

IV. Spleen and Blood

Splenic Scan for Congenital Heart Disease Patient

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To know the abnormality of the spleen prior to the operation will produce an important factor towards the indication and prognosis of cardiac surgery.

This is a report of the splenic scans performed at Tokyo Women's Medical College between september 1968 and september 1969.

All of these patients had proven diagnosis of congenital heart disease and clinical diagnosis of asplenism.

The scanning methods were red blood cell heating methods for 3 cases and Hg-203-MHP methods for 11 cases.

In 9 out of 14 cases, the splenic uptake was identified. Four out of 9 cases were normal and 5 out of 9 cases showed abnormal positions.

By using Hg-203-MHP method, the splenic uptake was identified in 8 out of 11 cases.

There were 11 cases with pre-scan diagnosis of asplenism. Seven out of 11 cases showed

splenic uptake by scanning method.

By using Hg-203-MHP method, 6 out of 9 cases with pre-scan diagnosis of asplenism showed an splenic uptake.

It is impossible to make a diagnosis of asplenism in case of poor uptake in the region of the spleen.

No case of polysplenism was identified in our series.

The splenic scan seems to be helpful in making a diagnosis of congenital abnormality of the spleen such as asplenism or an abnormality in position.

The role of the splenic scan would be valuable in light of its easy procedure to perform and the least load to the patient.

However the problem exist in making a definite diagnosis in the case of poor uptake, lobulated spleen or polysplenism.

Study of the Influence of Splenomegaly in Shistosomiasis on Plasma Volume, Red Cell Volume and Total Blood Volume

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The purpose of this report is to evaluate the influence of the enlarged spleen on plasma volume, red cell volume and total blood volume in splenomegaly of shistosomiasis. Our twelve

patients were studied. (5: liver cirrhosis with splenomegaly, 2: liver cirrhosis without splenomegaly, 3: splenomegaly, 2: the other)
1) In splenomegaly the red cell volume (RCV),

measured with ^{51}Cr labeled method, was 14 to 36 ml/kg (27 to 36 ml/kg in normal control). 5 patients had normal RCV, but 4 patients had decreased RCV indicating anemia. Plasma volume (PV), measured with RISA, was 44 to 94 ml/kg (44 to 54 ml/kg in normal control). 4 patients had normal PV, but 5 patients had increased PV. Total blood volume (TBV), expressed as the sum of RCV and PV, was 67 to 126 ml/kg (64 to 81 ml/kg in normal control). 4 patients had normal TBV, but 5 patients had increased TBV. These facts show that splenomegaly has hypervolemia resulting from the plasma volume expansion. 2) Plasma volume was plotted against the spleen size, expressed as the sagittal areas of the splenic scanning which was performed with MHP method. There was positive correlation between them. Plasma volume increased with enlarging the size of the spleen. This result shows that hypervolemia (or the elevated plasma volume) in splenomegaly may be due to the increased volume of the spleen, resulting from increased capillary beds of the spleen. Most of our cases have liver cirrhosis with portal hypertension which is responsible for splenomegaly. 3) The red cell volume was plotted against the size of the spleen, expressed as the sagittal areas of splenic scanning. There was no correlation between them. The red cell volume is influenced by the hematopoiesis of the bone

marrow, the bleeding from esophageal varices and the other factors. 4) The body hematocrit was calculated from the formula $\frac{\text{RCV}}{\text{RCV} + \text{PV}} \times 100 (\%)$. Its value is compared with the venous hematocrit. In most cases of splenomegaly with anemia and without anemia the venous hematocrit was greater than the body hematocrit. These facts are inconsistent with Mollison's opinion. According to him the venous hematocrit is greater than the body hematocrit in normal, but the body hematocrit may be greater than the venous hematocrit in splenomegaly, due to the relatively large amount of splenic blood which has a relatively high hematocrit. The hematocrit of the spleen is greater than the one of the other circulated blood. This indicates that there are enlarged sequestered red cell pool and smaller circulated blood pool. The enlarged capillary beds in splenomegaly result in enlarging the plasma volume of circulated blood pool of the spleen, while sequestered red cell pool increases too. The enlarged degree of plasma volume of circulated blood pool is greater than the one of sequestered red cell pool in splenomegaly. The hematocrit of the enlarged spleen may be smaller than the hematocrit of the normal spleen. And then it is thought that the body hematocrit is smaller than the venous hematocrit in splenomegaly.

Studies on the ^{51}Cr -labelled Heat Damaged Erythrocytes Method as a Sequestration Test of Mouses RES

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The sequestration of mouse spleen has been studied with ^{51}Cr -labelled heat damaged erythrocytes with a large standard errors in our laboratories since 1968. The experiments for improvement of this method had been our urgent problem and is the subject of this paper.

Our improved method of sequestration function test with ^{51}Cr -labelled heat damaged erythrocytes in mice is as follows;

1) Female ICR mouse weighing 20 to 24 gm were used throughout this experiments. Three ml of isostrain blood was collected by depletion.

2) One hundred μCi of $\text{Na}_2^{51}\text{CrO}_4$ was added in this blood at 49°C for twenty minutes to avoid excess hemolysis and to perform the label and damage at the same time.

3) The labelled blood was washed repeatedly with saline for three to four times. It is