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Coagulation Time Following Hemorrhage After Splenectomy.

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In 1914 H. Gray and L. K. Lunt¹ reported that blood obtained from a cat, which had been subjected to a hemorrhage amounting to 13 per cent of its blood volume, coagulated at a much greater rapidity than the blood obtained from the same animal prior to the hemorrhage. The most important organs having to do with this change were found by Gray and Lunt to be located below the diaphragm and they expressed the opinion that the liver, together with the intestines and possibly the adrenals, were probably responsible for the addition of substances which made the increased rapidity of coagulation possible.

In 1924 Barcroft, Harris, Orahovats and Weiss² reported upon the contraction of the spleen under conditions which require an increased amount of circulating hemoglobin. In hemorrhage, the spleen, by contraction, was found to be able in the cat to fully compensate for a loss of 1/15 of the total blood volume.

Our experiments were undertaken to determine what influence this ejection of splenic blood in hemorrhage might have in causing the increased rapidity of coagulation. Dogs were used in all the experiments and in some cases the coagulation time was obtained before and after hemorrhage both prior to splenectomy as well as afterwards. In the last few animals the tests were made only after splenectomy. Periods varying from 1 week to 3 1/2 months were allowed to elapse between the date of the splenectomy and the time of the hemorrhage experiment. Blood for each test was drawn, with a clean dry hypodermic needle, from exposed veins, and the coagulation time was determined in all cases by two methods, the

Dale and Laidlaw³ and the Peterson and Mills⁴. The time recorded in seconds is from the moment the blood appeared in the syringe until the end point was reached. Great care was exerted to insure obtaining circulating blood for each sample, and to maintain the same technic in handling all samples of blood.

Typical results are shown in Tables I and II. After splenectomy the increased rapidity of coagulation did not occur, and our results indicate that the blood forced out by the splenic contraction, at the time of hemorrhage, contains elements which hasten the coagulating process.

TABLE I.		
Dog B. Wgt. 5.2 kgm.		
3/3/26 Normal Animal		
Time	D. L.* Seconds	P. M.† Seconds
10:39	135	105
10:43	135	105
10:47	165	105
10:57	Hemorrhage 39 cc.	
10:58	135	105
11:03	60	60
11:12	30	30
11:14	15-30	15-30
Splenectomy, March 22, 1926		
4/1/26		
10:48	145	120
10:52	135	120
10:55	120	105
11:06	Hemorrhage 55 cc.	
11:07	120	120
11:11	180	120
11:19	180	105
11:26	165	120
11:32	Hemorrhage 55 cc.	
11:37	135	110
11:42	150	135

* D. L. Dale-Laidlaw Method.

† P. M. Peterson-Mills Method.

TABLE II.		
Dog L. Wgt. 10.8 kgm.		
Splenectomy, July 9, 1926.		
Time	D. L.* Seconds	P. M.† Seconds
10/2/26		
10:40	195	135
10:45	240	135
10:50	195	120
10:57	Hemorrhage 118 cc.	
10:58	195	135
11:02	165	120
11:07	195	120
11:12	225	120
11:17	Hemorrhage 117 cc.	
11:18	205	135
11:24	255	135
11:29	195	135
11:34	225	135

* D. L. Dale-Laidlaw Method.

† P. M. Peterson-Mills Method.

¹ Gray, H., and Lunt, L. K., *Am. J. Physiol.*, 1914, xxxiv, 332.

² Barcroft, J., Harris, H. A., Orahovats, D., and Weiss, R., *J. Physiol.*, 1925, ix, 443.

³ Dale, H. H., and Laidlaw, P. P., *J. Path. and Bact.*, 1912, xvi, 351.

⁴ Peterson, M. F., and Mills, C. A., *Arch. Int. Med.*, 1923, xxxii, 188.