Original

ON THE TRANSFUSION OF BLOOD CONCENTRATES.

WITH RECORDS OF 100 CASES.

by

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Thesis for the Degree of M.D.,

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CONTENTS.

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1) PREFACE.

The work for this thesis was done while acting as an Assistant in the Glasgow and West of Scotland Blood Transfusion Association, and while holding a Hall Fellowship of Glasgow University.

I should like to acknowledge my indebtedness to the Physicians and Surgeons of the Glasgow Royal Infirmary for allowing me to transfuse their cases, and to carry out investigations upon them. I should also like to thank Professor J.A.G. Burton and Professor Noah Morris of the Glasgow and West of Scotland Blood Transfusion Association for their interest and encouragement.

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2) INTRODUCTION.

In 1916, Peyton Rous and Turner described experiments on the storage of red blood corpuscles and their transfusion into experimental animals. They used both whole blood and washed cells, thus being the first to introduce erythrocytes without serum into the living animal. They noted the damage done to the cells by handling in solutions of sodium chloride, Locke's or Ringer's solutions. They found gelatin ⅛% solution or plasma to have a protective effect, and they described the preservative qualities of glucose and saccharose.

Their recommendation for a storage solution was

Blood	3 parts.
3.8% solution Sodium Citrate	2 parts.
5.4% solution Dextrose	5 parts.

These proportions give a final concentration of citrate of .74% and of dextrose 2.7%.

In a second paper, Rous and Turner described experiments in transfusing stored cells into the experimental animal. In some cases plasma was withdrawn, and cells only were used for transfusion. Their conclusion was, that cells could be stored for a period up to five weeks after withdrawal.

Robertson(1918) also used stored cells for the transfusion of human casualities. He resuspended the erythrocytes (500 c.c.) in saline (1,000 c.c.) before transfusion. As he was dealing with Army casualities, the increased fluid was probably beneficial in the treatment of shock, at least temporarily.

Castellanos (1937) appears to have been the first worker to transfuse human cell concentrates. In two papers (Castellanos/

(Castellanos and Riera 1937a, Castellanos 1937b), he discussed the technique and indications for this method of treatment.

He suggests the name erythro-transfusion for the transfusion of red cells with the plasma withdrawn, and he has re-transfused cells into donors after separation of the plasma for use as an intravenous infusion fluid. He noted the very low figures for packed cell volumes in severe anaemias, leukaemias and Hodgkin's disease, these sometimes being as low as 8% compared to the normal 45% to 55%. The total blood volume does not diminish markedly, but the volume of red corpuscles per kilo. of body weight, may reach the very low figure of 6 to 7 c.c.

With such small quantities of red cells, the vital functions on the blood are embarrassed. Tissue oxygenation requires a compensatory mechanism. Tachycardia is the simplest modification, as it allows a greater quantity of blood to be distributed in a given time. This may not be sufficient, and a "hunger for red corpuscles" ensues leading to dysfunction of all organs and tissues. It also results in plasma changes causing hypoproteinaemia and dyscrasic oedema.

Thus the main treatment of anaemia should aim at restoring the packed cell volume to within normal limits. The transfusion of red cell concentrates allows us to do this quickly.

Castellanos notes the disadvantages attached to transfusion of large quantities of fluid, and that by giving cell concentrates, the same effect can be achieved with half the volume. He also suggests that a certain amount of transfused blood is stored in the organs and tissues.

In the technique of Castellanos and Riera, only persons of homologous groups were used as donors and recipients, and/

and cross-matching was invariably carried out. Theoretically this is unnecessary, as the amount of serum transfused is negligible, and will have no effect on the recipients' corpuscles. The blood was withdrawn from the donor and mixed with 3% sodium citrate (10 c.c. per 100 c.c. blood). It was placed in centrifuge tubes and spun for ten minutes at 1,000 revolutions per minute. The plasma was then syphoned off. The viscosity of the concentrate required pressure for injection, and it was transfused at a rate of 200 c.c. in fifteen minutes.

Castellanos states that the heightening of colour of the patients is remarkable, and that finally they appear to have been using lipstick. He claims that he had no reactions whatsoever, ascribing this to the fact that most of the citrate is withdrawn in the plasma, and only about 1% of it is left to be injected with the corpuscles.

Finally, the authors claim that abnormal heart sounds disappear, that symptoms disappear, and that cell concentrate is better in certain cases than whole blood transfusion. The true indication is severe anaemia with great loss of red cells in which there is a diminution in the cell/plasma ratio. In such cases, the volume of red cells per kilo. on body weight may diminish to less than 10 c.c. compared to the normal 30 c.c.

McQuaide and Mollison (1940) described 60 transfusions of cell concentrate. They studied especially the incidence of reactions, and concluded that the method was advantageous because:-

(a) less than half the usual volume of fluid will produce the same rise in haemoglobin.

(b) the plasma can be used for shocked patients.

(c) reactions are fewer.

(d) the danger of transfusion of potentially incompatible agglutinins when using Group O blood is greatly lessened.

Williams and Davie (1941) used erythrotransfusion on many types of cases, 77 in all, and were able to follow up 38 transfusions on 35 cases. The technique of preparation of concentrate and of administration was similar to that evolved here. Their rate of administration was much slower than that used here, being 100 c.c. per hour. The average rise in haemoglobin in all groups of cases was 10% to 12% per 500 c.c. of concentrate, but they criticize the blood counts, and suggest that they may be unreliable. Reactions were numerous, but probably due to impurities of water supply owing to War conditions; one was fatal. They suggest that the fatal reaction was due to an allergic mechanism. They note increased fragility of stored erythrocytes, but do not think that it is clinically significant.

DeGowin, Harris, Bell and Hardin (1942) also investigated this fragility. They note it is diminished by rapid cooling of the blood after withdrawal, and suggest that it should be brought to a temperature of 2°C. within six hours. Haemolysis and fragility tests were the main standards for this conclusion. Williams and Davie record the cell count of their concentrate as about:-

Hb.	150%
R.B.C.	8,500,000 per cu. mm.
W.B.C.	3,000 per cu. mm.
Cell/plasma ratio	85% to 15%.

Their summary and conclusions are (a) the preparation and properties of concentrated red cell suspensions are described, and the advantages of their use in preference to whole blood in certain cases are discussed.

(b) Results of 77 transfusions are reported, special reference being made to the percentage rise of haemoglobin per 500 c.c. of suspension, and to the effect, if any, of the patient's clinical condition upon this result.

(c) The frequency of reactions is calculated and found to be lower/

lower than when whole blood is used. One fatal case is reported, and aetiology discussed.

When working in a blood bank producing plasma, one is struck by the waste of potentially useful blood cells in concentrated suspension. This investigation was, therefore, undertaken without knowledge of Castellanos' work, to discover the utility of concentrate, and to elaborate a technique to give the best results.

The theoretical advantages to be gained are (a) the smaller quantity of fluid infused especially in severe anaemias with poor cardiac function.

(b) the possibility of transfusing large amounts of haemoglobin in small volume with advantage even to the normal cardiovascular system.

(c) the small proportion of reactions.

Reactions may be due to incompatibilities between the recipient cells and the donor serum, and to the transfusion of sodium citrate with the blood. Both these sources of reactions are diminished in erythrotransfusion, as most of the donor serum is withdrawn, and with it 98% of the sodium citrate.

In addition to clinical assessment and investigation of blood counts, an attempt was made to discover the effects on blood pressure and blood volume. An investigation was carried out on persons with abnormal heart sounds in severe anaemia, and their reaction to erythrotransfusion. The reaction rate was noted, and the life of transfused cells and the best conditions for storage were investigated.

This series of 100 erythrotransfusions on 70 patients is the largest recorded number, and, as the investigations were carried out by one worker, the results are not liable to the variations in technique and personal error of which Williams and Davie complained.

3) TECHNIQUE.

The donors were voluntary members of the Glasgow and West of Scotland Blood Transfusion Service. Before withdrawal, each was typed, and had a haemoglobin estimation. A sample of cells was taken in citrate for direct compatibility and a sample of whole blood for Wassermann Reaction.

The median basilic vein of the arm was generally used, and a small quantity of novocaine inserted intradermally. The vein was entered by a standard blood withdrawal needle and blood allowed to run off by gravity through rubber tubing into the standard blood bottle containing 50 c.c. of 3.8% sodium citrate. A total amount of 540 c.c. of whole blood was taken. To this was added later 5 c.c. of 50% glucose. These quantities give final concentrations of .35% citrate and .5% glucose. The addition of glucose improves the keeping qualities of stored blood. This was first noted by Peyton Rous and Turner who used a final concentration of 2.7%. DeGowin, Harris and Bell (1942) suggest a final concentration of 3%, but Janet Vaughan (1940) considered that .5% was the most satisfactory proportion. As few of our bloods were kept stored for longer than seven days, the addition of glucose was immaterial, but it appeared that haemolosis was diminished by the addition of .5% glucose. The amount of citrate was not sufficient, and it is now suggested that the final concentration should be about .5% togive the best results as an anti-coagulant without increasing the incidence of reactions.

The blood was stored in a refrigerator at 2°C. - 4°C and allowed to sediment. Maximum separation occurred in two to three days, and the average time after withdrawal of blood for preparation of concentrate was five days. No mechanical separation was used, as in Castellanos' work, owing to the risk of mechanical damage to erythrocytes (Peyton Rous and Turner,1916).

The/

The blood was kept thus until required for transfusion. It was then drained of supernatant plasma by withdrawal into a vacuum bottle. A long needle was first plunged through the stopper after flaming, to the bottom of the layer of plasma, and if necessary a rotary pump was used to complete the operation. A filter was incorporated in the circuit.

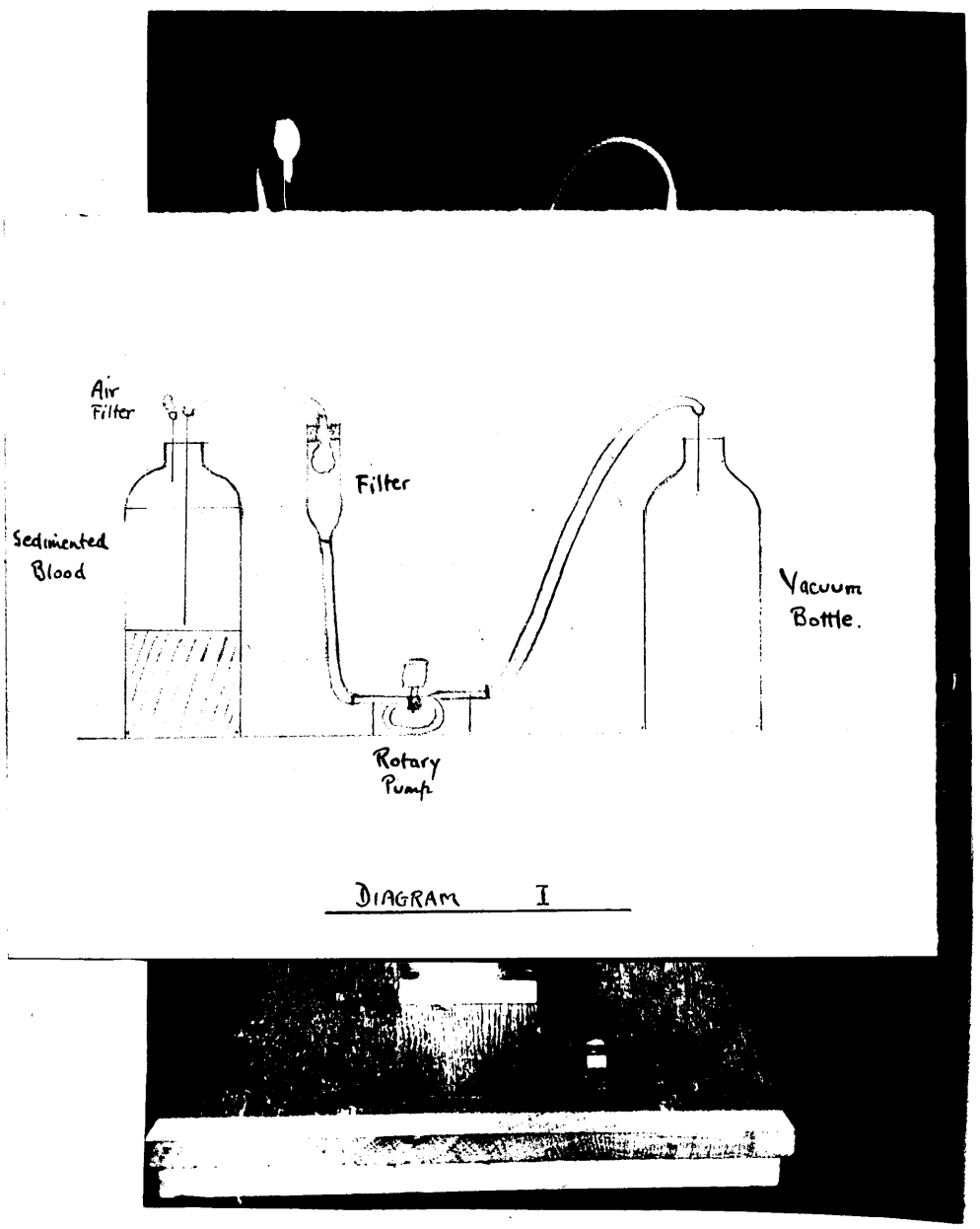

DIAGRAM I

There was now left in the bottle a sediment of red cells on top of which lay a gelatinous layer of degenerate leucocytes, platelets and fibrin. The cells were withdrawn by plunging the needle to the bottom of the bottle, and transferring them into a fresh vacuum bottle being careful to/

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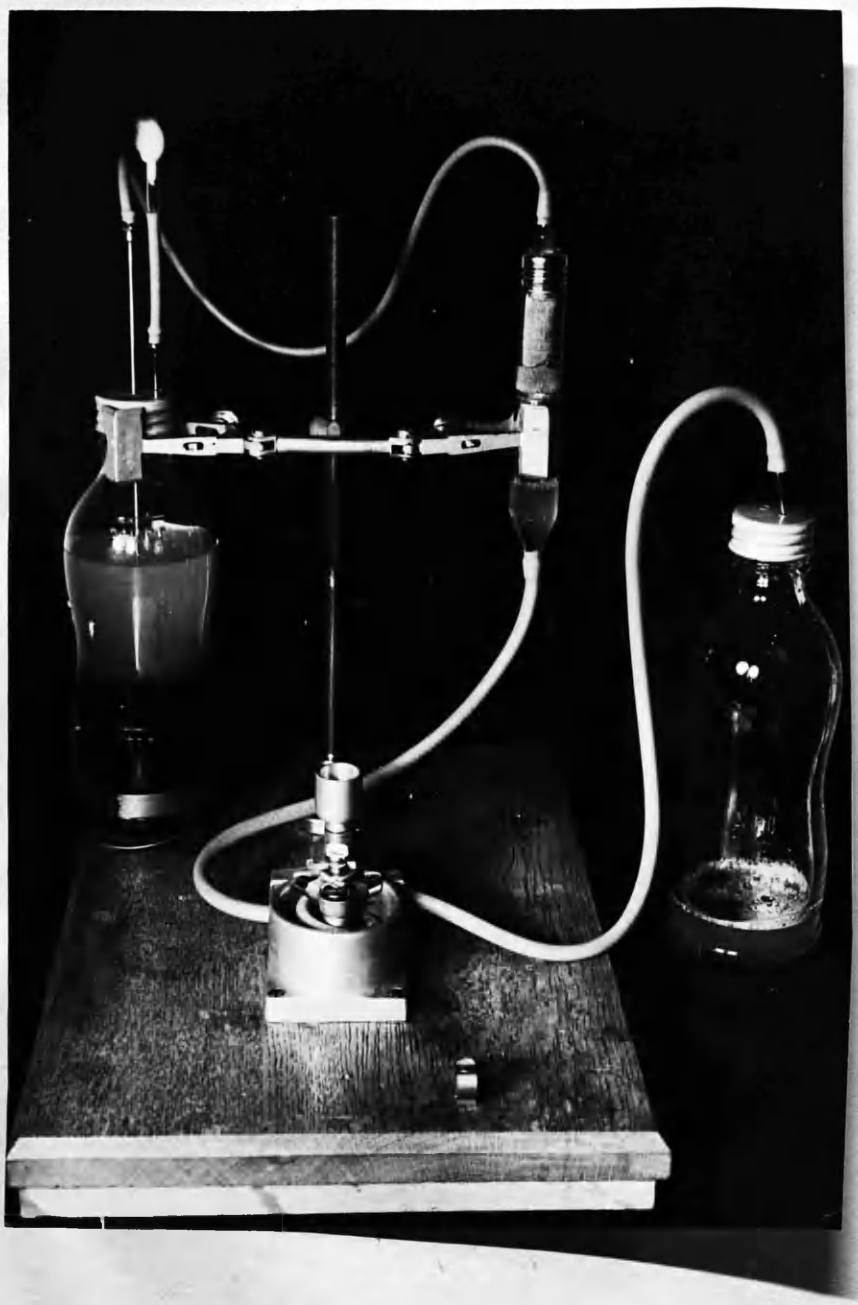

There was now left in the bottle a sediment of red cells on top of which lay a gelatinous layer of degenerate leucocytes, platelets and fibrin. The cells were withdrawn by plunging the needle to the bottom of the bottle, and transferring them into a fresh vacuum bottle being careful to/

to leave the degenerate layer behind. The cells were also passed through a filter. In the early stages, filtration was carried out through gauze by an open method, but the concentrate flowed freely by the modified technique described without risk of contamination.

At first, before blood concentrates were mixed, samples of each were matched with each other and with the patient, but the incidence of reactions was so low as to make this laborious technique unnecessary.

Also in the early stages, it was thought necessary to use pressure to ensure a flow of concentrate into the recipient's veins, and the Kimpton tube was used. As the concentrate was citrated it was not necessary to vaseline the tube, but the obvious disadvantages of cutting down on a vein for each transfusion led to experiments with venoclysis with a needle and eventually the standard transfusion apparatus was used with success. If pressure was required it could be applied to the air inlet tube. (See Diagram 2).

In this method a bottle (550 c.c.) of concentrate was fitted with donor apparatus which consisted of a rubber bung with air inlet tube and blood outlet tube. The blood was filtered, and ran through a drip to a needle which was inserted into a vein after local anaesthesia of the skin. The tubing was strapped to the recipient's arm to warm the blood (see photograph) otherwise no heating measures were used as they tend to damage erythrocytes.

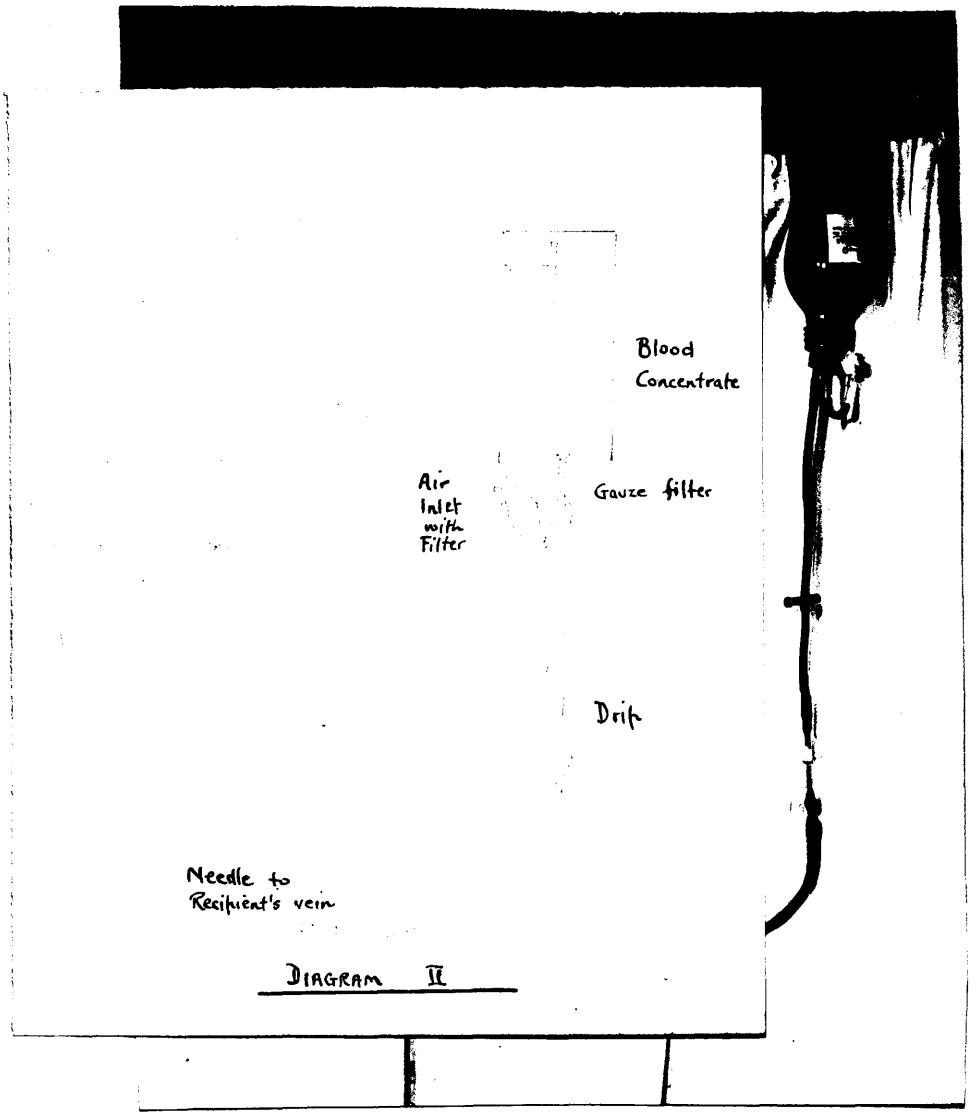

DIAGRAM II

The cell count of the concentrate varied considerably depending upon the sedimentation rate and blood count of the donor, the time and temperature of storage and the amount of disturbance of the bottles during storage. An average count was:

Haemoglobin	155% (24.8 gr. per 100 c.c.)
R.B.C.	9,000,000 per cu. mm.
W.B.C.	2,500 per cu. mm.

The leucocyte count varied greatly with the time of storage as noted by Scarborough and Thomson (1940). These figures agree with Williams and Davie (1941).

A blood count estimating haemoglobin content, erythrocyte count and packed cell volume was done on the recipient/

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The leucocyte count varied greatly with the time of storage as noted by Scarborough and Thomson (1940). These figures agree with Williams and Davie (1941).

A blood count estimating haemoglobin content, erythrocyte count and packed cell volume was done on the recipient/

recipient before transfusion. This was repeated 15 minutes after completion of transfusion, and daily for the next three days. Thereafter the blood was counted every second day until the eighth day after transfusion.

Homologous groups were not always used, but, of course, the bloods required to be compatible.

Zimmerman, Strauss and Laufmann (1941) agree with the use of Group O blood, and consider that reactions are more due to faulty technique than to heterologous transfusion.

Aubert, Bootman, Dodd and Loutit (1942) considered that blood from high titre universal donors should not be used for transfusion into other groups. They investigated the serum bilirubin of patients of Group A, after giving serum or plasma from donors of Group O. No dangerous reactions were noted, but a rise in the bilirubin content was noted when Group O serum with an agglutination titre of 512 or over was used. They consider that Group O serum with such a titre is contraindicated for universal use.

In this work no disadvantages were found in the use of universal donors and heterologous transfusion allowed the determination of the life of transfused cells by the Ashby Differential agglutination technique in 25 cases. Van den Berg reaction was noted before and after transfusion in 28 cases.

The time taken to transfuse concentrate varied considerably, but was about 500 c.c. per hour.

Reactions were divided into:

Group 1 - slight elevation of temperature.

Group 11 - pyrexia with slight shivers.

Group 111 - pyrexia with definite rigors.

4) RESUME OF CASES. (Figures in brackets under H.B. represent grams per 100 c.c.)
(Numbers under R.B.C. are millions per cu.mm.)

Transfusion. Case.

1. P.A. (59 Years). Admitted 5.11.41.

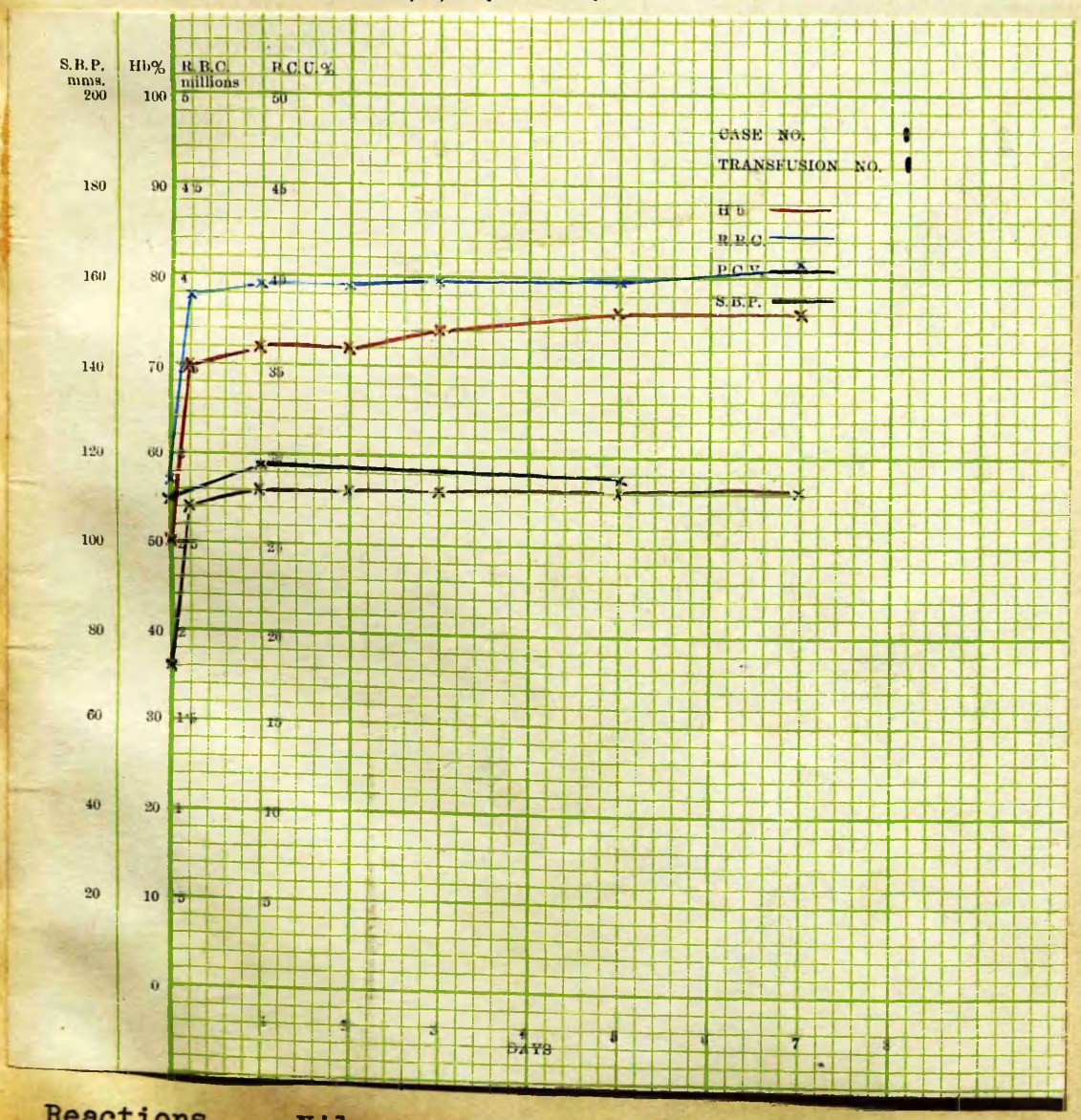
This patient was admitted with a history of intermittent abdominal pain for ten years. There had been recent vomiting and haematemesis. Loss of weight was noted, X-Ray showed pyloric stenosis.

On 21.11.41 he had a posterior gastro-enterostomy performed. The stomach was hypertrophied and there was marked thickening of the pylorus, but no glands or indications of malignancy were present.

On 7.12.41, the blood count was Hb 50% (8 gms) R.B.C. 2.89 W.B.C. 5,400 G.AB.

1. On 7.12.41 he was given the cells from 1,400 c.c Group A blood by Kimpton tube at a rapid rate.

Blood changes.	H.B.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before.	50% (8)	2.84	18%	1.4		110
After 15 mins.	70% (11.2)	3.89	27%	1.6		118
8.12.41.	72% (11.52)	3.84	28%			
9.12.41.	72% (11.52)	3.96	28%			
10.12.41.	74% (11.84)	3.96	28%			
12.12.41.	76% (12.16)	3.98	28%			112
14.12.41.	76% (12.16)	4.06	28%	1.4		



Reactions - Nil.

Transfusion. Case.

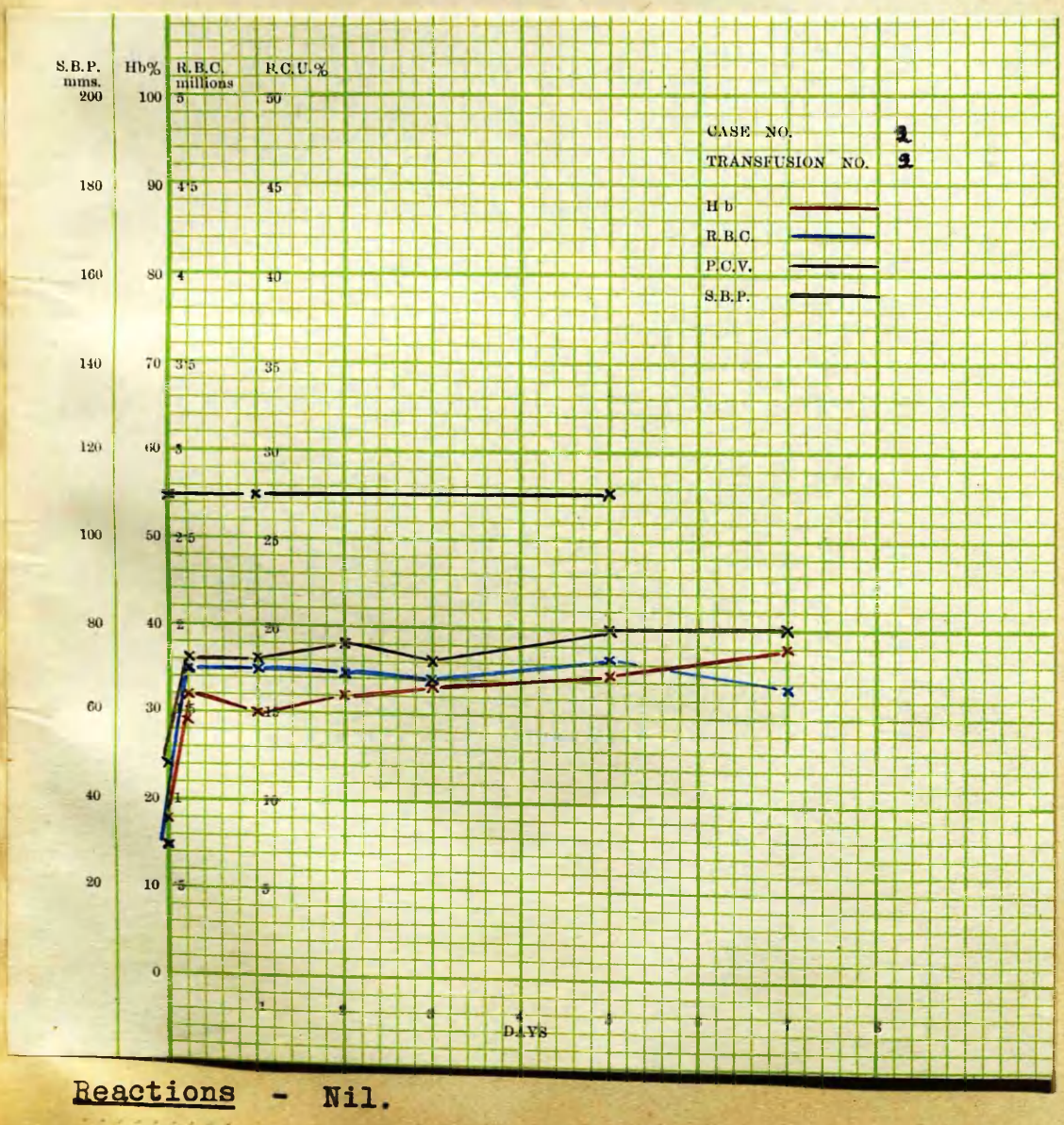
2. Mrs. A.B. (48 years). Admitted 25.5.42.

This patient had had nausea, vomiting and weakness of four months duration. There was breathlessness and loss of weight. Pallor, collapses, haematuria and menorrhagia were noted. The appetite was erratic. The vomitus was black and bitter. The pallor had a yellow tinge. There was oedema of the ankles, and a V.S. Murmur was present at all the cardiac areas. The liver and spleen were enlarged, and there was albuminuria. B.P. 105/70.

The blood count was H.B. 20% (3.2 gms.) R.B.C. 2.0 millions per cu.mm., W.B.C. 2,000 per cu. mm. Group A (11). Blood films showed megalocytosis, polychromasia and punctate basophilia.

2. On 31.5.42. she was given the cells from 800 c.c. Group A blood by the drip method.

Blood changes.	H.B.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	18% (2.88)	.74	12%			105
After 15 mins.	32% (5.12)	1.76	18%			105
1.6.42.	31% (4.96)	1.76	18%			
2.6.42.	32% (5.12)	1.75	19%			
3.6.42.	33% (5.28)	1.70	18%			
5.6.42.	35% (5.6)	1.83	20%			107
7.6.42.	38% (6.08)	1.68	20%			



Reactions - Nil.

Transfusion. Case.

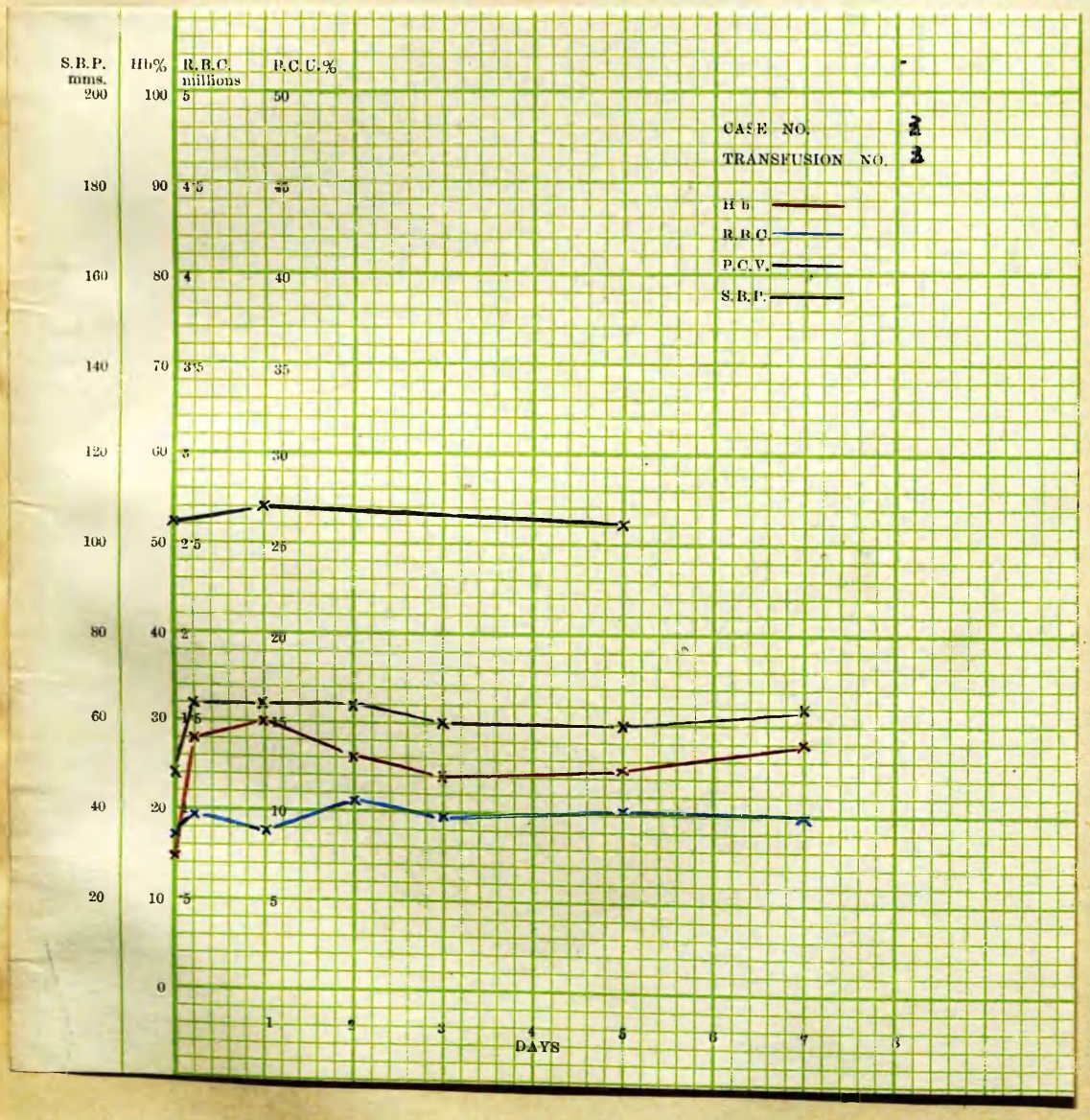
3. A.B. (62 Years) Admitted 14.6.42.

This patient had noted loss of weight for eight months. He had marked weakness and malaise of eleven weeks duration. There was anorexia and flatulence with some vomiting. Breathlessness and oedema were present. The heart sounds were weak, but pure. Glossitis and koilonychia were noted, but no organ or mass was palbable in the abdomen. B.P. 105/60.

The blood count was H.B. 12% (1.92 gms), R.B.C. .64 millions per cu.mm., W.B.C. 2,200 Group B (111).

3. On 20.6.42. he was given the cells from 850 c.c. Group B blood by the drip method.

Blood changes.	H.B.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before.	15% (2.4)	.86	12%			105
After 14 mins.	29% (4.64)	.97	16%			108
21.6.42.	30% (4.8)	.89	16%			
22.6.42.	28% (4.48)	1.12	16%			
23.6.42.	24% (3.84)	.98	15%			
25.6.42.	25% (4)	1.02	15%			105
27.6.42.	28% (4.48)	.99	16%			



Reactions - Nil.

Transfusion. Case.

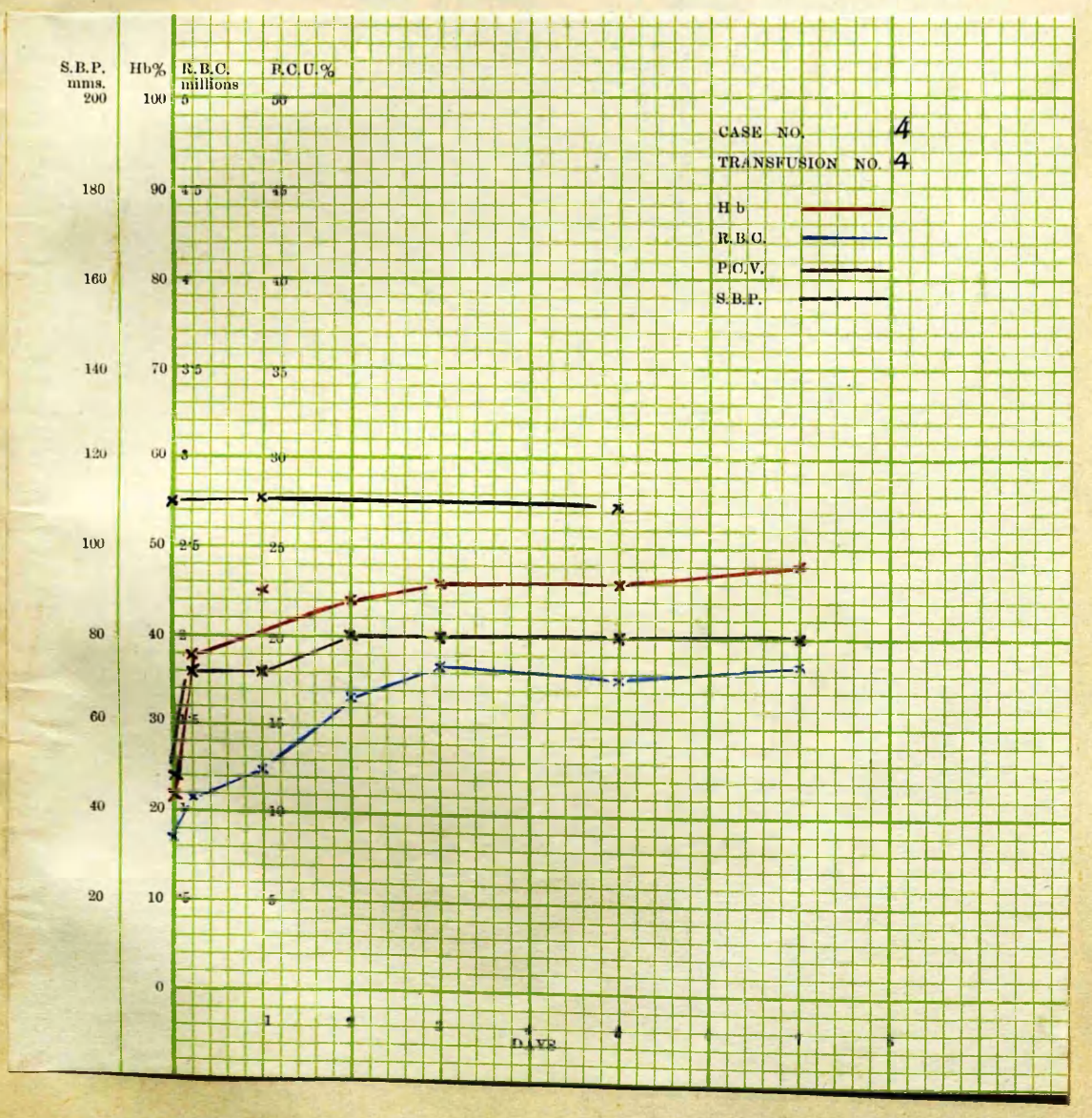
4. J.B. (62 Years) Admitted 21.11.41.

This man suffered from asthma for fifteen years. Weakness and malaise had been present for eight years, and had been treated with liver extracts. This treatment had a good effect for the first five years, but for the last three had been of little avail. Vomiting had been present for three weeks before admission. On Examination, glossitis was present, the heart sound were pure, but of poor tone. A V.S. murmur was present at the apex, and emphysema was noted in the lungs. B.P. 110/70.

The blood count was H.B. 22% (3.52 gms.) R.B.C. .895 millions per cu.mm., W.B.C. 3,500. Group A (11).

4. On 22.11.41 the cells from 1,400 c.c. Group A blood were given by Kimpton tube at a rapid rate.

Blood Changes.	H.B.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before.	22% (3.52)	..84	12%	1.8		110
After 15 mins.	38% (6.08)	1.09	18%	1.8		115
23.11.41.	45% (7.2)	1.24	18%			
24.11.41.	44% (7.04)	1.67	20%			
25.11.41.	46% (7.36)	1.82	20%			
27.11.41.	46% (7.36)	1.78	20%			112
29.11.41.	48% (7.68)	1.84	20%	1.6		



Reactions - Nil.

Transfusion. Case.

5. Mrs. A.B. (25 Years) Admitted 3.11.42.

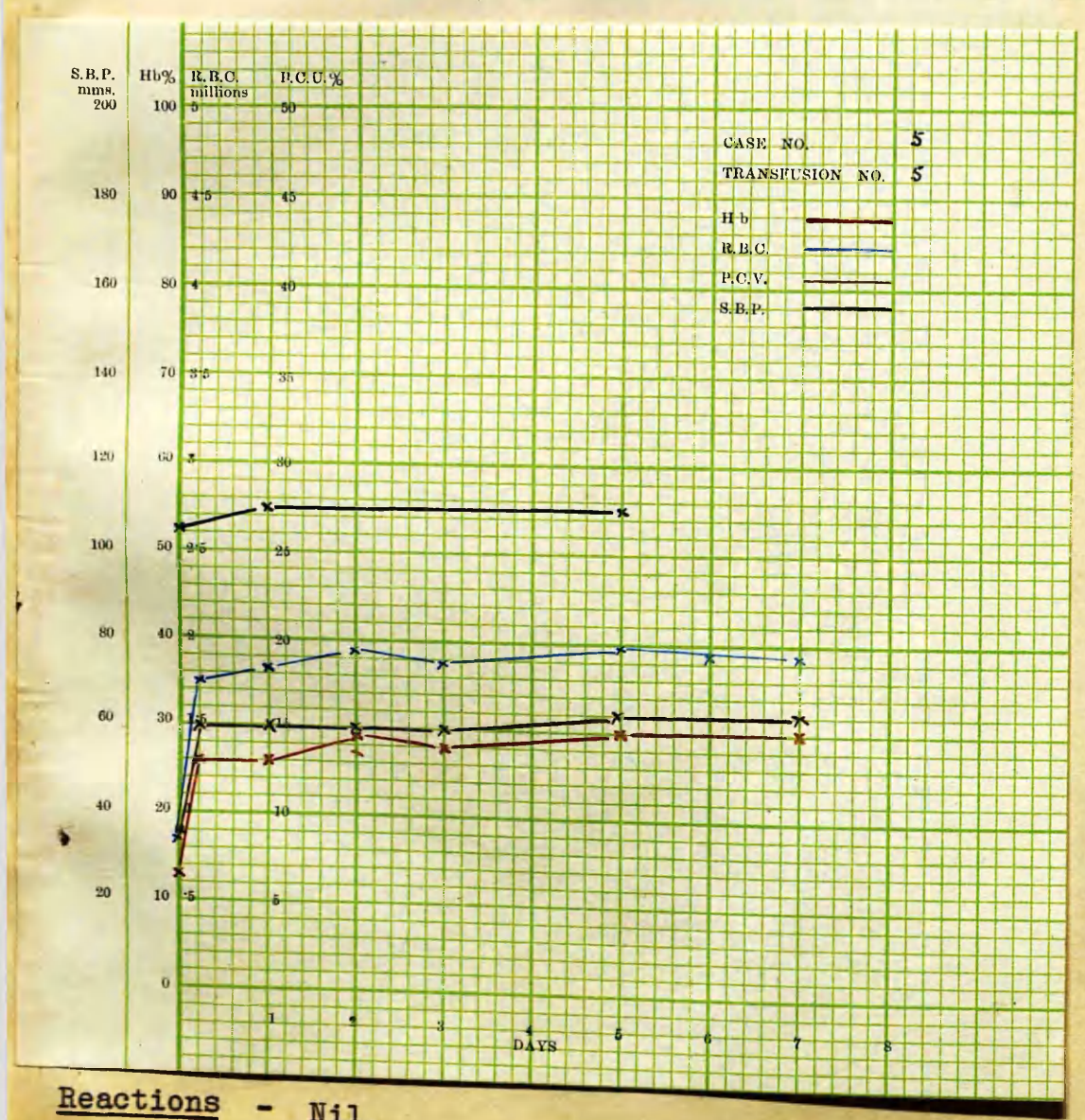
Fourteen days before admission this patient had a baby without difficulty. Breathlessness and weakness developed with cough and spit. The heart sounds were rapid and irregular, and a V.S. murmur was present at the apex. B.P. 104/86.

There was some dullness to percussion at the right base, and the liver and spleen were enlarged.

The blood count was H.B. 13% (2.08), R.B.C. .61 millions per cu.mm., W.B.C. 12,000 per cu.mm. Group A (11).

5. Immediate blood transfusion of 500 c.c. Group O blood was carried out, followed by transfusion of cells from 1,000 c.c. Group O blood by the drip method.

Blood Changes.	H.B.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before.	13% (2.08)	.84	9%		.10	105
After 15 mins.	26% (4.15)	1.74	15%		.94	110
13.3.42.	26% (4.16)	1.82	15%			
14.3.42.	29% (4.64)	1.94	15%			
15.3.42.	28% (4.48)	1.88	15%			
17.3.42.	30% (4.8)	1.98	16%			110
19.3.42.	30% (4.8)	1.94	16%		.92	



Reactions - Nil.

Transfusion. Case.

