

extrahepatic shunt to that in the portal vein (R_1) would be estimated as follows:

$$\frac{a'_2 a_2}{a'_2} = 1 - \frac{a_2 c_1}{a_1 c_2}$$

Meanwhile, when the intra- and extrahepatic shunts coexist in a single individual like those with hepatic cirrhosis, $\frac{b_3}{a_3} < \frac{b_1}{a_1}$ and $c_3 a_3$ and the above mentioned ratio R_1 is calculated from the formula, $1 - \frac{a_3 c_1}{a_1 c_3}$.

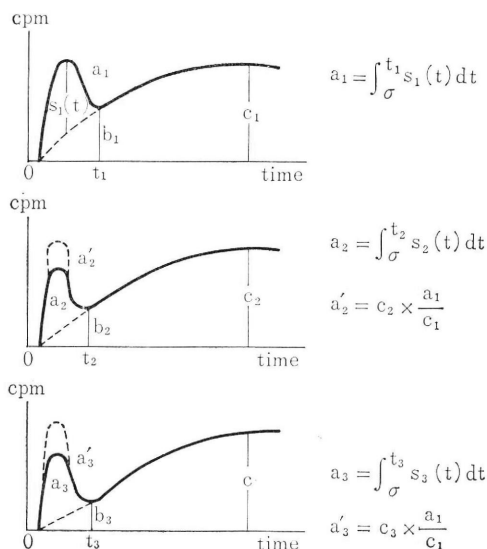
R_2 , the ratio of the blood flow in the intrahepatic shunt to that in the portal vein, can similarly be estimated by the followings formula:

$$\frac{a_3 \times \frac{b_1}{a_1} - b_3}{a_3 \frac{b_1}{a_1}} = 1 - \frac{a_1 b_3}{a_3 b_1}$$

From this mathematical analysis, the following results were obtained: (1) the efficiency of radiogold removal by the liver, was 54.4—63.2% and hepatic uptake of radiogold was 92.5%. (2) In a splenomegaly case, intrahepatic shunt was not found by this analysis and R_1 was 62.7%. In this case, although hepatic blood flow and liver biopsy findings were both normal, portal angiography demonstrated the presence of extrahepatic

shunt. (3) In two cases of hepatic cirrhosis, R_2 was found 27.9% and 13.6%, and R_1 was 25.4% and 18.4%.

Our analysis was made on the assumption that the hepatic removal and extrahepatic uptake of the radiogold are constant, but would be a useful tool for the study of intra- and extrahepatic shunts in various diseases, although further investigation are required.



Skeletal Muscle Blood Flow in Diabetic Patients Measured by ^{133}Xe Clearance

I. HOSHIBA, M. MURAKAMI, M. KURODA, Y. KOSHIMURA and M. NOTO
*The Second Department of Internal Medicine, Kanazawa University
 School of Medicine, Kanazawa*

Recent studies with intramuscular injection of small amount of ^{133}Xe solution have tended to support that radioactive inert gas such as $^{133}\text{Xenon}$ is probably a better indicator of blood flow than ^{24}Na . The test is easy to perform, and is sensitive for discriminating between healthy legs and legs with arterial disease; it demands no standardization, the result is available immediately after the test, and it compares favorably with plethysmographic method. The purpose of this paper is to study some features of the peripheral circulation in diabetic patients.

Materials and Methods: We investigated ten normal subjects, fifty-four diabetics, ten hypertensives, three of aortitis syndrome and other miscellaneous diseases such as two of collagen disease, two of uremia with edema and one of dystrophic myotonia. The average age of the healthy subjects was 29 yrs. (15 to 49 yrs.). Twelve of the diabetics were younger than 35 yrs. (young group); forty-two of the diabetics were older than 36 yrs. (aged group). With the materials in supine position the disappearance rate of the radioactivity of ^{133}Xe was measured according to

the technique of Lassen et al. The clearance curves were estimated with the following parameters: (1) muscle blood flow at rest (F-rest), (2) muscle blood flow after ischemic contraction (F-max.), (3) time from release of cuff pressure to F-max. (T-i.).

Results: (1) F-rest; There were no significant differences between healthy subjects and diabetics and/or the other diseases. The average value in healthy subjects was 11.3 ml./100g./min. (2) F-max.; The average in healthy subjects was 103 ml./100g./min, and that of diseased legs in aortitis syndrome was 25 ml./100g./min. In diabetics of young group, that was 123 ml./100g./min., and that in aged group was 79 ml./100g./min. The average was 90 ml./100g./min. in hypertensive patients. The low values of F-max. were observed in the miscellaneous diseases except a myotonia. (3) T-i.; The average was 0.14 min. in healthy subjects, 0.23 min. in young group of diabetics, 0.37 min. in aged group

of that, 0.33 min. in hypertensives, and 0.40 min. in diseased legs of aortitis syndrome.

Comments: The values of F-rest were not so sensitive to discriminate between normal legs and legs with peripheral vascular disease. The intervals of T-i. were too short to give clearcut separation between normal and diseased legs. A more discriminating test may be obtained by F-max. It is interesting findings that F-max. of young group of diabetics was greater than healthy subjects. The exact reason why it was so has not yet been elucidated, and further studies into this region are necessary. At present, it is of interest to speculate that muscle tissue after ischemic contraction in young group of diabetics demands more blood flow than healthy subjects, and/or accumulates some substances to change the value for the tissue: blood partition coefficient; and in aged group of diabetics vascular changes masked these observations.

Panel Discussion I

Present Status of Radioisotopes in Clinics

H. YASUKOCHI (Chairman)

Lecturer of Radiology, University of Tokyo, Tokyo

F. KINOSHITA

Chief, Radiology Section, Okubo Hospital

K. TORIZUKA

Associate Professor of Radiology, University of Kyoto, Kyoto

T. SHIDA

Chief, Radioisotope Section, Univ. of Tohoku

I. KURAMITSU

Chief, Radioisotope Section, Tokyo Second National Hospital

In Japan the use of radioisotopes is severely limited by law for the care of radiation hazards. But some of the doctors who use radioisotopes are seemed to have less knowledge about radiation.

Other problem occurs in this field of medicine which is the radioisotope examination service in hospitals, because the doctors in the section are occupied their time mostly in routine works instead of their hope to have

research program.

These problems are discussed during active members of radioisotope use in hospitals.

Former works of Dr. Yasukochi mainly depend on radiation therapy and nuclear medicine, Dr. Kinoshita nuclear medicine, Dr. Torizuka endocrinology and nuclear medicine, Dr. Shida radiology in general and Dr. Kuramitsu nuclear medicine.