THE SURVIVAL OF TRANSFUSED ERYTHROCYTES FROM PATIENTS WITH POLYCYTHAEMIA VERA

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The following observations are concerned with the survival of erythrocytes from three polycythaemic patients transfused into normal recipients and estimated by the method of differential agglutination.

The donors were (1) a man aged 60, known to be suffering from polycythaemia vera for seven years. A typical blood count at one time in July, 1949, gave R.B.C. 11.6 million, W.B.C. 19,000, Hb 112% (Haldane 100% = 14.8 g.%), and a haematocrit of 76; (2) a man aged 34, first seen in January, 1949, with the follow-

FIG. 1.—Diagram showing survival of cells from cases of primary polycythaemia after transfusion, into normal recipients.

ing blood count: R.B.C. 11 million, W.B.C. 17,000, Hb 156%, and a haematocrit of 84; (3) a man aged 61, first seen in March, 1950, when he had a blood count of R.B.C. 8.7 million, W.B.C. 81,000, Hb 126%, haematocrit 58, and was found to have a myelosclerotic bone marrow. This latter association in certain cases of polycythaemia vera has recently been stressed by Dameshek (1950).

The recipients were (1) a normal man, aged 28; (2) a man aged 42, suffering from carcinoma of the bronchus, whose general condition was initially satisfactory, except for a slowly resolving paraplegia due to spinal secondaries; (3) a woman aged 62, recovering from a cerebral thrombosis and with mild iron deficiency anaemia. Unfortunately, six weeks after transfusion, the second recipient died from cerebral secondaries, which became manifest four weeks after transfusion.

Technique

Approximately 1 pint of citrated blood from a polycythaemic donor was transfused after storing for 24 hours into the recipient. The day after transfusion and at intervals thereafter the surviving cells were estimated by differential agglutination, using the ABO system. This was carried out by Dacie's method (1950).

For the purpose of constructing a graph the basal inagglutinable count was subtracted from the inagglutinable count found on any particular day after transfusion. That count on the day after transfusion is called 100% survival, and the number of surviving cells on subsequent days is expressed as a percentage of this figure.

TABLE I
SURVIVAL OF CELLS FROM CASES OF PRIMARY POLYCYTHAEMIA AFTER TRANSFUSION INTO
NORMAL RECIPIENTS

Transfusion from Case 1 to Recipient 1*			Transfusion from Case 2 to Recipient 2†			Transfusion from Case 3 to Recipient 3‡		
Days after Transfusion	Observed Count (c.mm.)	Percentage Cells Surviving	Days after Transfusion	Observed Count (c.mm.)	Percentage Cells Surviving	Days after Transfusion	Observed Count (c.mm.)	Percentage Cells Surviving
1	570,000	100.0	2	480,000	100.0	1	679,000	100.0
3	555,000	97.3	5	422,000	86.7	3	607,600	89.3
8	480,000	84.0	9	382,000	77.6	9	558,800	81.9
14	417,000	72.7	17	325,000	64.6	13	566,400	83.1
16	423,000	73.8	24	335,000	66.9	23	504,200	73.9
22	442,000	77.1	32	278,000	53.9	30	447,000	63.6
28	328,000	56.9	38	267,000	51.2	37	359,000	51.9
36	322,000	55.8				45	319,000	44.4
42	330,000	57.4				51	326,000	45.4
49	306,000	53.0				58	245,400	34.7
56	299,000	51.7				75	139,700	21.0
63	275,000	47.4				90	59,200	6.8
77	210,000	35.9				99	39,200	3.8
84	216,000	37.0				104	32,800	2.8
93	112,000	18.4				114	19,200	0.8
98	75,000	11.8				119	13,400	0
105	61,800	9.5						
112	39,400	5.5						
119	36,000	4.9						
128	19,400	1.9						
140	7,600	0						

* Basal inagglutinable count 8,500/c mm.

† Basal inagglutinable count 41,500/c mm.

‡ Basal inagglutinable count 13,700/c mm.

Results

The results are shown in Fig. 1 and Table I. The survival of cells from polycythaemic patients was found to be normal in the experiments which were completed. The rate of destruction in the patient who died six weeks after transfusion was also found to be normal.

Summary

Our observations show that the life span of transfused red cells from cases of primary polycythaemia is normal. These results confirm the findings of Merskey (1949), who used a similar differential agglutination technique. There is further confirmation that the red cell life in primary polycythaemia is normal. Using another technique (with isotopic nitrogen), London, Shemin, West, and Rittenberg (1949) have shown in one case that the otherwise undisturbed red cell in a polycythaemic patient has a normal life span.

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REFERENCES

- Dacie, J. V. (1950). *Practical Haematology*. London.
Dameshek, W. (1950). *J. Amer. med. Ass.*, **142**, 790.
London, I. M., Shemin, D., West, R., and Rittenberg, D. (1949). *J. biol. Chem.*, **179**, 463.
Merskey, C. (1949). *S. Afr. J. med. Sci.*, **14**, 1.