6. Miss M.B. (21 Years) Admitted 21.11.41.

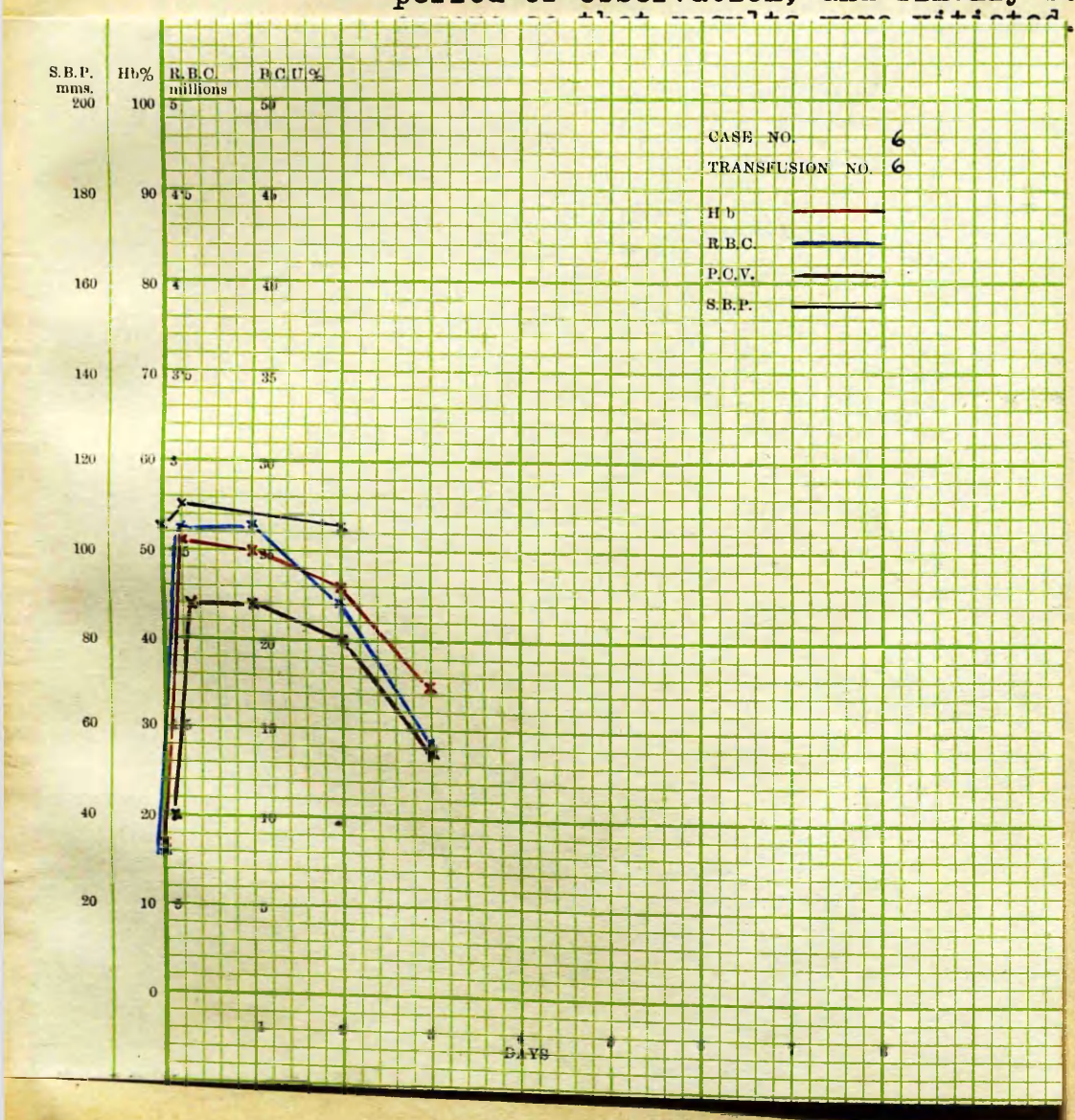
This patient had purpura of five weeks' duration. There were bruising and bleeding from the gums, and menorrhagia. Pallor was marked and a purpuric eruption was present. Blood examination on admission showed H.B. 52% (8.32), R.B.C. 2.1 millions per cu.mm., W.B.C. 2,900 per cu.mm. Group O.

No platelets were seen. Bleeding time eleven minutes. Clotting time 34 minutes. Capillary fragility was greatly increased.

6. The patient's general condition deteriorated rapidly, and on 7.12.41. the cells from 1,400 c.c. Group O blood were given by Kimpton tube at a rapid rate.

Blood Changes.	H.B.	R.B.C.	P.C.V.	V.D.B.	B.	S.B.P.
Before.	17% (2.72)	.84	10%			110
After 14 mins.	51% (8.16)	2.62	22%			115
8.12.41	50% (8)	2.64	20%			
9.12.41	46% (7.36)	2.23	20%			110
10.12.41	35% (5.6)	1.44	14%			

Bleeding continued in this case throughout the period of observation, and finally became very



Reactions - Very slight, Grade 1.

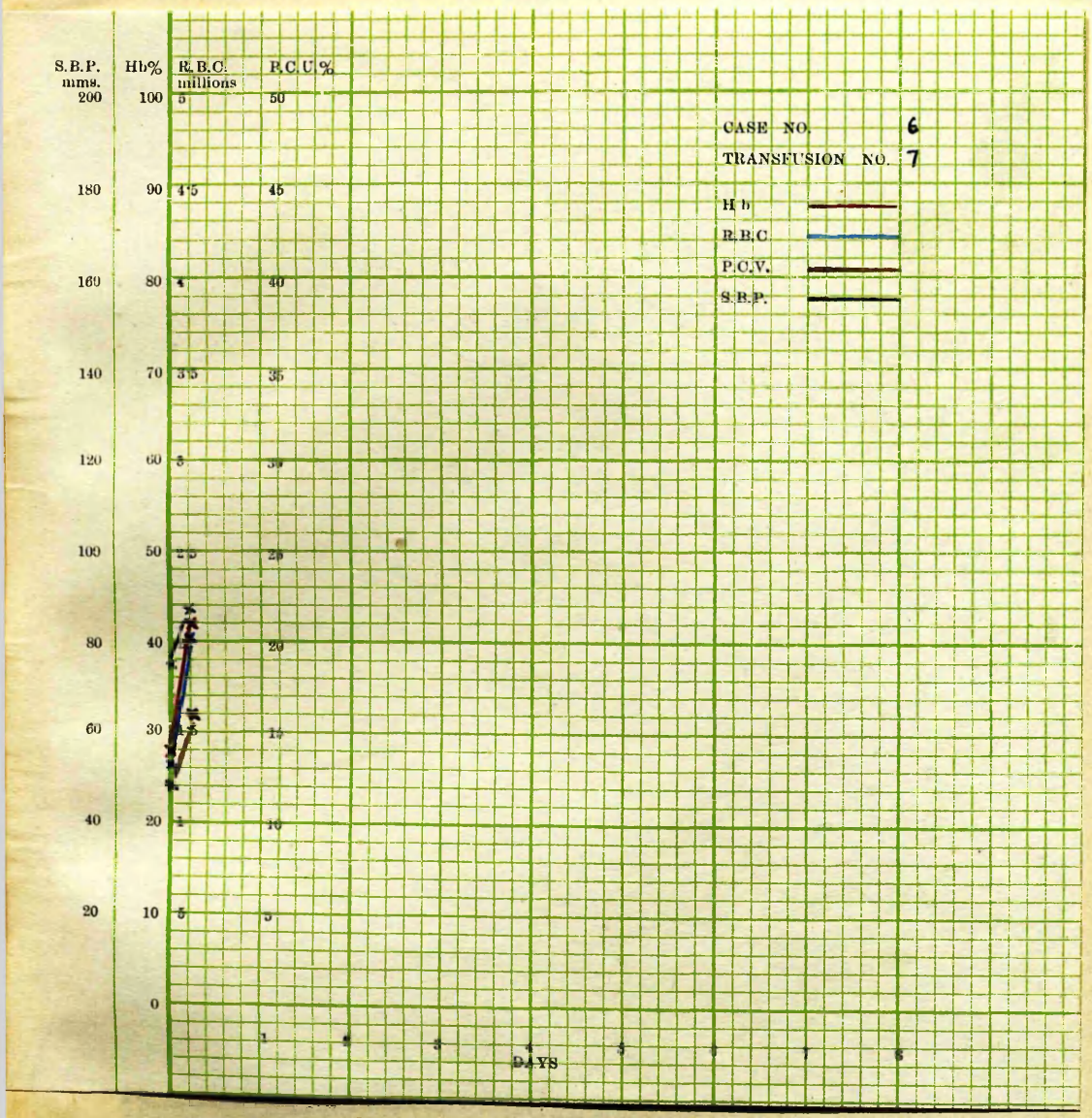
Transfusion. Case.

7. The condition again rapidly deteriorated, and the patient became almost moribund.

On 11.12.41. the cells were 1,400 c.c. Group O Blood were given by Kimpton tube at a rapid rate.

Blood Changes.	H.B.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	29% (4.64)	1. 44	12%			75
After 15 mins.	42% (6.72)	2. 04	16%			85

Further severe bleeding developed from gums, stomach, vagina and bowel, and the patient died.



Transfusion. Case.

7. Miss J.B. (40 Years). Admitted 20.7.41.

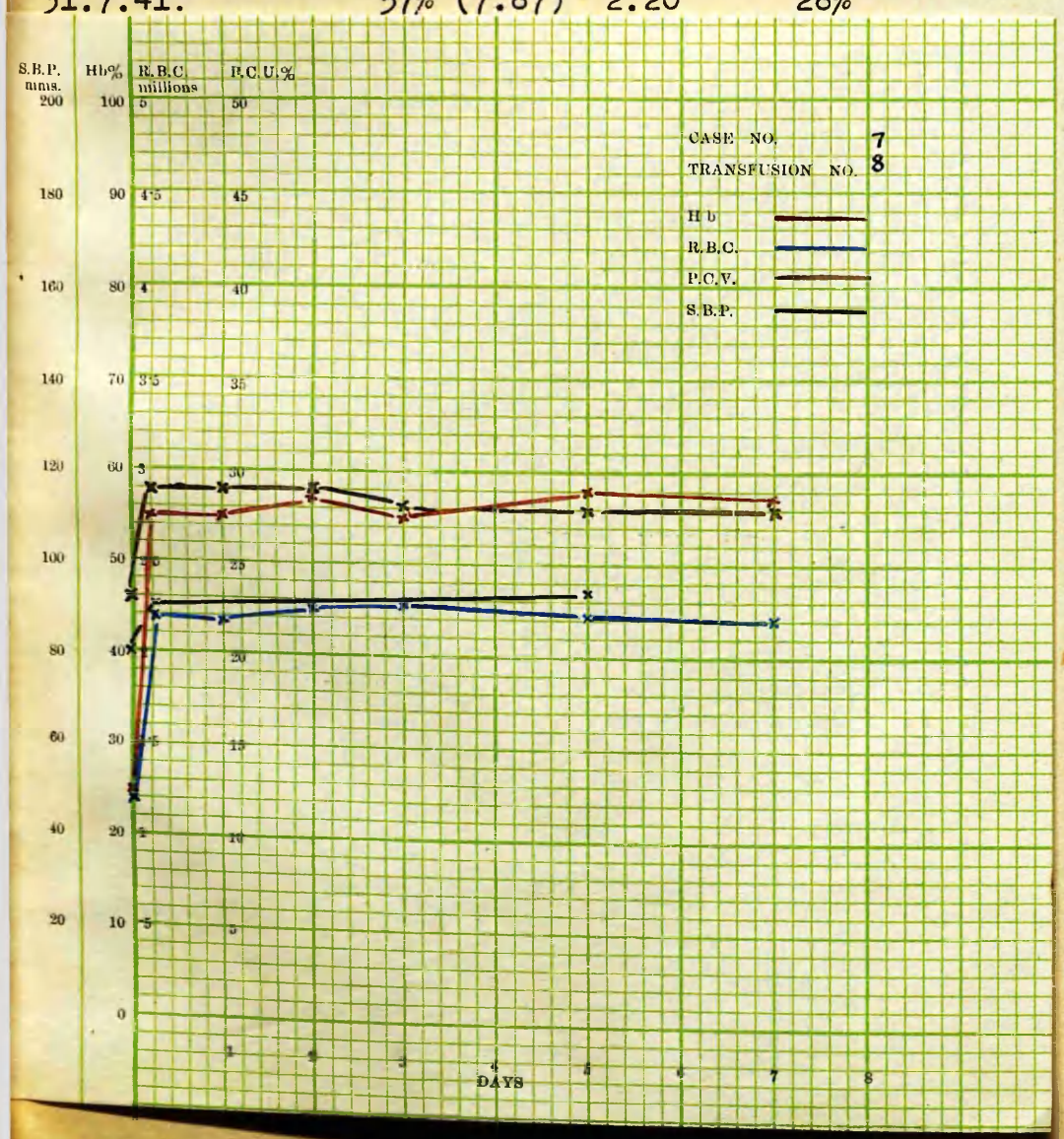
This woman complained of weakness and soreness of mouth for ten months. She lived alone, and existed mainly on a diet of porridge and tea. The heart sounds were weak, and a v.s. murmur was present at the apex, and slight oedema of the ankles. Marked pigmentation of skin was present with an atrophic tongue, and ulceration of the gums. B.P. 78/35.

Blood examination on 20.7.41. showed H.B. 20% (3.2), R.B.C. 1.1 millions per cu.mm., W.B.C. 4,500 per cu.mm. Group A(11).

On examination of blood films anisocytosis, poikyloscytosis and megalocytosis were noted with less than 1% reticulocytes. Test meal normal.

8. She was treated with liver extracts and Eucortone but with little improvement, and on 24.7.41. the cells from 1,100 c.c. Group A blood were given by Kimpton tube at a rapid rate.

Blood changes.	H.B.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before.	25% (3.45)	1.24	23%			80
After 15 mins.	55% (7.59)	2.2	29%			90
25.7.41	55% (7.59)	2.18	29%			
26.7.41.	57% (7.87)	2.25	29%			
27.7.41	55% (7.59)	2.27	28%			
29.7.41	58% (8.00)	2.23	28%			90
31.7.41.	57% (7.87)	2.20	28%			



Transfusion. Case.

She was dismissed in fairly good health, but, due to lack of treatment, deteriorated, and was readmitted on 18.11.41.

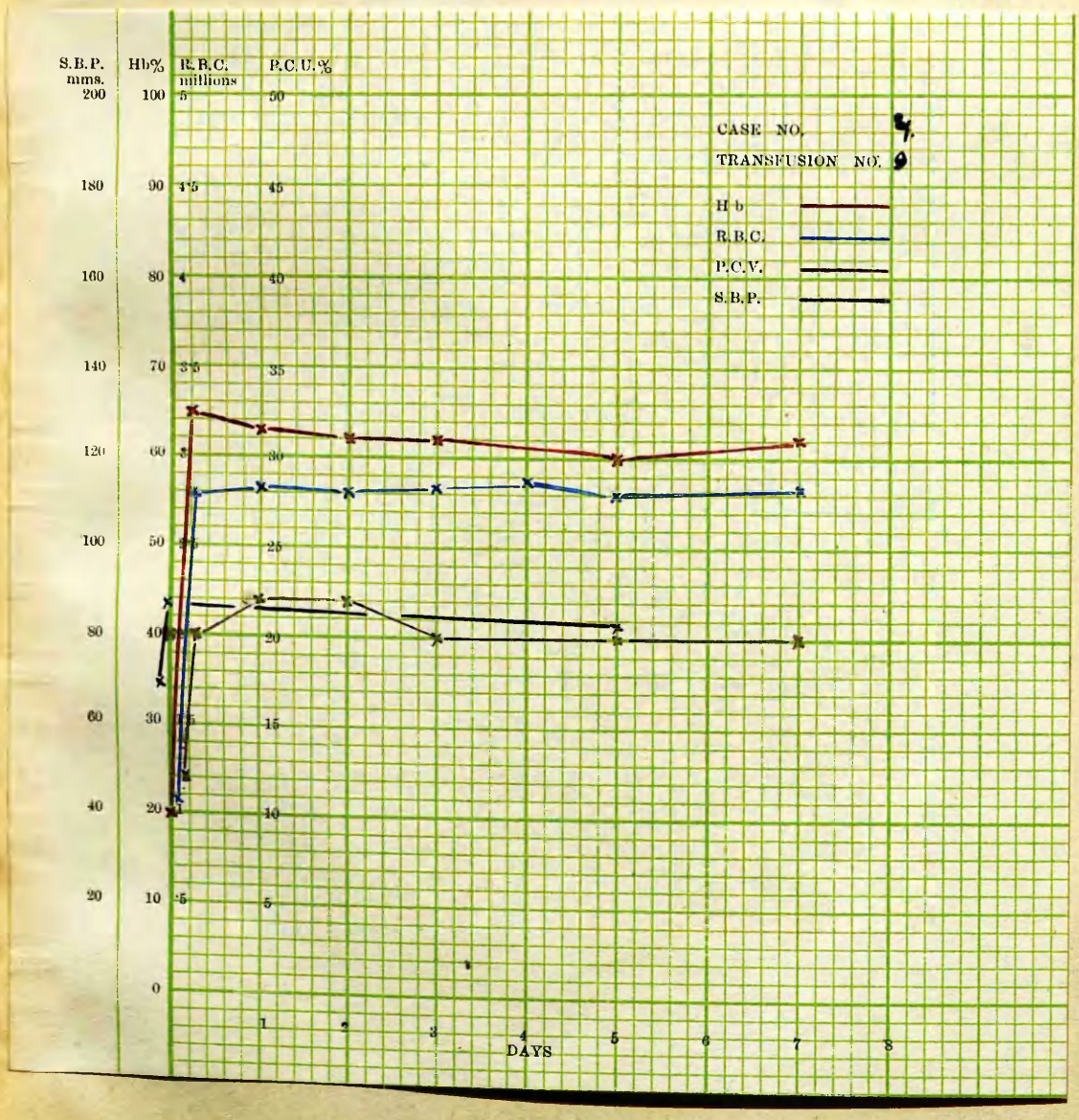
Blood count was then H.B. 20% (3.2), R.B.C. 1.05 millions per cu.mm. W.B.C. 4,200 per cu.mm.

9.

On 20.11.41. she was given the cells from 1,000 c.c. Group O blood by Kimpton tube at a rapid rate.

Blood Changes.	H.B.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before.	20% (3.2)	1.07	12%	1.0	.08	70
After 15 mins.	65% (10.08)	2.58	20%	1.2	1.48	85
21.11.41	63% (10.08)	2.62	22%			
22.11.41	62% (9.92)	2.60	22%			
23.11.41	62% (9.92)	2.64	20%			
25.11.41.	60% (9.6)	2.70	20%			80
27.11.41.	62% (9.92)	2.62	20%	1.0	1.36	

In this case the V.S. murmur at the apex disappeared after each transfusion.



Reactions - Nil.

Transfusion. Case.

8. A.B. (63 Years) Admitted 20.5.42.

This man complained of pain in the chest, and black spit for seven years. He was very pale, and the heart sounds were weak. B.P. 100/65.

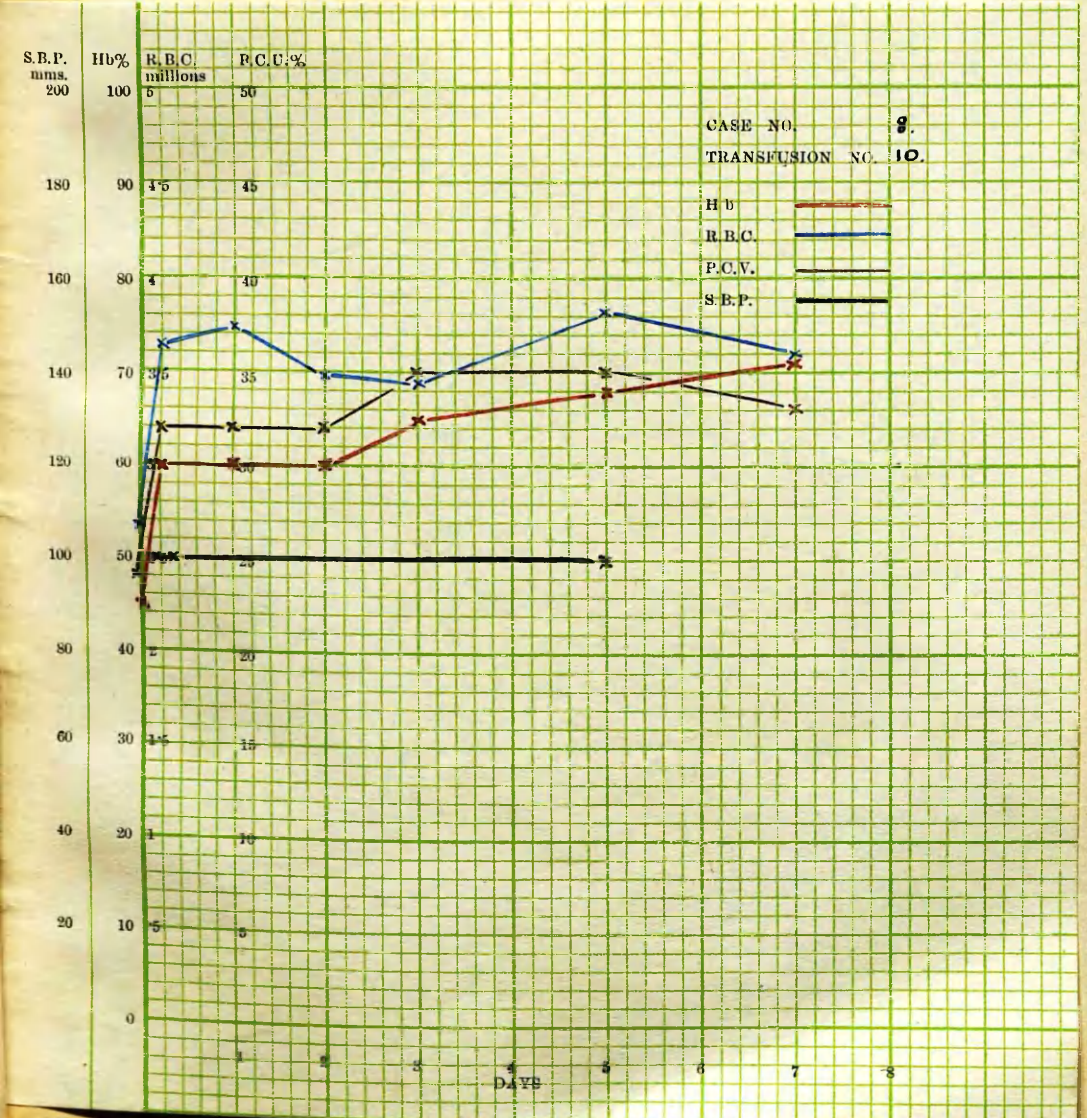
A.V.S. murmur was present at the apex. Liver and spleen were enlarged, and albuminuria was present.

Blood examination on 20.5.42 showed H.B. 40% (6.4), R.B.C. 1.65 millions per cu.mm., W.B.C. 3,500 per cu.mm. Group O.

Blood films showed a picture like pernicious anaemia, and sternal puncture revealed great marrow activity.

10. On 20.6.42. the cells from 800 c.c. Group O blood were given by the drip method.

Blood Changes.	H.B.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before.	45% (7.2)	2.69	24%	2.0		100
After 15 mins.	60% (9.6)	3.63	32%	2.4		100
21.6.42	60% (9.6)	3.74	32%			
22.6.42	60% (9.6)	3.49	32%			
23.6.42	65% (10.4)	3.45	35%			
25.6.42	68% (10.88)	3.82	35%			100
27.6.42	71% (11.36)	3.52	33%	1.8		



Transfusion. Case.

9. Mrs. A.B. (67 years). Admitted 29.7.41

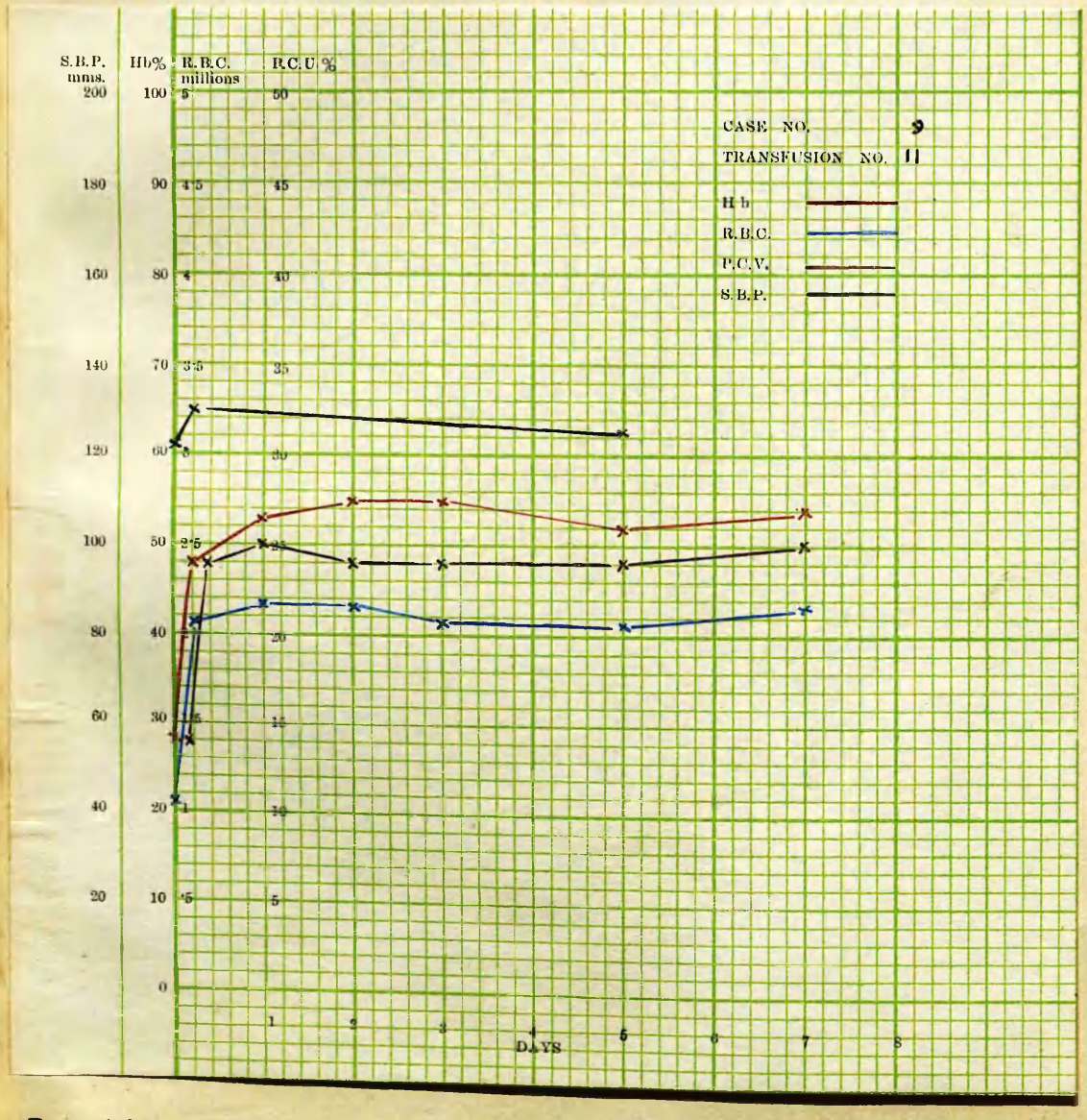
This patient complained of weakness and pallor of four months duration. There was nausea and sickness and she had pains in her joints.

The heart was enlarged and the sounds were weak. There was a V.S. murmur at the base. B.P. 122/46. Marked osteoarthritis was present.

Blood examination on 29.7.41 showed Hb 28% (4.48), R.B.C. 1.05 millions per cu.mm., W.B.C. 3,000 per cu. mm. Group O.

11. On 31.7.41, she was given the cells from 1,000 ccs. Group O blood by Kimpton tube at a rapid rate.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	28%(3.86)	1.06	14%	3		122
After 15 mins	48%(6.62)	2.08	24%	3		130
1.8.41	53%(7.31)	2.18	25%	2		
2.8.41	55%(7.59)	2.16	24%			
3.8.41	55%(7.59)	2.08	24%			
5.8.41	52%(7.18)	2.06	24%			125
7.8.41	54%(7.45)	2.15	25%	2.5		



Reactions - Nil

Transfusion. Case.

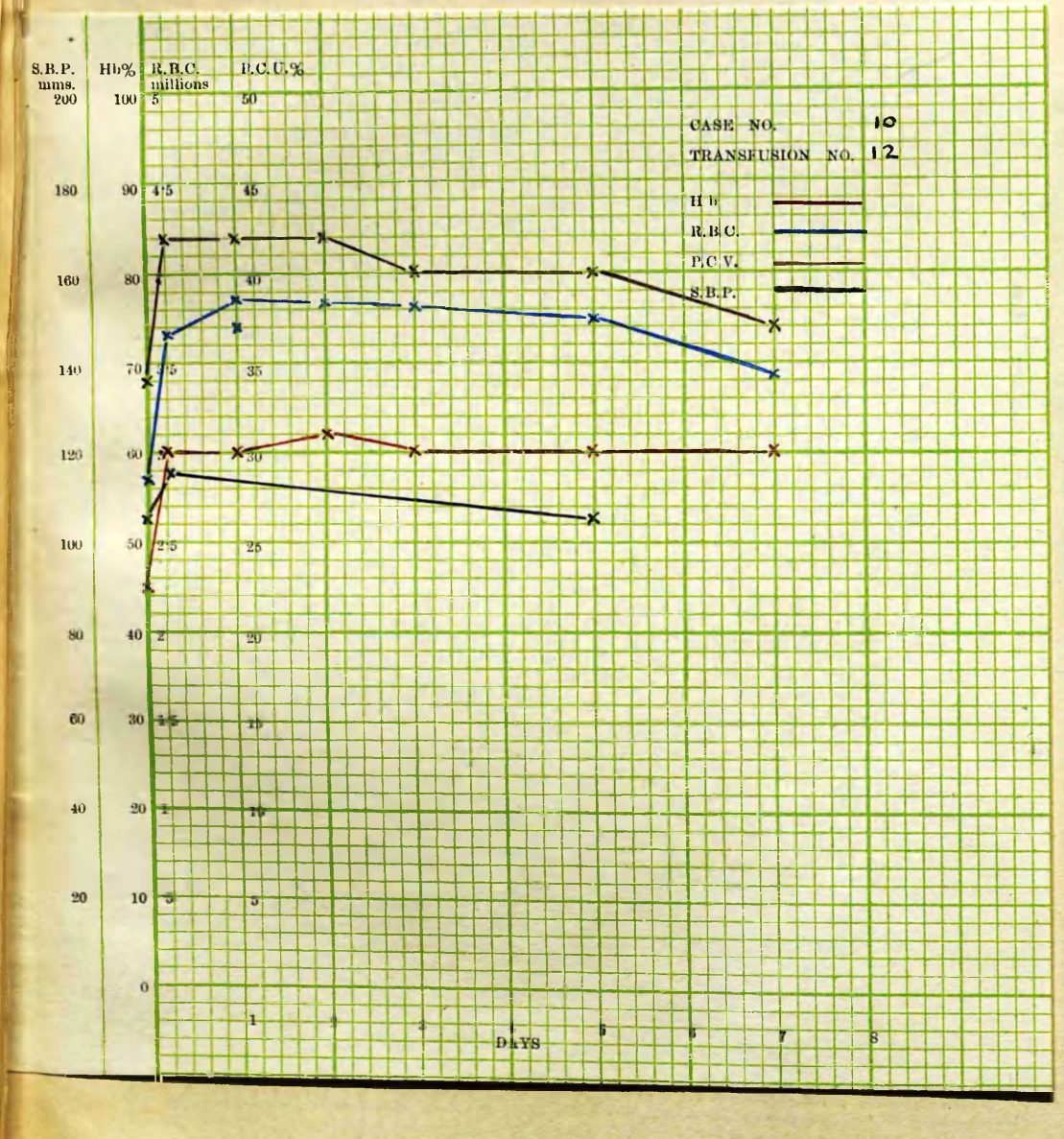
10. Mrs. A.C. (32 years). Admitted 15.9.41.

This woman complained of abdominal swelling and loss of weight for three months. There was amenorrhoea, nausea and vomiting, diarrhoea and melaena. A large hard mass was palpable in the epigastrium, movable and not tender. This was a carcinoma of the colon and secondaries were present in the liver.

The blood count was Hb 40%, R.B.C. 2.8 millions per cu.mm., W.B.C. 4,300 per cu.mm., Group A.

12. On 19.9.41., the cells from 950 ccs. Group O blood were given by Kimpton tube at a rapid rate.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	45% (7.2)	2.85	34%	3.8	.48	115
After 15 mins.	60% (9.6)	3.68	42%	4.6	1.28	118
20.9.41	60% (9.6)	3.87	42%			
21.9.41	62% (9.92)	3.84	42%	6.0		
22.9.41	60% (9.6)	3.82	40%			
24.9.41	60% (9.6)	3.74	40%			115
26.9.41	60% (9.6)	3.42	37%		.98	



Reactions - Nil

Transfusion. Case.

11 Mrs. C.C. (50 years). Admitted 15.9.41.

This patient had dyspnoea and weakness for three weeks before admission. Bleeding from the gums was troublesome and purpuric spots were present. There was sickness and loss of weight.

The heart was enlarged to the right and there was a V.S. murmur at the apex. B.P.100/65. The liver and spleen were enlarged.

Blood examination showed Hb 30% (4.8) R.B.C. 1.72 millions per cu. mm. W.B.C. 2,400 per cu. mm. Group AB.

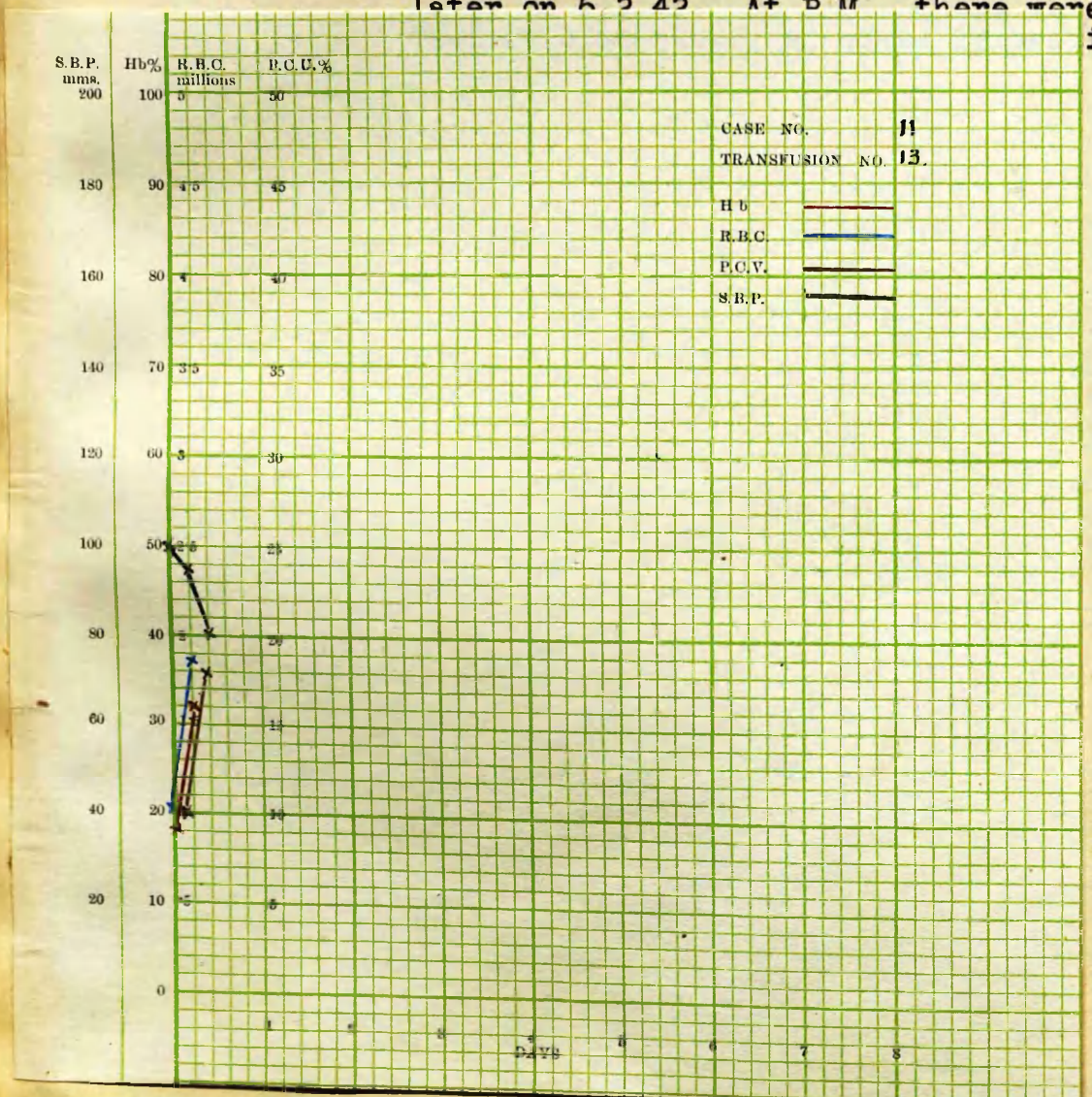
Films showed a hypochromic anaemia. The bleeding time was greatly increased and the clotting time was 12½ mins.

On 5.2.42, the patient was comatose with bleeding from the gums, into the skin and from the nose. Blood count was now Hb 20% (3.2) R.B.C. 1 milliom per cu. mm., W.B.C. 1,800 per cu.mm. Differential count - Polymorphs 4%, lymphocytes 96%.

13. On 6.2.42, the cells from 900 ccs. Group O blood were given by the drip apparatus.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	18% (2.88)	.98	10%		.21	100
After 15 mins.	32% (5.12)	1.86	18%		1.07	95

The patient continued to bleed and died later on 6.2.42. At P.M. there were found the ic leukaemia.



Reactions - Nil.

ransfusion. Case.

11 Mrs. C.C. (50 years). Admitted 15.9.41.

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The heart was enlarged to the right and there was a V.S. murmur at the apex. B.P.100/65. The liver and spleen were enlarged.

Blood examination showed Hb 30% (4.8) R.B.C. 1.72 millions per cu. mm. W.B.C. 2,400 per cu. mm. Group AB.
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fter 15 mins.	32% (5.12)	1.86	18%		1.07	95

The patient continued to bleed and died later on 6.2.42. At P.M., there were found the typical appearances of acute lymphatic leukaemia.

etions - Nil.

Transfusion. Case.

12. Mrs. M.D. (59 years). Admitted 31.7.42.

This patient suffered from recurrent attacks of haematemesis for several months. There was no abdominal pain but marked jaundice and pallor. She was weak and listless.

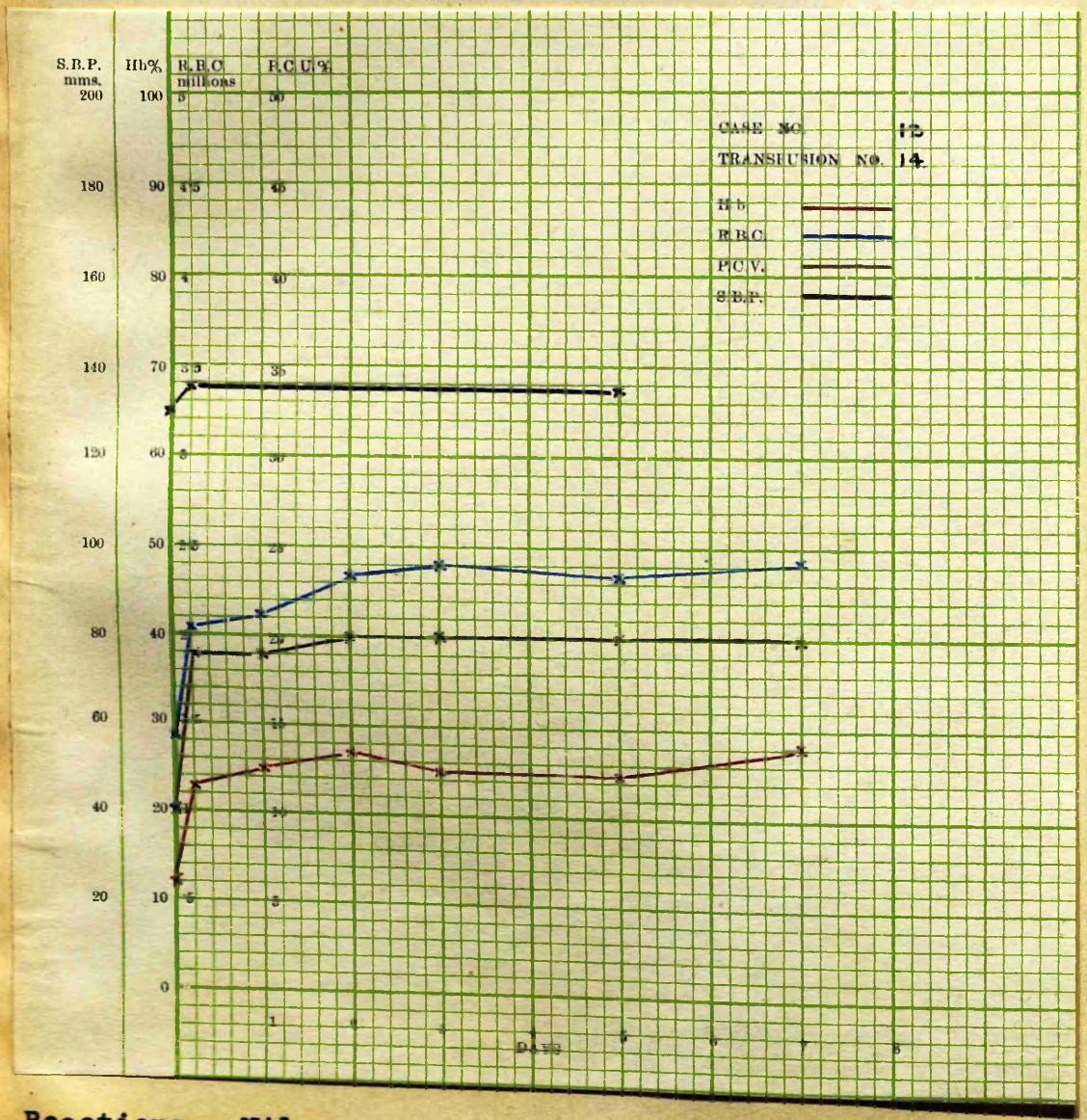
A palpable mass was present in the right hypochondrium with enlargement of the liver and spleen. Ascites was marked. There was some weakness of the heart sounds with a V.S. murmur at all areas and oedema. B.P. 130/90.

Blood examination showed Hb 12% (1.92) R.B.C. 1.42 millions per cu. mm. W.B.C. 3,400 per cu.mm. Group A.

She was suffering from a carcinoma of the colon with secondary deposits in her liver.

14. On 21.8.42, she was given the cells from 750 ccs. Group A blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	L.D.B.	A.	S.B.P.
Before	12% (1.92)	1.42	10%			130
After 15 mins.	23% (3.68)	2.04	18%			135
22.8.42	25% (4.0)	2.11	18%			
23.8.42	27% (4.32)	2.34	20%			
24.8.42	25% (4.0)	2.40	20%			
26.8.42	25% (4.0)	2.36	20%			135
28.8.42	28% (4.48)	2.42	20%			



Reactions - Nil.

Transfusion. Case.

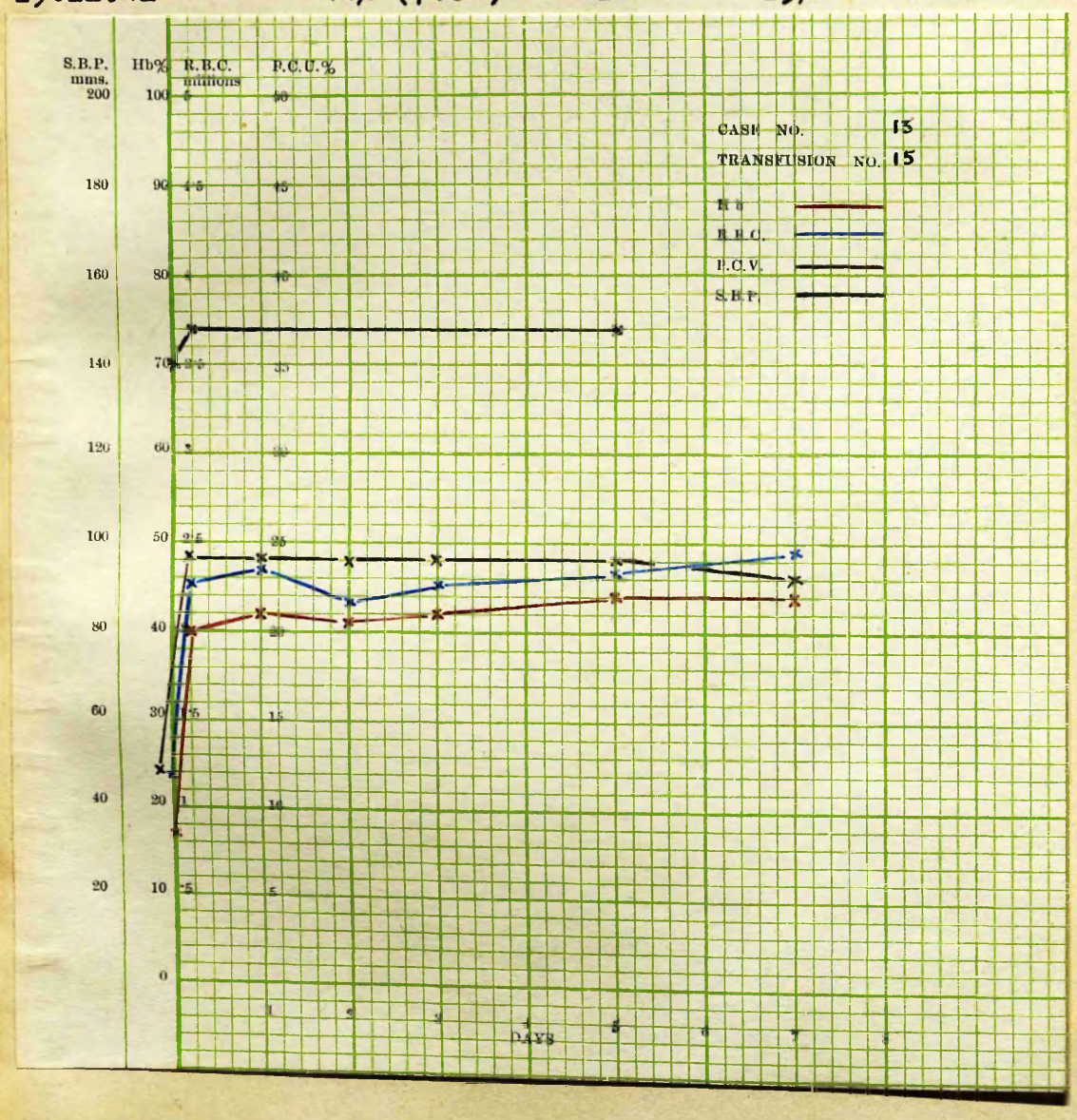
13. Mrs. M.D. (37 Years). Admitted 21.11.41.

This patient had had period attacks of epistaxis for fifteen years. She had had in all thirteen transfusions, snake venom, cautery, radium splenectomy, and many other forms of treatment. There was little abnormal to be made out on physical examination, and heart and lungs were normal.

Blood examination showed Hb 17% (2.72), R.B.C. 1.17 millions per cu. mm., W.B.C. 9,000 per cu. mm. Group O. B.P. 138/65.

