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A consideration of the reduction of blood platelets in purpura.By **ALFRED F. HESS, M.D.***[From the Department of Health, New York City.]*

As is well known, typical purpura is characterized by a marked diminution in the number of platelets; whereas the normal individual has about 300,000 platelets per cubic centimeter of blood, the purpuric individual has less than 100,000. Evidently this abnormal condition may be due either to a lack of formation of these cells, or to their increased destruction. A number of studies have been undertaken to decide this question, but no conclusive evidence has been brought forward.

The coagulation time of the plasma centrifugalized for fifteen minutes is normal in purpura or but slightly prolonged. If we centrifugalize plasma for two hours we find that, whereas the coagulation time in the normal case has been greatly prolonged—for example—from 8 to 18 minutes (Case 1, Table I), in the case of purpura, the centrifugation has frequently occasioned but little or no delay in coagulation (see Table I). This distinction may be interpreted as due to the fact that in the normal plasma we have removed all the platelet cells, whereas in the purpuric plasma, there is considerable platelet substance *in solution* which could not be removed by means of centrifugation.

This question can also be answered by means of employing a dilute solution of hirudin, an antithrombic substance, which combines with thromboplastic substances such as platelets. If we remove practically all the suspended platelet cells by means of prolonged centrifugation, we shall then be able to determine whether or not there is platelet substance in solution by attempting to neutralize it by the addition of hirudin. This test has been carried out in many normal as well as purpura cases. It has been found that whereas the addition of the hirudin solution to the centrifugalized normal plasma brings about considerable delay (in Case 3 of the table, from 8 to 30 minutes), in the purpuric plasma on the contrary, a considerably less degree of retardation is effected (for example, in Case 7—from 11 to 16 minutes). We

interpret such instances as indicating that the purpuric plasma contains dissolved platelet (thromboplastic) substance and that the deficiency of platelets in purpura is frequently due to a destruction of these cells. It becomes evident therefore that the explanation for the fact that we may have a normal coagulation time in purpura, in spite of greatly diminished platelet count, can be accounted for on the ground that there is no true lack of platelet substance; the deficiency is merely apparent, the total amount of platelets in solution and in suspension equalling the normal. In some cases inhibiting coagulative factors also play a rôle.

In cases of purpura there is frequently a hemolytic substance in the plasma which renders it exceedingly difficult to find compatible donors for transfusion. It is possible that this lytic substance is associated with the function of the spleen. We know such to be the case in pernicious anemia and hemolytic icterus in regard to the destruction of the red cells. It has furthermore been established that the removal of the spleen, both in man and in animals, brings about a definite increase in the number of blood platelets. It would therefore seem worthy of trial to perform a splenectomy, immediately preceded by a blood transfusion, in severe cases of purpura where extreme therapeutic measures—repeated transfusions—have been resorted to in vain.

TABLE 1.

SHOWING DIFFERENCE OF EFFECT OF PROLONGED CENTRIFUGATION AND OF THE ADDITION OF HIRUDIN SOLUTION UPON NORMAL AND PURPURIC PLASMA.

Type of Case.	Coagulation Time.		No. of Hours Centrifugalized.	Coag. Time after Adding Hirudin Solution.
	After 15 Min. Centrifugation.	After Prolonged Centrifugation.		
Normal {	(1).....	8	18	2
	(2).....	9	18	2
	(3).....	4	8	1
	(4).....	1		30 28
Purpura {	(5).....	14	14	2
	(6).....	26	26	2
	(7).....	10	11	1
	(8).....	18		16 21
Hemophilia (9).....	30	94	1	