

Normal values were 0.13 for K value; 5.4 for free ^{131}I /protein bound ^{131}I ; 0.20 for free ^{131}I at 60 minutes/total ^{131}I at 3 minutes.

Non-treated patients with hypoplastic anemia were shown to have impaired RE function and diminished BMD while the cases in remission, normal RE function and BMD. In some blood disorders showing increased RE function increased BMD was clearly observed. On the contrary impaired RE function was related to the diminished BMD.

In cases with acute leukemia the RE function was within or above normal limits and related to the total cell counts of aspirated

BM except one case who died terminally.

From the above examined results we can conclude:

- (1) Impaired RE function of the whole body is shown in patients with hypoplastic anemia which is a primary BM disease.
- (2) Hepatic RE function is correlative with the BM RE function.
- (3) In acute leukemia the RE function is related to the cellularity in BM until a certain stage of the disease, after which it declines.

Therefore the determination of RE function may be a useful aid to evaluate the activity or prognosis of the disease.

Analog Simulation of Radiosplenogram to Analyse the Spleen Hemodynamics and Its Extraction Function

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For the analysis of splenic hemodynamics in which both rapid and slow phase coexist, radioisotope tracers such as ^{131}I -HSA and ^{51}Cr RBC were injected successively at first into the antecubital vein and radioprecordiogram and radiosplenogram were obtained. The heart-lung system spleen transfer characteristics was determined with radioprecordiogram as input and radiosplenogram as output. Then the tracers were injected into the celiac (or splenic) artery through a femoral catheter and the radiosplenogram was analysed by subtracting the recirculation component that was determined as the output through the identical transfer characteristics with input of

the radioprecordiogram.

For these analysis analog computer was used. The analog circuits were composed the second order filter for heart-lung system, the first order one with time delay for systemic circulation and parallel three first order filters connected in series to time delay for splenic capillary and arteriovenous systems respectively.

This analysis device was useful to define the initial circulation component when initial and re-circulation components overlapped intensely due to slowing of the former component or to increase in the latter caused by enlarged extrasplenic distribution of the in-

jected tracers.

Accurate determination of initial circulation characteristics enabled us also to analyse in rapid phase the splenic pooling and extracirculation into function of abnormal erythrocytes or colloid particles. To simulate this extraction process the first order accumulating filters were connected to each filters for splenic paths. N.E.M.-treated cells were disclosed to be just slightly impeded to flow out with much lower extraction rate than heat-treated cells whose

outflow delayed remarkably. Rate constant ratio of extraction versus outflow was observed to increase as mean particle size of administered radiocolloids increased.

In spite of some intricated process, this analysis method is considered to be necessary to analyse the spleen hemodynamics in which much slower component exists with closer relationship to its function than those seen in other organs.

Studies on Lymphoscintigraphy with ^{198}Au Colloid

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To clarify the factors affecting the pattern of the lymphoscintigraphy, transfer and distribution ratio of ^{198}Au colloid administered subcutaneously into rabbits were studied under various conditions. Fifty to 200 μCi of the colloid whose diameter was about 50 A in 0.2ml physiological saline were injected in the foot unless otherwise stated. A linear scanning was performed on foot injected, lymphnodes (popliteal and pelvic) as well as liver at definite intervals with a scintiscanner under the conditions as follows: slit width 1 cm, the detector to the bed distance 30 cm, bed speed 16 cm per minute. Twenty four hours after the injection, when radioactivity on the foot became almost stationary, the transfer ratio was calculated in terms of ratio of the reduced against the injected radioactivity. The distribution ratio was obtained as the ratio of each local radioactivity against the sum of the

localities tested. 1) Under the condition the transfer ratio was 26.2%. The distribution ratio was 71.9% on the popliteal, 13.2% on the pelvic lymphnodes and 14.9% on the liver respectively. 2) When ^{198}Au colloid whose diameter was 300 A instead of 50 A was used, the transfer ratio was raised but the distribution ratio was almost the same. 3) The transfer ratio and the distribution ratio of the liver were markedly increased by passive movement of the lower extremity injected. 4) Injection of typhoid vaccine or prednisolone hardly affected the transfer ratio or the pattern of distribution of the colloid. 5) Being tested on the third day after irradiation of 400 rad of betatron on the popliteal lymphnodes, the transfer ratio and the distribution ratio of the popliteal lymphnodes proved to be increased compared with the non irradiated.