15. On 22.11.41 the cells from 950 c.c. Group O blood were given at a rapid rate.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	17% (2.72)	1.17	12%	2.6		140
After 15 mins.	40% (6.4)	2.27	24%	2.8		148
23.11.41	42% (6.72)	2.34	24%			
24.11.41.	41% (6.56)	2.17	24%			
25.11.41	42% (6.72)	2.28	24%			
27.11.41	44% (7.04)	2.32	24%			148
29.11.41	44% (7.04)	2.46	23%	2.6		



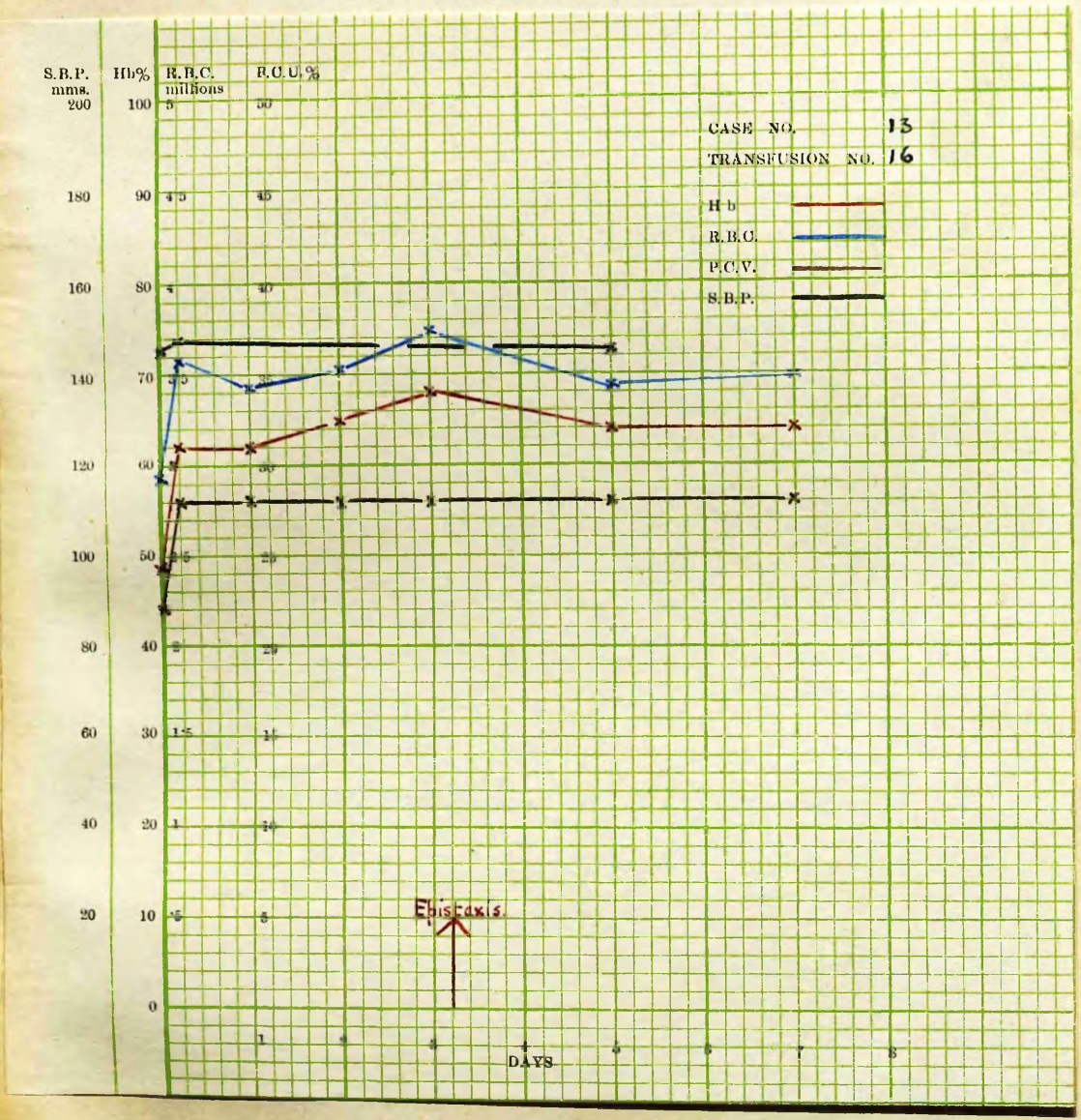
Reactions - Nil.

Transfusion. Case.

She progressed well with only occasional slight bleeding, which was easily controlled.

16. On 14.12.41. she was given the cells from 900 c.c. Group O blood by a Kimpton Tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	49% (7.84)	2.93	22%			145
After 15 mins.	62% (9.92)	3.59	28%			148
15.12.41	62% (9.92)	3.42	28%			
16.12.41	65% (10.4)	3.52	28%			
17.12.41	* 68% (10.88)	3.73	28%			145
19.12.41.	64% (10.24)	3.49	28%			
21.12.41	64% (10.24)	3.45	28%			



Reactions - Nil. *On 17.12.41. she had a further moderate epistaxis, which explains the fall in blood count.

Transfusion. Case.

14. Mrs. A.D. (31 Years). Admitted 23.12.41.

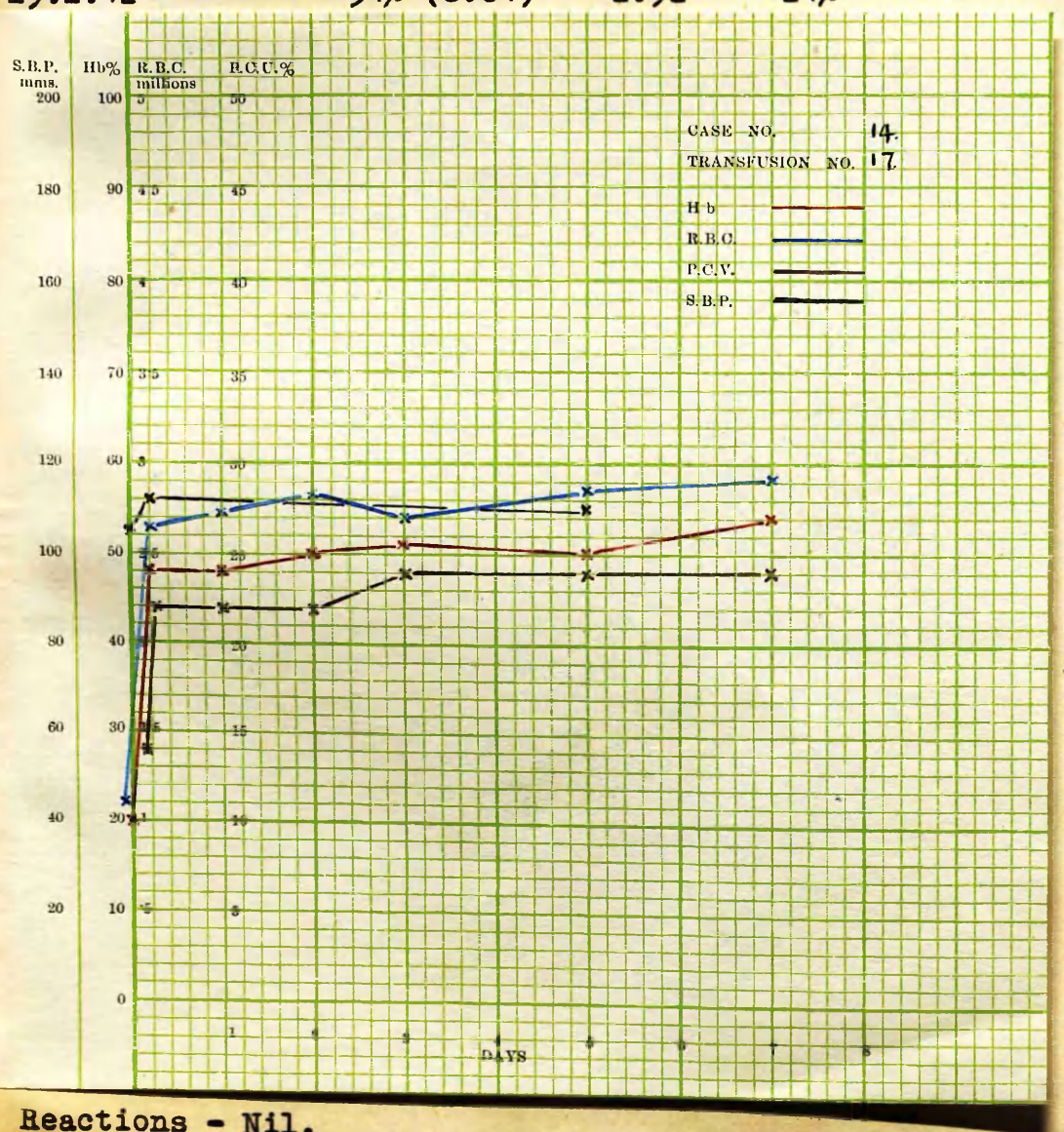
This patient had had intermittent attacks of acute colicy pain in the abdomen for two years. 1½ years before admission she had an Ovarian cyst removed without effect on the pain. Eight weeks before admission she had a full time normal child, and became weak, pale and listless. No abnormality was detected in the heart or lungs, beyond a V.S. murmur at the apex. B.P. 105/60.

On admission blood examination showed Hb 30% (4.8), R.B.C. 1.05 millions per cu.mm., W.B.C. 4,000 per cu. mm. Group B. Reticulocytes 1.2%.

By 11.1.42. blood count had fallen to Hb 21% (3.36), R.B.C. 1.05 millions per cu.mm., W.B.C. 6,600 per cu.mm.

17. On 12.1.42. she was given the cells from 1,400 c.c. Group O blood by the Kimpton Tube at a rapid rate.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	20% (3.2)	1.08	14%	2.6	.17	105
After 15 mins.	48% (7.68)	2.64	22%	3.0	1.70	112
13.1.42	48% (7.68)	2.72	22%			
14.1.42	50% (8)	2.82	22%			
15.1.42	51% (8.16)	2.70	24%			
17.1.42	50% (8)	2.84	24%	2.8	1.48	110
19.1.42	54% (8.64)	2.92	24%			

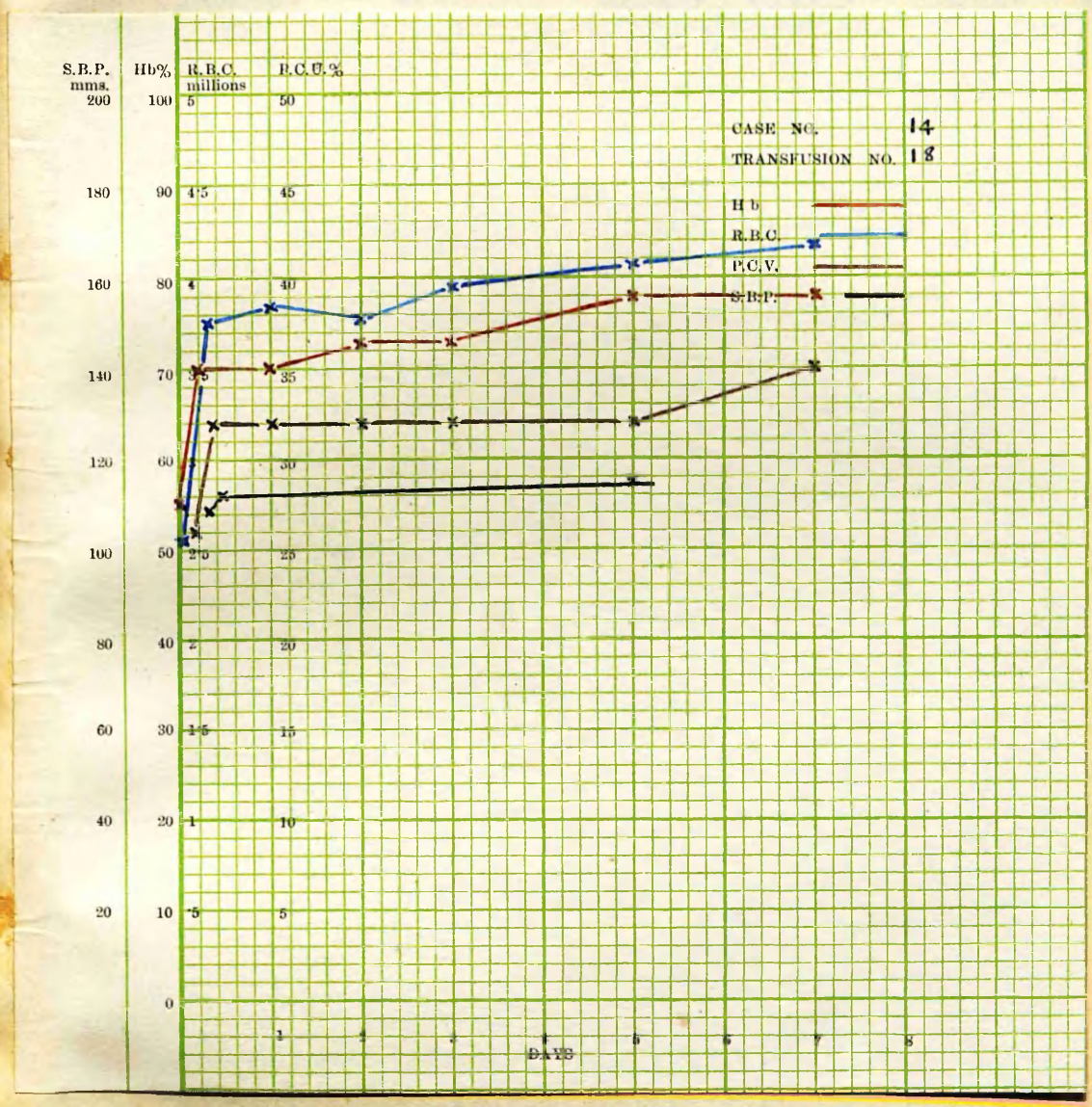


Reactions - Nil.

Transfusion. Case.

18. She maintained but did not much improve her condition and, on 15.2.42, she was given the cells from 1,000 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	55% (8.8)	2.53	26%		1.21	110
After 15 mins.	70% (11.2)	3.76	32%		2.30	112
17.2.42	70% (11.2)	3.04	32%			
18.2.42	73% (11.68)	3.79	32%			
19.2.42	73% (11.68)	3.96	32%			
21.2.42	78% (12.48)	4.08	32%			115
23.2.42	80% (12.8)	4.19	32%		2.24	



Reactions - Nil.

Transfusion. Case.

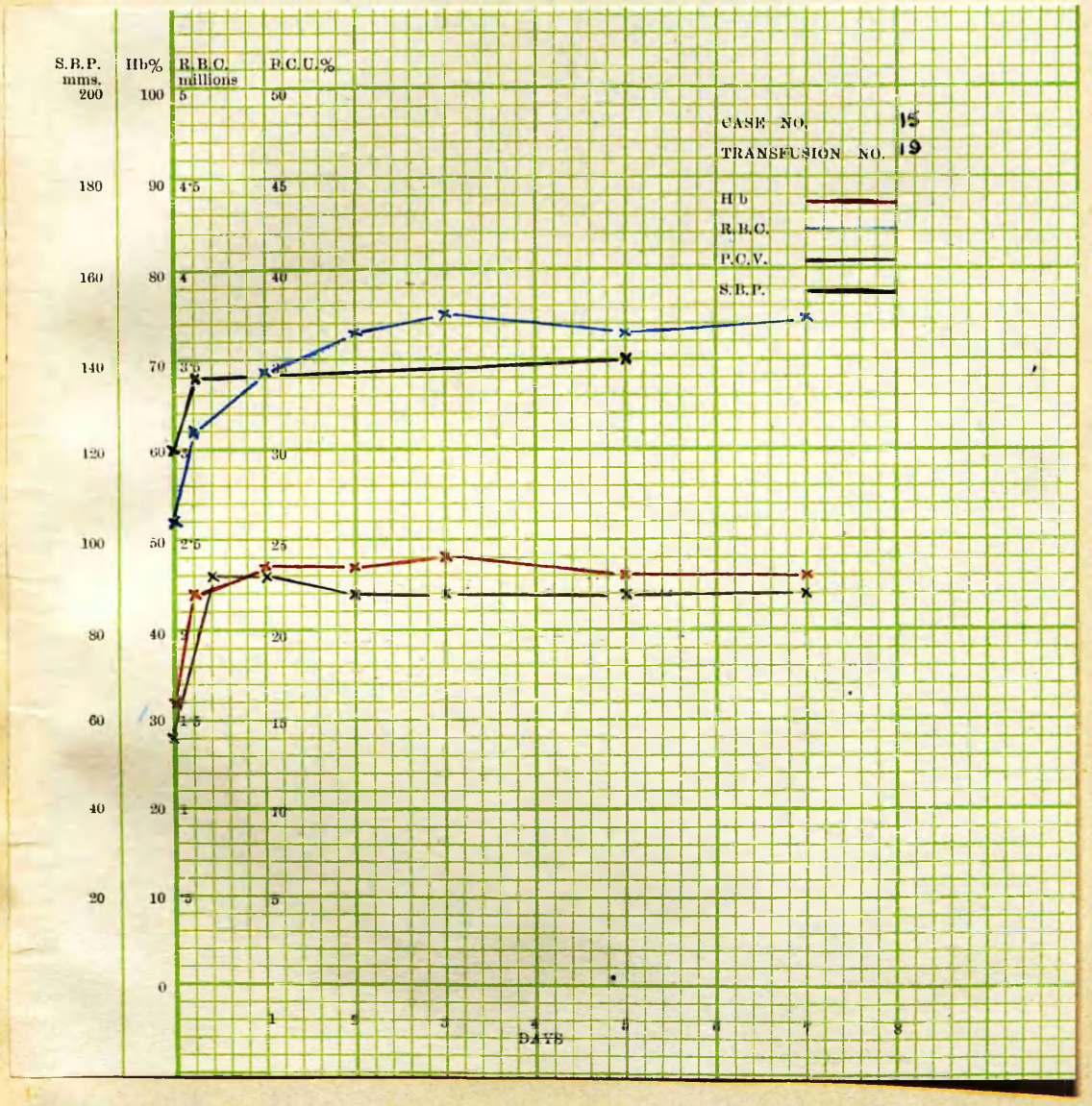
15. Mrs. E.D. (66 years). Admitted 15.7.42.

This patient suffered from distension of the abdomen and vomiting for three months. Anorexia and loss of weight were marked. A large mass was palpable in the epigastrium, and the liver was enlarged. X-ray showed a large carcinoma of the pyloric antrum.

On 3.8.42 a palliative posterior gastro-enterostomy was performed. The blood count after operation was Hb 33% (5.28), R.B.C. 2.6 millions per cu.mm. Group O.

19. On 4.8.42 she was given the cells from 750 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	32% (5.12)	2.6	14%			120
After 15 mins.	44% (7.04)	3.1	23%			128
5.8.42	47% (7.52)	3.42	23%			
6.8.42	47% (7.52)	3.65	22%			
7.8.42	48% (7.65)	3.75	22%			
9.8.42.	46% (7.36)	3.65	22%			130
11.8.42	46% (7.36)	3.72	22%			



Reactions - Nil.

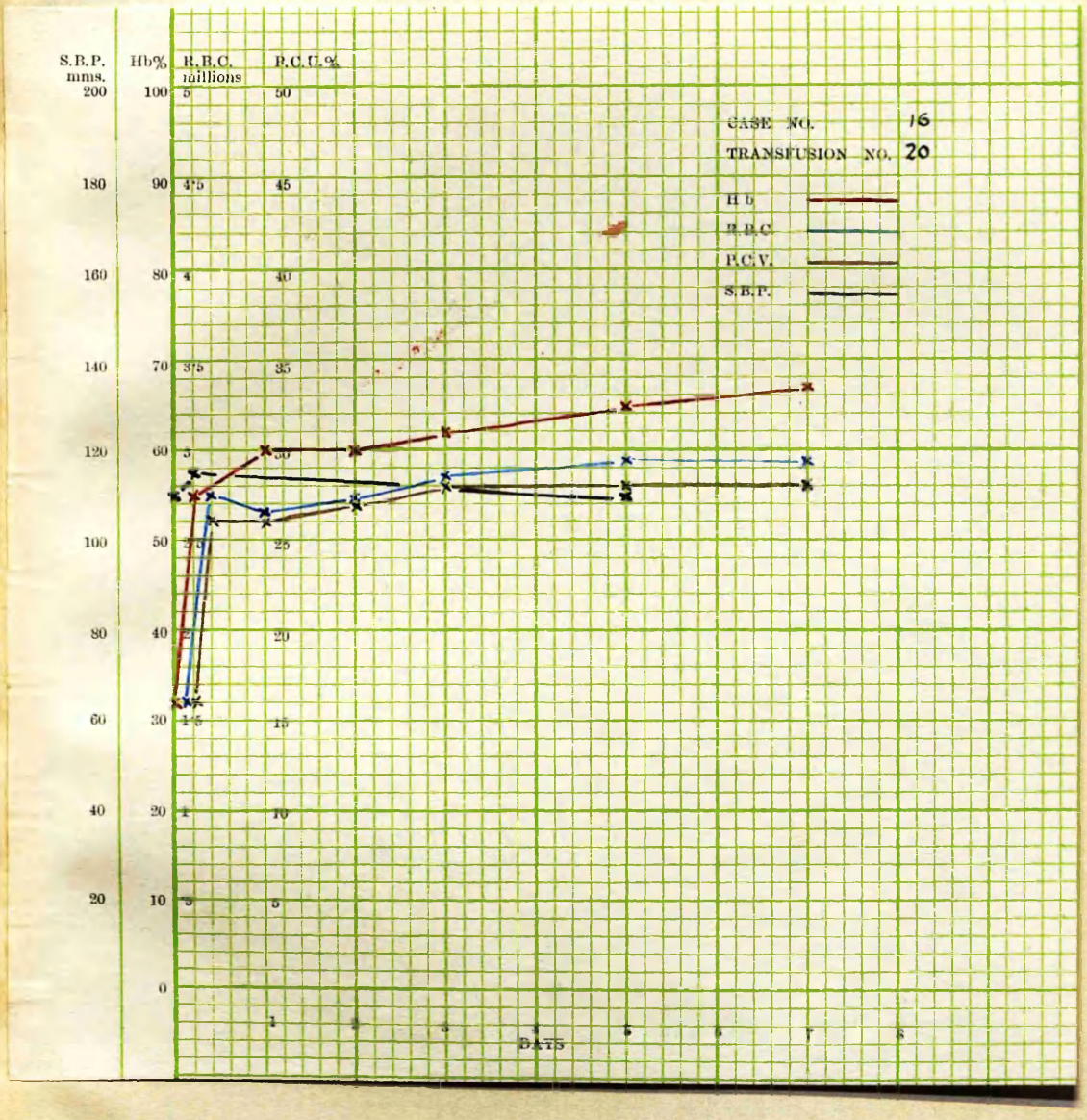
Transfusion. Case.

16. A.D. (11 Years). Admitted 28.8.41.

This boy had a double mastoiditis and conservative mastoidectomy performed on both sides. There was a considerable post-operative bleeding and the child became pale. Blood Group O.

20 On 12.9.41. the cells from 950 c.c. Group O blood were given by the Kimpton Tube.

Blood changes.	Hb	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	32% (5.12)	1.6	16%			110
After 15 mins.	55% (8.8)	2.74	26%			115
13.9.41	60% (9.6)	2.65	26%			
14.9.41	60% (9.6)	2.72	27%			
15.9.41	62% (9.92)	2.84	28%			
17.9.41.	65% (10.4)	2.94	28%			110
19.9.41	67% (10.72)	2.92	28%			



Reactions - Nil.

Transfusion. Case.

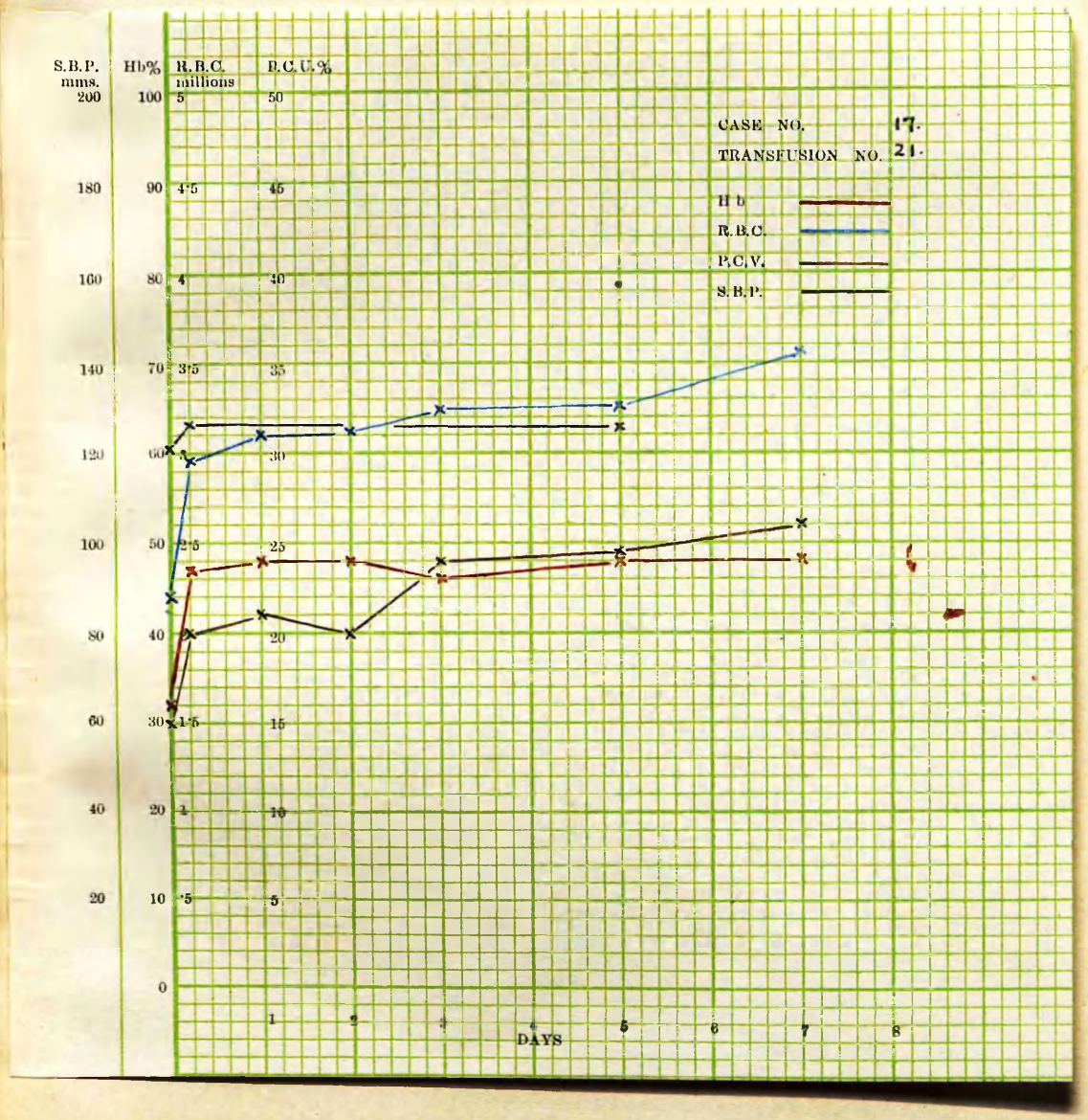
17. D.D. (38 Years). Admitted 23.9.41.

In 1931, this patient had an operation (? gastro-enterostomy) for ulcer of the stomach. He kept well for five years, but during the next few years had pain, vomiting and diarrhoea.

Blood examination showed Hb 35% (5.6), R.B.C. 2.3 millions per cu.mm. Group A.

21. On 29.9.41. he was given the cells from 900 c.c. Group O blood by a Kimpton Tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	32% (5.12)	2.2	15%	1.4	.73	120
After 15 mins.	47% (7.52)	2.96	20%	1.4	1.54	126
30.9.41.	48% (7.68)	3.10	22%			
1.10.41.	48% (7.68)	3.12	20%			
2.10.41.	46% (7.36)	3.23	24%			
4.10.41.	48% (7.68)	3.26	24%			125
6.10.41	48% (7.68)	3.54	26%	1.2	1.32	



Reactions - Nil.

Transfusion. Case. 18.

J.D. (14 Years). Admitted 27.8.41.

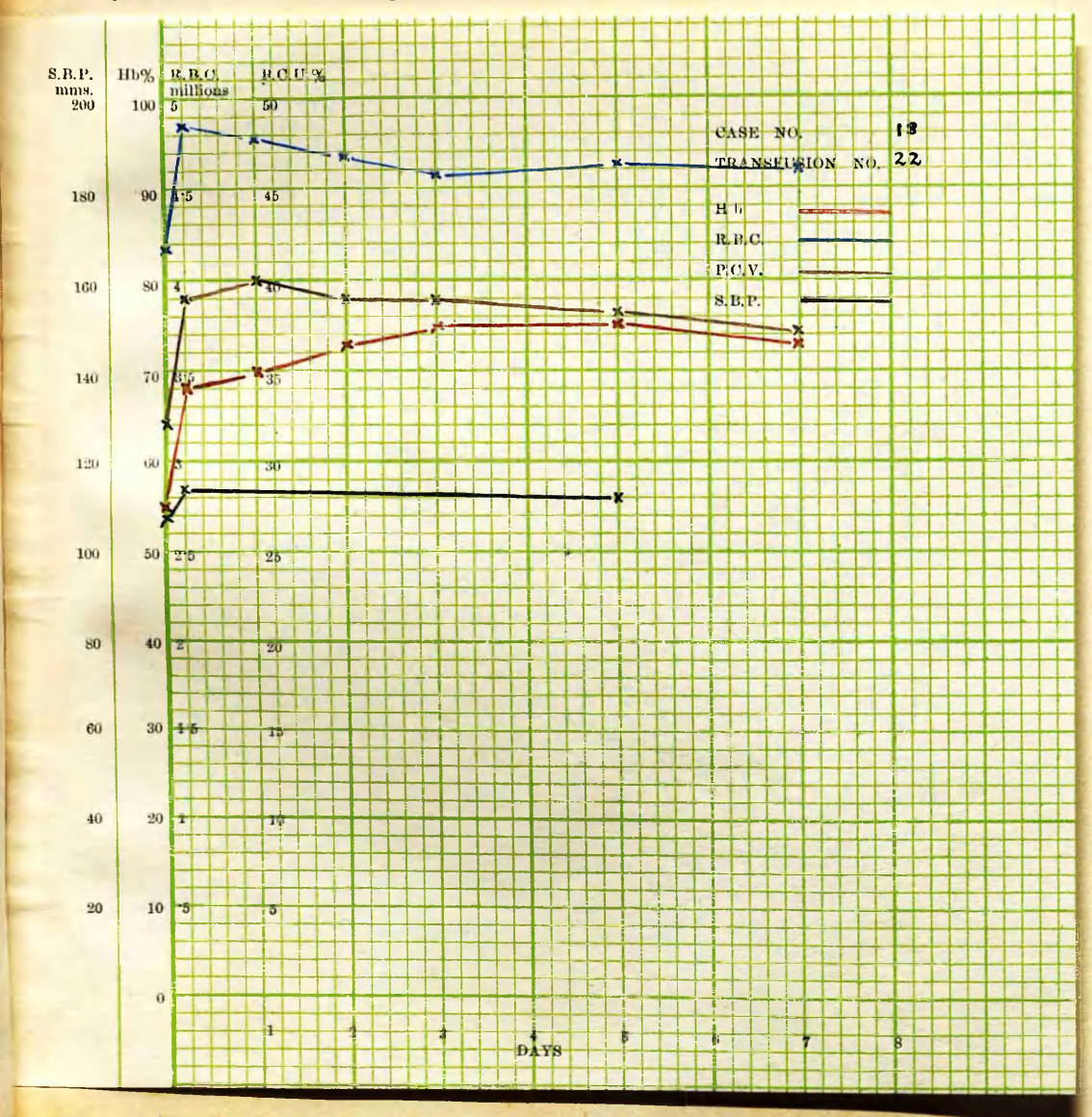
In February 1941, this boy was admitted complaining of weakness and coughing. He was diagnosed as lymphadenoma, and was treated with deep X-ray therapy. His blood count at that time was Hb 60%, R.B.C. 4.85 millions per cu.mm., W.B.C. 15,600 per cu.mm.

He improved and was dismissed. He required to be readmitted on account of diarrhoea and loss of weight. There were enlarged glands in both axillae and groins, and an increase in mediastinal dullness. A V.S. murmur was present at all cardiac areas.

Blood examination showed Hb 55% (8.8), R.B.C. 3.7 millions per cu.mm., W.B.C. 15,000 per cu.mm. Group A.

22. On 7.9.41. he was given the cells from 800 c.c. Group O blood by the Kimpton Tube at a rapid rate.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	55% (8.8)	4.18	32%	.2	.56	110
After 15 mins.	68% (10.88)	4.85	38%	.4	1.34	115
8.9.41.	70% (11.2)	4.79	39%			
9.9.41.	73% (11.68)	4.68	38%			
10.9.41.	75% (12.0)	4.57	38%			
12.9.41.	75% (12.0)	4.62	37%			
14.9.41.	73% (11.68)	4.60	36%	.2	1.15	112



Reactions - Nil.

Transfusion. Case.

19. Mrs. M.F. (21 Years). Admitted 11.9.41.

This woman was a patient in the Maternity Hospital, and was six months pregnant. She had been troubled since the onset of pregnancy with pallor, bruising, petechial haemorrhages and breathlessness.

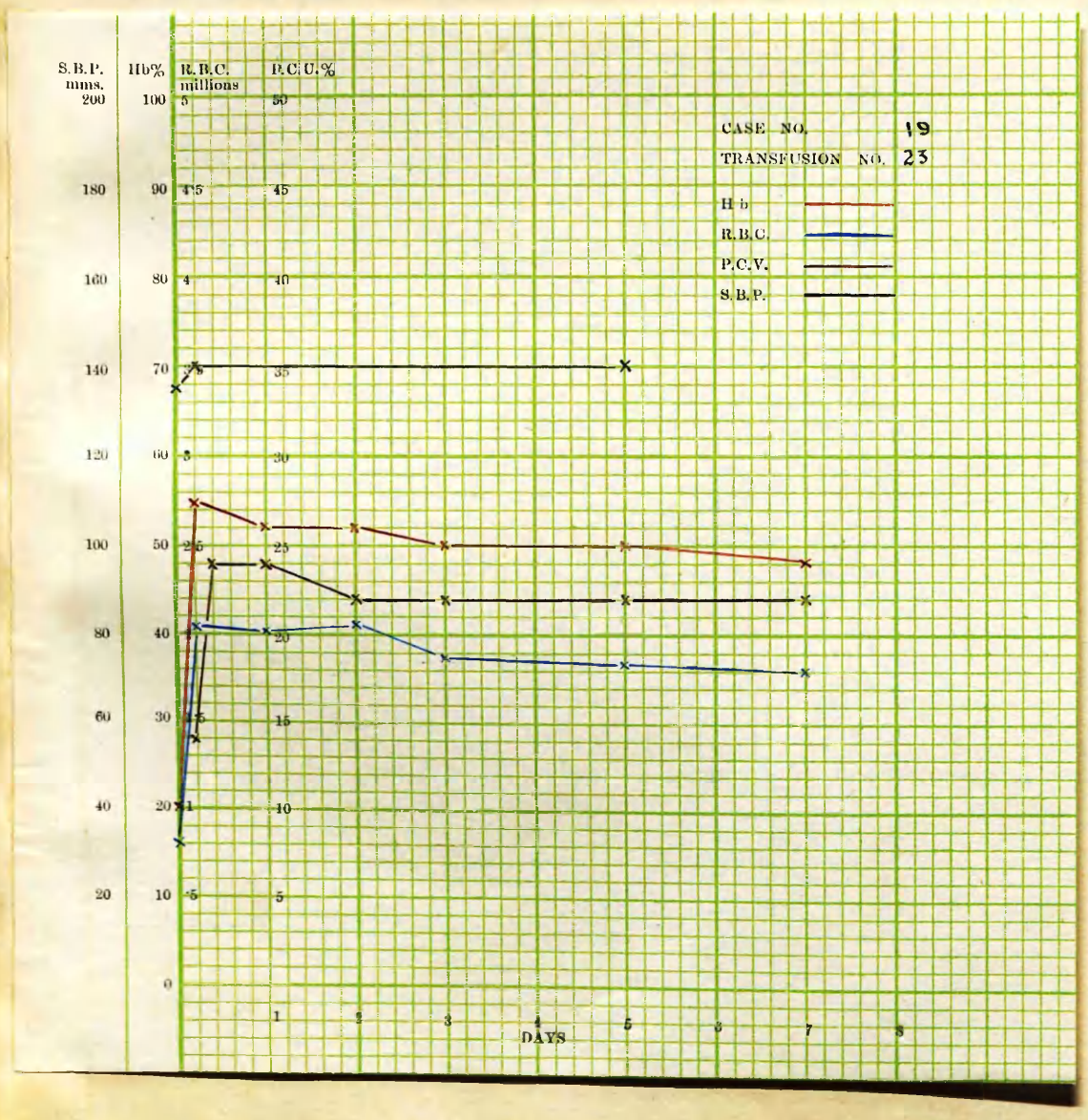
Her blood count on admission was Hb 22%, R.B.C. .94 millions per cu.mm. W.B.C. 3,600 per cu.mm. Group O.

During the following three months she had four fresh blood transfusions, haemoglobin rising about 10% per 500 c.c. of fresh blood.

She was delivered on 12.12.41. with intravenous drip transfusion in situ. Several other transfusions were also given.

23. On 18.12.41. she was given the cells from 1,400 c.c. Group O blood by the Kimpton Tube at a rapid rate.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	20% (3.2)	.8	14%			135
After 15 mins.	55% (8.8)	2.04	24%			140
19.12.41.	52% (8.32)	2.01	24%			
20.12.41	52% (8.32)	2.06	22%			
21.12.41	50% (8.0)	1.88	22%			
23.12.41	50% (8.0)	1.84	22%			140
25.12.41	48% (7.68)	1.80	22%			



Reactions - Nil.

Transfusion. Case.

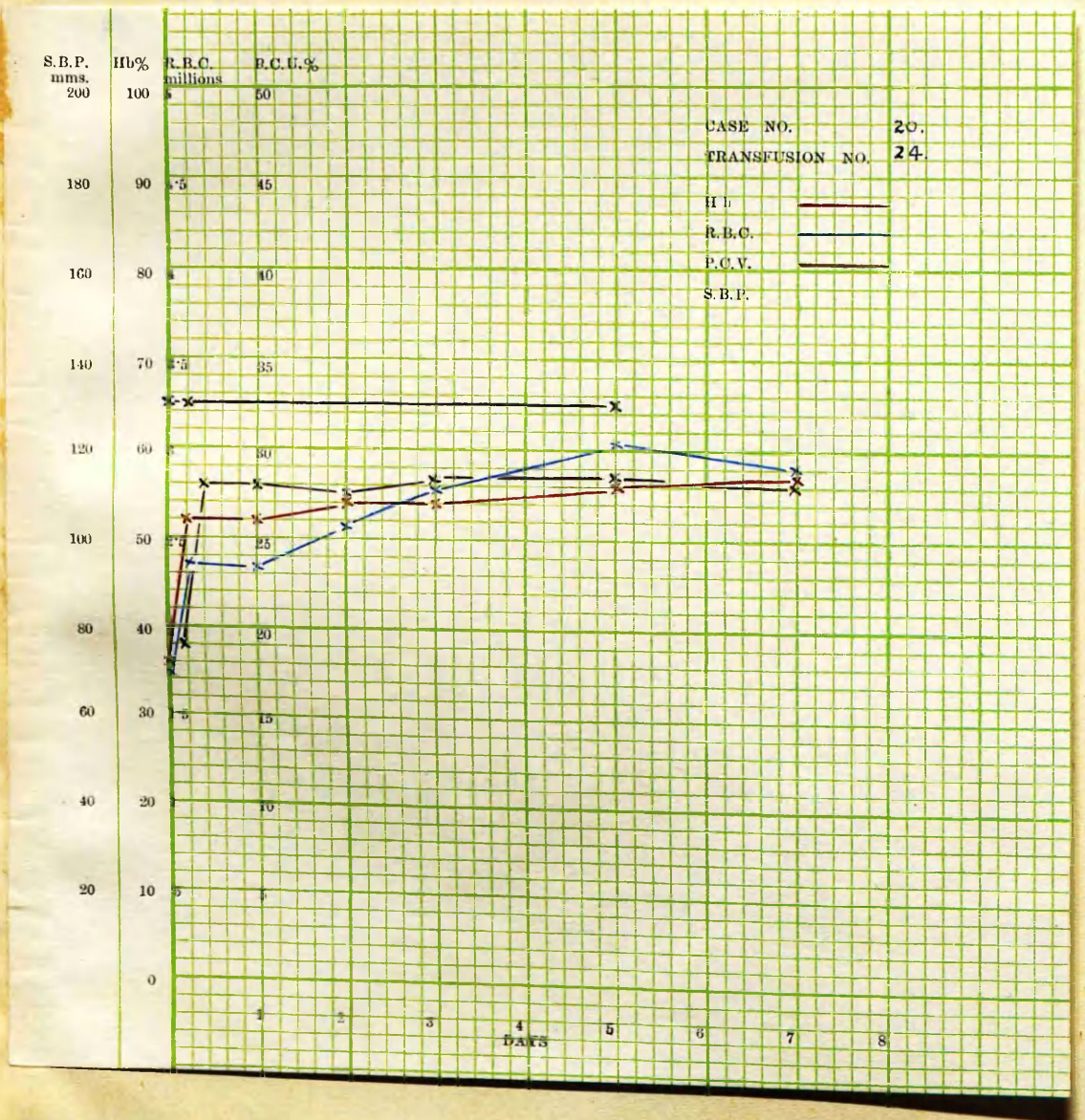
20. Miss D.G. (32 Years). Admitted 16.3.42

This girl complained of lassitude and malaise of one year's duration. She became easily exhausted and palpitation was frequently present. She had marked pallor and tachycardia. The heart sounds were soft, and a V.S. murmur was present at all areas. B.P. 128/78.

Blood examination showed Hb 50%, R.B.C. 1.7 millions per cu. mm., W.B.C. 2,800per cu.mm. Group O. She had several epistaxes, and the count fell. Sternal puncture showed very slight red cell regeneration.

24. On 7.5.42. she was given the cells from 900 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	36% (5.76)	1.75	18%	2.4		130
After 15 mins.	52% (8.32)	2.39	28%	2.4		130
8.5.42.	52% (8.32)	2.36	28%			
9.5.42.	54% (8,64	2.57	27%			
10.5.42.	56% (8.96)	2.78	28%			
12.5.42.	56% (8.96)	3.02	28%			130
14.5.42.	57% (9.12)	2.89	28%	2.0		



Reactions - Nil.

Transfusion. Case.

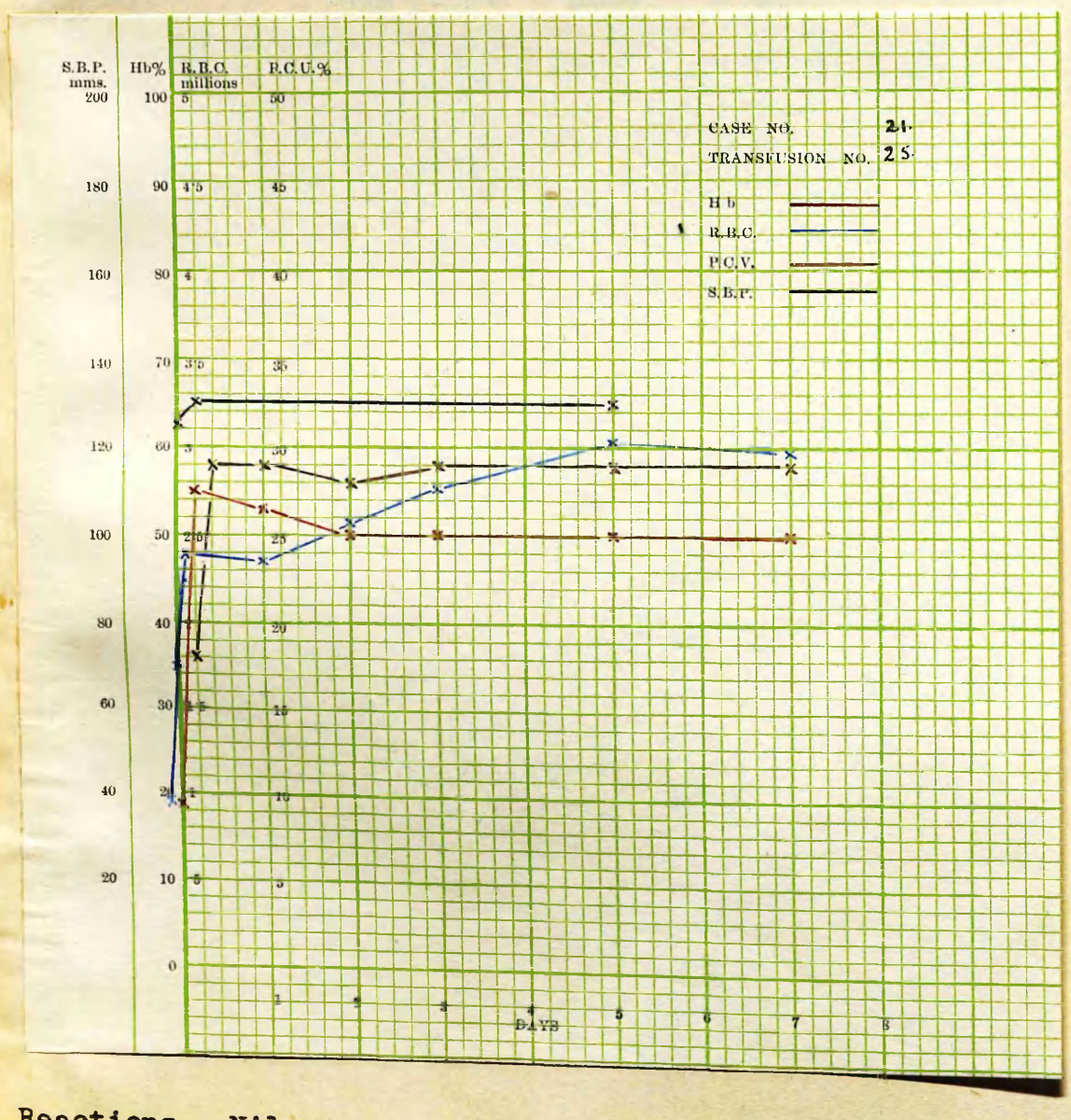
21. Mrs. M.G. (38 Years). Admitted 7.8.41.

This patient complained of weakness for one year with loss of weight and collapses. She had some oedema with poor heart sounds, and a V.S. murmur at all areas. B.P. 125/55. There was some albuminuria with casts of all types. The blood urea was 71.4 mgms. per 100 c.c.

The blood count on 7.8.41 was Hb 22% R.B.C. .85 millions per cu.mm., W.B.C. 1,800 per cu.mm. Reticulocytes 1%. Poikilocytosis and anisocytosis were marked. Group A.

25. On 13.8.41 she was given the cells from 1,400 c.c. Group O blood by the Kimpton Tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	19% (2.62)	.90	8%	2	.10	125
After 15 mins.	55% (7.59)	2.23	24%	2	1.13	130
14.8.41	53% (7.31)	2.03	24%			
15.8.41	50% (6.9)	2.07	23%			
16.8.41	50% (6.9)	2.19	24%			
18.8.41	50% (6.9)	2.15	24%			130
20.8.41	50% (6.9)	2.01	23%	2	.97	



Reactions - Nil.

Transfusion. Case.

