the type of total marrow depression. Among 12 patients in moderately impaired group, 5 showed the type of total marrow depression, 3 partial marrow depression of pelvic defect type and 4 partial marrow depression of thoraco-abdominal type. The transverse linear scans revealed early accumulation of ^{59}Fe at the liver in all 19 cases and gradual increase of ^{59}Fe at spleen in 11 of 19 cases. No marrow expansion and extramedullary erythropoiesis were demonstrated.

Thus, the whole body linear scan revealed the diverse patterns of bone marrow impairment in patients with aplastic anemia and provides powerful information in assessment of erythropoietic function of this disease.

Quantitative Determination of Vitamin B_{12} in Blood by Radioassay

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Since the last year we studied on quantitative determination of vitamin B_{12} in blood competitive binding analysis using a sephadex intrinsic factor complex as a binder and obtained some findings as follows:

A standard curve obtained by diluting a standard vitamin B_{12} solution (1,600 pg/ml) was slightly sigmoid in the range from 0 to 1,600 pg/ml. When transmission of a 0 pg/ml solution was adjusted to 100%, average transmission was 9.7±3.6% at 1600 pg/ml, 12.9±5.8% at 800 pg/ml, 21.3±10.2% at 400 pg/ml, 28.7±13.6% at 200 pg/ml, 38.9±12.1% at 100 pg/ml, 47.0±9.9% at 50 pg/ml and 71.3±1.2% at 25 pg/ml. An average of standard deviation at each concentration was 8.06%. When the same sample

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