53 (2013)

The intraperitoneal transfusion of citrated blood.

By DAVID M. SIPERSTEIN and J. MARTIN SANSBY.

[*From the Department of Pharmacology, University of Minnesota, Minneapolis, Minnesota.*]

These results are based on a study of over 100 rabbits. *Freshly citrated* blood was injected *immediately* into the peritoneal cavity of normal and anemic rabbits. In several instances, citrated pigeon's cells were introduced into the abdominal cavity of rabbits. All the animals were subjected to careful blood studies. They were killed and autopsied at the end of each series of experiments.

We think that freshly citrated blood injected into the peritoneal cavity of rabbits is absorbed, because:

1. Autopsies at various intervals following the operation show that the quantity present in the abdominal cavity rapidly decreases in amount, and that absorption of comparatively large amounts of blood (one-fifth of the total blood volume) is complete in 3-4 hours.

2. Estimations of blood values show definite increase from the time the blood is transfused until the animal is killed.

We think that erythrocytes enter the blood without undergoing any morphological changes, because:

1. Smears, taken at the autopsy, of the fluid in the abdominal cavity show no change in the size, shape or structure of the corpuscles and no evidence of hemolysis.

2. Our experiments show a rise in hemoglobin and cellular elements following transfusions in normal and anemic animals which cannot be accounted for by a mere concentration of the blood.

3. Nucleated corpuscles of pigeons when injected intraperitoneally into rabbits can be recovered from the general circulation in 15 minutes.

We submit the following additional evidence that the erythrocytes function, because:

1. They enter the blood stream very rapidly and are therefore presumably in a functioning condition.

2. The increase in the blood values of our animals persisted for many days.

3. After severe hemorrhage, the animals improved visibly following the transfusion.

4. No hemoglobinuria could be demonstrated at any time.

5. Autotransfusion and retransfusion have been used successfully in man.

6. Clinical experiences with cases of internal hemorrhage as compared with external hemorrhage tends to show that the blood is re-absorbed in a functioning condition.

As a result of our investigations we can draw the following conclusions:

1. The intraperitoneal transfusion of freshly citrated blood in rabbits is a safe procedure, simple to apply and efficient.

2. Absorption of blood from the peritoneal cavity of rabbits takes place very rapidly.

3. The intraperitoneal transfusion in anemic and normal animals apparently causes a sharp rise of blood values during the absorptive period (3-4 hours) which is only temporary. This is followed by a more permanent increase in the blood picture.

4. Studies at the autopsy table together with the blood counts would apparently indicate that the initial rise is due to an actual absorption of red blood cells from the peritoneal cavity and not merely to a concentration of the blood volume.

5. Pigeons' cells injected subcutaneously in rabbits cannot be found in the general circulation. The same blood injected intraperitoneally is absorbed very rapidly.

6. Rabbits' blood probably contains neither hemolysins or agglutinin.

7. The intraperitoneal transfusion of freshly citrated blood acts like a true transfusion and not like the absorption of nutrient material.

It is proposed as a therapeutic method of possible merit.