22. Mrs. M.G. (54 Years). Admitted 5.8.42

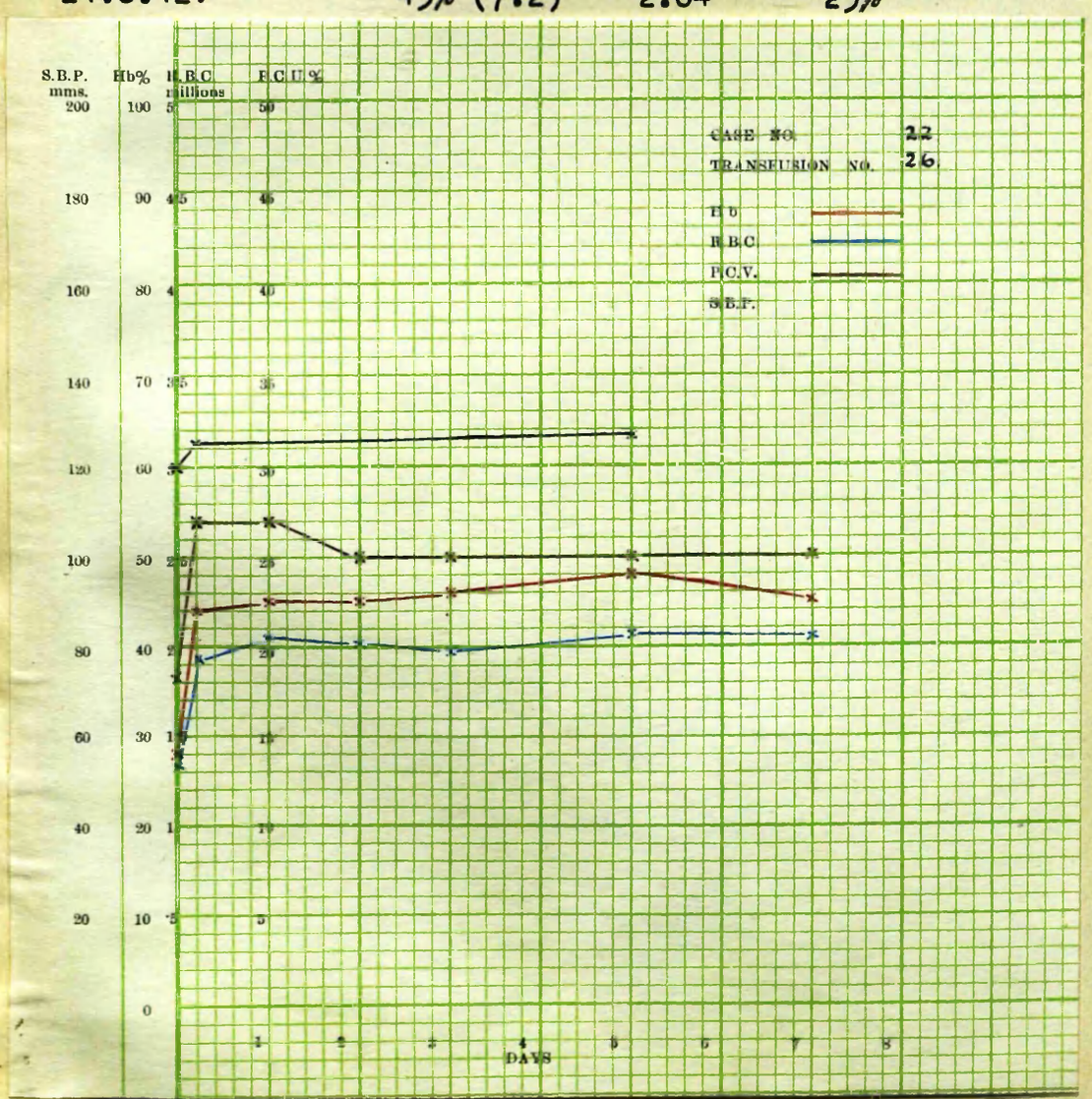
This patient had fullness in the epigastrium with occasional pain there for eight months. There was loss of weight with listlessness, breathlessness and jaundice. Anorexia was present, but no vomiting. Flatulence was noted.

There was discomfort on palpation of the upper abdomen, but no organ or mass was palpable. The pulse was regular, but of poor quality, and arterio-sclerosis was marked. B.P. 100/60. There was a V.S. murmur at all areas.

On 14.8.42. she had a cholecystostomy when several stones were removed from her gall bladder, and a chronic cholecystitis was discovered. The blood count after operation was Hb 30% (4.8), R.B.C. 1.36 millions per cu. mm. Group O.

26. On 17.8.42. she was given the cells from 700 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	28% (4.48)	1.36	18%			120
After 15 mins.	44% (7.04)	1.94	27%			125
18.8.42.	45% (7.2)	2.04	27%			
19.8.42.	45% (7.2)	2.01	25%			
20.8.42	46% (7.36)	1.98	25%			
22.8.42.	48% (7.68)	2.07	25%			128
24.8.42.	45% (7.2)	2.04	25%			



Reactions - Nil.

Transfusion. Case.

23. D.G. (50 Years). Admitted 16.2.42.

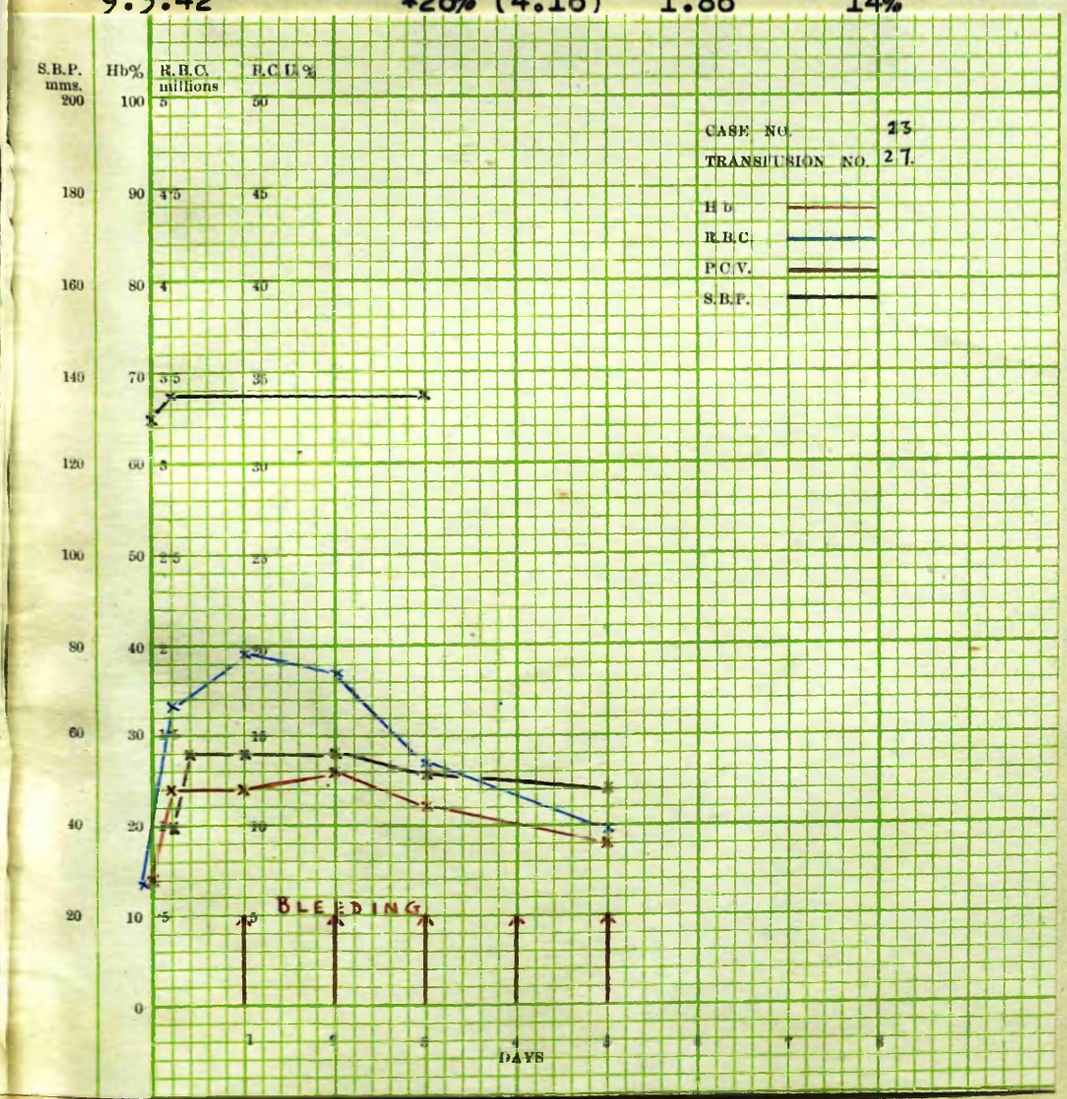
This man had weakness of one year's duration. There were haematemeses, bleeding from throat and ear, and purpuric spots on the skin. Pallor was marked and a V.S. murmur was present at the apex. Hess's test was markedly positive. Nothing abnormal was discovered in abdomen, chest or central nervous system.

On 20.2.42 blood examination showed Hb 30% (4.8), R.B.C. 1.6 millions per cu.mm., W.B.C. 7,000 per cu. mm. Platelets 300,000 per cu.mm. Bleeding time 20 minutes. Clotting time 5½ minutes. Group O.

Bleeding continued and on 26.2.42 the count had fallen to Hb 20% (3.2), R.B.C. 12 millions per cu. mm., W.B.C. 2,400 per cu.mm. One pint of fresh whole blood was given on 2.3.42. This raised his blood count by about 5% haemoglobin, and R.B.C. .15 millions per cu.mm.

27. His blood count continued to fall and on 7.3.42. he was given the cells from 1,000 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	D.B.P.
Before	14% (2.24)	.69	10%			130
After 15 mins.	24% (3.84)	1.68	14%			135
8.3.42	*24% (3.84)	1.96	14%			
9.3.42	*26% (4.16)	1.86	14%			155



Reactions - Nil. *Bleeding.

This is not a good case on which to base observations, as bleeding continued throughout. The patient eventually died of purpura haemorrhagica.

Transfusion. Case.

23. D.G. (50 Years). Admitted 16.2.42.

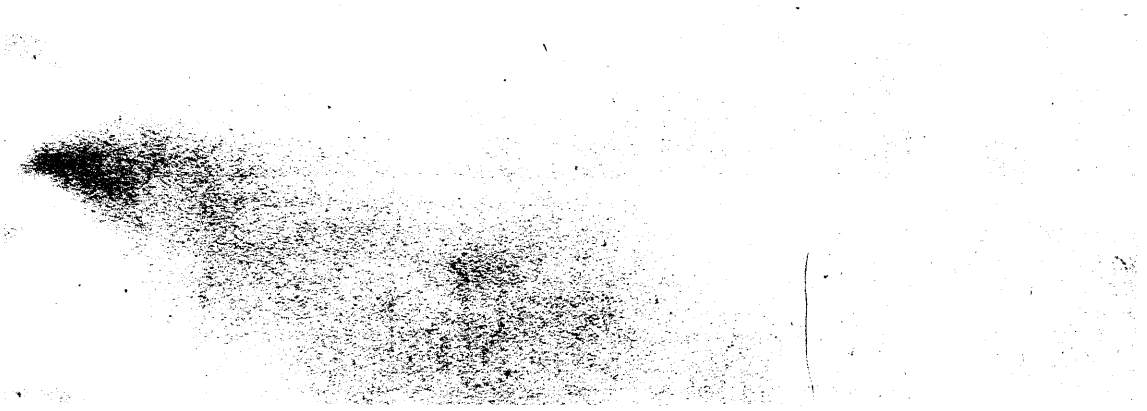
This man had weakness of one year's duration. There were haematemeses, bleeding from throat and ear, and purpuric spots on the skin. Pallor was marked and a V.S. murmur was present at the apex. Hess's test was markedly positive. Nothing abnormal was discovered in abdomen, chest or central nervous system.

On 20.2.42 blood examination showed Hb 30% (4.8), R.B.C. 1.6 millions per cu.mm., W.B.C. 7,000 per cu. mm. Platelets 300,000 per cu.mm. Bleeding time 20 minutes. Clotting time 5½ minutes. Group O.

Bleeding continued and on 26.2.42 the count had fallen to Hb 20% (3.2), R.B.C. 12 millions per cu. mm., W.B.C. 2,400 per cu.mm. One pint of fresh whole blood was given on 2.3.42. This raised his blood count by about 5% haemoglobin, and R.B.C. .15 millions per cu.mm.

27. His blood count continued to fall and on 7.3.42. he was given the cells from 1,000 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	D.B.P.
Before	14% (2.24)	.69	10%			130
After 15 mins.	24% (3.84)	1.68	14%			135
8.3.42	*24% (3.84)	1.96	14%			
9.3.42	*26% (4.16)	1.86	14%			
10.3.42.	*22% (3.52)	1.35	13%			155
12.3.42.	*18% (2.88)	.98	12%			



Reactions - Nil. *Bleeding.

This is not a good case on which to base observations, as bleeding continued throughout. The patient eventually died of purpura haemorrhagica.

Transfusion. Case.

24. W.G. (19 Years). Admitted 3.11.41.

This boy had lassitude and diarrhoea for four weeks before admission with greenish-black offensive stools. There was marked emaciation and pallor with a V.S. murmur at all areas. B.P. 95/65.

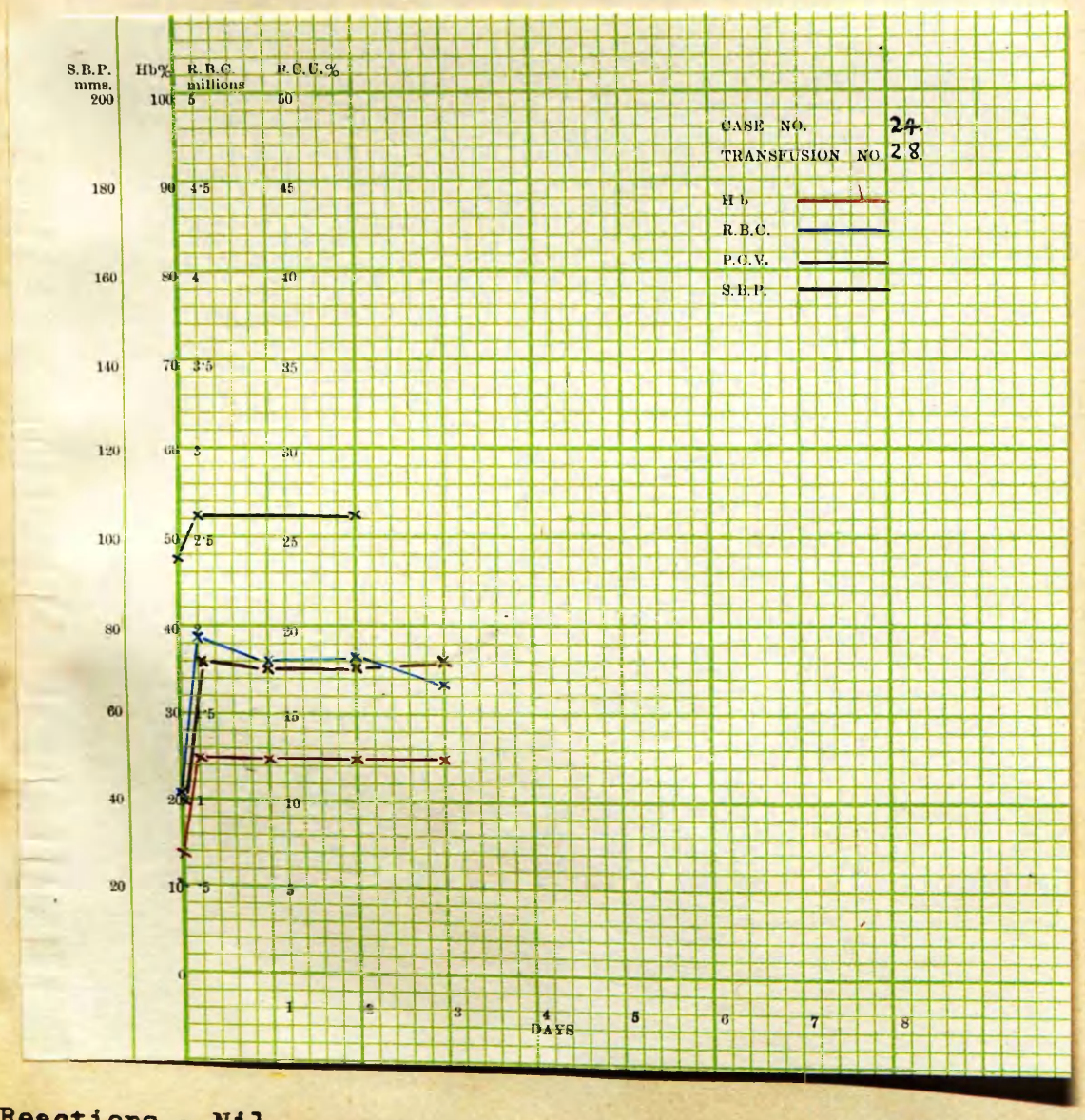
The muscles were very poor in tone, and biochemical examination of the blood showed a gross vitamin C deficiency.

Blood examination showed Hb 15% (2.4), R.B.C. 1.06 millions per cu.mm., W.B.C. 1,200 per cu.mm. Group A.

28. On 4.11.41 he was given the cells from 900 c.c. Group O blood by a Kimpton Tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	14% (2.24)	1.02	10%			95
After 15 mins.	25% (4)	1.94	18%			105
5.11.41.	25% (4)	1.80	18%			
6.11.41.	25% (4)	1.82	18%			
7.11.41	25% (4)	1.68	18%			105

See Transfusion 29.

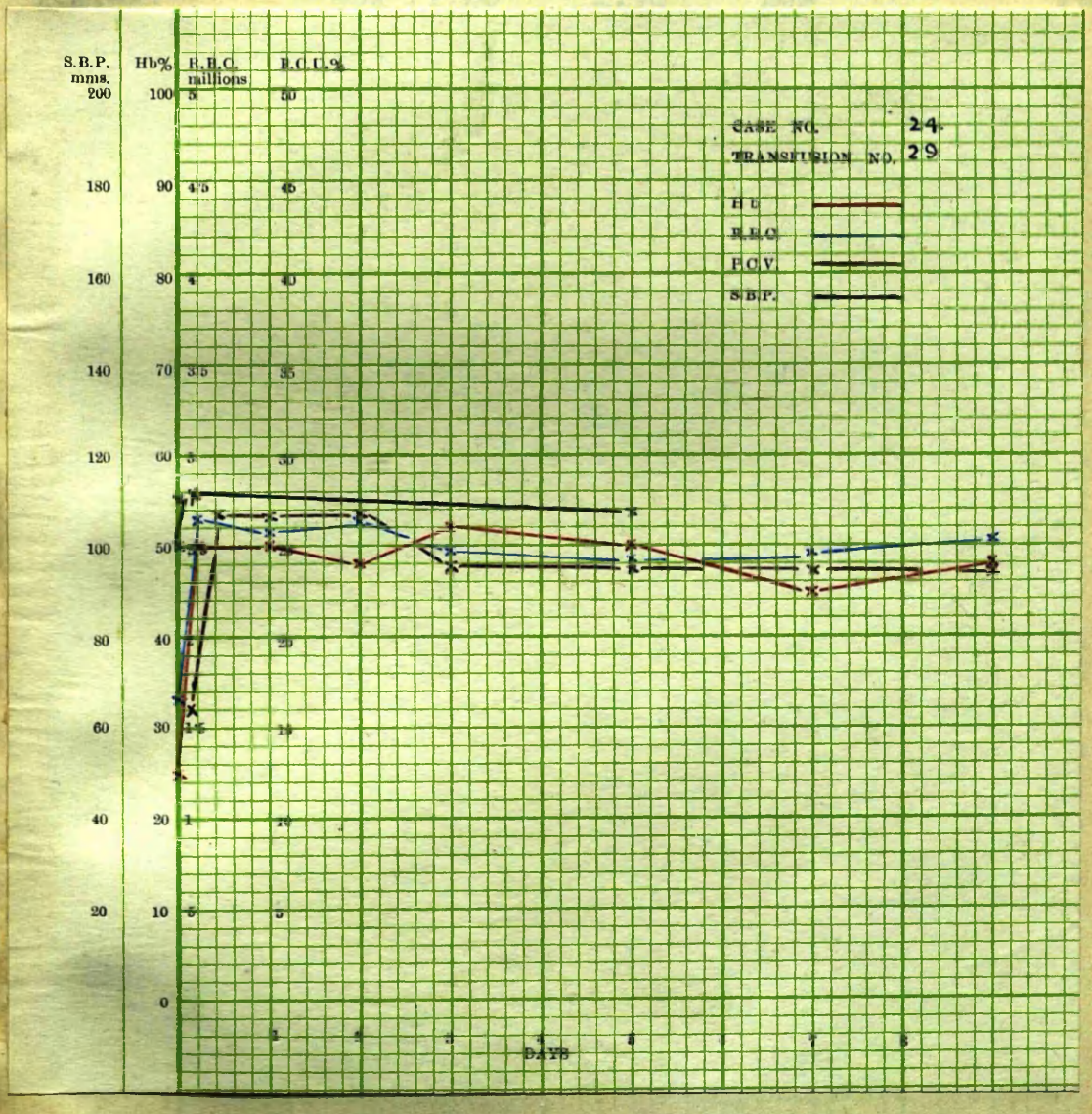


Reactions - Nil.

Transfusion. Case.

29. On 8.11.41, he was given the cells from 1,400 c.c. Group O blood by a Kimpton Tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	25% (4)	1.64	16%		.17	100
After 15 mins.	50% (8)	2.64	26%		1.03	110
9.11.41.	50% (8)	2.56	26%			
10.11.41.	48% (7.68)	2.62	26%			
11.11.41.	52% (8.32)	2.48	24%			
14.11.41	50% (8)	2.42	24%			
15.11.41.	45% (7.2)	2.47	24%			105
17.11.41.	48% (7.68)	2.52	24%		1.10	



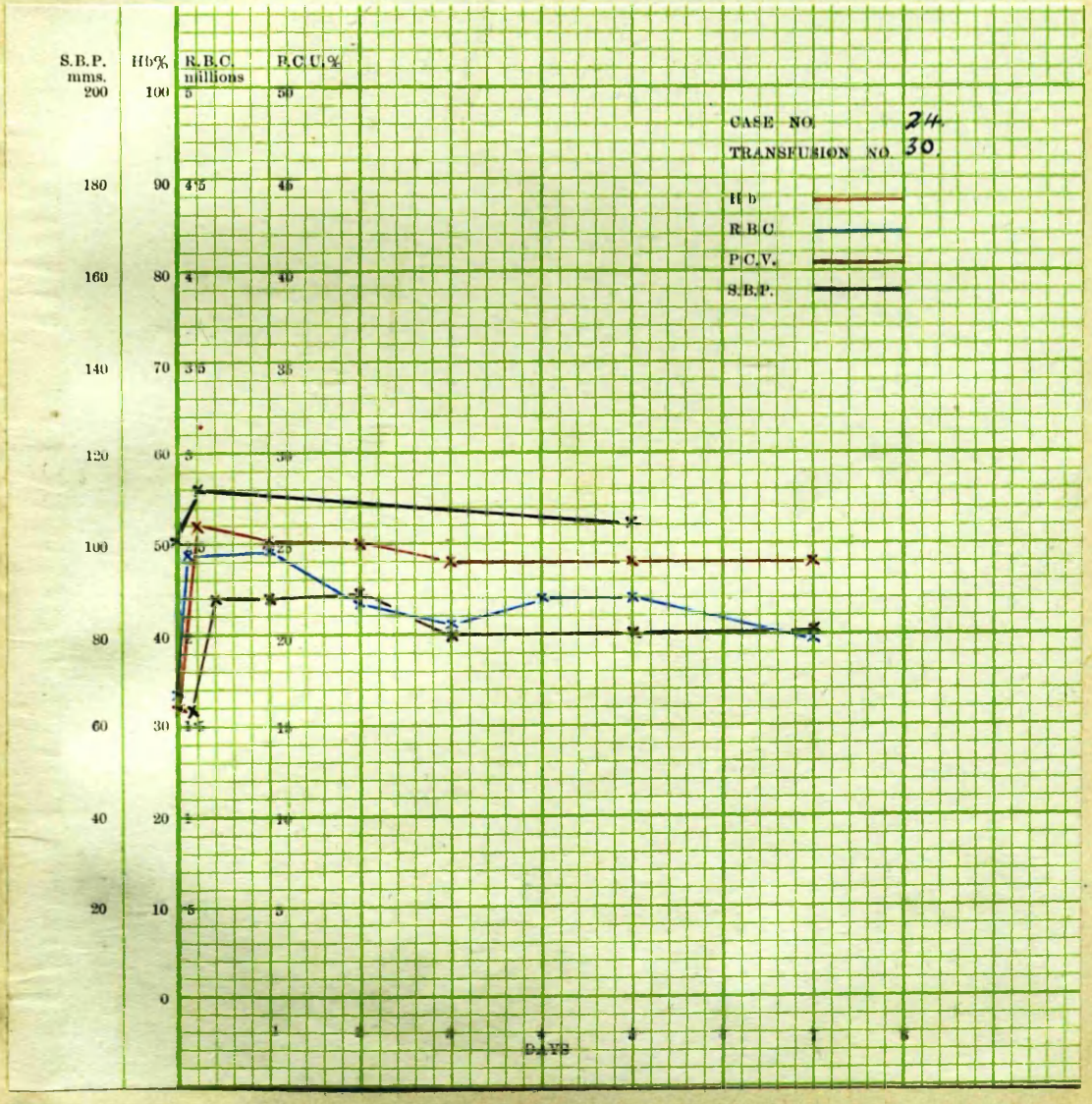
Reactions - Nil.

Transfusion. Case.

He gradually lost way, and there was noted an extreme hypoplasia of bone marrow, although his vitamin C deficiency had now been made up.

On 26.12.41. he was given the cells from
30. 1,400 c.c. Group O blood by a Kimpton Tube.

Blood changes.	Hb.	R.B.C.	PPC.V.	V.D.B.	A.	S.B.P.
Before	32% (5.12)	1.68	16%		.74	100
After 15 mins.	52% (8.32)	2.42	22%		1.42	112
27.12.41.	50% (8)	2.48	22%			
28.12.41.	50% (8)	2.18	22%			
29.12.41.	48% (7.68)	2.06	20%			
31.12.41.	48% (7.68)	2.20	20%			105
2.1.42.	48% (7.68	1.98	20%		1.02	

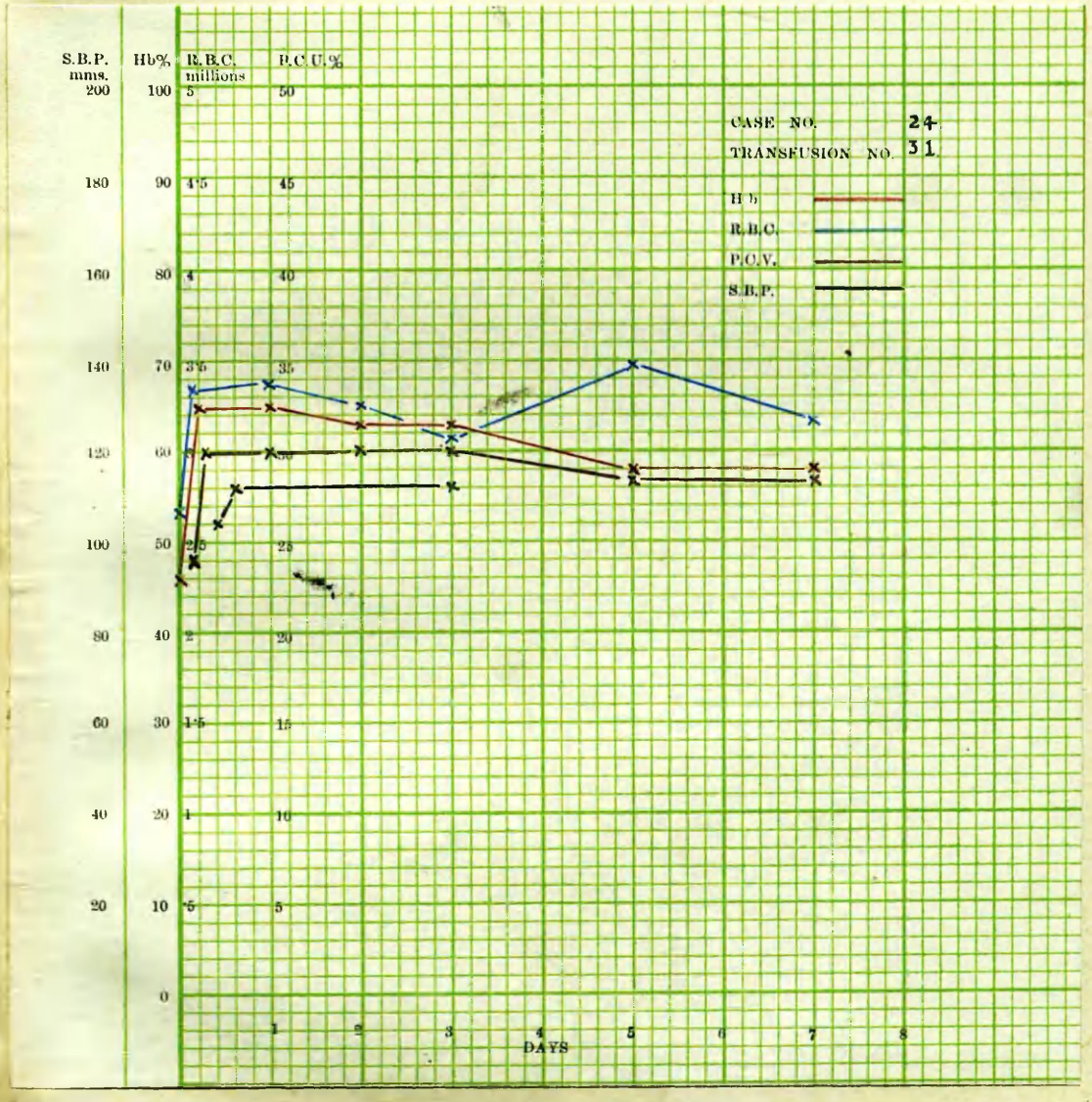


Reactions - Nil.

Transfusion. Case.

31. Again he gradually deteriorated, and on 6.1.42 he was given the cells from 1,400 c.c. Group O blood by a Kimpton Tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	46% (7.36)	2.68	24%		.87	108
After 15 mins.	65% (10.4)	3.30	30%		1.22	112
7.1.42	65% (10.4)	3.46)	30%			
8.1.42.	63% (10.08)	3.24	30%			
9.1.42.	63% (10.08)	3.08	30%			
11.1.42.	58% (9.28)	3.49	28%			112
13.1.42.	58% (9.28)	3.18	28%		.98	

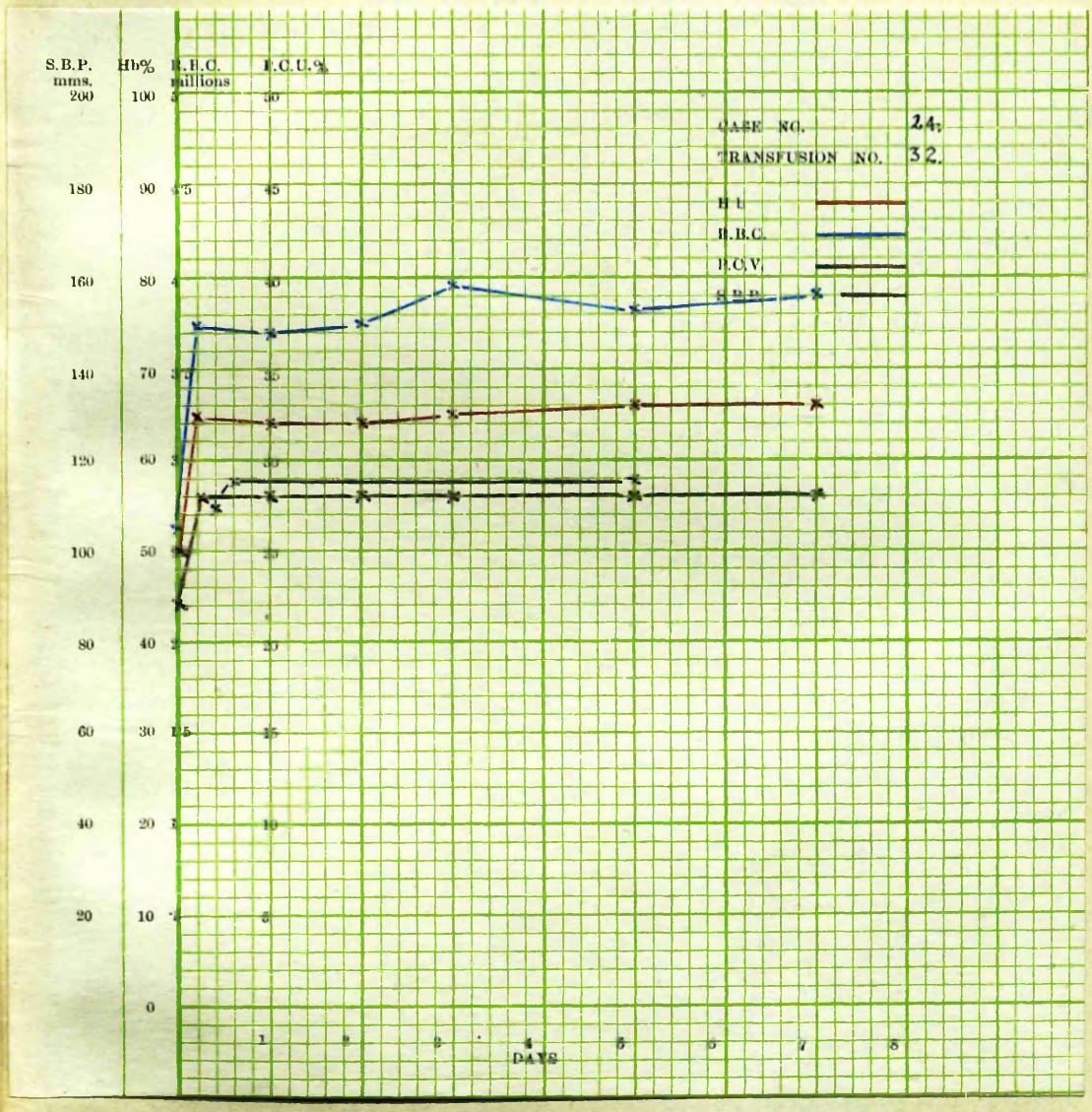


Reactions - Nil.

Transfusion. Case.

32. On 6.2.42. he was again transfused with the cells from 900 c.c. Group A blood by a Kimpton Tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	50% (8)	2.62	22%			110
After 15 mins.	65% (10.4)	3.74	28%			115
7.2142	64% (10.24)	3.70	28%			
8.2.42	64% (10.24)	3.74	28%			
9.2.42.	65% (10.4)	3.96	28%			
11.2.42.	66% (10.56)	3.82	28%			115
13.2.42	66% (10.56)	3.90	28%			



Reactions - Nil.

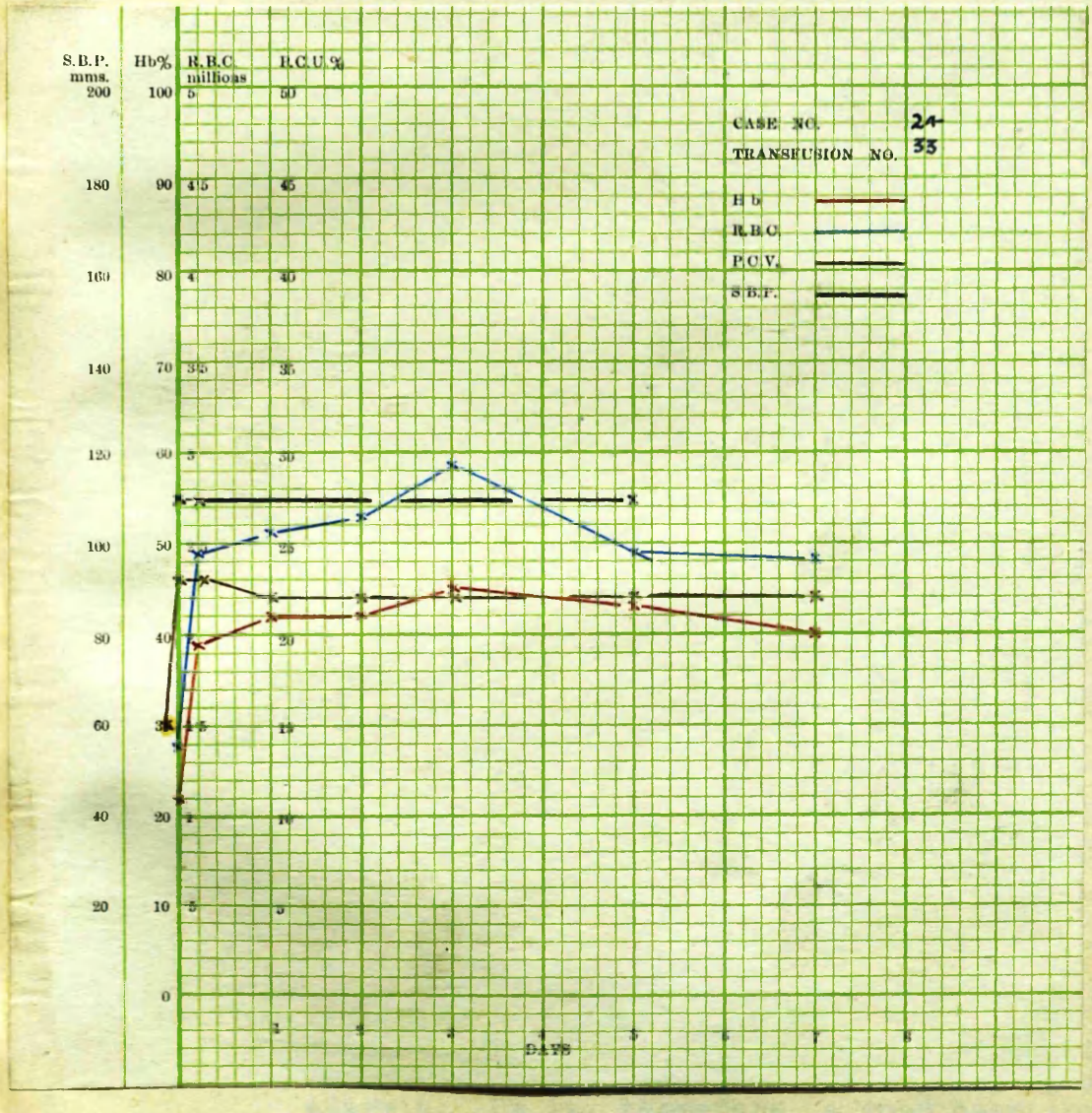
Transfusion. Case.

He was dismissed for a short time, but gradually relapsed, and was readmitted on 2.4.42, when his blood count had fallen to Hb 23% (3.68), R.B.C. 1.39 millions per cu.mm., W.B.C. 1,200 per cu.mm.

33.

On 3.4.42. the cells from 900 c.c. Group O blood were given by the drip method.

Blood changes.	Hb	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	22% (3.52)	1.39	15%		.50	110
After 15 mins.	39% (6.24)	2.46	23%		1.47	110
4.4.42.	42% (6.72)	2.56	23%			
5.4.42.	42% (6.72)	2.64	22%			
6.4.42.	45% (7.2)	2.92	22%			
8.4.42.	43% (6.88)	2.46	22%			110
10.4.42.	40% (6.4)	2.42	22%		1.38	



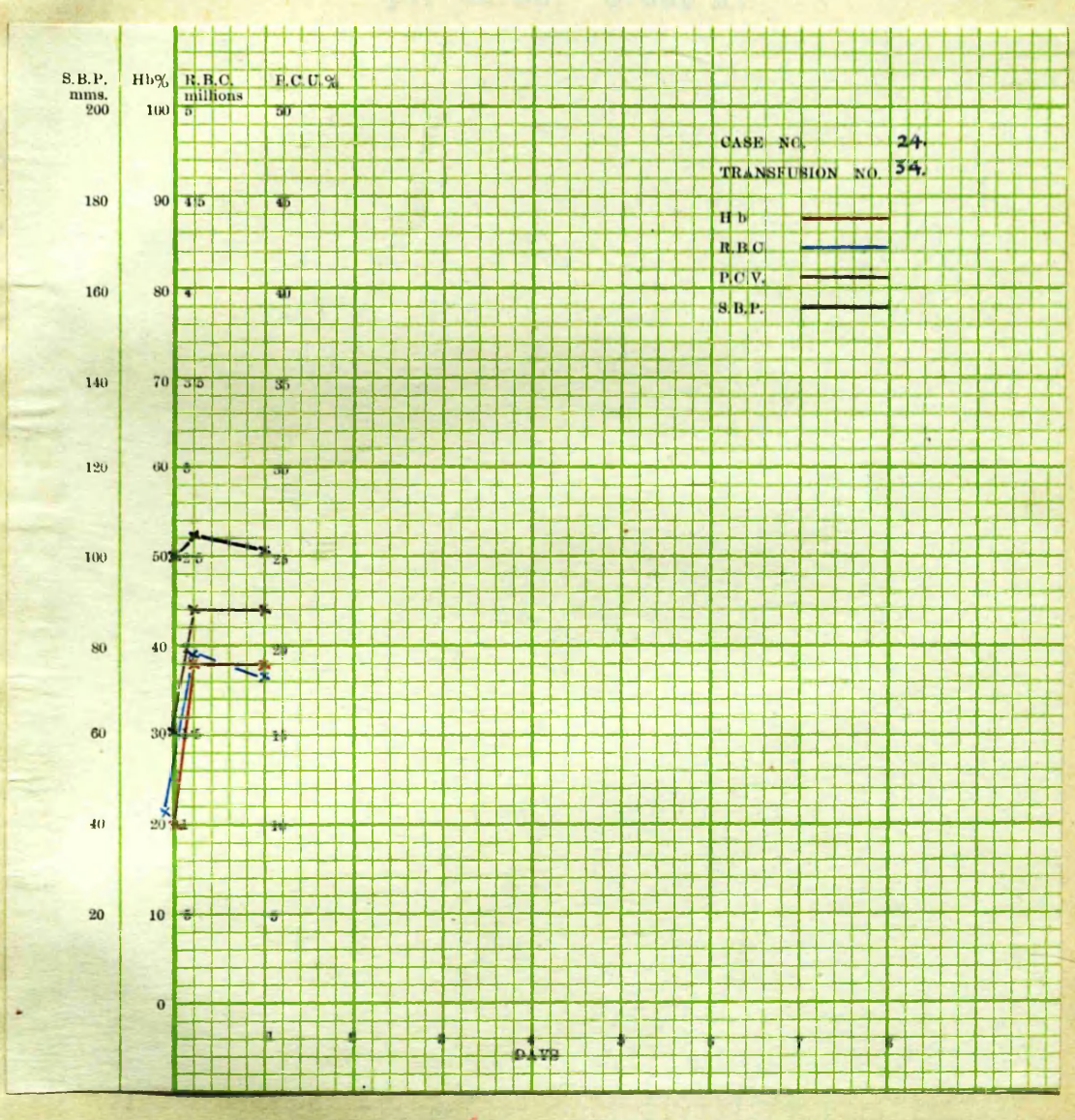
Reactions - Nil.

Transfusion. Case.

He was again dismissed, but was readmitted on 27.4.42 when his blood count had fallen to Hb 20% (3.2), R.B.C. 1.05 millions per cu.mm., W.B.C. 1,200 per cu.mm.

34. On 28.4.42. the cells from 900 c.c. Group A blood were given by the drip method.

Blood changes.	Hb	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	20% (3.2)	1.02	15%			100
After 15 mins.	38% (6.08)	1.94	22%			105
29.4.42.	38% (6.08)	1.86	22%			102



Reactions - Nil. The patient was again dismissed.

This patient was of great interest as a case of extremely hypoplastic, if not truly aplastic, anaemia. He is, therefore, a good case for study of the results of erythro-transfusion without the variations due to haemopoiesis. The variation in results must be due to factors such as storage of transfused cells.

Transfusion. Case.

25. Mrs. L.G. (41 Years). Admitted 28.7.42

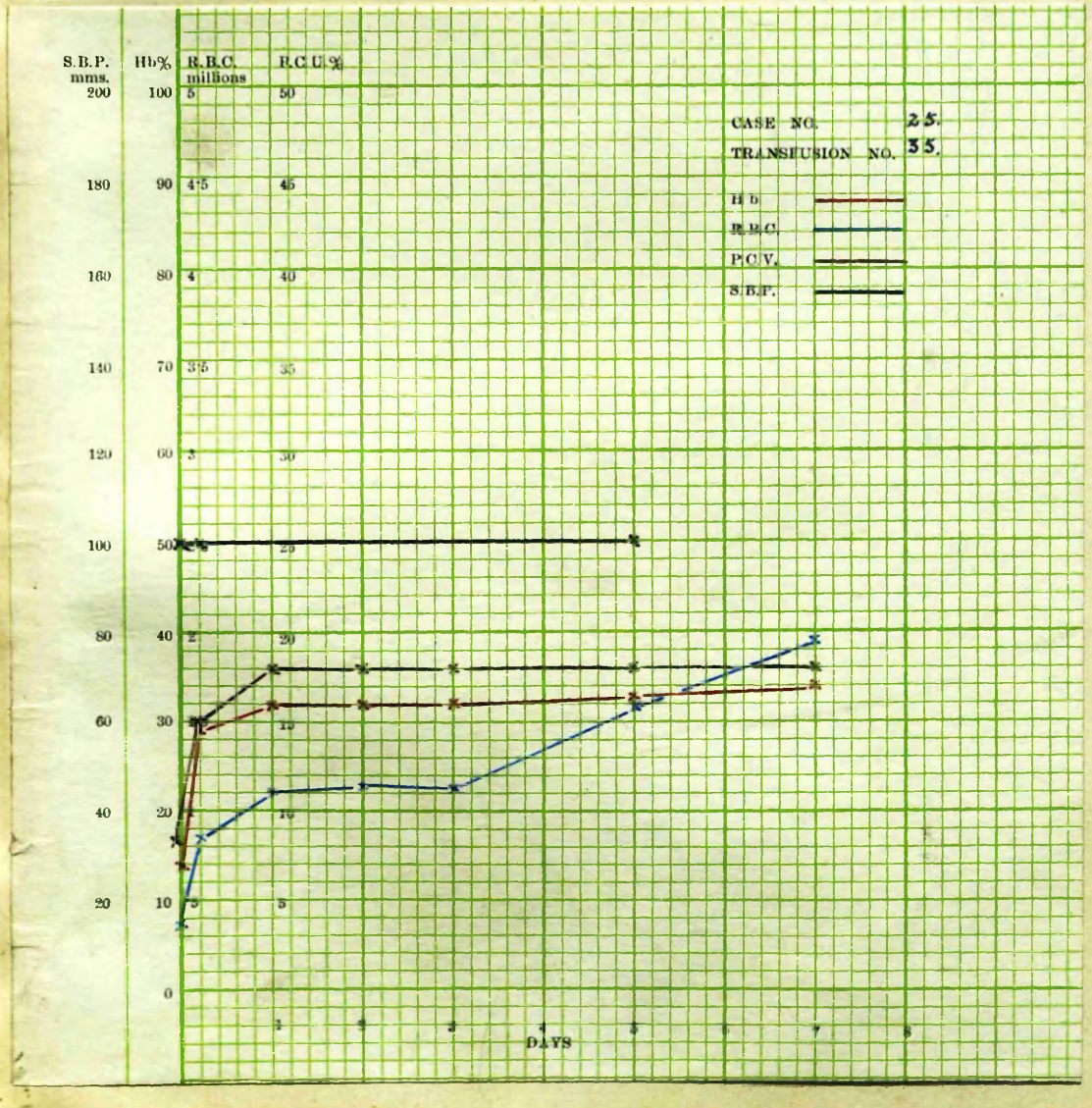
This patient was a known case of pernicious anaemia, and had been receiving treatment since March, 1941. She was having injections of 2 c.c. Perhepar per week, but missed two doses before admission, and began to feel unwell. There had been no menstrual period for three months.

She was very pale. The pulse was regular but weak. Her heart was not enlarged, but there was a V.S. murmur at all areas. B.P. 100/55. The spleen was enlarged.

Blood examination showed Hb 14% (2.24), R.B.C. .623 millions per cu.mm., W.B.C. 1,000 per cu.mm. Group A.

35. On 28.7.42. she was given the cells from 900 c.c. Group A blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	14% (2.24)	.38	8%	1.8		100
After 15 mins.	29% (4.64)	.84	15%	2.0		100
29.7.42	32% (5.12)	1.10	18%			
30.7.42	32% (5.12)	1.13	18%			
31.7.42.	32% (5.12)	1.12	18%			
2.8.42.	33% (5.25)	1.65	18%			100
4.8.42.	34% (5.44)	1.96	18%	1.6		



Reactions - Nil.

The exceptionally low initial blood count in this case was checked twice.

Transfusion. Case.

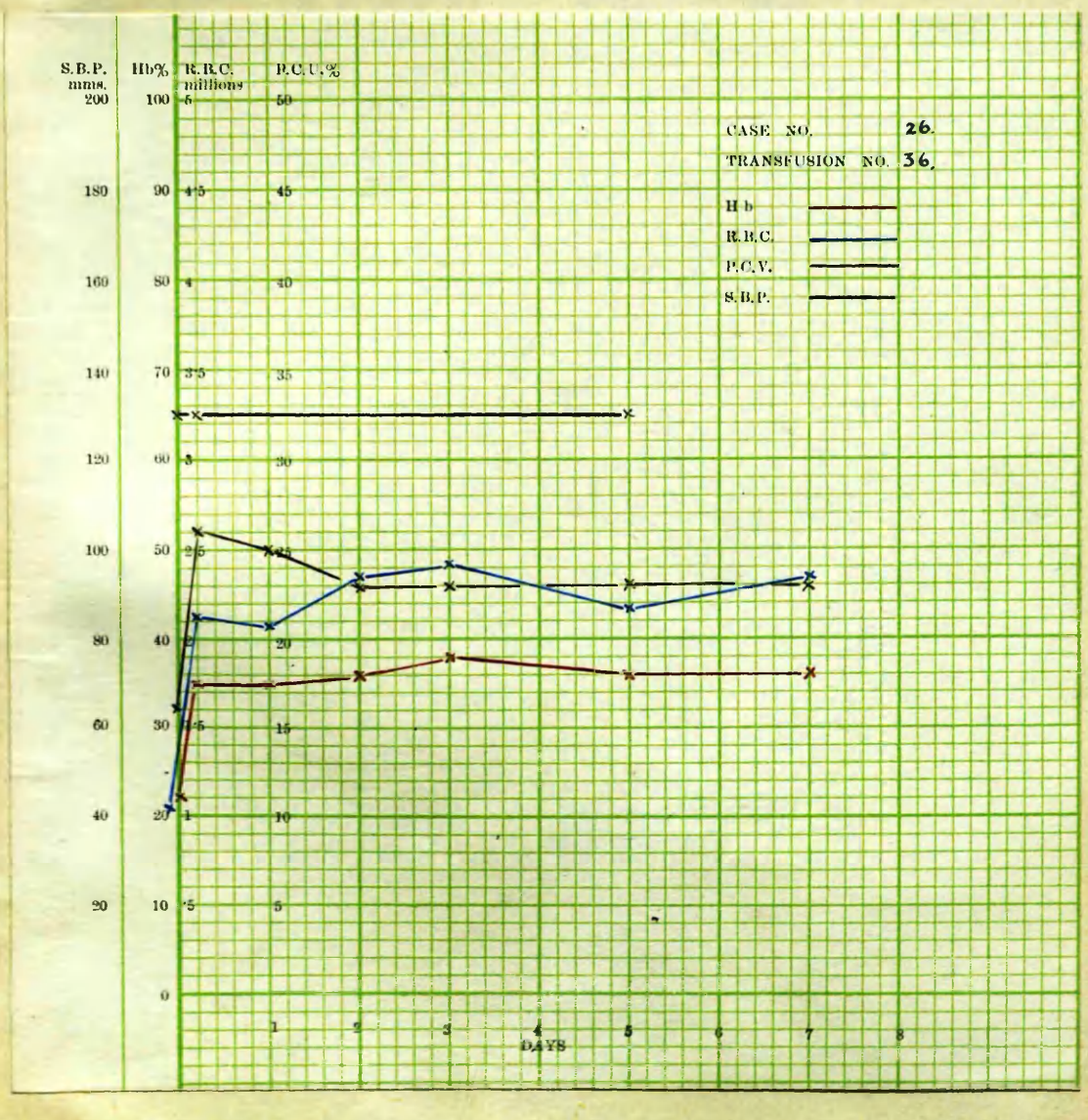
26. T.G. (68 years). Admitted 31.3.42 to Canniesburn Hospital.

This patient complained of weakness and jaundice of four weeks' duration. There was pallor, but no clay-coloured stools. The heart sounds were weak, and a V.S. murmur was present at the apex. Diagnosis made was pernicious anaemia complicated by catarrhal jaundice.

Blood examination showed Hb 24% (3.84), R.B.C. 1 million per cu.mm., W.B.C. 4,600 per cu.mm. Group O.

36. On 5.4.42. he was given the cells from 900 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	22% (3.52)	1.04	16%			130
After 15 mins.	35% (5.6)	2.12	26%			130
6.4.42	35% (5.6)	2.08	25%			
7.4.42	36% (5.76)	2.36	23%			
8.4.42	38% (6.08)	2.42	23%			
10.4.42	36% (5.76)	2.18	23%			130
12.4.42	36% (5.76)	2.36	23%			



Reactions - Nil

Transfusion. Case.

27 J.H. (65 Years) Admitted 6.6.42.

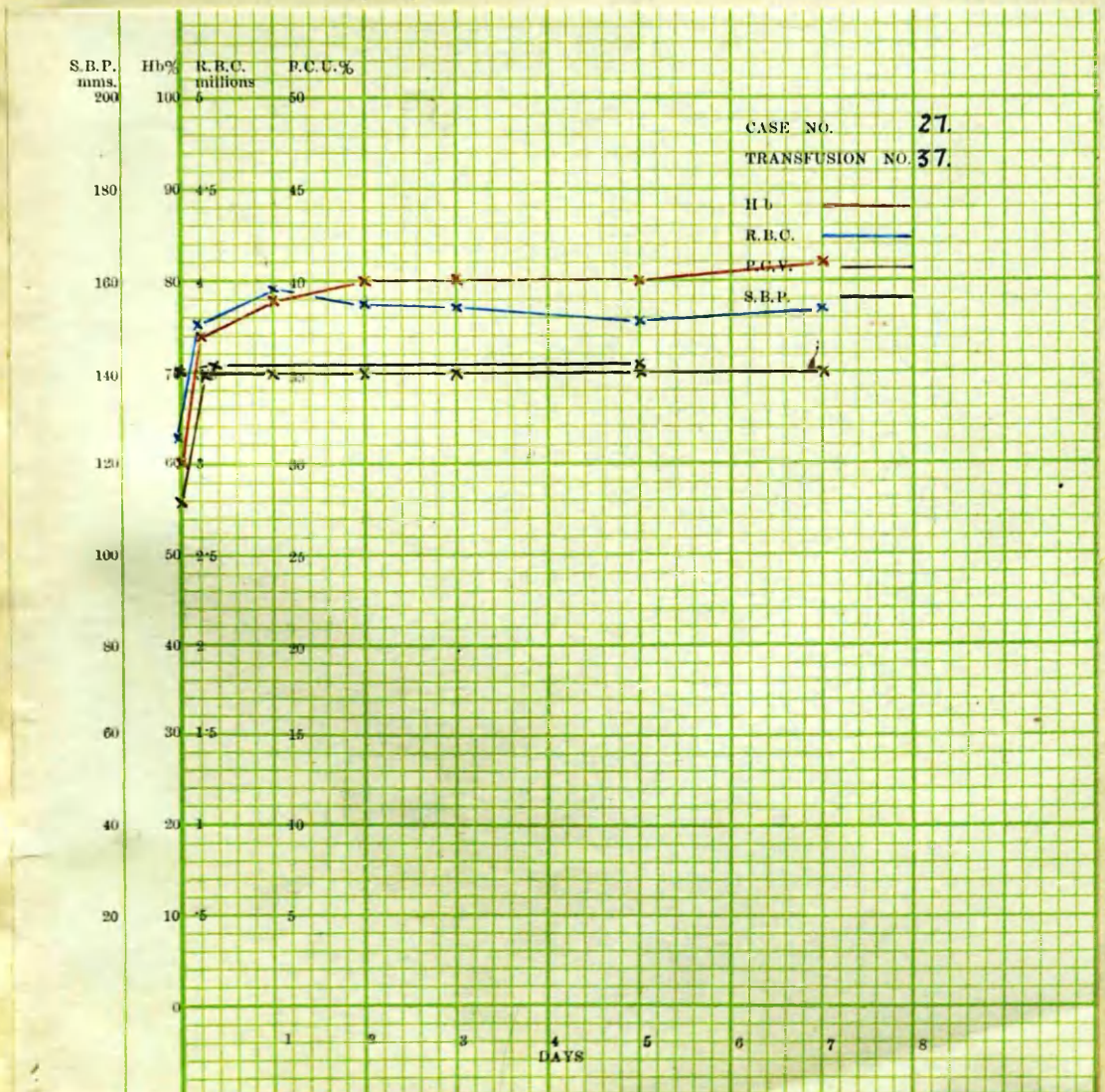
This man had a history of epigastric pain unrelated to food, accompanied by loss of appetite and weight. There was vomiting, weakness and lassitude.

Tenderness was present in the epigastrium, but no mass was palpable. He had bilateral herniae and a left hydrocoele. The heart sounds were weak but no murmurs were present. X-ray examination showed a large carcinoma of the pylorus.

Blood examination showed Hb (10.40), R.B.C. 3.2 millions per cu.mm., W.B.C. 6,000 per cu.mm. Group A.

37. On 13.6.42. he was given the cells from 850 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	60% (9.6)	3.2	28%	3.0	.20	140
After 15 mins.	74% (11.84)	3.74	35%	3.4	.76	142
14.6.42	78% (12.48)	3.96	35%			
15.6.42	80% (12.8)	3.89	35%			
16.6.42	80% (12.8)	3.87	35%			
18.6.42	80% (12.8)	3.79	35%			140
20.6.42	82% (13.12)	3.84	35%	3.2	.72	



Reactions - Nil.

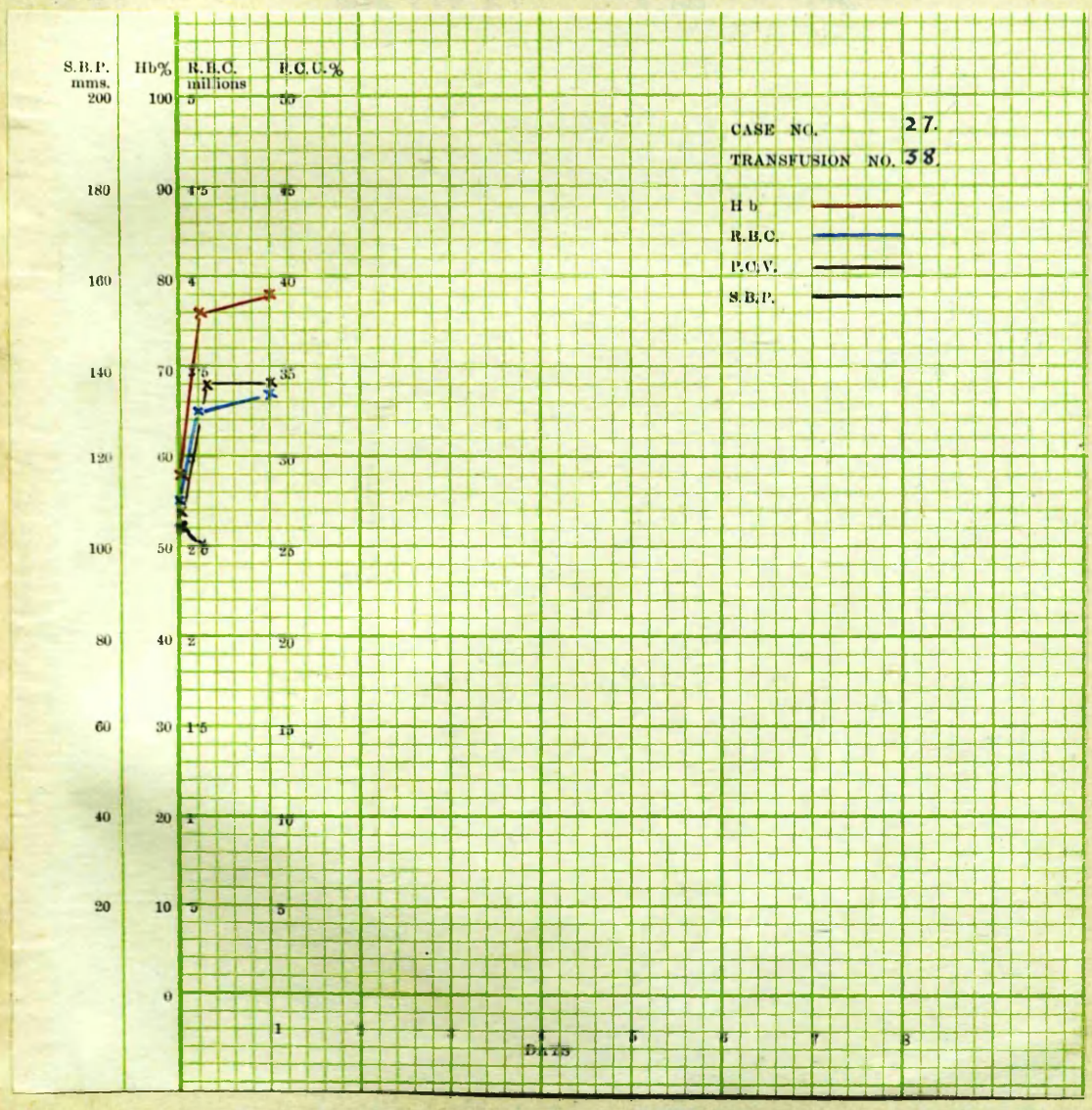
Transfusion. Case.

The tumour was found to be inoperable, and she was dismissed. He deteriorated rapidly and was readmitted on 4.7.42. in a moribund condition with multiple secondaries in bones, lungs and glands.

Blood count was Hb 60% (9.6), R.B.C. 2.88 millions per cu.mm.

38. On 7.7.42. while comatose, the patient was given the cells from 700 c.c. Group A blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	58% (9.28)	2.75	27%			105
After 15 mins.	76% (12.16)	3.24	34%			100
8.8.42.	78% (12.48)	3.43	34%			



Reactions - Nil.

This patient never regained consciousness, and died on 8.8.42. He was moribund on readmission, and the result was not influenced by transfusion.

Transfusion. Case.

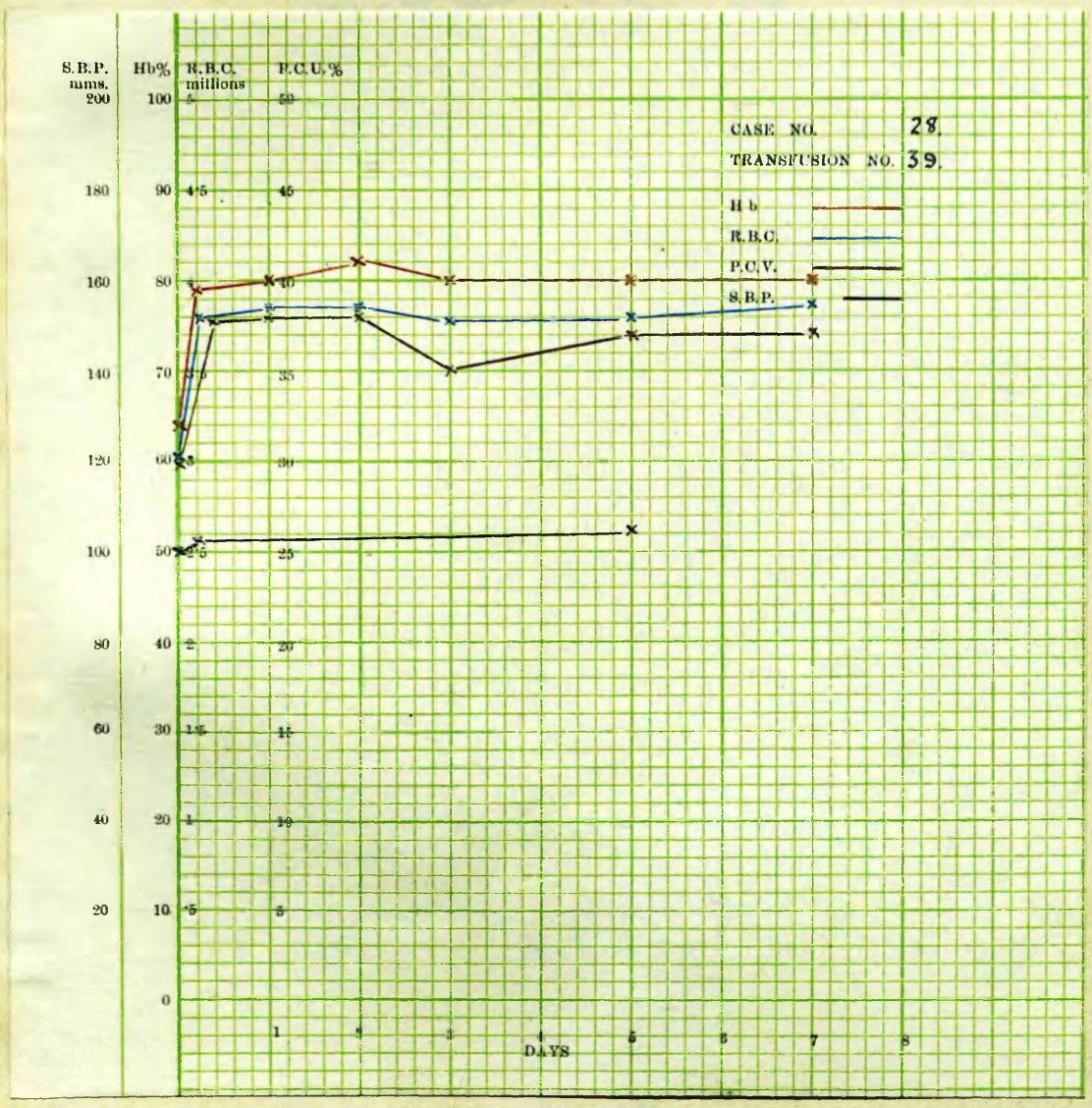
28. Mrs. A.H. (59 years). Admitted 12.8.42.

This woman complained of weakness and lassitude following a gynaecological operation three years before. She had been treated with liver injections without improvement, and iron preparations caused gastric upset. The pulse rate was regular, and a V.S. murmur was present at the apex. B.P. 100/65.

The blood examination showed Hb 65% (10.4), R.B.C. 3.11 millions per cu.mm., W.B.C. 4,600 per cu.mm. Group O.

39. On 17.8.42. she was given the cells from 800 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	64% (10.24)	3.11	30%			100
After 15 mins.	79% (12.64)	3.80	38%			103
18.8.42.	80% (12.8)	3.84	38%			
19.8.42.	82% (13.12)	3.86	38%			
20.8.42	80% (12.8)	3.79	35%			
22.8.42.	80% (12.8)	3.80	37%			105
24.8.42	80% (12.8)	3.88	37%			



Reactions - Nil.

After transfusion there was no evidence of a V.S. murmur, even after exercise.

Transfusion. Case.

29. J.H. (43 Years). Admitted 23.4.42 to Gartloch Emergency Hospital.

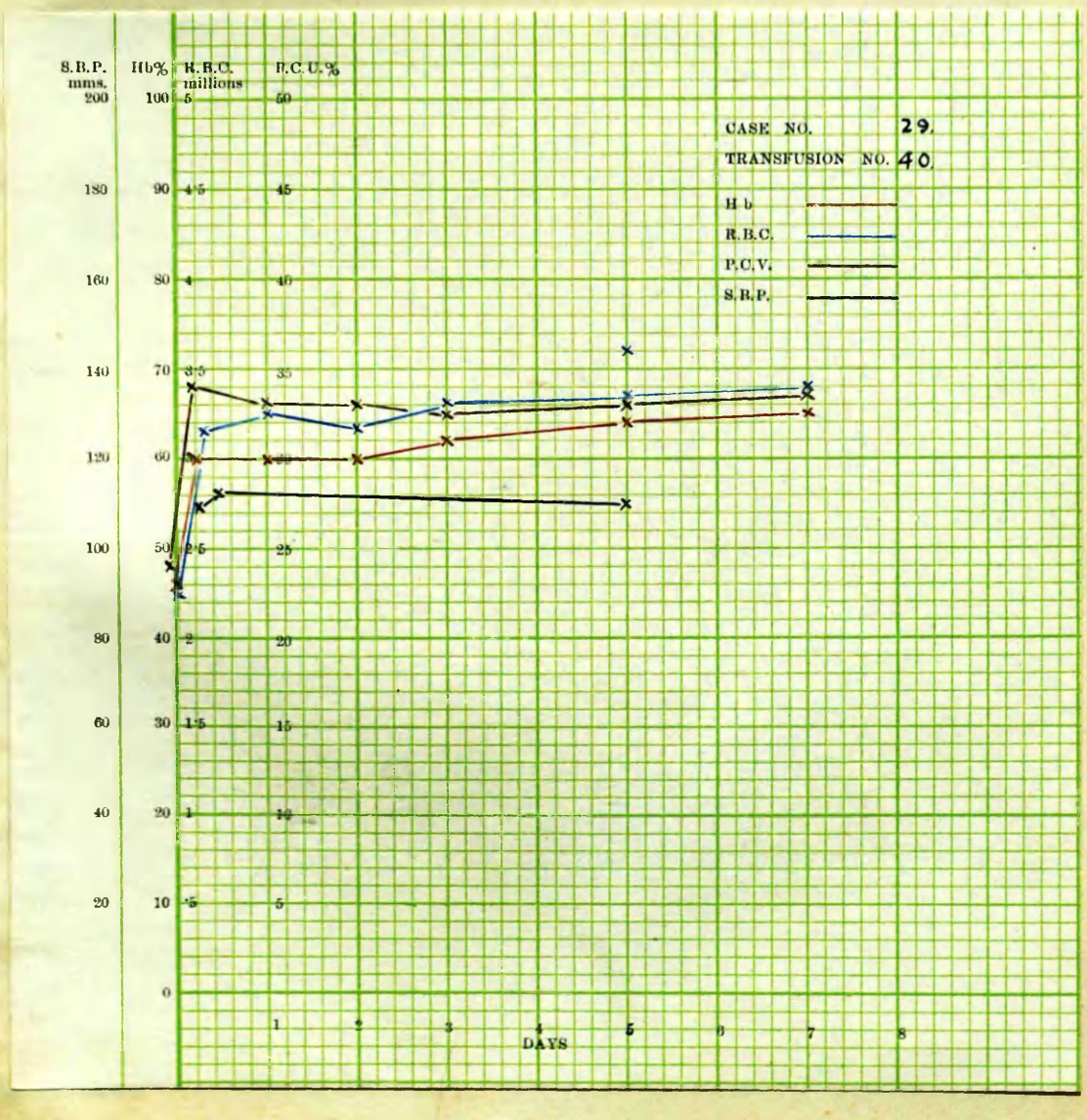
This man had weakness and breathlessness for three months before admission. There was cough of an unproductive nature and pallor was marked. The heart was not enlarged, and the pulse was regular. B.P. 110/65.

Blood examination showed Hb 45% (7.2), R.B.C. 2.54 millions per cu.mm., W.B.C. 5,800 per cu.mm. Group A.

Blood films showed that the anaemia was of a megalocytic nature.

40. On 2.5.42. he was given the cells from 250 c.c. Group A blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	46% (7.36)	2.28	24%			110
After 15 mins.	60% (9.6)	3.15	34%			112
3.5.42.	60% (9.6)	3.24	32%			
4.5.42	60% (9.6)	3.19	32%			
5.5.42	62% (9.92)	3.32	32%			
7.5.42.	64% (10.24)	3.36	33%			110
9.5.42.	65% (10.4)	3.40	34%			



Reactions - Nil.

Transfusion. Case.

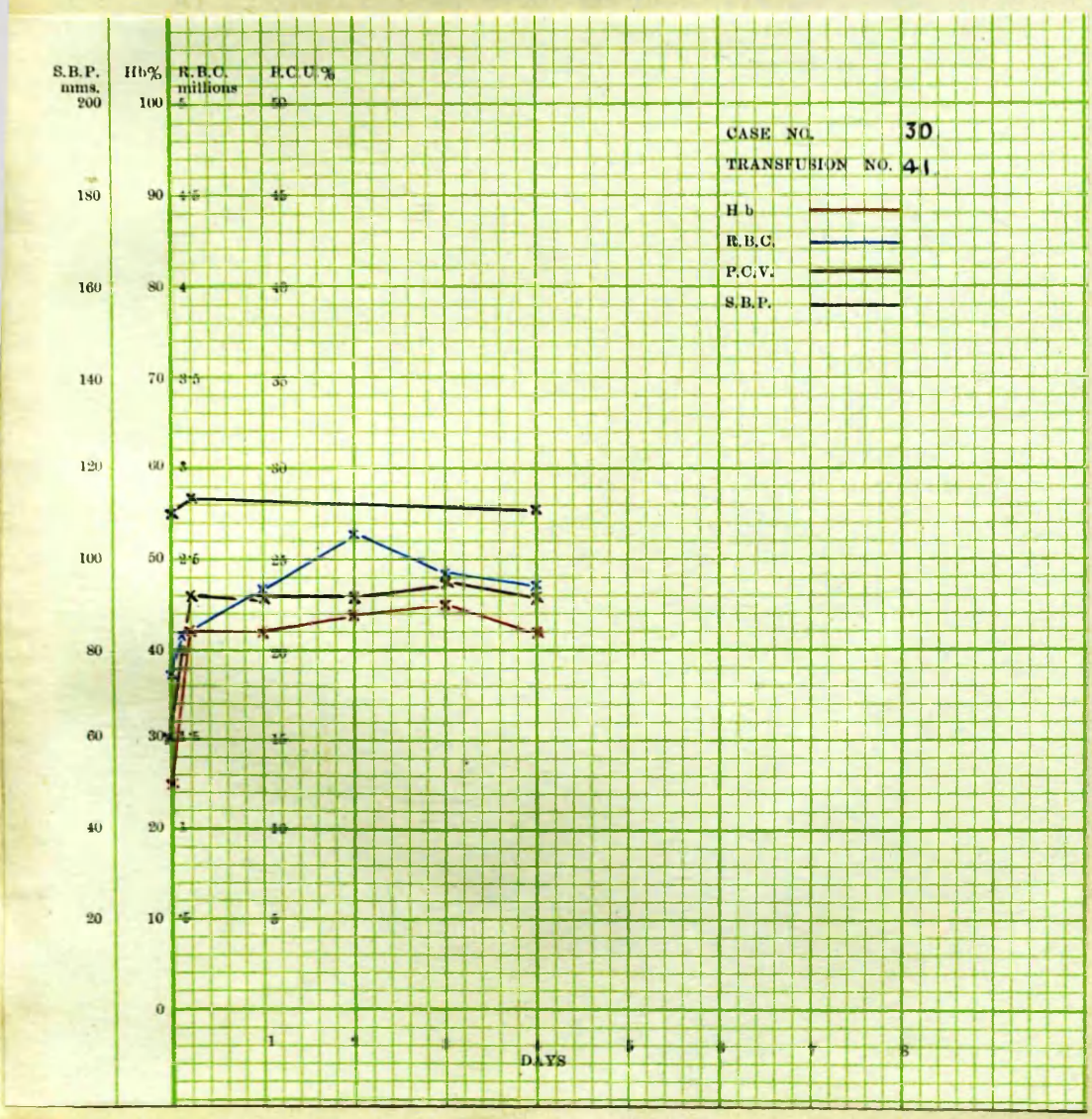
30. I.H. (49 Years). Admitted 4.5.42.

This patient had had irregular periods from puberty, and recently there had been profuse loss. Bleeding had been constant for five months before admission. There was pallor, breathlessness and oedema of the ankles. The abdomen was full and slightly tender, with a large irregular mass in the lower part reaching the umbilicus. A V.S. murmur was present at all areas.

The blood examination showed Hb 27% (4.23), R.B.C. 1.62 millions per cu.mm., W.B.C. 10,000 per cu.mm. Group A.

41. On 6.6.42. she was given the cells from 850 c.c. Group A blood by the drip method.

Blood changes.	Hb	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	25% (4)	1.88	15%			110
After 15 mins.	42% (6.72)	2.08	23%			114
7.6.42	42% (6.72)	2.35	23%			
8.6.42.	44% (7.04)	2.63	23%			
9.6.42.	45% (7.2)	2.41	24%			
10.6.42.	42% (6.72)	2.37	23%			112



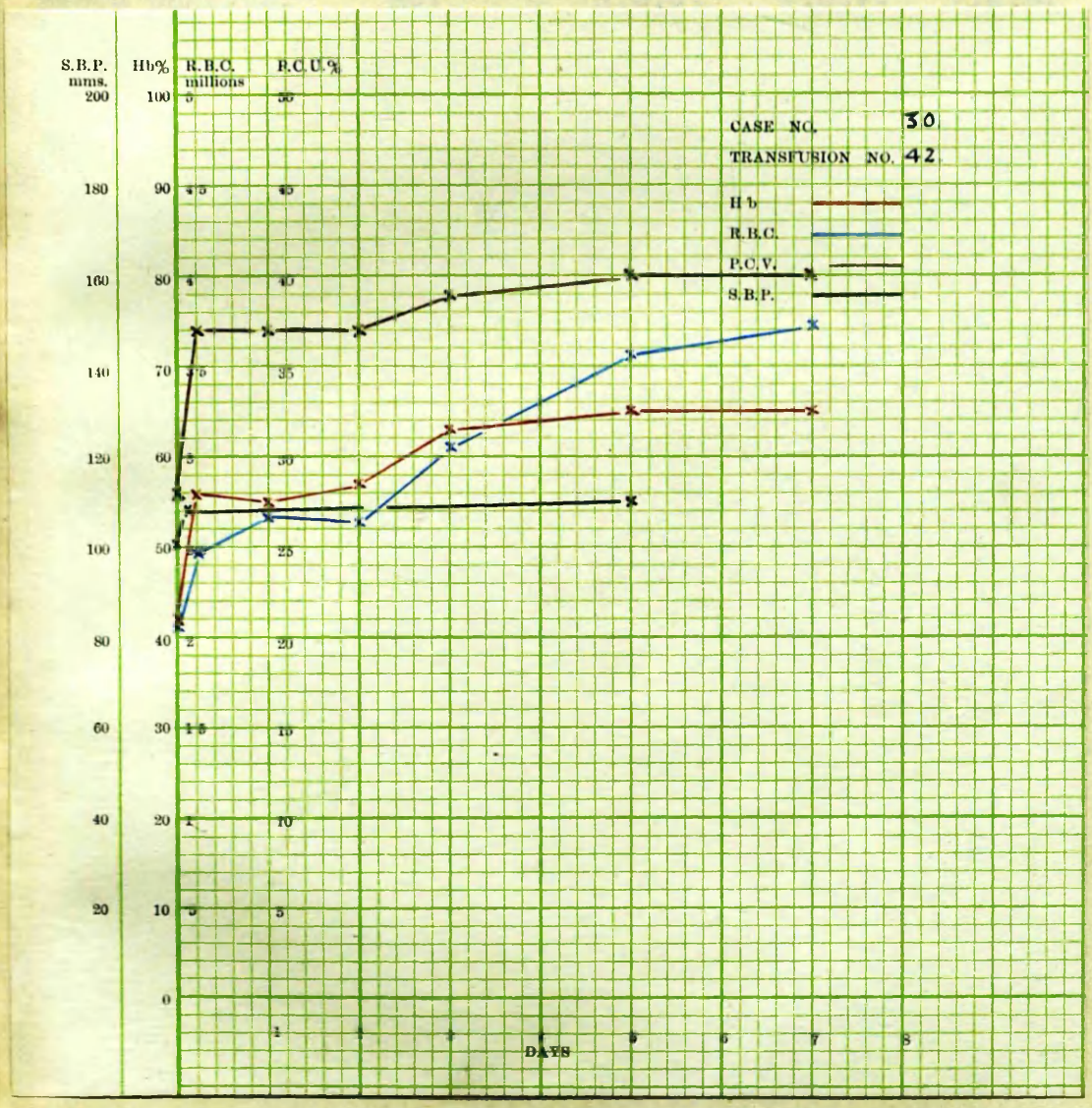
Reactions - Nil.

Transfusion. Case.

On 12.6.42. she was taken to Theatre, and a large ovarian cyst containing grumous pus was removed. Supravaginal hysterectomy and right salpingectomy with drainage were carried out.

42. On 14.6.42. the cells from 800 c.c. Group O blood were given by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	42% (6.72)	2.08	28%	1.6	.16	100
After 15 mins.	56% (8.96)	2.48	37%	1.8	.50	108
15.6.42.	55% (8.8)	2.68	37%			
16.6.42.	57% (9.12)	2.64	39%			
17.6.42.	63% (10.08)	3.04	40%			
19.6.42.	65% (10.4)	3.57	40%			110
21.6.42.	65% (10.4)	3.72	40%	1.4	.47	



Reactions - Nil.

Transfusion. Case.

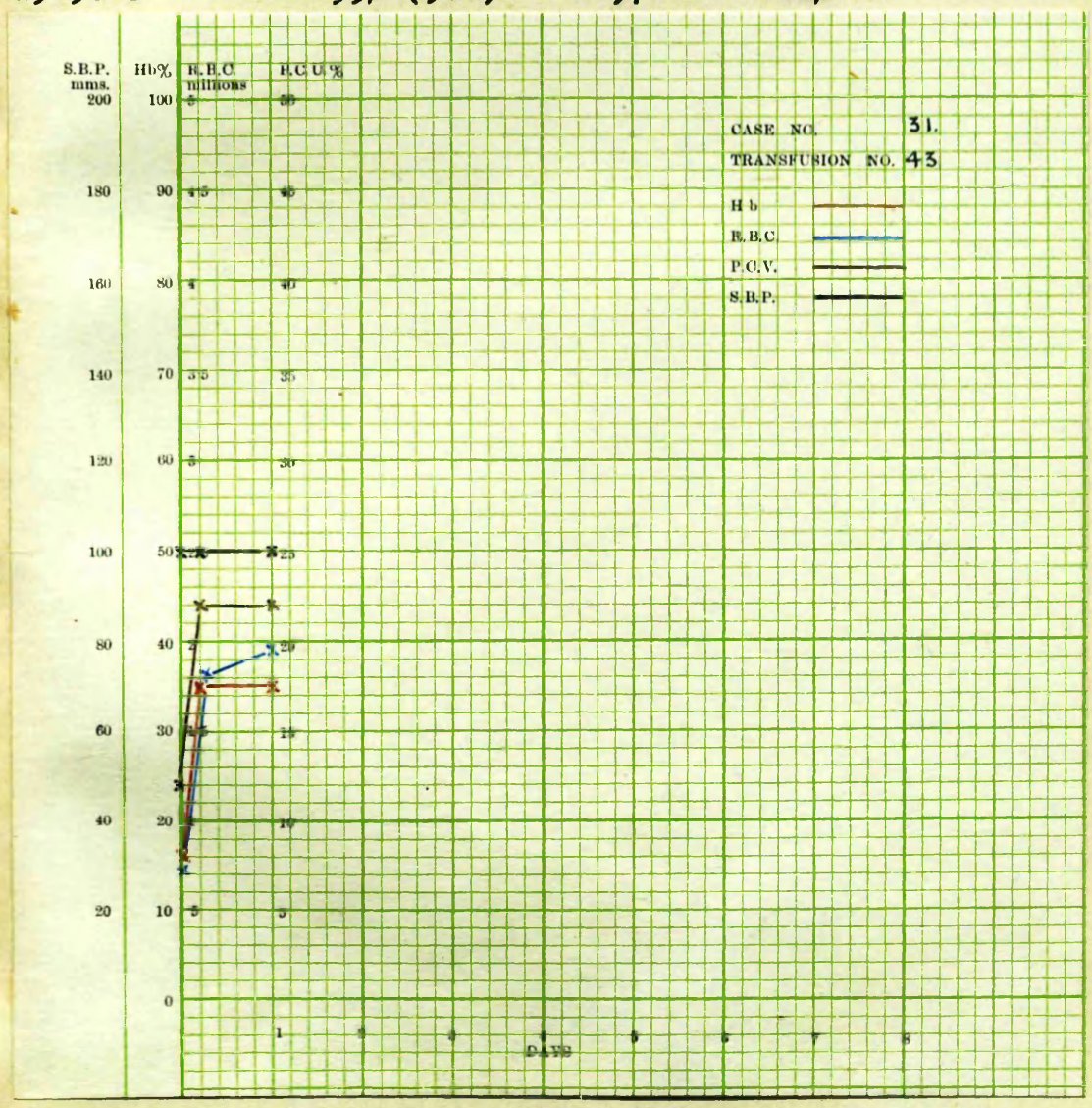
31. Mrs. H. (66 Years). Admitted 22.5.42.

This patient complained of weakness and breathlessness of five months duration. She had abdominal discomfort, and vomiting was frequent. She was very restless and confused, with weak heart sounds and numerous rales in the chest. A pale yellow pallor was present. There was some tenderness in the right hypochondrium.

Blood examination showed Hb 20% (3.2), R.B.C. .76 millions per cu.mm., W.B.C. 8,400 per cu.mm. Group O. Blood films showed anisocytosis, poikylocytosis and a large number of hyperchromic cells.

43. On 24.5.42. she was given the cells from 800 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	16% (2.56)	.73	12%			100
After 15 mins.	35% (5.6)	1.80	22%			100
25.5.42	35% (5.6)	1.97	22%			100



On 25.5.42. the patient died from broncho-pneumonia, which was probably her primary condition. In the opinion of the clinicians, the pathologist and the author, death was not hastened by transfusion.

Reactions - Nil.

Transfusion. Case.

32. F.H. (51 Years). Admitted 2.2.42.

This man had a feeling of constriction in his chest of six weeks' duration. He had been bleeding from haemorrhoids and from the gums. For some time marked loss of weight was present. He was a pale yellow colour.

The heart sounds were very poor, and there was a rough V.S. murmur at the apex. B.P.120/65. The spleen was much enlarged.

Blood examination showed Hb 26% (4.16), R.B.C. 1.60 millions per cu. mm., W.B.C. 2,400 per cu.mm. Group O..Nucleated red cells were present.

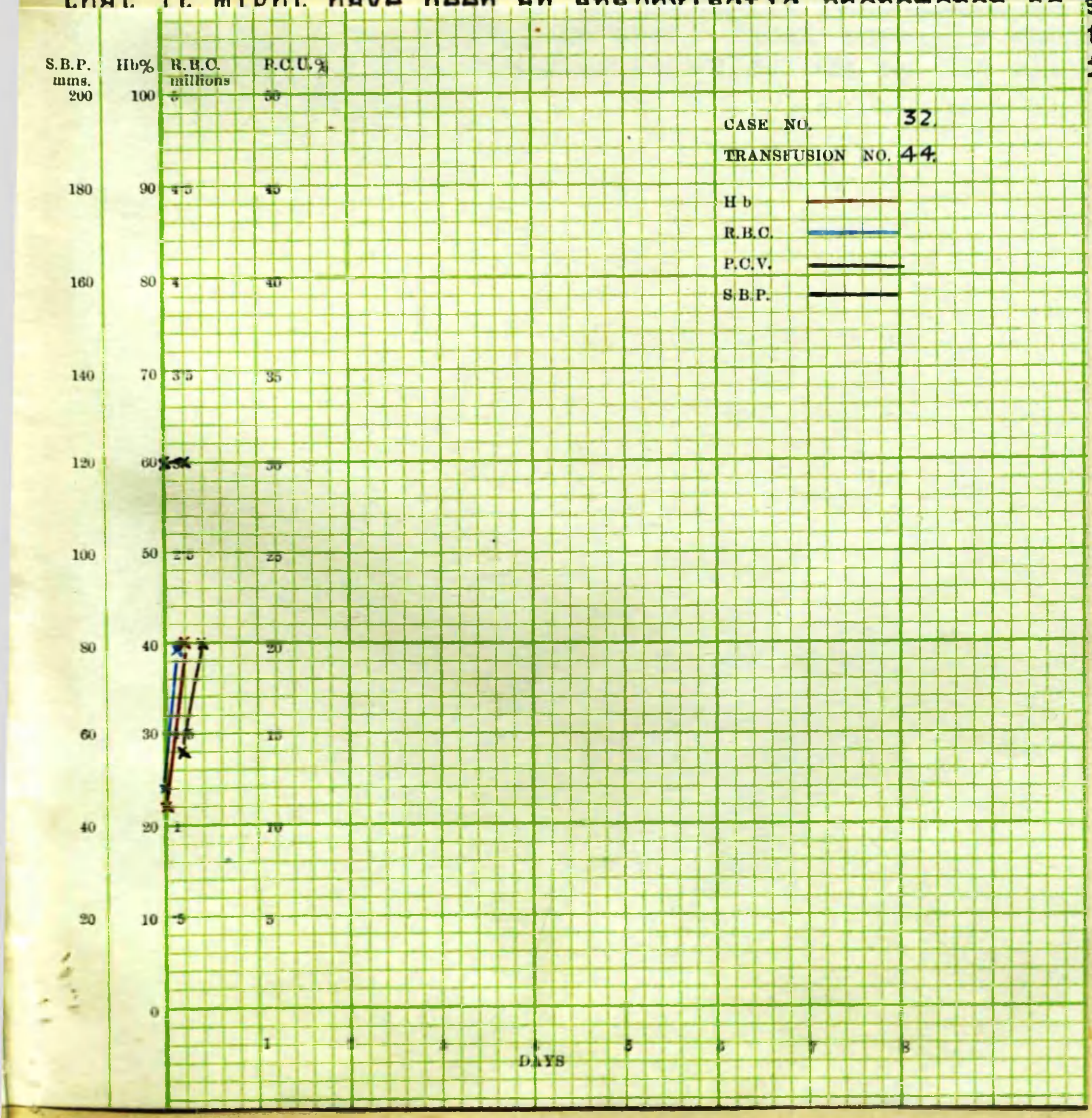
44. On 7.2.42. he was given the cells from 950 c.c. Group O blood by Kimpton tube. The transfusion lasted about 25 minutes.

Blood Changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	22% (3.52)	1.2	14%			120
After 15 mins.	40% (6.4)	1.98	20%			120

The patient had a slight rigor two hours after transfusion and suddenly collapsed and died.

At post mortem, the final diagnosis was megalocytic anaemia of pernicious type. The heart was extremely flabby, and the seat of extreme fatty degeneration.

This case was the one which finally decided the termination of the use of the Kimpton tube. There was no evidence of incompatibility either clinically or post mortem, and the most probable cause of death was the sudden overloading of a very poor heart muscle by the introduction of a quantity of viscous fluid. There is no suggestion that it might have been an anaphylactic phenomenon as suggested by [illegible] tion of Rh [illegible] ical history



Transfusion. Case.

32. F.H. (51 Years). Admitted 2.2.42.

This man had a feeling of constriction in his chest of six weeks' duration. He had been bleeding from haemorrhoids and from the gums. For some time marked loss of weight was present. He was a pale yellow colour.

The heart sounds were very poor, and there was a rough V.S. murmur at the apex. B.P.120/65. The spleen was much enlarged.

Blood examination showed Hb 26% (4.16), R.B.C. 1.60 millions per cu. mm., W.B.C. 2,400 per cu.mm. Group O..Nucleated red cells were present.

44. On 7.2.42. he was given the cells from 950 c.c. Group O blood by Kimpton tube. The transfusion lasted about 25 minutes.

Blood Changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	22% (3.52)	1.2	14%			120
After 15 mins.	40% (6.4)	1.98	20%			120

The patient had a slight rigor two hours after transfusion and suddenly collapsed and died.

At post mortem, the final diagnosis was megalocytic anaemia of pernicious type. The heart was extremely flabby, and the seat of extreme fatty degeneration.

This case was the one which finally decided the termination of the use of the Kimpton tube. There was no evidence of incompatibility either clinically or post mortem, and the most probable cause of death was the sudden overloading of a very poor heart muscle by the introduction of a quantity of viscous fluid. There is no suggestion that it might have been an anaphylactic phenomenon as suggested by Williams and Davie (1941) in their fatal case. A question of Rh factor arises. This can also be ruled out by the clinical history and P.M. findings.

Transfusion. Case.

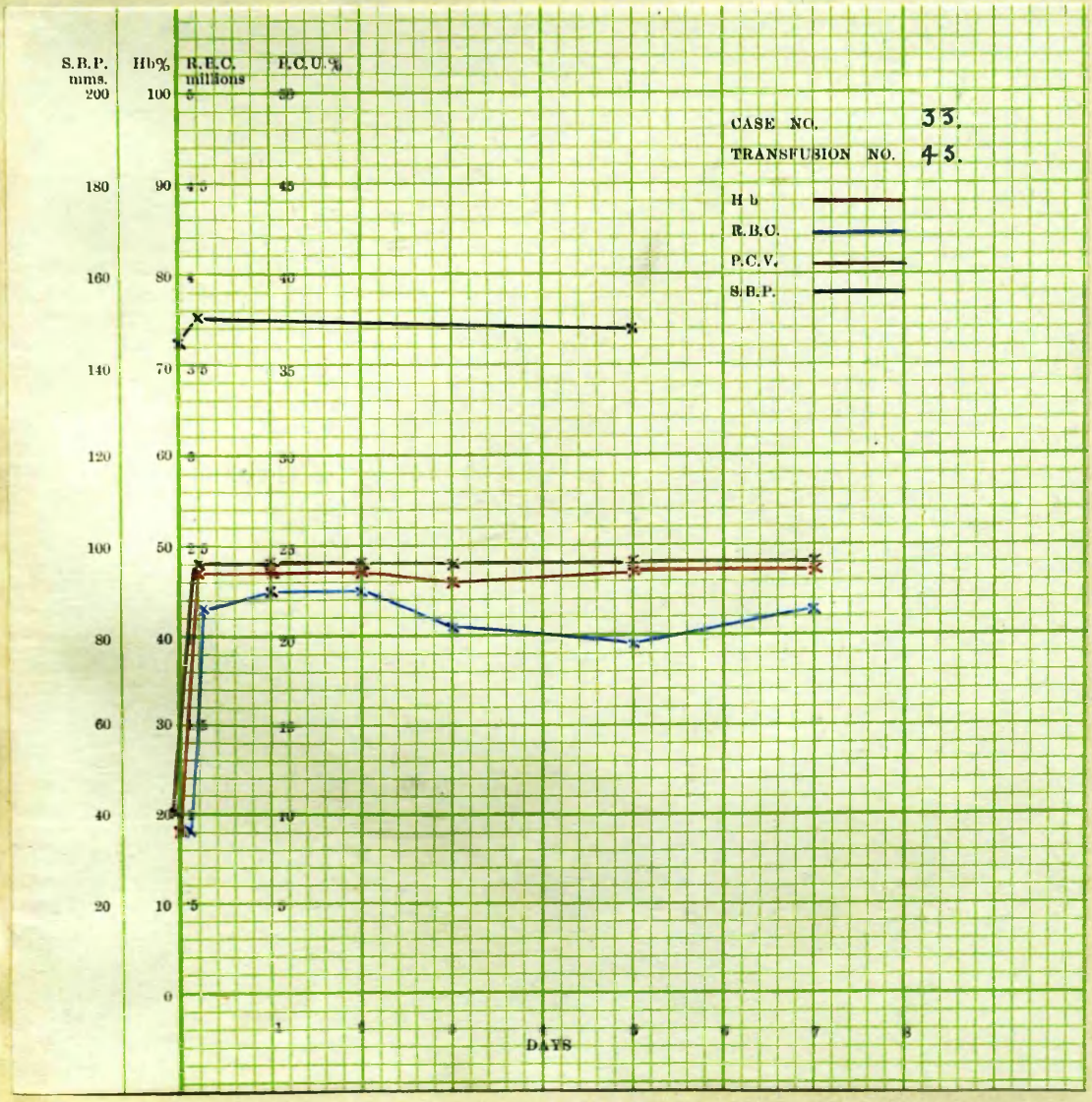
33 Mrs. E.H. (31 Years). Admitted 4.2.42.

This woman had a child four weeks before admission, the fifth in five years. There was no abnormality about the pregnancy or labour, but weakness and pallor came on in the puerperium. There was glossitis and pallor, cough and oedema of the ankles were present. The heart sounds were poor with a marked V.S. murmur at the apex. B.P. 144/84. The spleen was grossly enlarged.

Blood examination showed Hb 18% (2.88), R.B.C. .88 millions per cu.mm., W.B.C. 3,200 per cu. mm. Group O. Megalocytosis, poikylocytosis and anisocytosis were present.

45. On 7.2.42. the cells from 900 c.c. Group O blood were given by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	18% (2.88)	.9	10%			145
After 15 mins.	47% (7.52)	2.17	24%			152
8.2.42.	45% (7.2)	2.24	24%			
9.2.42.	47% (7.52)	2.24	24%			
10.2.42.	46% (7.36)	2.04	24%			
12.2.42.	47% (7.52)	1.96	24%			148
14.2.42.	47% (7.52)	2.13	24%			



Reactions - Nil.

Transfusion. Case.

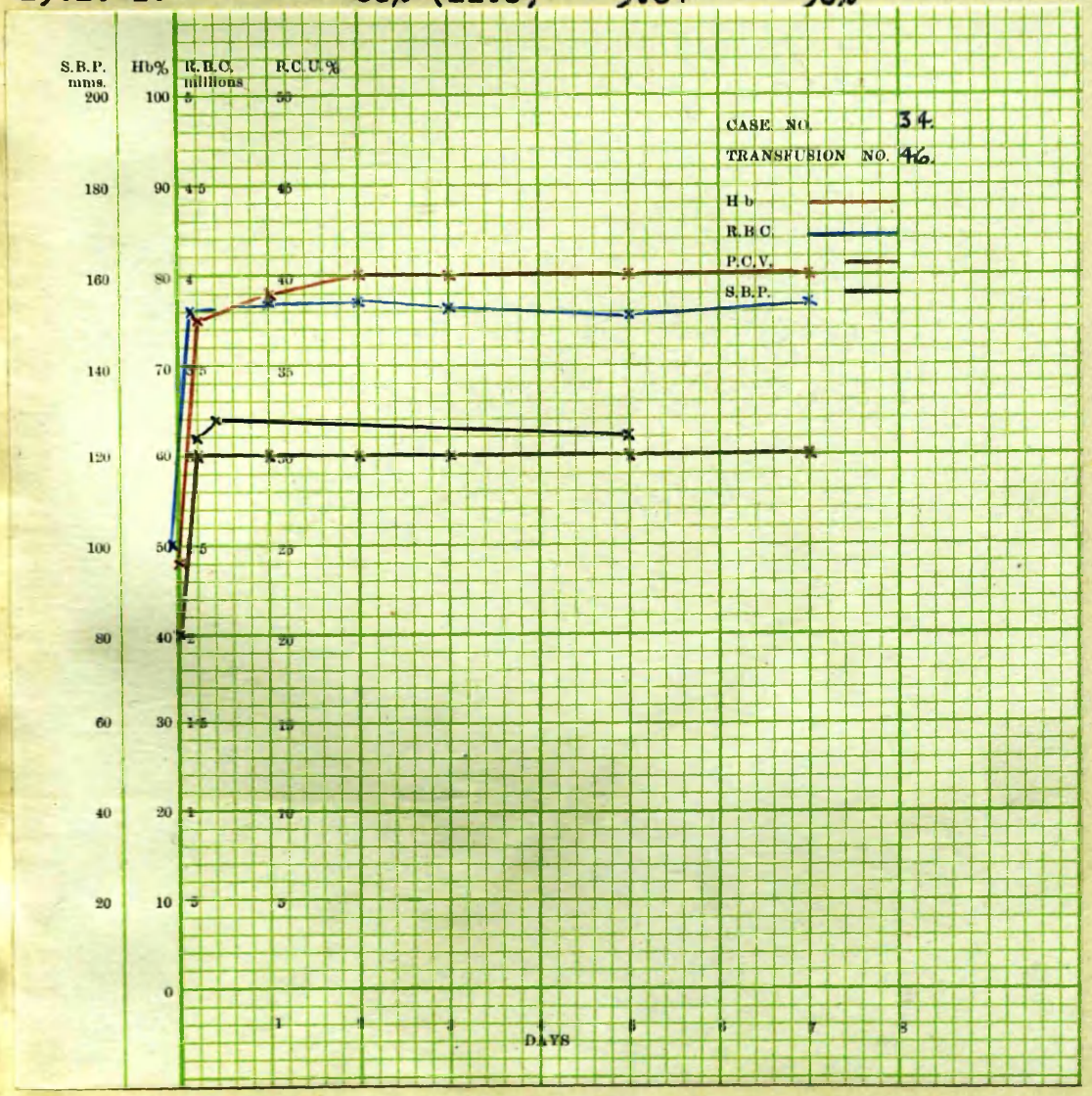
34. This patient had suffered from colitis for years, the condition having been confirmed by laparotomy. Recently, she had become weak and listless with diarrhoea, the stools containing mucus and blood. There was pallor, emaciation and oedema of the feet and ankles. The heart sounds were poor, and a V.S. murmur was present at the base. B.P. 118/78. Slight albuminuria was noted.

Blood examination showed on admission Hb 35% (5.6), R.B.C. 2.26 millions per cu.mm., W.B.C. 2,800 per cu.mm.

She improved under medical treatment until on 11.1.41 the blood count was Hb 50% (8.0), R.B.C. 2.44 millions per cu.mm., W.B.C. 6,000 per cu.mm.

46. On 12.1.42. she was given the cells from 900 c.c. Group O blood by the Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	48% (7.68)	2.48	20%			120
After 15 mins.	75% (12.0)	3.78	30%			124
13.1.42.	78% (12.48)	3.84	30%			
14.1.42.	80% (12.8)	3.86	30%			
15.1.42.	80% (12.8)	3.82	30%			
17.1.42.	80% (12.8)	3.78	30%			120
19.1.42.	80% (12.8)	3.84	30%			



Reactions - Nil.

In this case the V.S. murmur at the heart disappeared after transfusion.

Transfusion. Case.

35. W.J. (56 Years). Admitted 24.7.41.

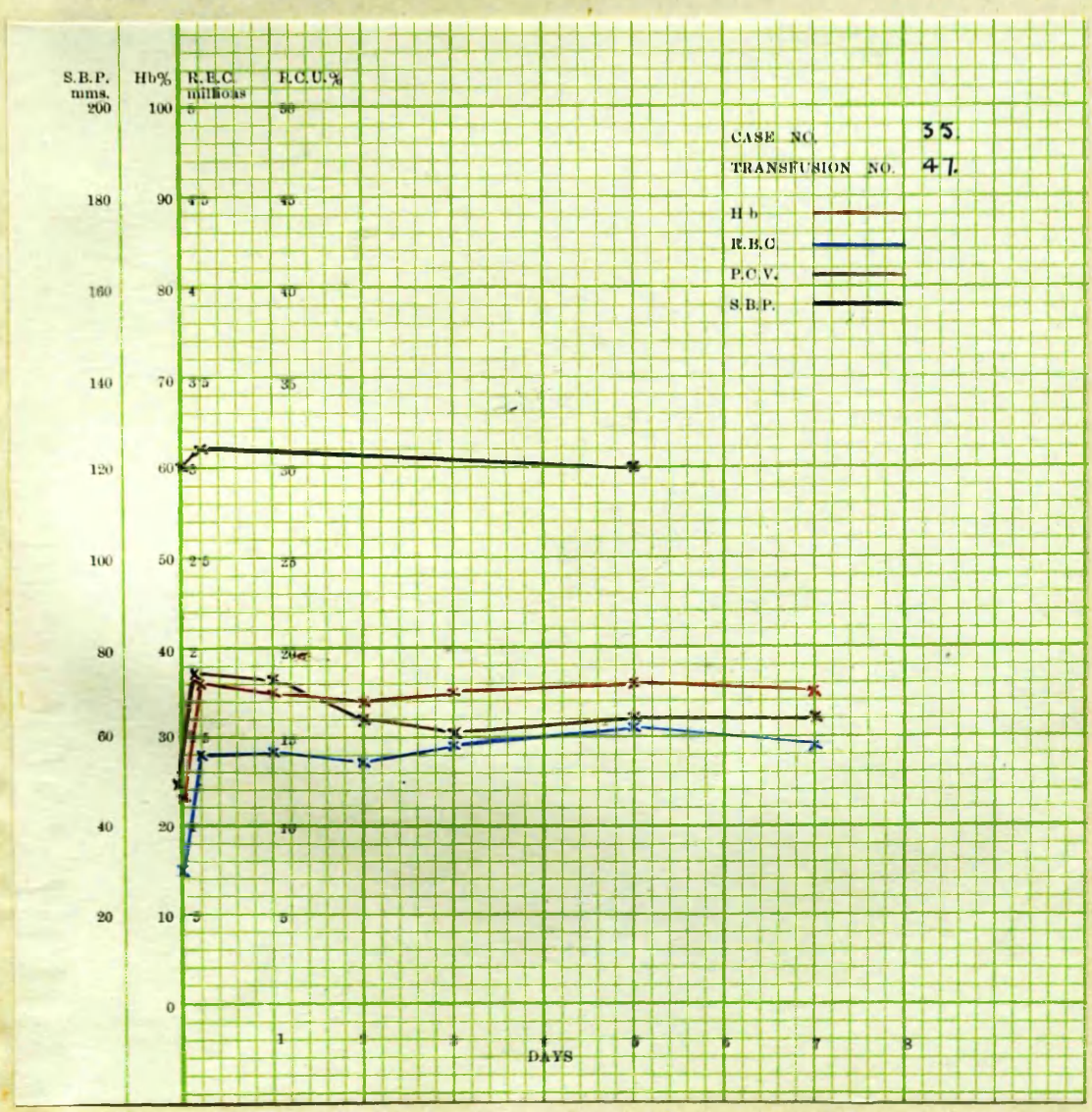
This man had weakness and loss of weight for ten months. There was pallor and glossitis, and the heart sounds were poor. B.P. 120/60.

He had had a cough for four years, probably due to his occupation as a miner.

Blood examination showed Hb 22% (3.52), R.B.C. .84 millions per cu. mm., W.B.C. 3,000 per cu.mm. Group B. There was megalocytosis, poikylocytosis and anisocytosis.

47. On 26.7.41. he was given the cells from 1,000 cc. Group O blood by the Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	SBP.
Before	23% (3.17)	.72	12%	2	.14	120
After 15 mins.	36% (4.97	1.40	18%	2	.92	124
27.7.41.	35% (4.83)	1.41	18%			
28.7.41.	34% (4.69)	1.37	16%	1.6		
29.7.41.	35% (4.83)	1.46	15%			
31.7.41.	36% (4.97)	1.56	16%	.8		120
2.8.41	35% (4.83)	1.45	16%		.62	



Reactions - Nil.

Transfusion. Case.

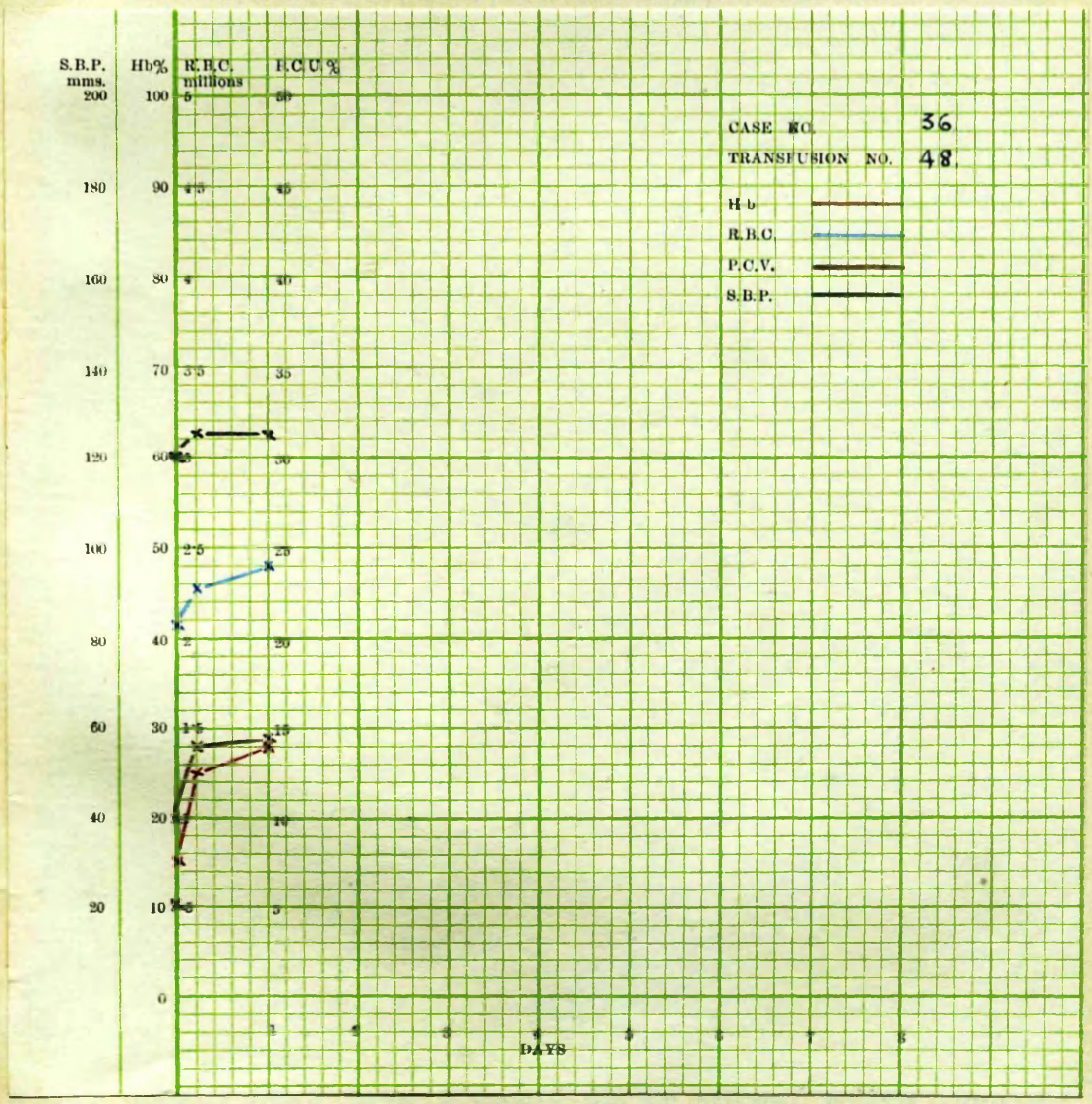
36. Mrs. M.K. (32 Years). Admitted 15.12.41.

This patient had a fibroid polyp removed from her uterus in April, 1938, and thereafter, kept well for two years. Nine months before admission she began to have excessive periods, and for the last six months bleeding was irregular and copious. There was a submucous fibroid polypus of large size in the vagina, and the patient was very pale.

Blood examination showed Hb 15% (2.4), R.B.C. 2.1 millions per cu.mm. Group O.

48. On 16.12.41. the cells from 500 c.c. Group O blood were given by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	15% (2.4)	2.08	10%			120
After 15 mins.	25% (4)	2.28	14%			125
17.12.41	28% (4.48)	2.40	14%			125



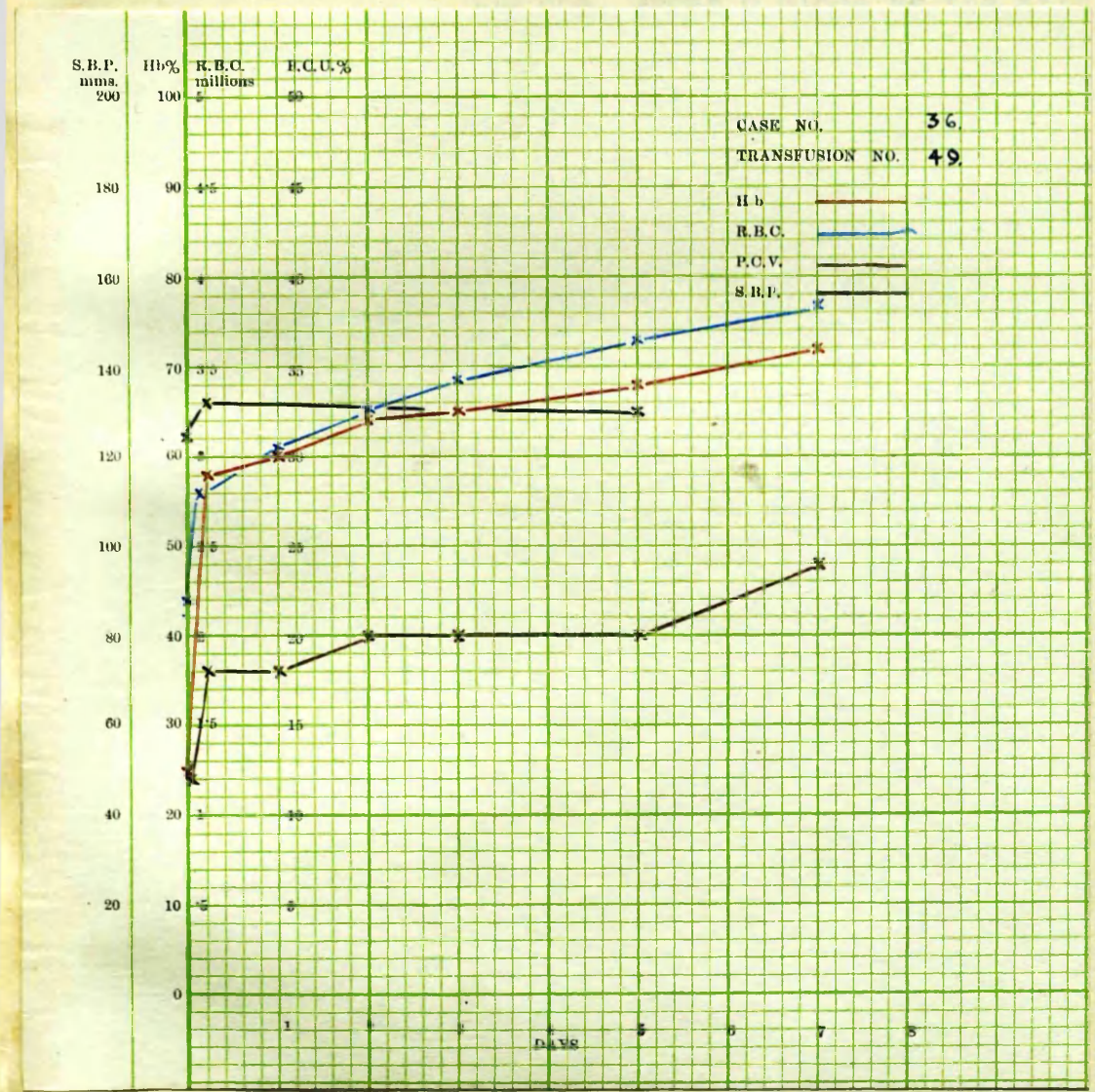
Reactions - Nil.

Transfusion. Case.

She underwent operation on 17.12.41 when the polypus was removed without much loss of blood.

49. On 21.12.41, she was given the cells from 1,400 ccs. Group O blood by the Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	25% (4.0)	2.20	12%			125
After 15 mins.	58% (9.28)	2.98	18%			132
22.12.41	60% (9.6)	3.02	18%			
23.12.41	64% (10.24)	3.22	20%			
24.12.41	65% (10.4)	3.42	20%			
26.12.41	68% (10.88)	3.64	20%			130
28.12.41	72% (11.52)	3.84	24%			



Reactions - Nil.

This is a very typical example of the rapid recovery of blood haemoglobin after a source of bleeding is removed. This patient had a reasonable blood picture within a week of her operation and could easily have been brought up to normal blood levels. This type of case is the one most successfully treated by transfusion and especially by erythro-transfusion.

Transfusion. Case.

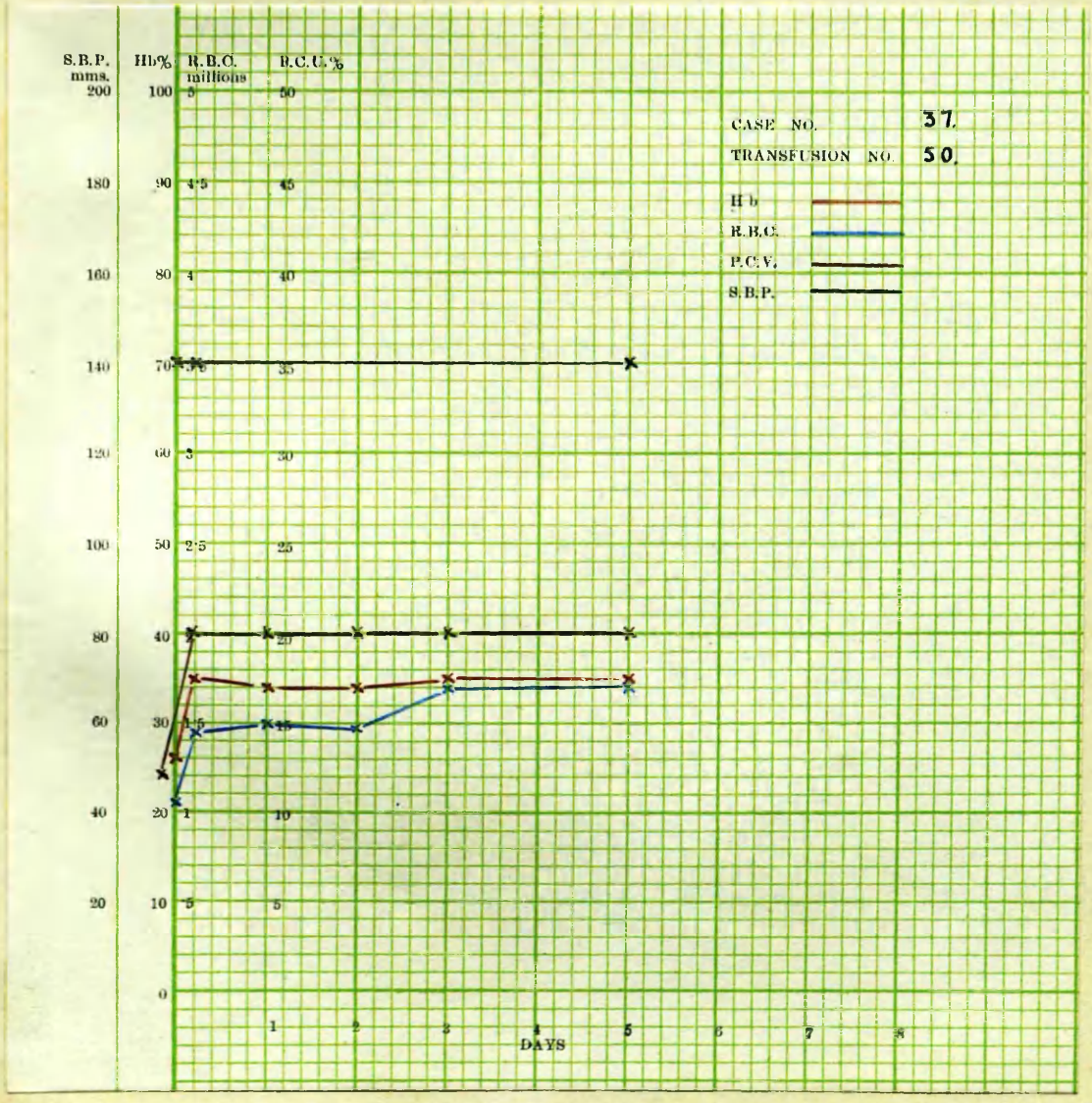
37. W.K. (66 years). Admitted 25.7.42.

This man had worked in a benzol plant and since then had noticed that he was breathless and easily fatigued. He had many bruises over his body, numerous petechial spots and marked pallor. There was a V.S. murmur at all areas.

Blood examination showed Hb 27% (4.32), R.B.C. 1.04 millions per cu.mm., W.B.C. 3,800 per cu.mm. Group O. Bleeding time 27 mins. Clotting time 5 mins. No platelets were seen on examination of films.

50. On 25.7.42, he was given the cells from 500 ccs. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	26% (4.16)	1.04	12%			140
After 15 mins.	35% (5.6)	1.46	20%			140
26.7.42	34% (5.44)	1.50	20%			
27.7.42	34% (5.44)	1.48	20%			
28.7.42	35% (5.6)	1.75	20%			140
30.7.42	35% (5.6)	1.76	20%			



Reactions - Nil

This patient appeared to have a toxic purpura due to industrial poisoning. Owing to the small numbers of platelets, subsequent transfusions were carried out with fresh blood, the first being given on 30.7.42.

Transfusion. Case.

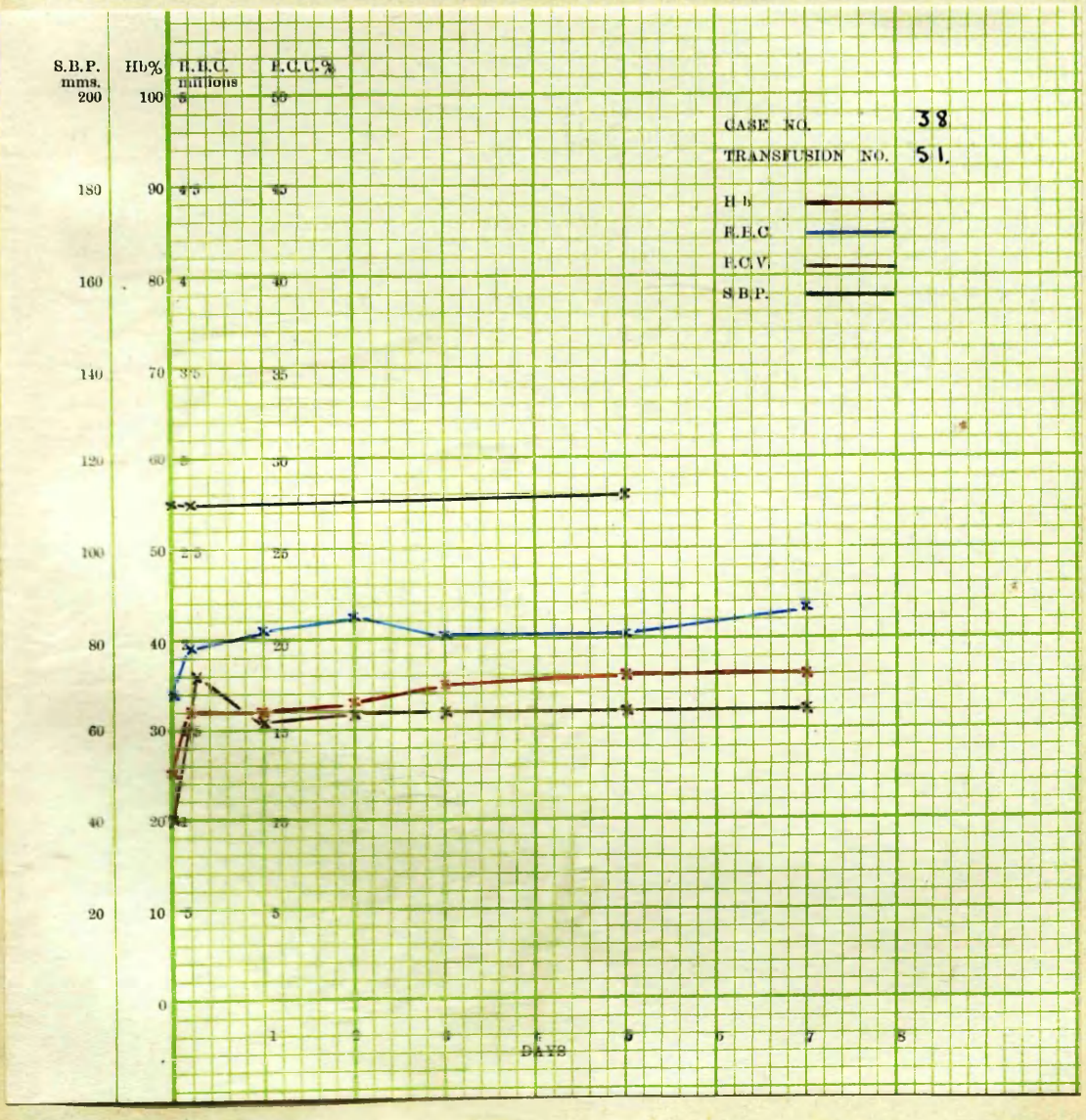
38. R.K. (34). Admitted 18.8.42.

This man had been a known megalocytic, hyperchromic anaemia for 1½ years but treatment had been occasional and intermittent. He had marked pallor and very poor heart sounds with a V.S. murmur at the apical area.

His blood count was Hb 25% R.B.C. 1.7 millions per cu. mm., W.B.C. 3,700 per cu.mm. Group O.

51. On 20.8.42, he was given the cells from 800 ccs. Group O blood by the drip method.

Blood changes.	Hb	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	25% (4.0)	1.7	10%			110
After 15 mins.	32% (5.12)	1.97	18%			110
21.8.42	32% (5.12)	2.04	16%			
22.8.42	33% (5.28)	2.12	16%			
23.8.42	35% (5.6)	2.01	16%			
25.8.42	36% (5.76	2.01	16%			112
27.8.42	36% (5.76)	2.17	16%			



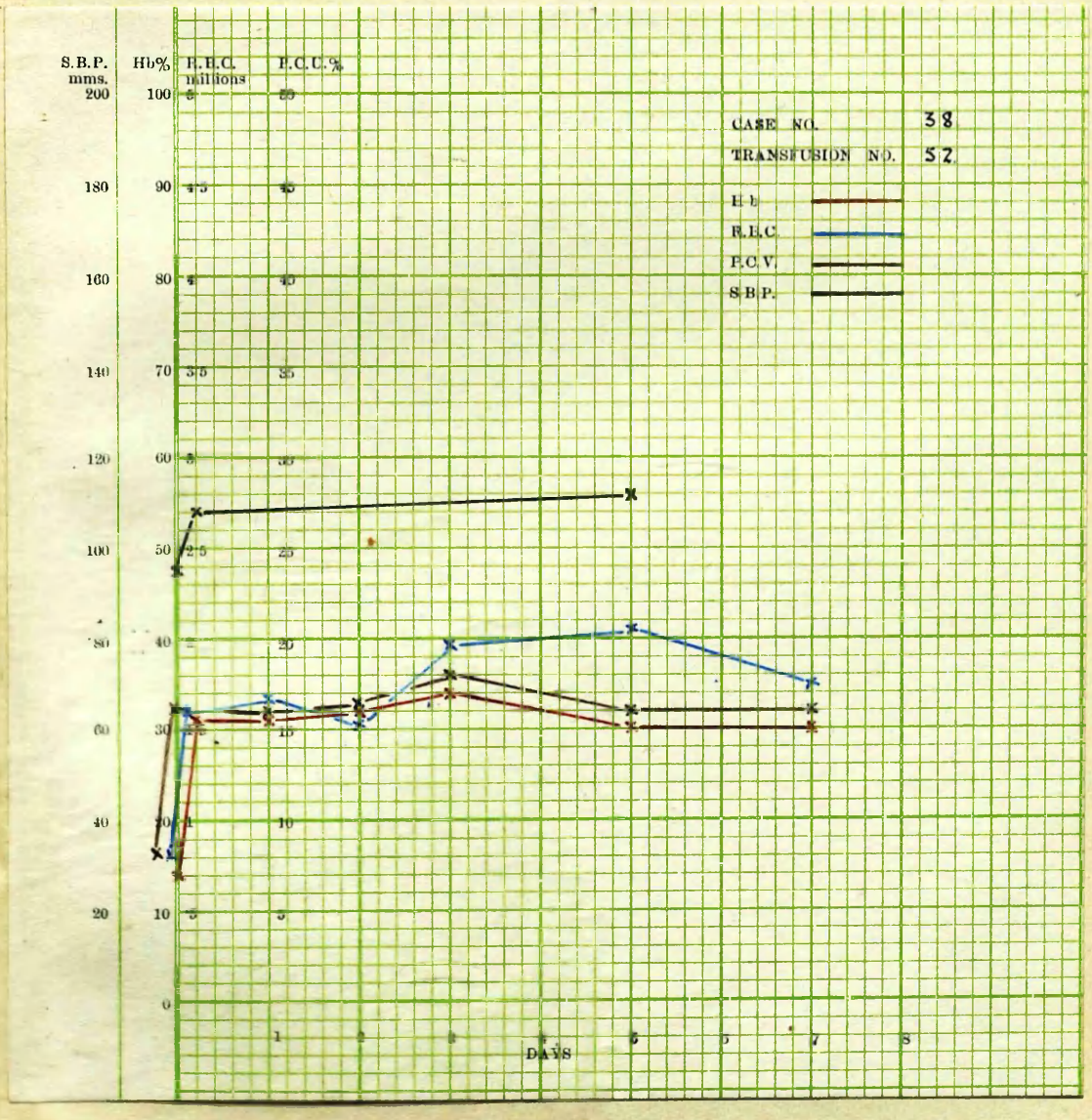
Reactions - Nil.

Transfusion. Case.

52

He began to have severe epistaxes and lost large quantities of blood. On 5.9.42, he was given the cells from 900 ccs. Group O blood by the drip method.

Blood Changes.	Hb	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	14% (2.24)	.79	8%			95
After 15 mins.	31% (4.96)	1.56	16%			108
6.9.42	31% (4.96)	1.68	16%			
7.9.42	32% (5.12)	1.42	16%			
8.9.42	34% (5.44)	1.98	18%			
10.9.42	30% (4.8)	2.04	16%			112
12.9.42	30% (4.8)	1.74	16%			



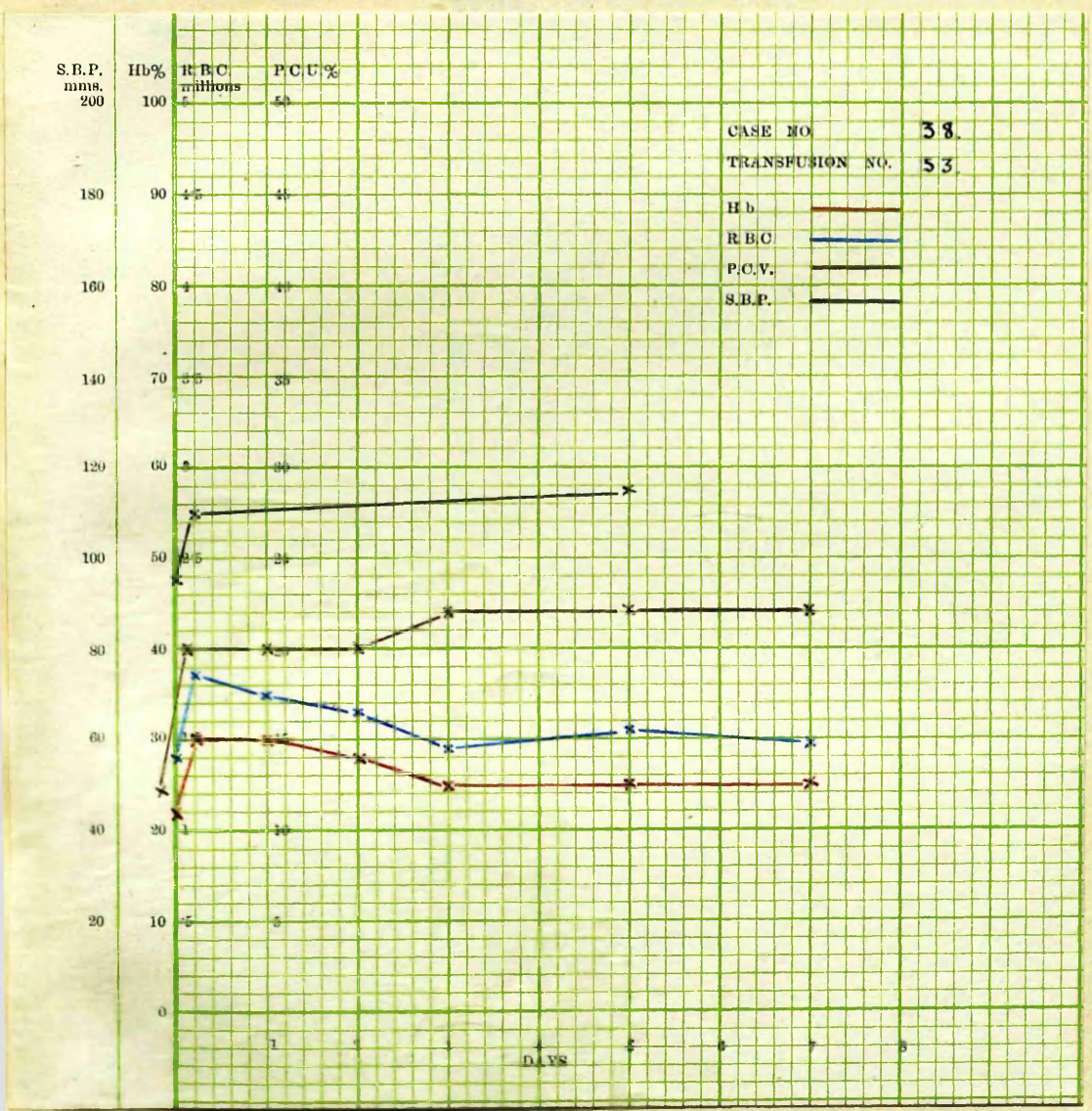
Reactions - Nil.

Transfusion. Case.

53

Epistaxis again occurred and caused great loss of blood. On 6.10.42, he was given the cells from 750 ccs. Group O blood by the drip method.

Blood changes.	Hb	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	22% (3.52)	1.40	12%			95
After 15 mins.	30% (4.8)	1.87	20%			110
7.10.42	30% (4.8)	1.74	20%			
8.10.42	28% (4.48)	1.65	20%			
9.10.42	25% (4.0)	1.46	22%			
11.10.42	25% (4.0)	1.53	22%			115
13.10.42	25% (4.0)	1.49	22%			



Reactions - Nil.

The disappointing results in this case were repeated on fresh blood transfusion. Haemopoiesis seemed to be minimal and raising the blood count seemed to induce epistaxis although there was no concomitant rise in blood pressure.

Transfusion. Case.

39. J.L. (67 years) Admitted 12.1.42.

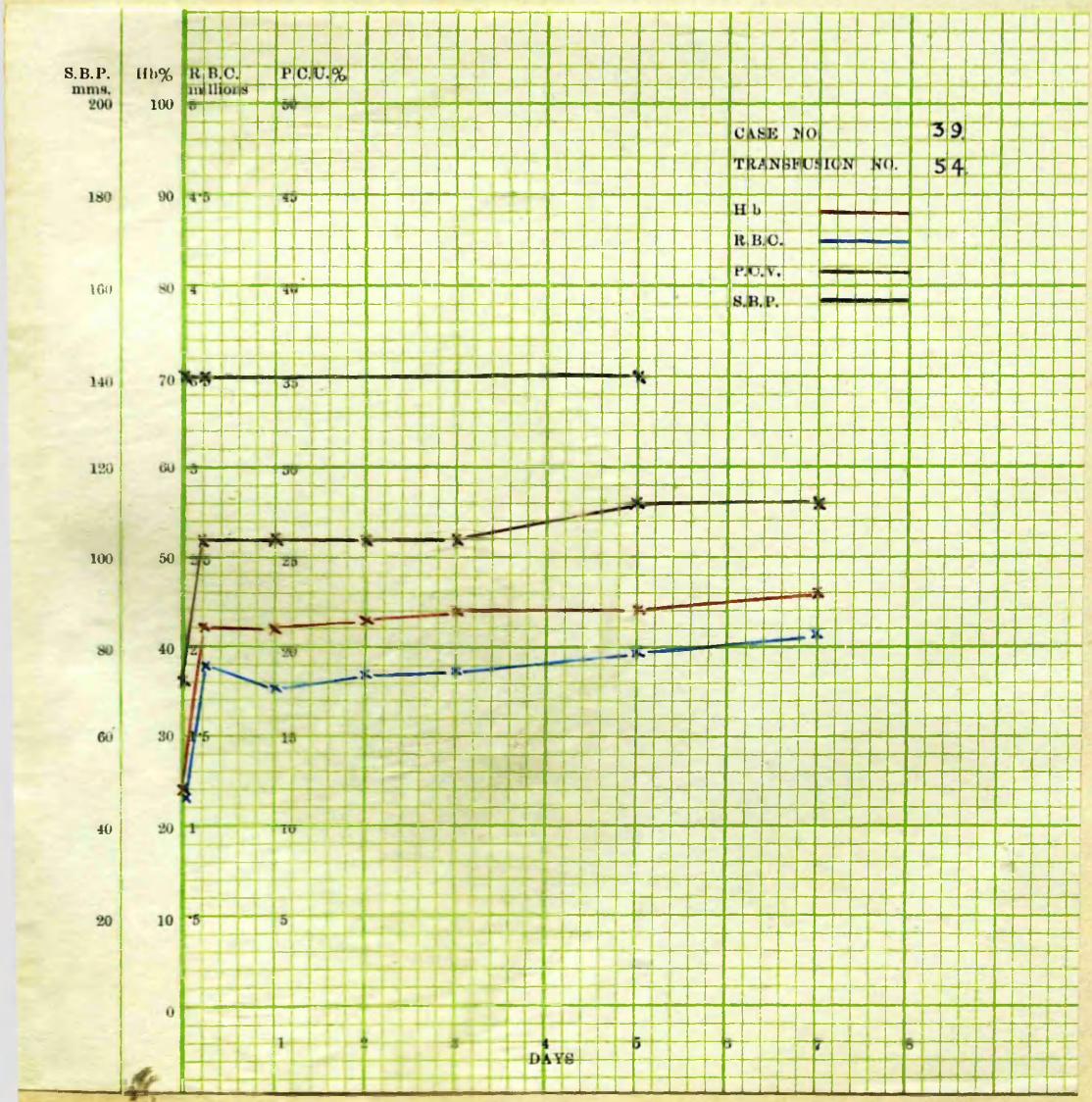
This man complained of retro-sternal pain intermittently for six months before admission. He had an operation for perforated peptic ulcer three months previously and since then had occasional vomiting and marked loss of weight.

He was thin and pale. There was some degree of renal insufficiency and albuminuria was present. A presystolic murmur was present at the apex; B.P. 140/90.

Blood examination showed Hb 24% (3.84), R.B.C. 1.17 millions per cu. mm., W.B.C. 7,600 per cu.mm. Group A. Sternal puncture showed a hypoplastic anaemia of normochromic type.

54. On 21.3.42, he was given the cells from 900 ccs. Group A blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	24% (3.84)	1.17	18%	2.8		140
After 15 mins.	42% (6.72)	1.90	26%	3.2		140
22.3.42	42% (6.72)	1.78	26%			
23.3.42	43% (6.88)	1.86	26%			
24.3.42	44% (7.04)	1.88	26%			
26.3.42	44% (7.04)	1.98	28%			140
28.3.42	46% (7.36)	2.08	28%	2.6		

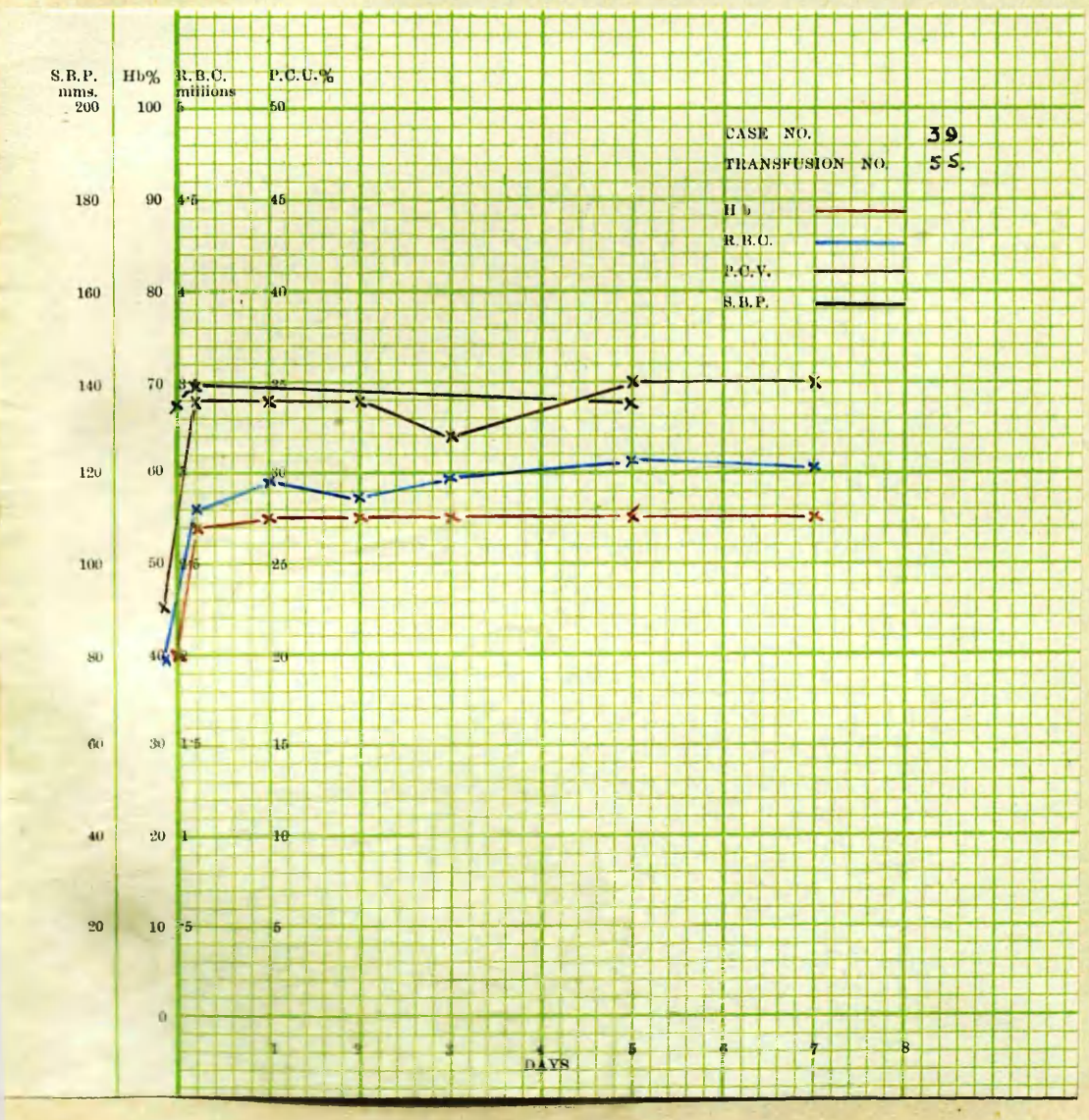


Reactions - Nil.

Transfusion. Case.

55. The patient maintained his improvement but did not much further rise and, on 3.4.42, he was given the cells from 900 ccs. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	40% (6.4)	1.98	25%		.08	135
After 15 mins.	54% (8.64)	2.80	34%		.79	138
4.4.42	55% (8.8)	2.96	34%			
5.4.42	55% (8.8)	2.87	34%			
6.4.42	55% (8.8)	2.98	32%			
8.4.42	55% (8.8)	3.08	35%			135
10.4.42	55% (8.8	3.02	35%		.275	



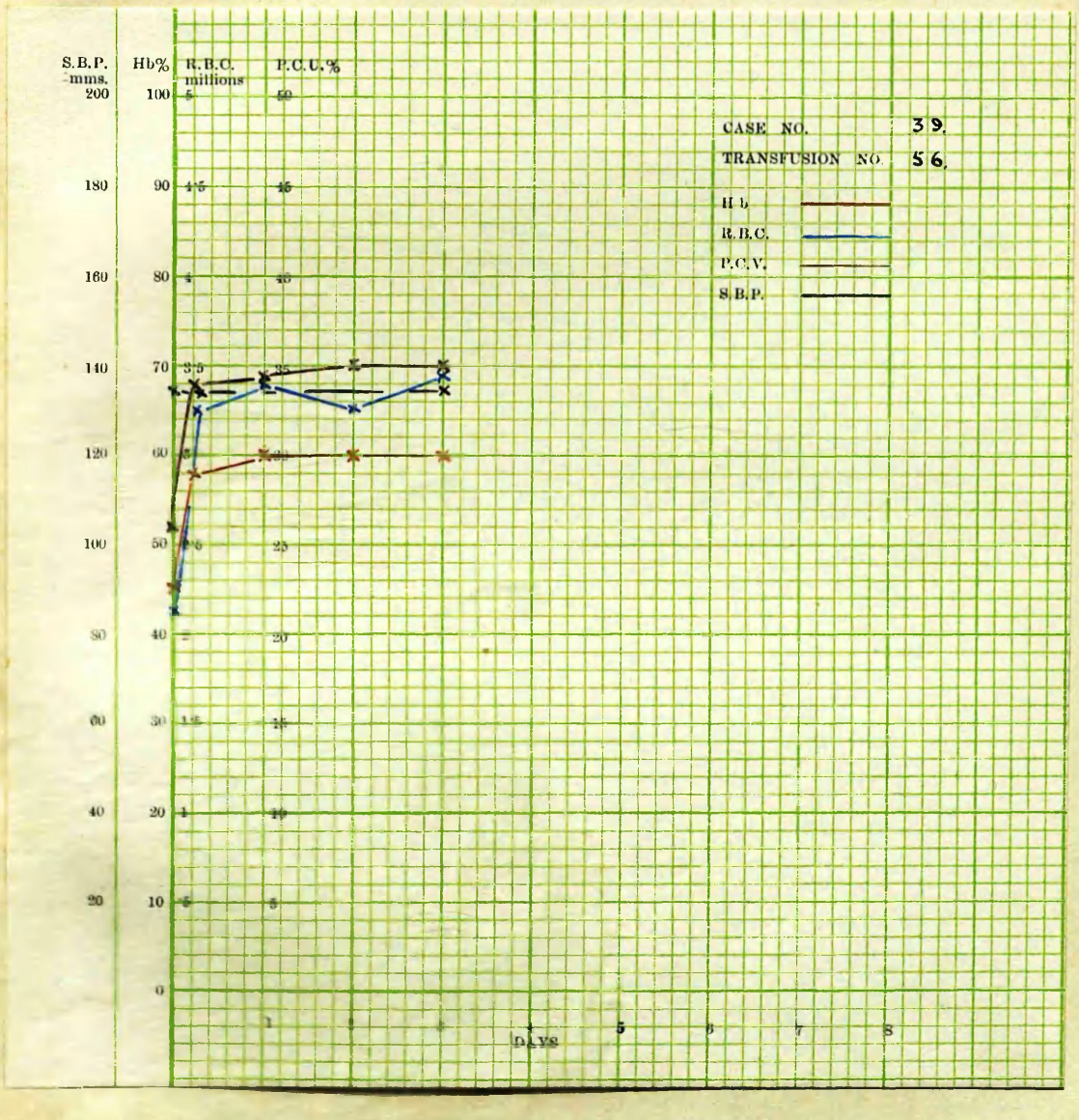
Reactions - Nil.

Transfusion. Case.

The patient gradually lost way but had no specific complaint. On 7.5.42, he was given the cells from 800 ccs. Group A blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	45% (7.2)	2.12	26%			135
After 15 mins.	58% (9.28)	3.25	34%			135
8.5.42	60% (9.6)	3.40	34%			
9.5.42	60% (9.6)	3.26	35%			
10.5.42	60% (9.6)	3.45	35%			135

The patient was dismissed on 12.5.42 feeling well and without symptoms.



Reactions - Nil.

Transfusion. Case.

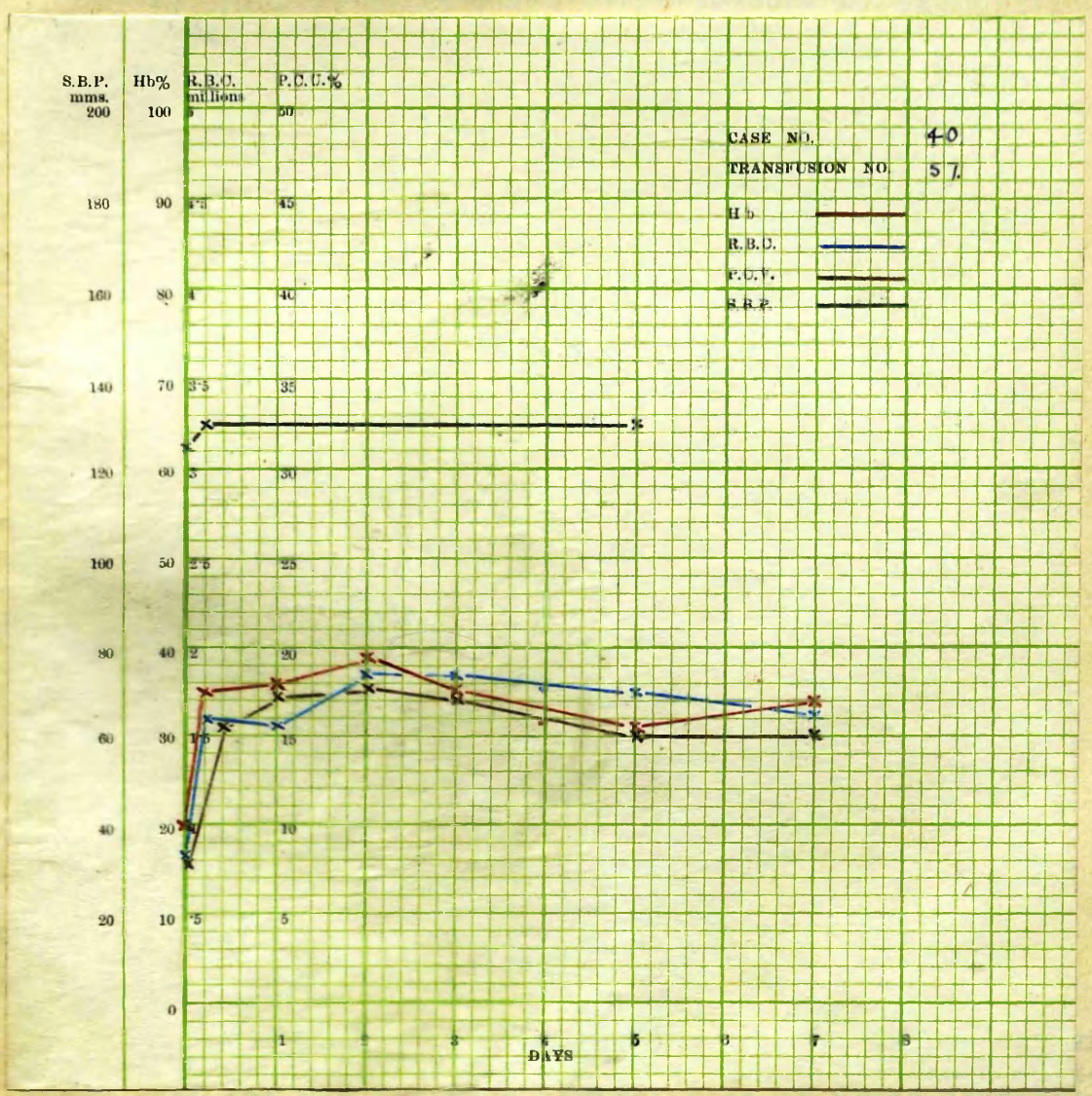
40. Mrs. M. McG. (64 Years). Admitted 24.7.41.

This patient had had a pernicious type of anaemia for three years of which treatment had been neglected. She suffered from weakness, lassitude and breathlessness. Glossitis was present. The heart sounds were poor, and a V.S. murmur was present at the apex. B.P.125/45. Paraesthesia was noted and the left plantar response was extensor.

Blood examination showed Hb 25% (4.0), R.B.C. .82 millions per cu.mm., W.B.C. 2,000 per cu.mm. Group A.

57. On 26.7.41. she was given the cells from 1,000 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	20% (2.76)	.825	8%	1.5	.15	125
After 15 mins.	35% (4.83)	1.60	16%	1.5	.84	130
27.7.41	36% (4.97)	1.55	18%			
28.7.41	39% (5.38)	1.85	18%	2.0		
29.7.41.	35% (4.83)	1.85	18%			
31.7.41	31% (4.28)	1.75	16%	1.2		130
2.8.41	34% (4.69)	1.61	15%		.72	



Reactions - Nil.

Transfusion. Case.

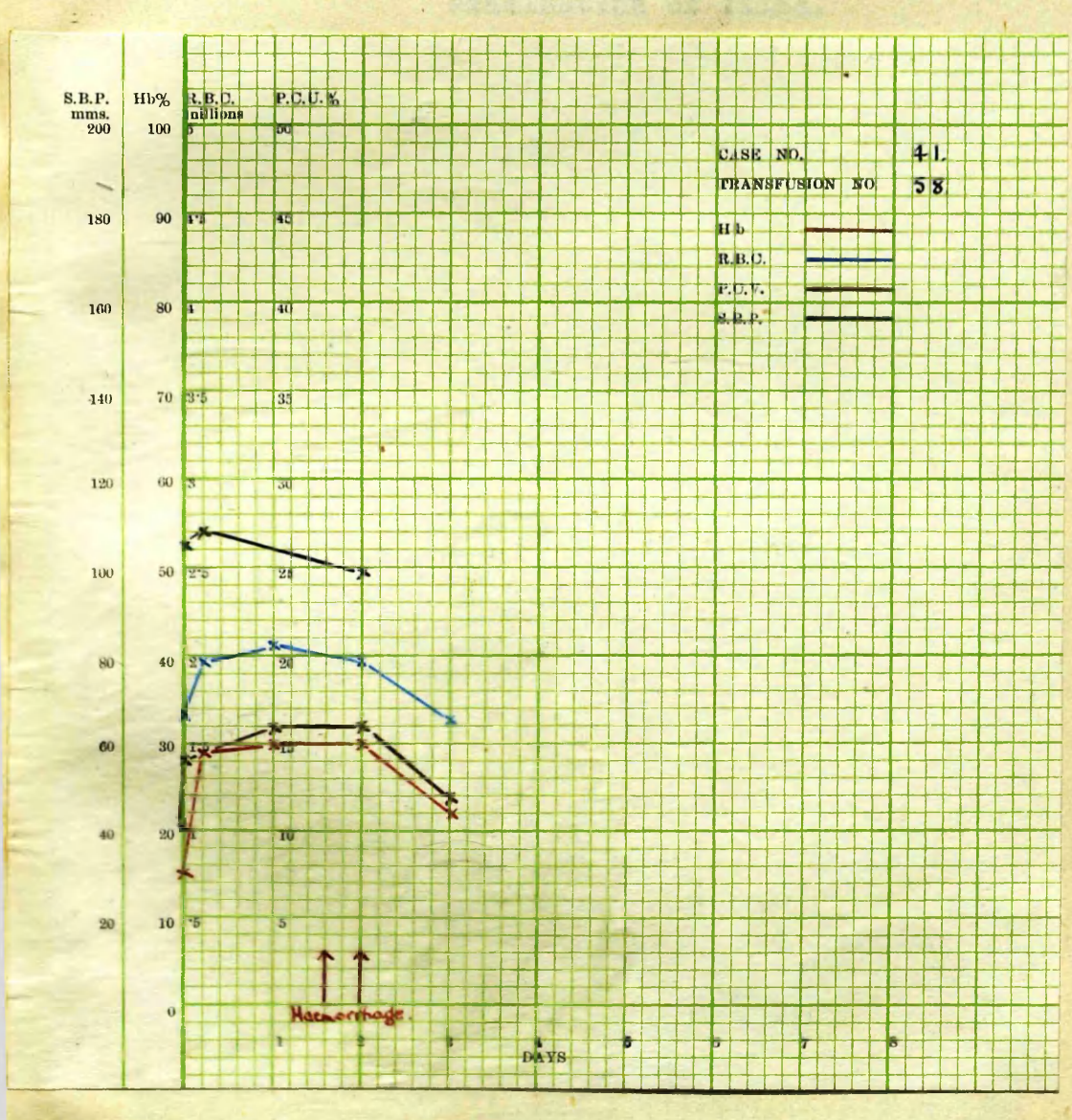
41. Mrs. A.McG. (32 Years). Admitted 11.3.42.

This patient complained of weakness of eight weeks' duration. She had a sore tongue, loss of appetite and vague abdominal pain. Loss of weight was marked. Bleeding haemorrhoids were present, and the spleen was enlarged. The heart sounds were poor, with a V.S. murmur at all areas. B.P. 104/64.

Blood examination showed Hb 16% (2.56), R.B.C. 1.64 millions per cu.mm., W.B.C. 2,000 per cu.mm. Group O. There was a relative increase in the proportion of lymphocytes.

58. On 12.3.42. she was given the cells from 900 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	15% (2.4)	1.68	10%			105
After 15 mins.	29% (4.64)	1.98	14%			108
13.3.42.	30% (4.8)	2.04	16%			
14.3.42.	30% (4.8)	1.98	16%			98
15.3.42.	22% (3.52)	1.64	12%			



Reactions - Nil.

Bleeding took place from the gums, rectum and vagina on 14.3.42, and the patient gradually retrogressed. Her white cell count rose and she became a typical case of acute leukaemia of lymphatic type. Several fresh blood transfusions were given, but she eventually died.

Transfusion. Case.

42. Mrs. M. McK. (52 Years). Admitted 23.4.42.

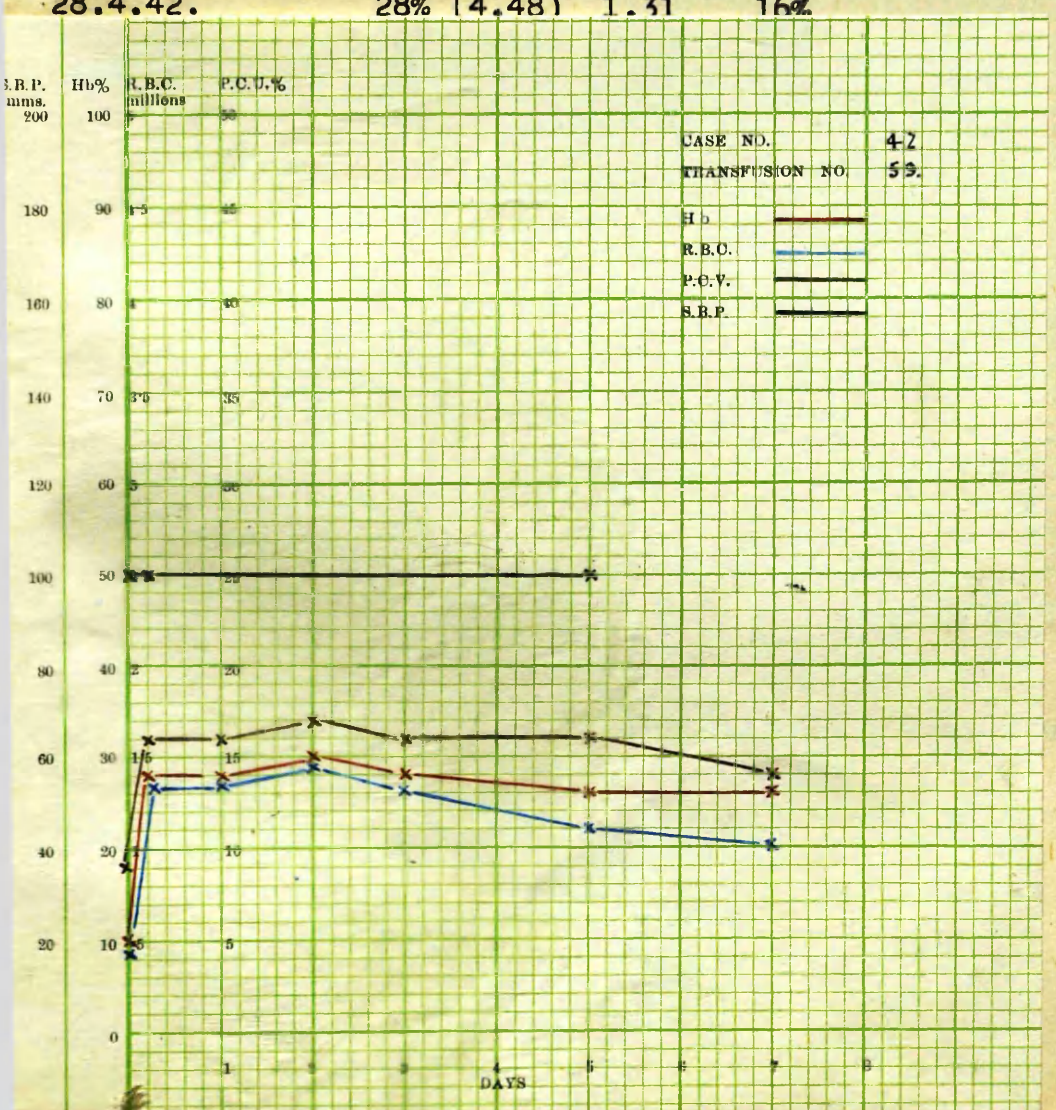
This woman had been tired and listless for one year. She had recurrent attacks of faintness and breathlessness. Diarrhoea had been present intermittently for seven months. She was diagnosed as a case of pernicious anaemia, but large doses of Anahaemin failed to bring about any improvement.

The pulse was soft, and there was no enlargement of the heart. A V.S. murmur was present at all areas. The liver was enlarged, but the spleen was normal to clinical examination. The arm reflexes were diminished, knee jerks increased, and both plantar responses extensor. Clonus was present in both ankles. Ophthalmic examination showed haemorrhages in both retinae.

Her blood counts were exceptionally low on 25.4.42, being Hb 10% (1.6), R.B.C. .45 millions per cu.mm., W.B.C. 1,900 per cu. mm. Group O. No reticulocytes were seen on examination of films.

59. On 25.4.42. she was given the cells from 900 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	10% (1.6)	.46	8%	1.4		100
After 15 mins.	28% (4.48)	1.41	16%	1.8		100
26.4.42.	28% (4.48)	1.38	16%			
27.4.42	30% (4.8)	1.48	17%			
28.4.42.	28% (4.48)	1.31	16%			100

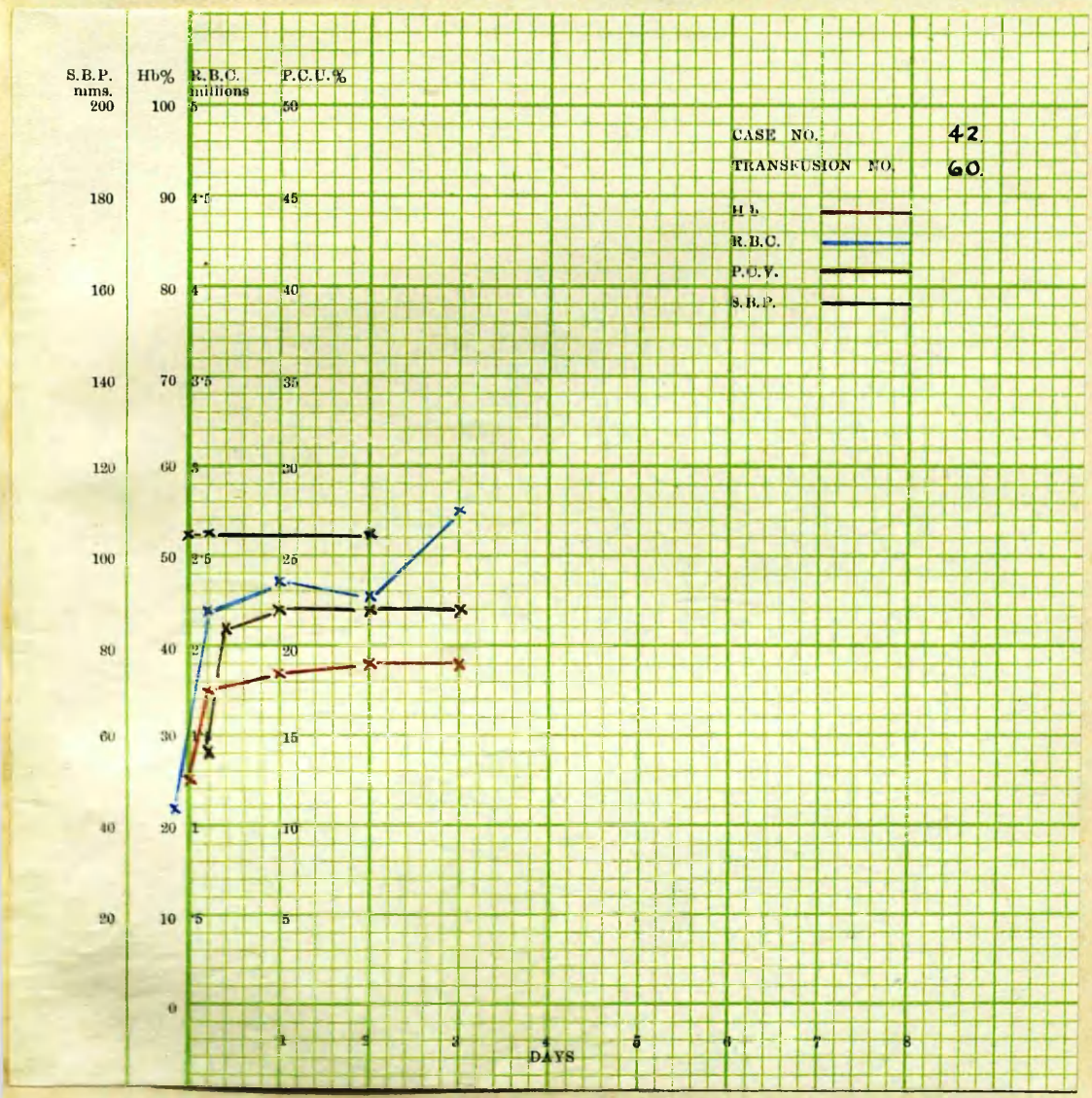


Reactions - Nil.

Transfusion. Case.

60. She maintained her improvement, and on 2.5.42. was given the cells from 900 c.c. Group O blood by the drip method.

Blood changes.	Hb	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	25% (4)	1.08	14%			105
After 15 mins.	35% (5.6)	2.20	21%			105
3.5.42.	37% (5.92)	2.46	22%			
4.5.42.	38% (6.08)	2.38	22%			105
5.5.42.	38% (6.08)	2.74	22%			



Further fresh blood transfusions were given before the period of observation was complete.

Reactions - Nil.

Transfusion. Case,

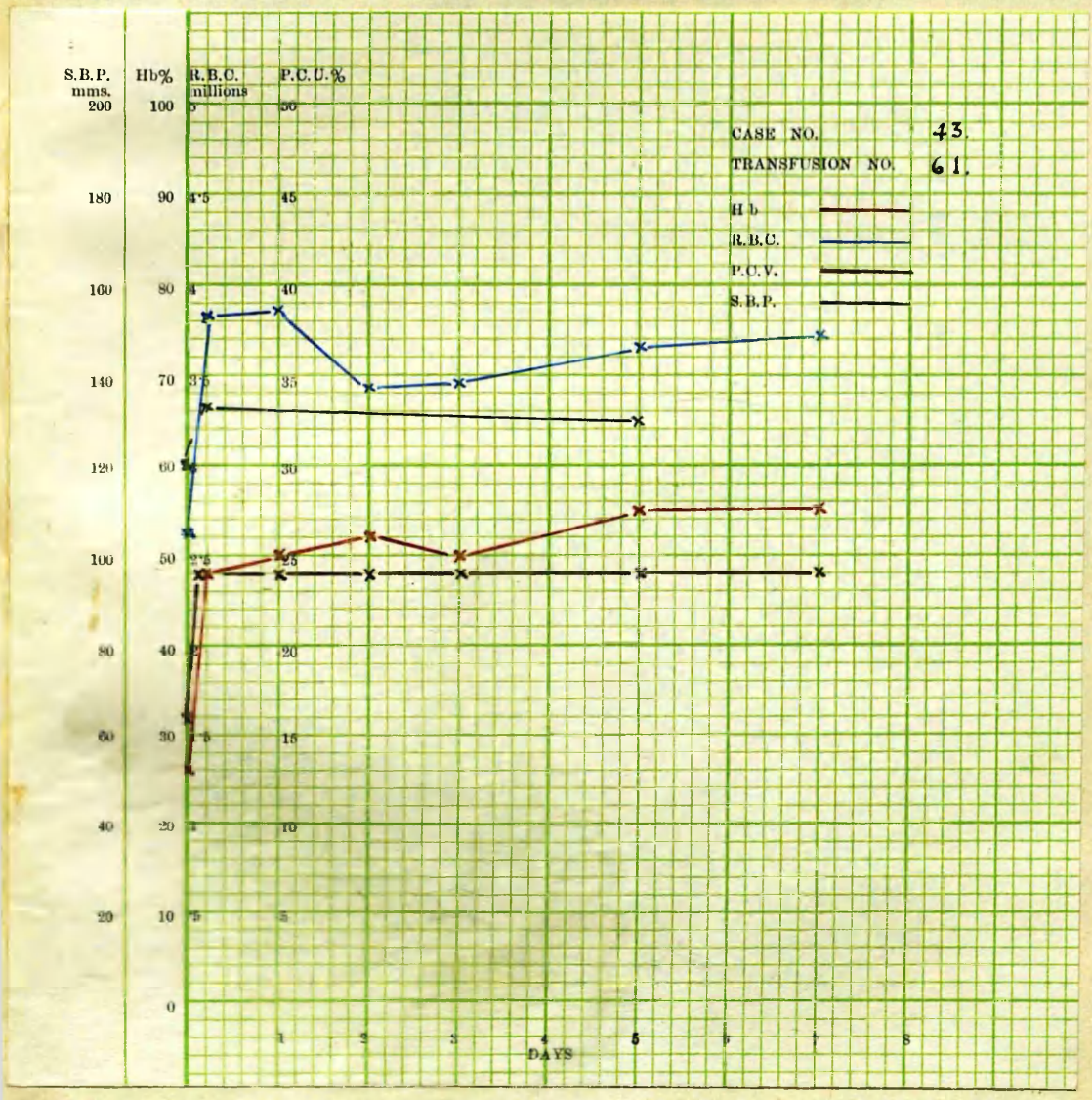
43. J.McL. (56 Years). Admitted 26.11.41.

This man had his right leg crushed in an industrial accident, and required amputation below the knee. The stump became infected, and his general condition deteriorated. The heart sounds were weak but pure.

Blood examination showed Hb 30% (4.8), R.B.C. 2.37 millions per cu.mm., W.B.C. 9,600 per cu.mm. Group A.

61. On 4.1.42. the cells from 1,200 c.c. Group O blood were given by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	26% (4.16)	2.62	16%	3.4	.30	120
After 15 mins.	48% (7.68)	3.83	24%	3.8	1.41	134
5.1.42.	50% (8)	3.86	24%			
6.1.42.	52% (8.32)	3.42	24%			
7.1.42.	50% (8)	3.46	24%			
9.1.42.	55% (8.8)	3.68	24%			130
11.1.42	55% (8.8)	3.71	24%	3.8	1.20	



Reactions - Nil.

Transfusion. Case.

44. Mrs. E. McL. (44 Years). Admitted 25.6.41. to Gartloch Emergency Hospital.

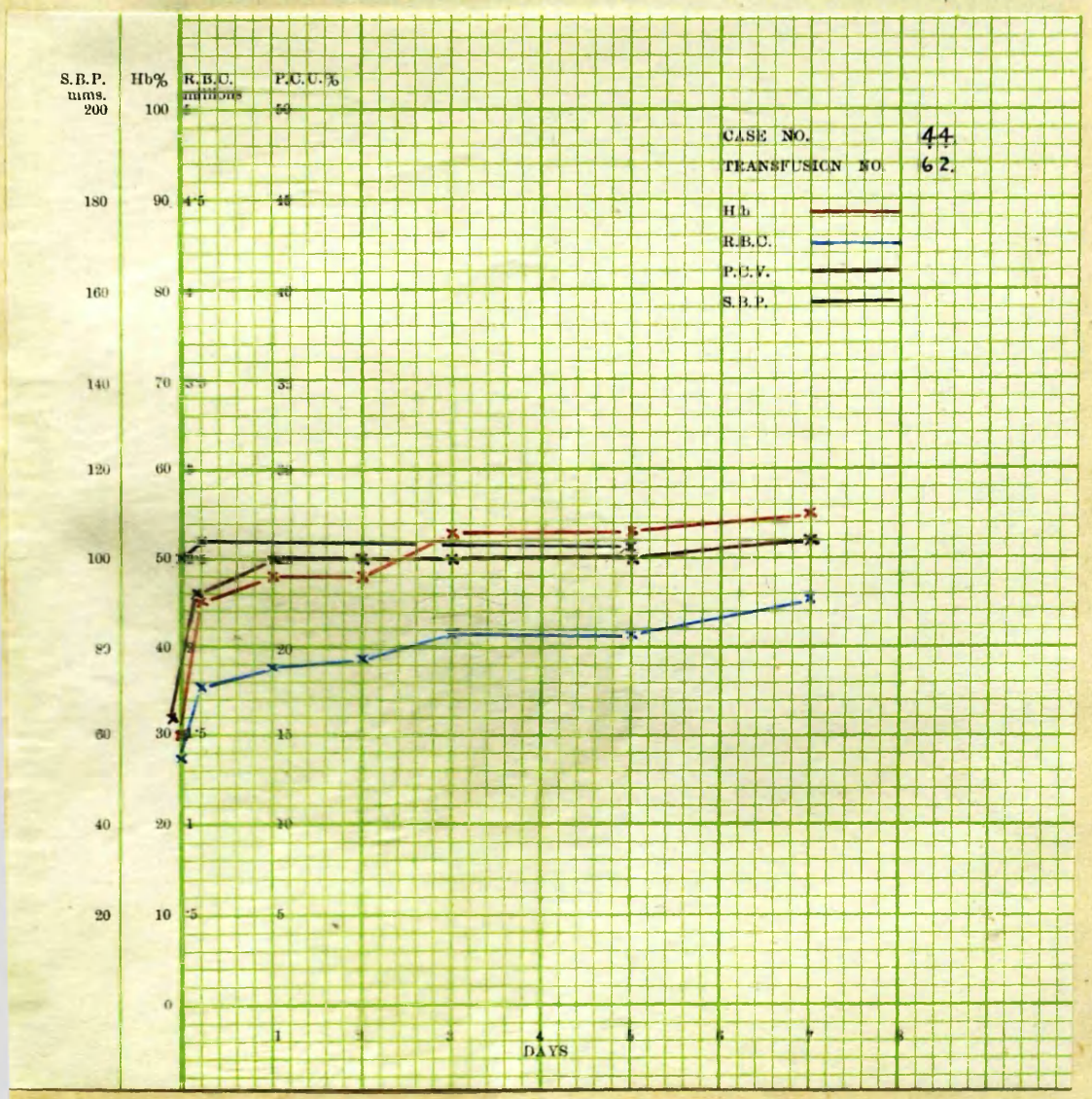
This woman had a partial thyroidectomy in 1936. Since then, she complained of pallor, loss of weight and weakness. Palpitation, nervousness and diarrhoea were also troublesome. There was swelling of the ankles. The heart was enlarged, and auricular fibrillation was present. B.P. 110/60. The spleen and liver were both much enlarged. Blood culture was negative. Haematuria was present. Test meal was within normal limits.

Her blood count on admission was Hb 50% (6.9), R.B.C. 2.5 millions per cu.mm., W.B.C. 4,000 per cu.mm. Group O.

This gradually fell in spite of fresh blood transfusions on 17.1.41 and 24.7.41.

62. On 1.8.41. she was given the cells from 1,000 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	30% (4.14)	1.37	16%			110
After 15 mins.	45% (6.21)	1.79	23%			114
2.8.41.	48% (6.62)	1.89	25%			
3.8.41.	48% (6.62)	1.92	25%			
4.8.41.	53% (7.31)	2.09	25%			
6.8.41.	53% (7.31)	2.07	25%			112
8.8.41.	55% (7.59)	2.28	26%			

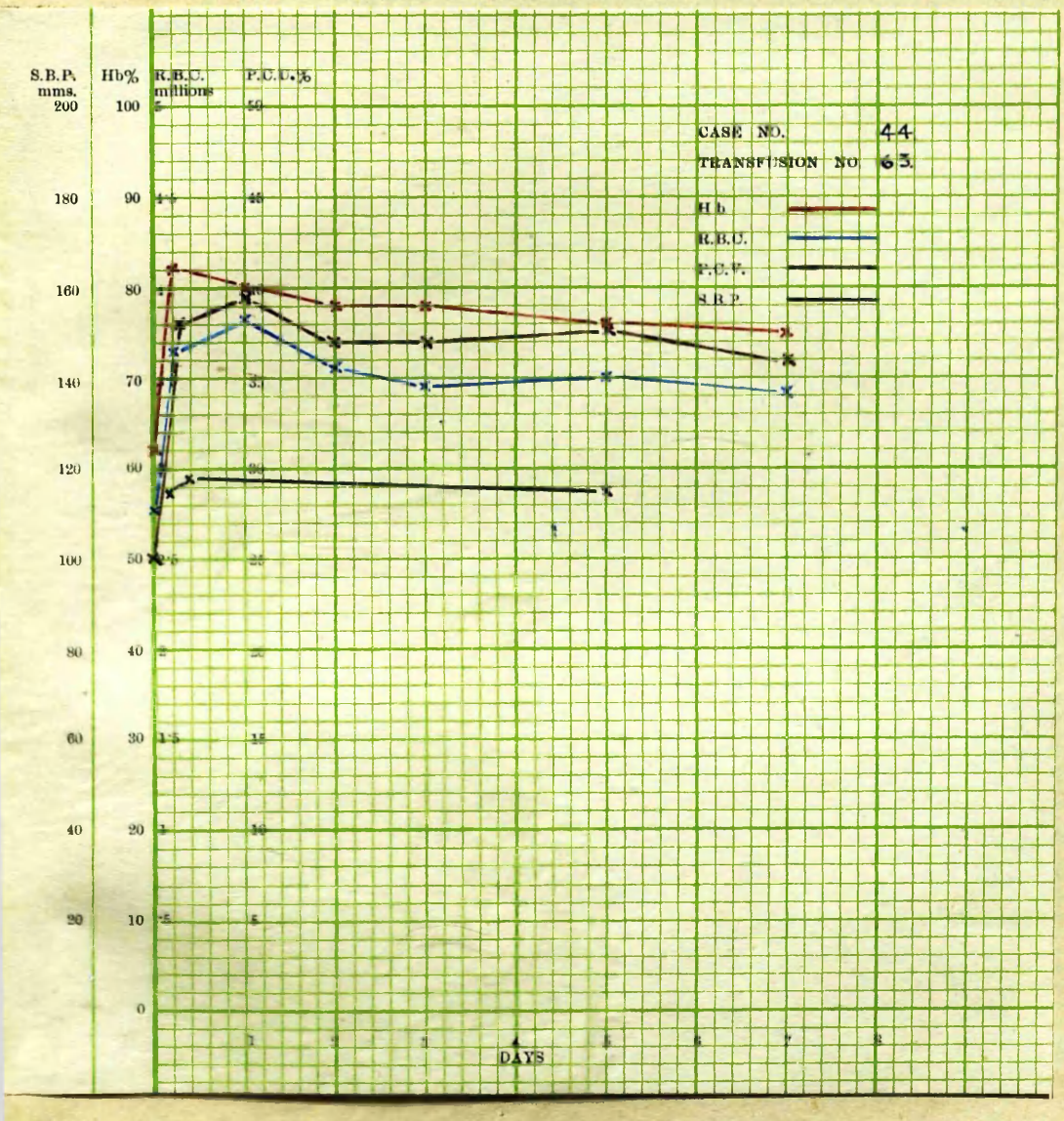


Reactions - Nil.

Transfusion. Case.

63. She remained well and improved slightly. On 14.8.41. she was given the cells from 900 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	62% (8.56)	2.78	25%	1.0		115
After 15 mins.	82% (11.32)	3.66	38%	.8		118
15.8.41	80% (11.04)	3.82	40%			
16.8.41	78% (10.76)	3.56	37%			
17.8.41	78% (10.76	3.46	37%			
19.8.41.	76% (10.49)	3.50	38%			115
21.8.41.	75% (10.35)	3.42	36%	1.0		



Reactions - Nil.

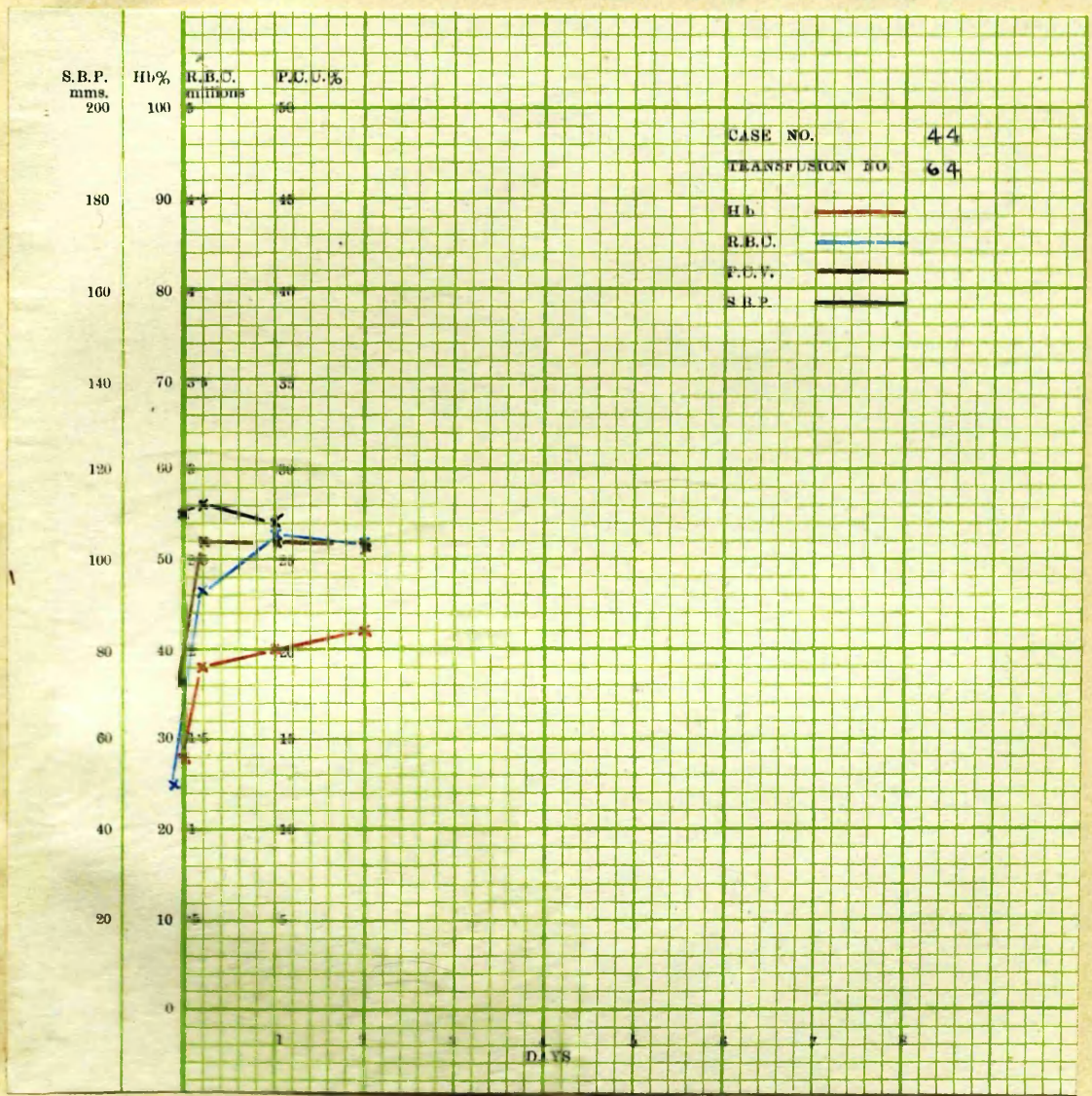
Transfusion. Case.

She was dismissed on 25.10.41. Haemoglobin was 78%. No treatment was given at home, and she gradually relapsed. She was admitted after two weeks with a troublesome cough, and recurrence of fibrillation.

64.

On 15.12.41 she was given the cells from 900 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	28% (4.48)	1.24	18%			110
After 15 mins.	38% (6.08)	2.42	26%			112
16.12.41.	40% (6.4)	2.64	26%			108
17.12.41.	42% (6.72)	2.60	26%			



Reactions - Nil.

Cardiac failure was marked on readmission with oedema, cyanosis and dyspnoea. She died on 18.12.41.

Transfusion. Case.

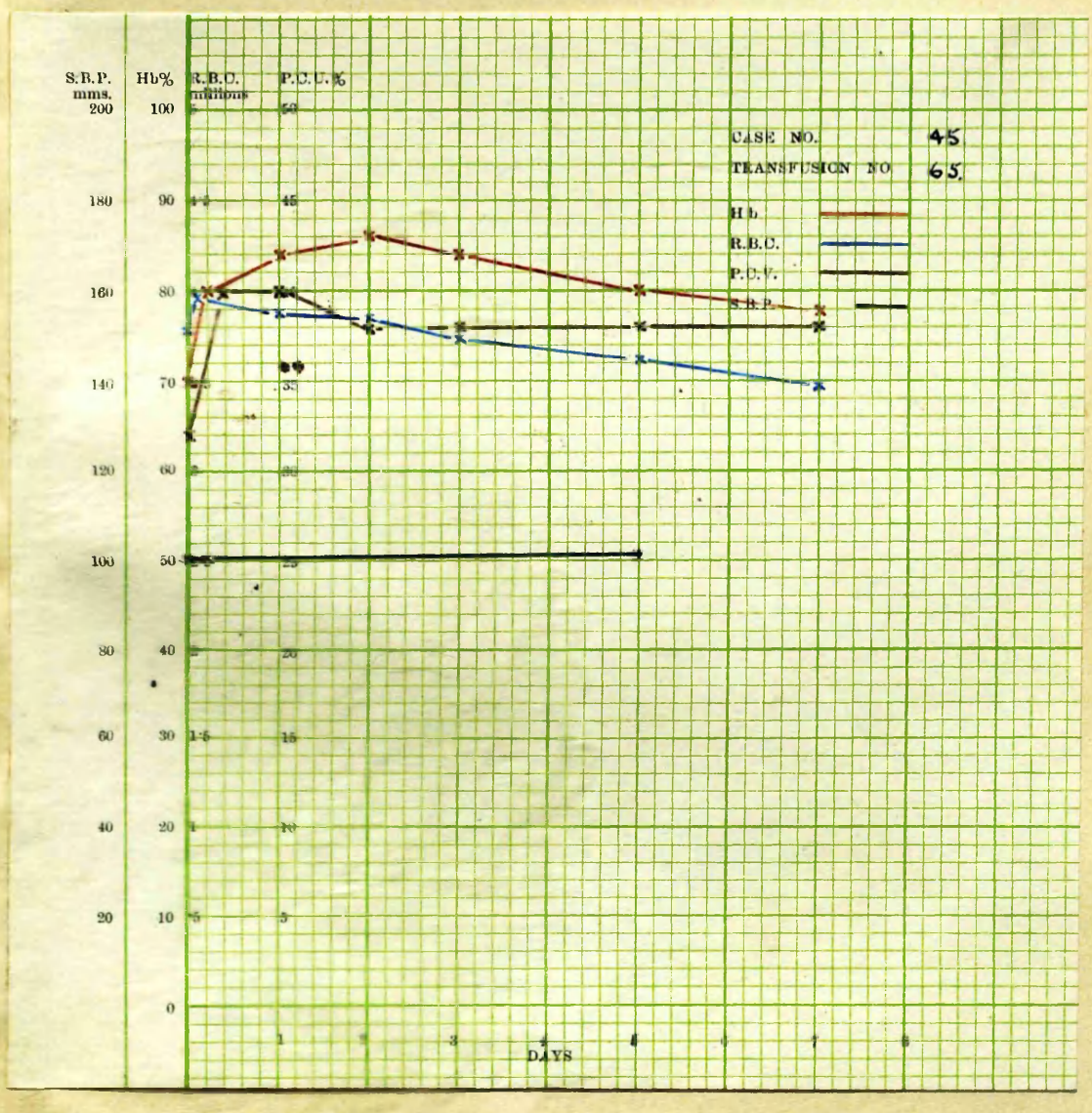
45. Mrs. M. McM. (38 Years). Admitted 13.7.42.

This patient had been treated for purpura haemorrhagica nine years before admission, and remained well until one week before admission. Bruises and petechial spots reappeared with gross uterine and nasal haemorrhages. The heart was not enlarged, but the sounds were soft. B.P. 100/60.

Blood examination showed Hb 72% (11.52), R.B.C. 2.55 millions per cu.mm., W.B.C. 3,400 per cu.mm. No platelets were seen on films. Bleeding time was much prolonged, and the capillary resistance was grossly diminished. Group O.

65. On 25.7.42. the cells from 500 c.c. Group O blood were given by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	70% (11.2)	3.78	32%			100
After 15 mins.	80% (12.8)	3.98	40%			100
26.7.42.	84% (13.44)	3.89	40%			
27.7.42.	86% (13.76)	3.84	38%			
28.7.42	84% (13.44)	3.72	38%			
30.7.42.	80% (12.8)	3.62	38%			102
1.8.42.	78% (12.48)	3.48	38%			



Reactions - Slight Grade I.

Transfusion. Case.

46. W. McR. (38 Years). Admitted 17.4.42.

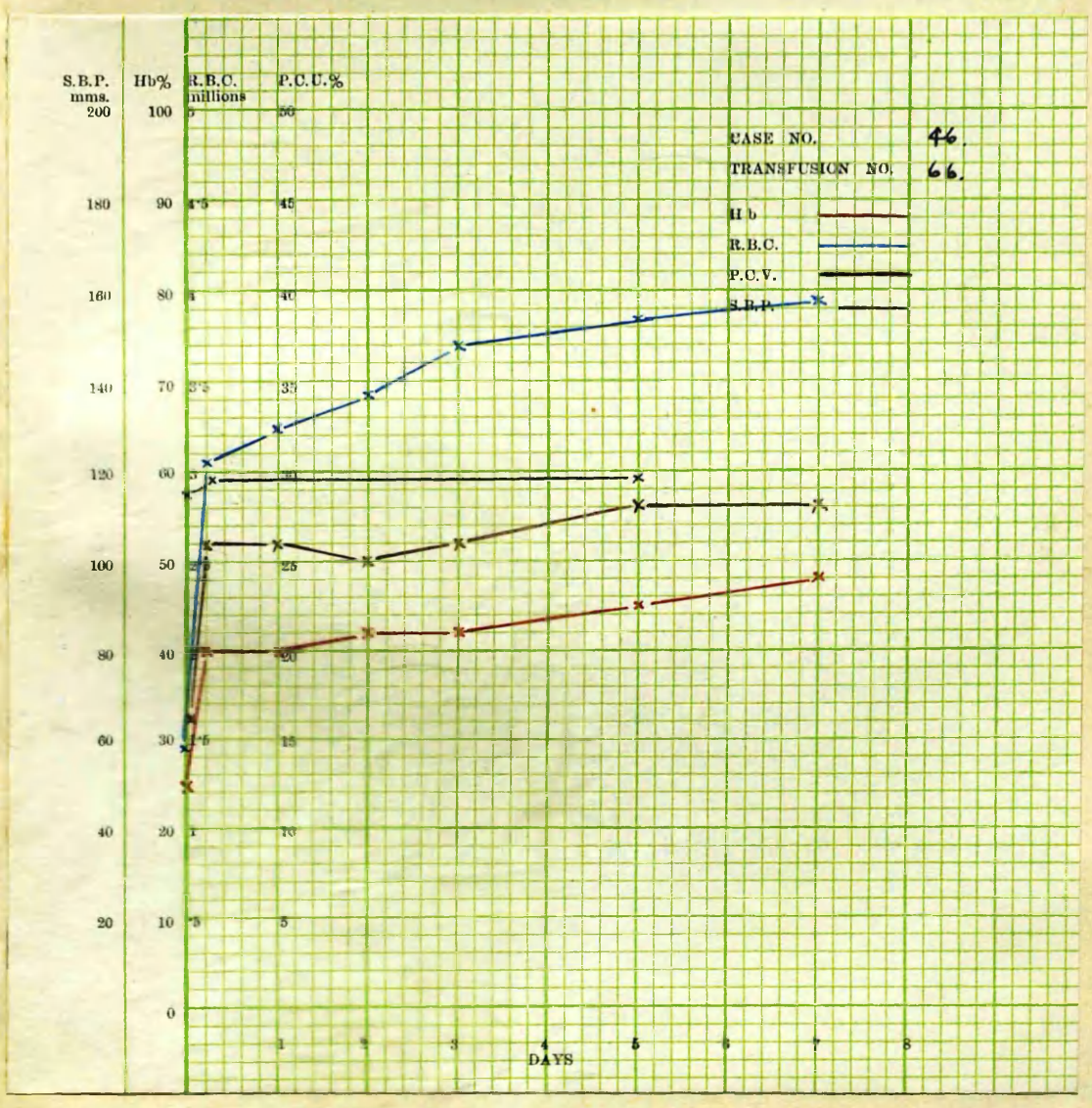
This man had sudden nausea and haematemesis for four days before admission. There was no previous history of gastric disease, and nothing abnormal was discovered on examination, apart from anaemia.

Blood examination showed Hb 25% (4.0), R.B.C. 1.35 millions per cu.mm., W.B.C. 18,200 per cu.mm. He was typed by the Resident Medical Officer and thought to belong to Group AB.

On 23.4.42. he was given Group AB blood which was followed by haematuria. On regrouping, he was found to be Group B.

66. On 2.5.42. the cells from 900 c.c. Group B blood were given by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	25% (4)	1.45	16%			115
After 15 mins.	40% (6.4)	3.04	26%			118
3.5.42.	40% (6.4)	3.23	26%			
4.5.42	42% (6.72)	3.42	25%			
5.5.42.	42% (6.72)	3.70	26%			
7.5.42.	45% (6.72)	3.84	28%			118
9.5.42.	48% (7.68)	3.93	28%			



Reactions - Nil.

Transfusion. Case.

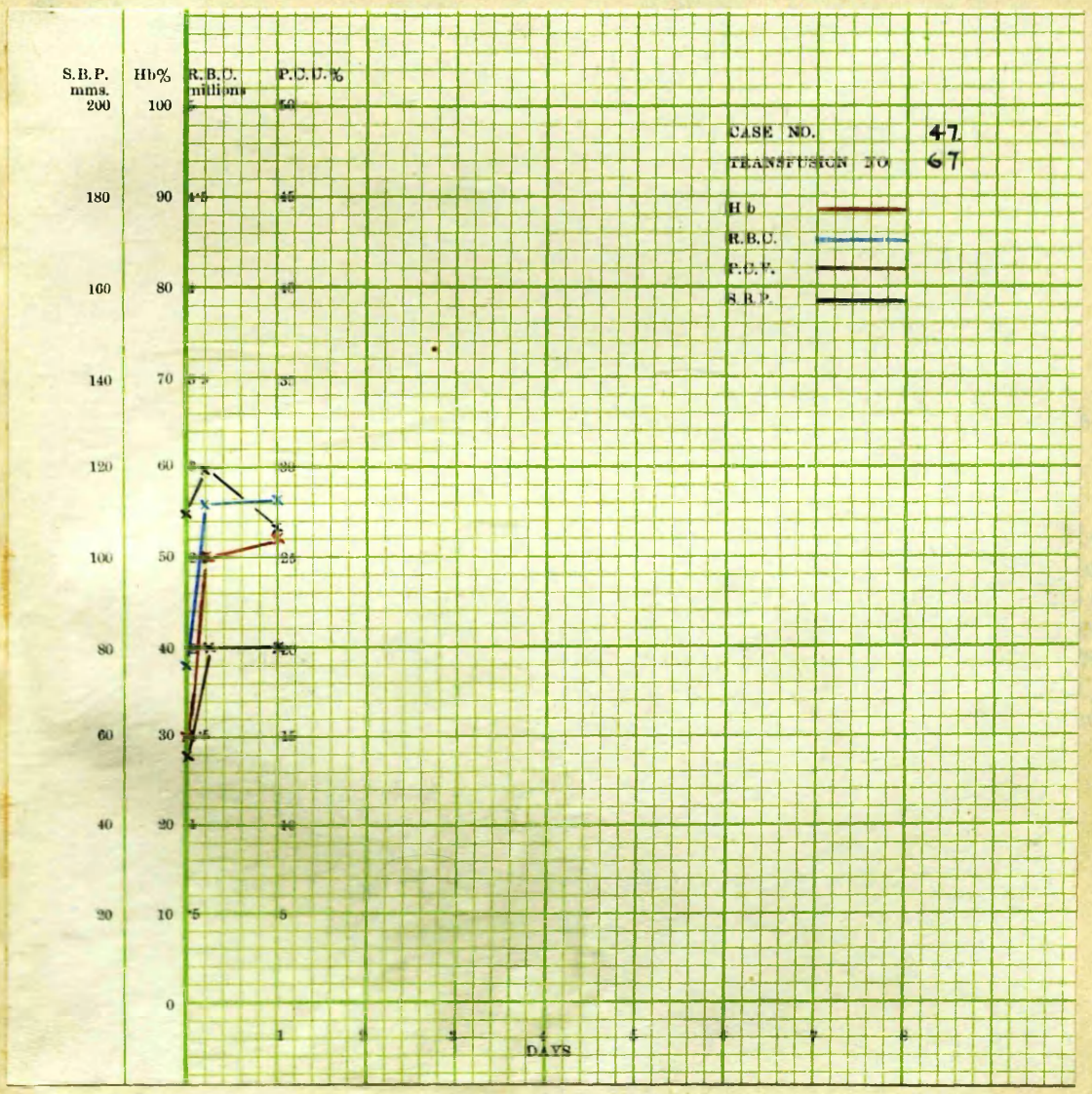
47. Mrs. J.M. (63 Years). Admitted 2.9.41.

This woman had been a mild diabetic for twelve years. Three months before admission she lost her appetite, and became pale and weak. Two months later she began to have copious, effortless vomiting with marked constipation. She was very cachectic and a tumour, the size of an orange, was palpable in the epigastrium.

On 18.9.41. she had a laparotomy disclosing an inoperable carcinoma of the pylorus. A posterior gastro-enterostomy was performed. Blood group O.

67. On 18.10.41 she was given the cells from 1,400 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	30% (4.8)	1.9	14%			110
After 15 mins.	50% (8)	2.8	20%			120
19.10.41	52% (8.32)	2.81	20%			105



Reactions - Nil.

The patient died on 19.10.41. without recovering from the effects of operation.

Transfusion. Case.

48. J.M. (14 Years). Admitted 23.2.42.

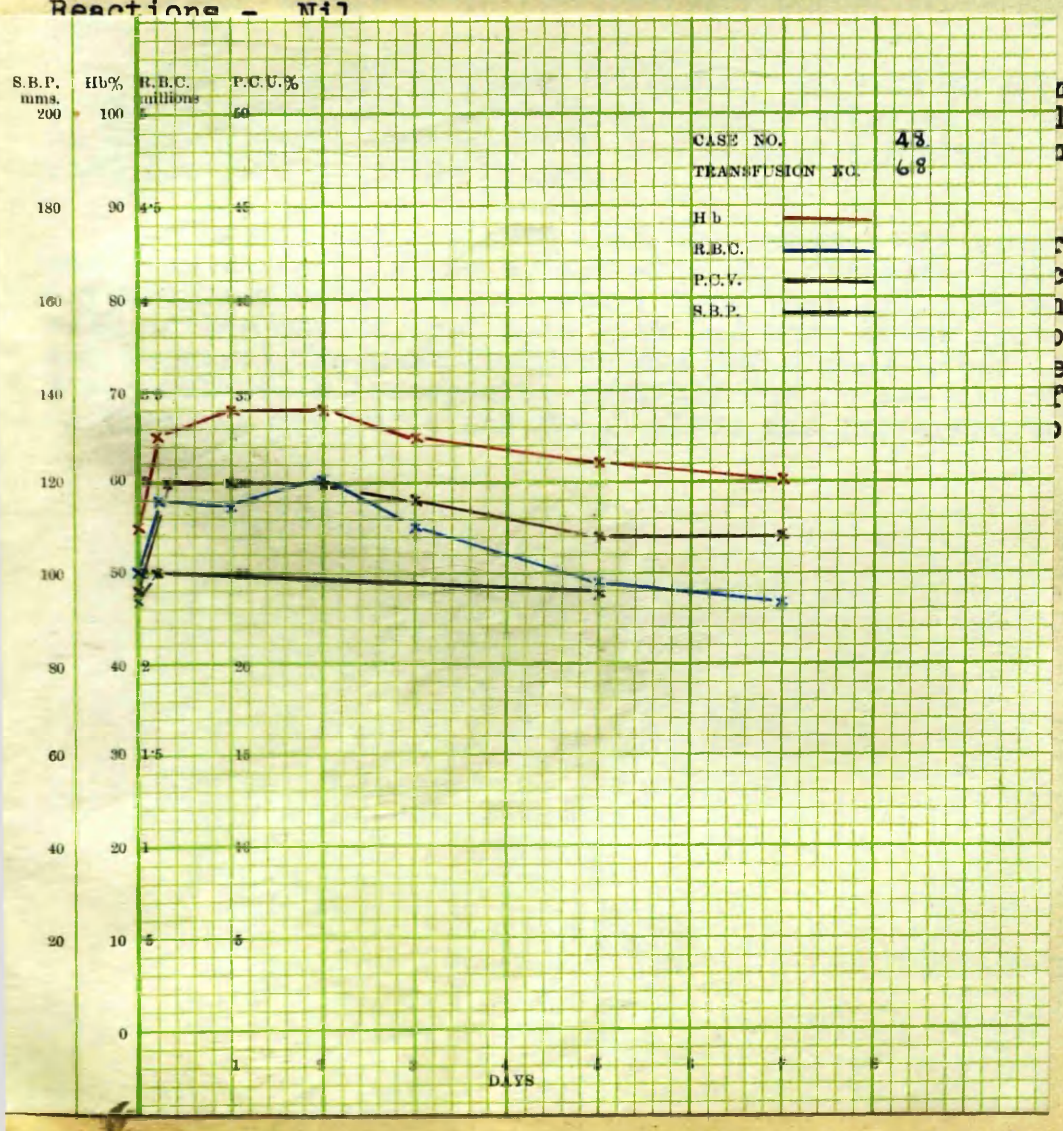
This girl was severely burned on 23.2.42. and about 1/3 of her body surface was affected, including most of her lower abdomen, thighs and buttocks. She received four pints of plasma rapidly, and began to show a progressive anaemia, as seen by the following blood examinations. Blood group B.

	Hb.	R.B.C.	P.C.V.	W.B.C. (thousands)
24.2.42.	20.5. gms.	6.1	58%	15.5
25.2.42.	16.5 gms.	4.6	42.5%	4.0
26.2.42	15.6 gms.	4.4	42%	6.4
27.2.42.	13.1 gms.	3.9	37.5%	6.4
28.2.42.	12.5 gms.	3.5	33.5%	7.2
6.3.42.	8.8 gms.	2.5	24%	17.0

68. On 6.3.42. she was given the cells from 900 c.c. Group B blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	55% (8.8)	2.5	24%	1.4		95
After 15 mins.	65% (10.4)	2.9	30%	1.6		100
7.3.42.	68% (10.88)	2.87	30%			
8.3.42.	68% (10.88)	3.01	30%			
9.3.42.	65% (10.4)	2.64	29%			
11.3.42.	62% (9.92)	2.45	27%			97
13.3.42.	60% (9.6)	2.32	27%	1.8		

Reactions - Nil



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Transfusion. Case.

49. Mrs. M.M. (35 Years). Admitted 17.2.42.

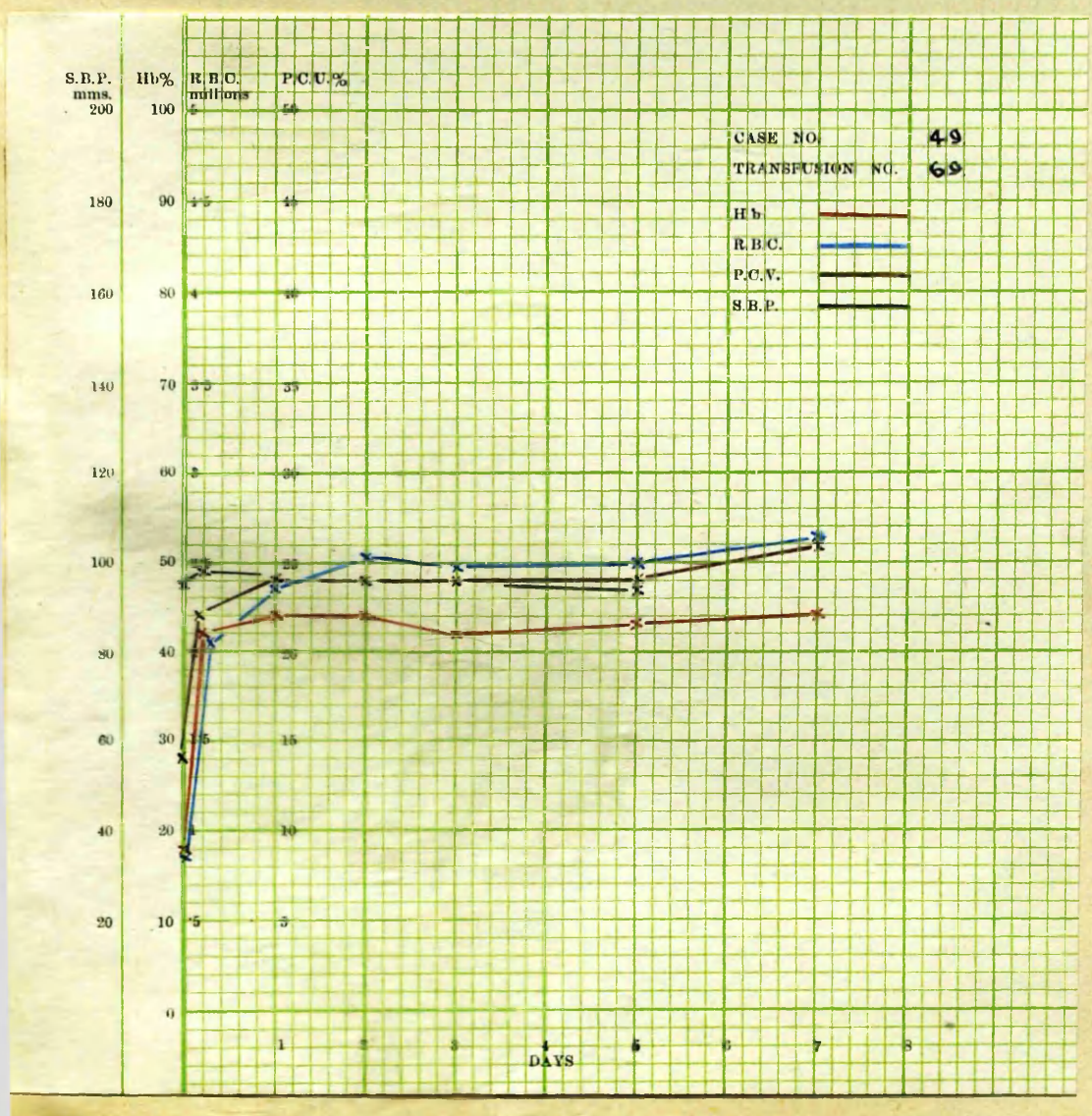
This woman was a known pernicious anaemia of ten years duration, but she kept well until 8.2.41, when she contracted cerebro-spinal fever. She recovered from this, but since then had become weak and listless with pallor and shortness of breath. There is now a numbness and paraesthesiae of left leg. The heart sounds were weak and there was a V.S. murmur at the apex. B.P. 94/50.

Examination of the central nerve system showed little abnormal, but the reflexes of the leg were diminished.

Blood examination showed Hb 24% (3.84), R.B.C. 1.07 millions per cu.mm., W.B.C. 5,000 per cu.mm. Group A.

69. On 26.2.42. she was given the cells from 1,400 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	18% (2.88)	.88	14%		.07	95
After 15 mins.	42% (6.72)	2.05	22%		1.26	98
27.2.42.	44% (7.04)	2.37	24%			
28.2.42.	44% (7.04)	2.52	24%			
1.3.42.	42% (6.72)	2.49	24%			
3.3.42.	43% (6.88)	2.50	24%			95%
5.3.42.	44% (7.04)	2.64	26%		1.10	



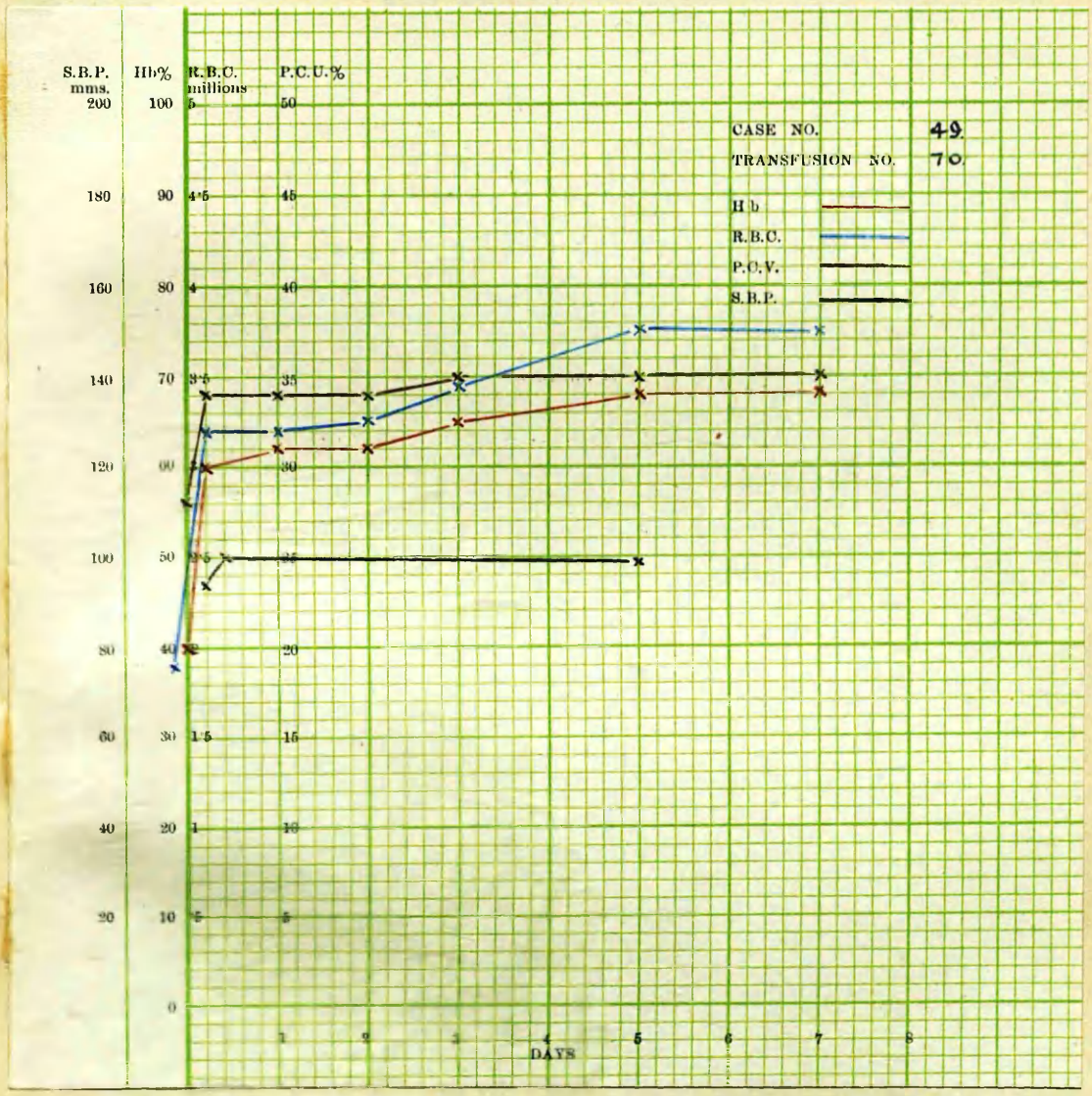
Reactions - Nil.

Transfusion. Case.

70

She maintained her improvement and on 11.3.42 she was given the cells from 1,400 c.c. Group A blood by the drip method.

Blood changes.	Hb	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P
Before	40% (6.4)	1.89	28%			95
After 15 mins.	60% (9.6)	3.20	34%			100
12.3.42.	62% (9.92)	3.20	34%			
13.3.42.	62% (9.92)	3.26	34%			
14.3.42.	65% (10.4)	3.45	35%			
16.3.42.	68% (10.88)	3.76	35%			98
18.3.42.	68% (10.88)	3.74	35%			



Reactions - Nil.

Transfusion. Case.

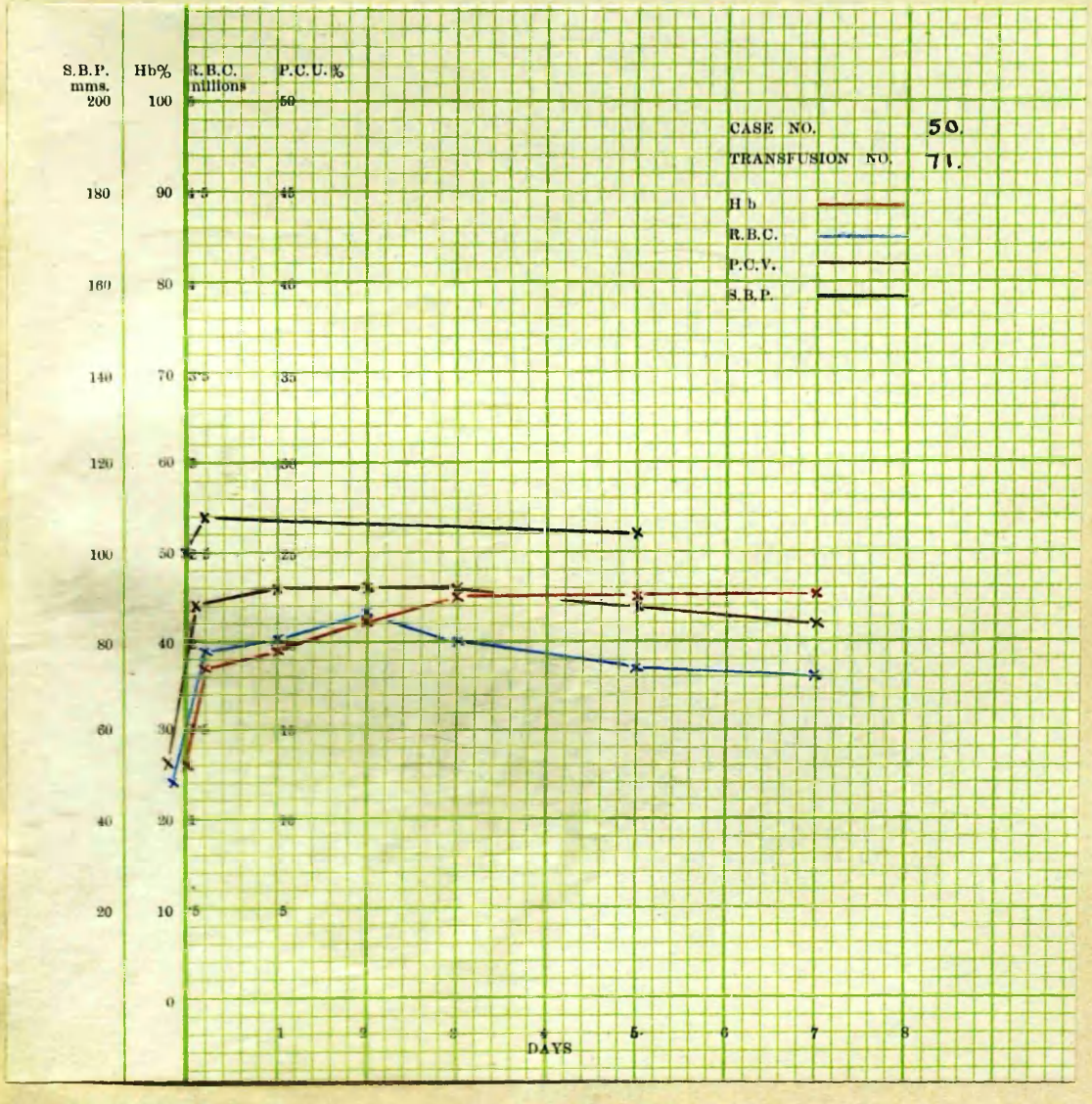
50. Mrs. V.M. (34 Years). Admitted 11.7.41.

This woman complained of weakness of fifteen months duration. She had marked generalised pigmentation and an atrophic tongue. The heart sounds were weak. B.P. 100/55.

Blood examination showed Hb 28% (3.86), R.B.C. 1.38 millions per cu.mm., W.B.C. 2,000 per cu.mm. Mean cell volume 92 cu.mmm. Fragility .4% - .35% sodium citrate. No reticulocytes were seen. Blood sodium and potassium were normal. Group O.

71. On 21.7.41. she was given the cells from 1,080 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	26% (3.59)	1.2	13%			100
After 15 mins.	37% (5.11)	1.94	23%			108
22.7.41.	39% (5.38)	2.0	23%			
23.7.41.	42% (5.80)	2.1	23%			
24.7.41.	45% (6.21)	2.0	23%			
26.7.41	45% (6.21)	1.84	22%			104
28.7.41	45% (6.21)	1.80	21%			



Reactions - Nil.

Transfusion. Case.

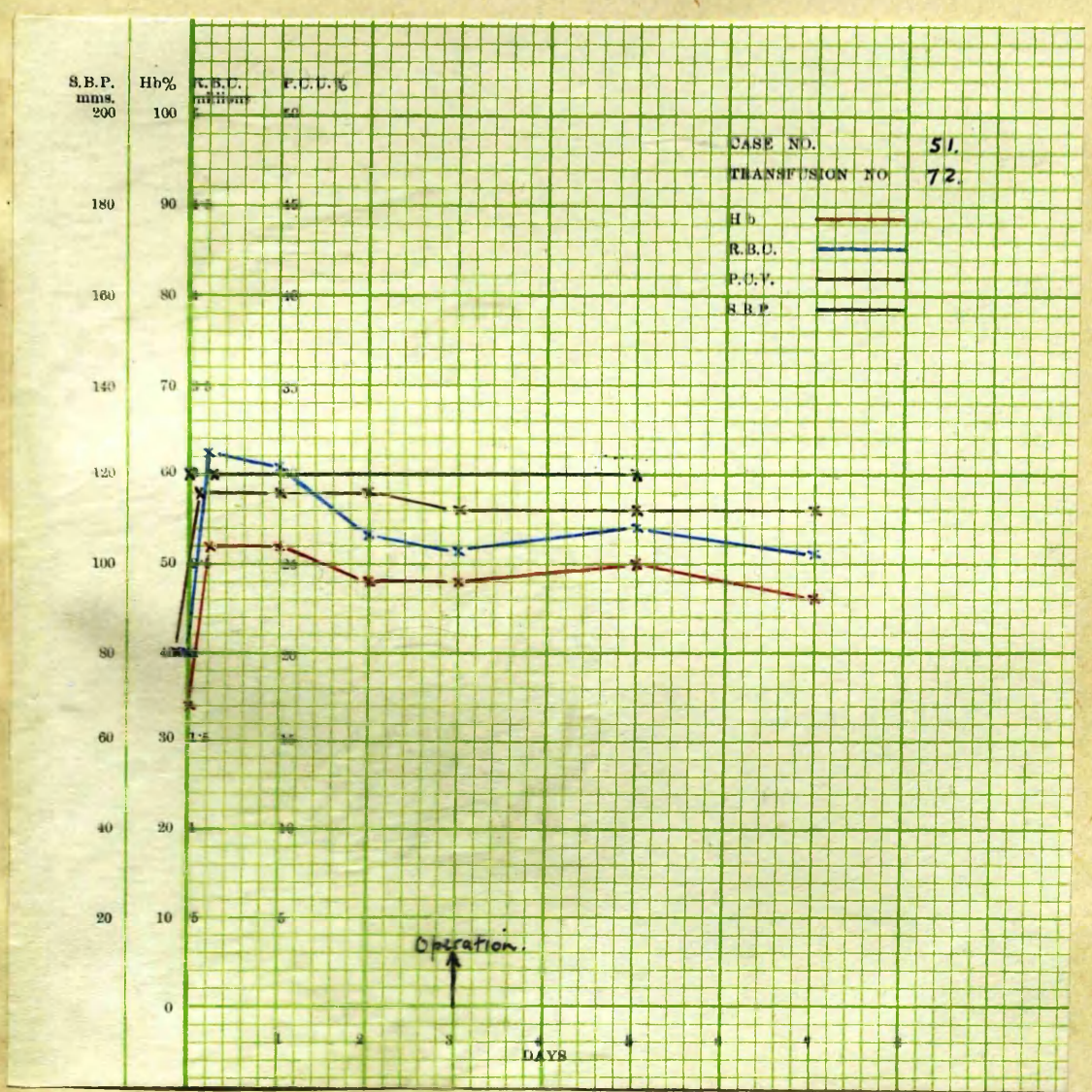
51. Mrs. A.N. (59 Years). Admitted 17.8.42.

The complaint in this case was of pain in the epigastrium and loss of weight for six months. The liver was slightly enlarged, but no other organ or mass was palpable in the abdomen. The heart sounds were poor. B.P. 120/85. Radiology showed a carcinoma of the pyloric region.

Blood examination revealed Hb 40% (6.4), R.B.C. 2.02 millions per cu. mm., W.B.C. 6,800 per cu.mm. Group A.

72. On 11.8.42. she was given the cells from 900 c.c. Group A blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	34% (5.44)	2.00	20%			120
After 15 mins.	52% (8.32)	3.12	29%			120
12.8.42.	52% (8.32)	3.04	29%			
13.8.42.	48% (7.68)	2.67	29%	operation.		
14.8.42.	48% (7.68)	2.58	28%			
16.8.42	50% (8)	2.70	28%			120
18.8.42.	46% (7.36)	2.54	28%			



Reactions - Nil.

She had a partial gastrectomy carried out on 13.8.42. At operation a moderate size carcinoma of the pylorus was noted.

Transfusion. Case.

52. J.O'B. (64 Years). Admitted 6.1.42.

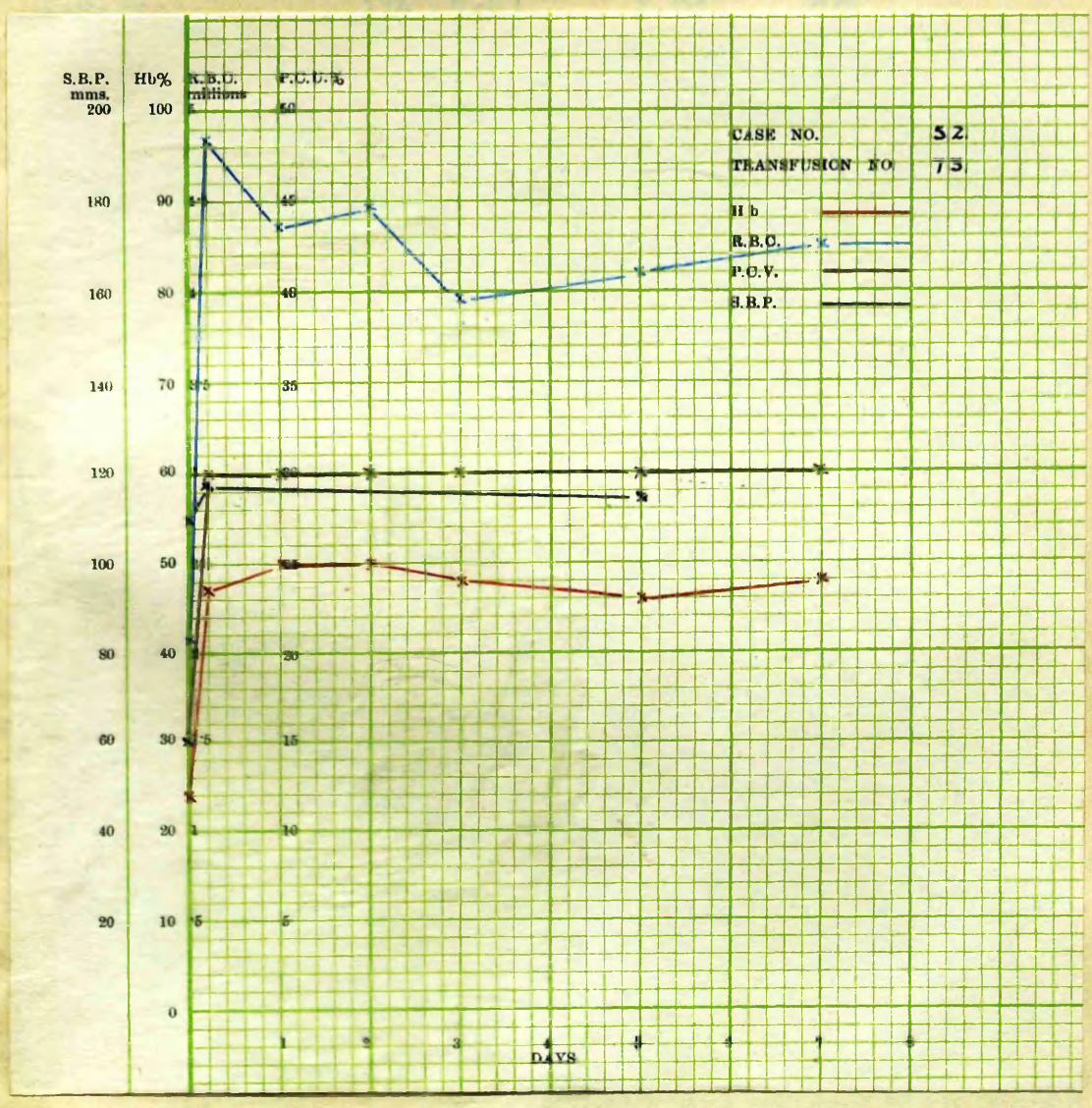
This man had complained of weakness and pallor for 2½ years. There was pain in the right hypochondrium, and swelling of the ankles. The heart sounds were weak, and a blowing V.S. murmur was present at the apex. B.P. 112/58.

X-Ray showed a large tumour (probably carcinoma) at the cardiac end of the stomach.

Blood examination showed Hb 25% (4.0), R.B.C. 2.42 millions per cu.mm., W.B.C. 5,200 per cu.mm. Group A.

73. On 8.1.42. he was given the cells from 1,000 c.c. Group A blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.P.B.
Before	24% (3.84)	2.08	15%			110
After 15 mins.	47% (7.52)	4.84	30%			118
9.1.42	50% (8)	4.36	30%			
10.1.42.	50% (8)	4.48	30%			
11.1.42.	48% (7.68)	3.98	30%			
13.1.42.	46% (7.36)	4.1	30%			115
15.1.42	48% (7.68)	4.24	30%			



Reactions - Nil.

Transfusion. Case.

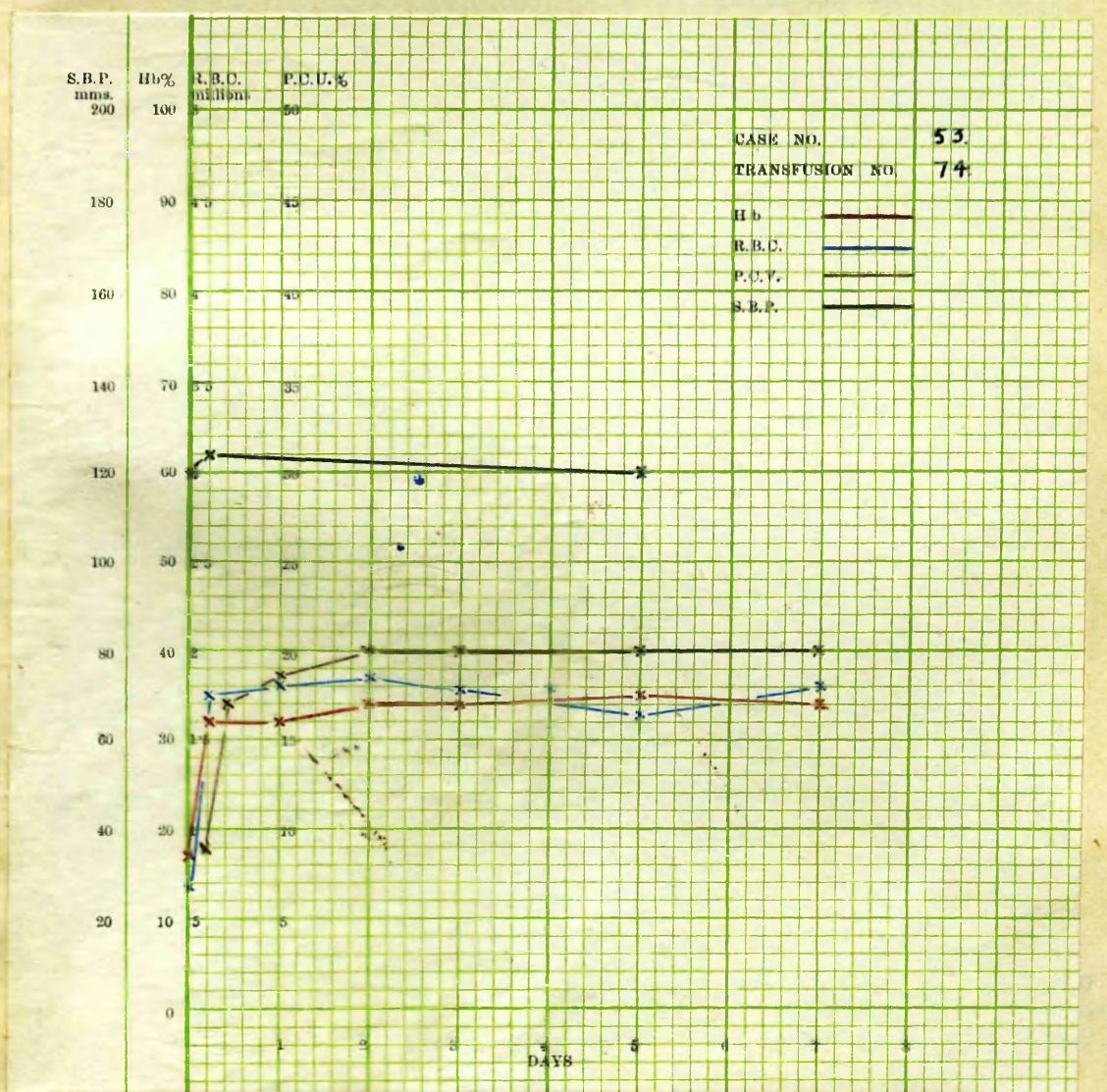
53. Mrs. E.R. (25 Years). Admitted 26.7.42.

This woman was confined four weeks before admission. She was a primipara, but had a normal delivery and no undue blood loss. Four weeks before term, she became weak and listless with marked pallor. She had vague indigestion, and had lost a stone in weight. The pulse was poor, and the heart sounds weak, the heart being slightly enlarged. A V.S. murmur was present at all areas. B.P. 120/64.

Blood examination showed Hb 17% (2.72), R.B.C. .68 millions per cu.mm., W.B.C. 9,400 per cu.mm. Group O. Anisocytosis and poikylocytosis were present, but, in general, the picture was hyperchromic.

74. On 27.7.42. she was given the cells from 750 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	17% (2.72)	.68	9%			120
After 15 mins.	32% (5.12)	1.75	17%			124
28.7.42	32% (5.12)	1.80	18%			
29.7.42.	34% (5.44)	1.84	20%			
30.7.42.	34% (5.44)	1.79	20%			
1.8.42.	35% (5.6)	1.64	20%			120
3.8.42	34% (5.44)	1.80	20%			



Reactions - Nil.

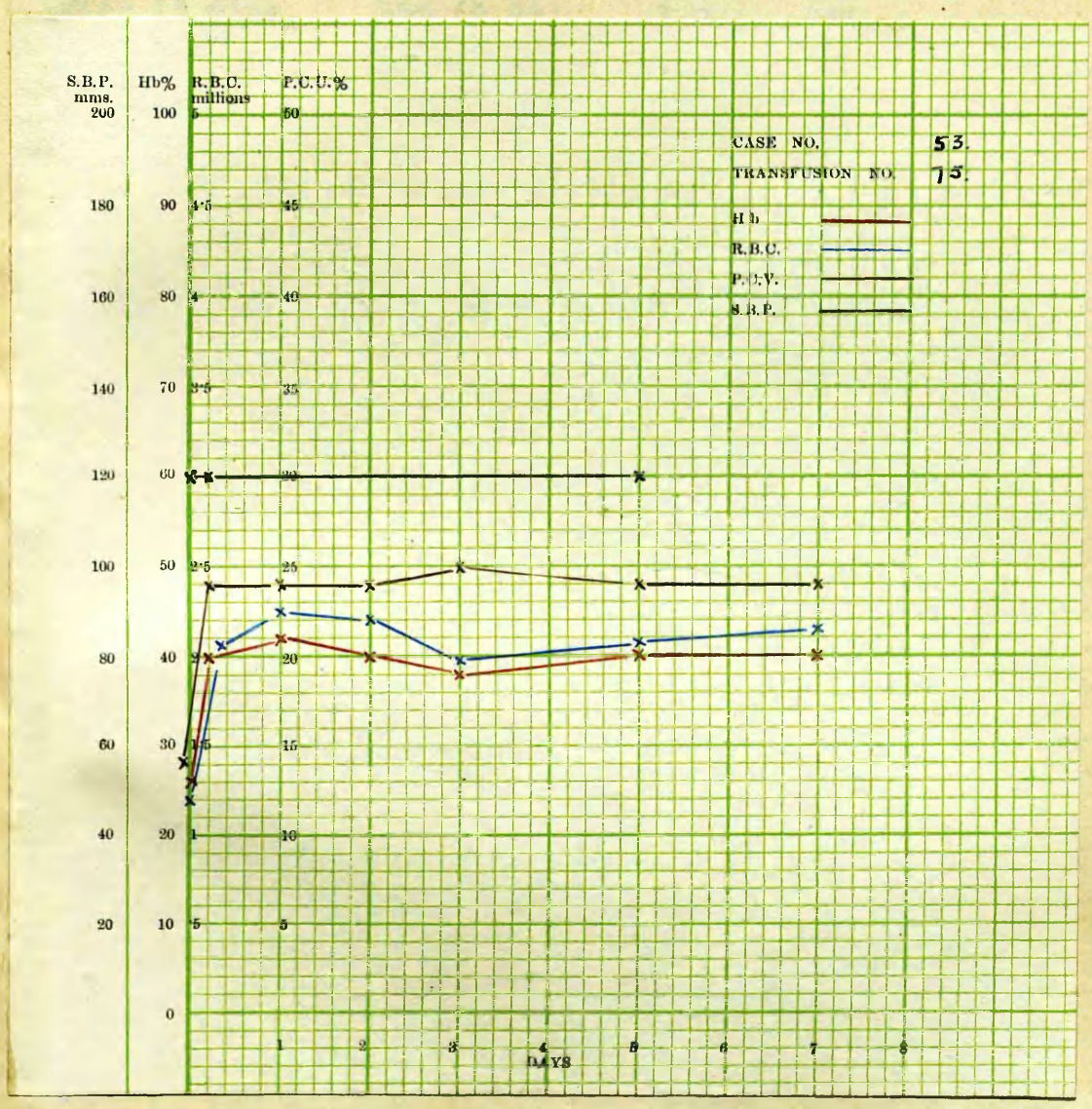
Transfusion. Case.

She maintained her improvement for two weeks, and then gradually relapsed. Fresh blood was given on 3.9.42. with temporary improvement.

75.

On 11.9.42. she was given the cells from 1,000 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	26% (4.16)	1.20	14%			120
After 15 mins.	40% (6.4)	2.04	24%			120
12.9.42.	42% (6.72)	2.24	24%			
13.9.42.	40% (6.4)	2.20	24%			
14.9.42.	38% (6.08)	1.98	25%			
16.9.42.	40% (6.4)	2.07	24%			120
18.9.42.	40% (6.4)	2.14	24%			



Reactions - Nil.

This is a case of hypoplastic anaemia, and at the time of writing, is still requiring transfusion. On the last six occasions, fresh blood has been used, but with only a temporary effect.

Transfusion. Case.

54. G.R. (53 Years). Admitted 7.10.41.

This man complained of indigestion for four years. Pain came on one hour after food, and was relieved by food and alkalies. Recurrent haematemeses occurred, and medical treatment did not relieve the condition.

On 8.10.41 he had a laparotomy, which showed a large indefinite mass surrounding the pylorus. No secondaries were palpable. A posterior gastroenterostomy was performed.

Blood examination showed Hb 35% (5.6), R.B.C. 2.0 millions per cu.mm., Group A.

76. On 18.10.41. he was given the cells from 1,500 c.c. Group A blood by Kimpton Tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	35% (5.6)	2.4	18%			120
After 15 mins.	58% (9.28)	3.2	28%			125
19.10.41.	60% (9.6)	3.5	27%			
20.10.41.	60% (9.6)	3.46	26%			
21.10.41.	64% (10.24)	3.62	28%			
23.10.41.	66% (10.56)	3.56	28%			125
25.10.41.	66% (10.56)	3.64	28%			

Reactions - Nil.

Transfusion. Case.

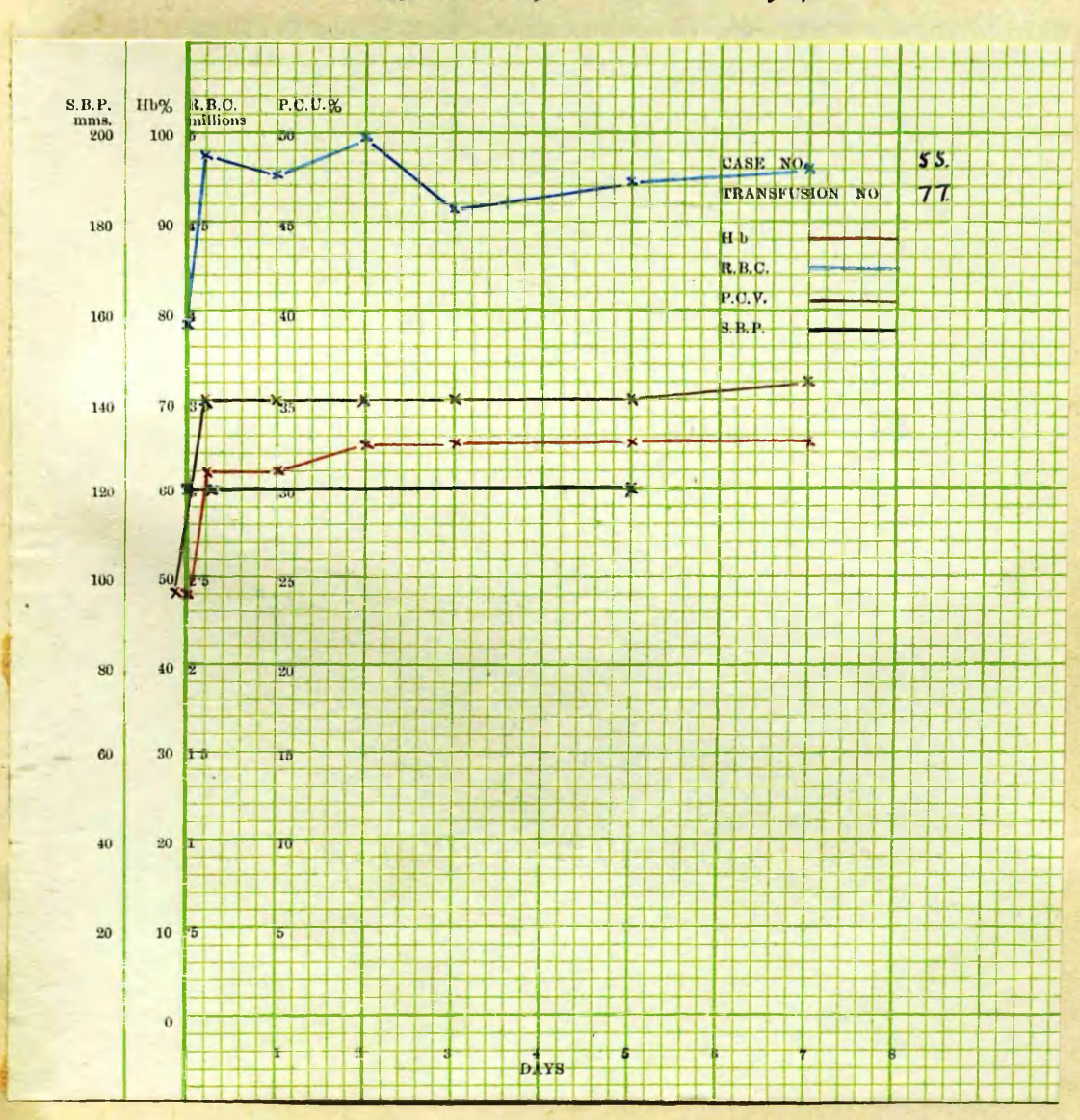
55. Mrs. M.S. (33 Years). Admitted 1.4.42.

For three years, this patient had suffered from a tumour of the left parotid region. At first, it was of mixed tumour type, but later became definitely sarcomatous. Partial removal was carried out on several occasions, and deep X-ray therapy applied without effect. On this occasion, the swelling extended from the Zygoma to the mandible and invaded the pterygoid region. Further partial removal was carried out on 1.4.42 Thereafter her general condition was poor with weak heart sounds and gross pallor.

Blood examination showed Hb 50% (8.0), R.B.C. 4.17 millions per cu.mm., W.B.C. 3,400 per cu.mm. Group O.

77. On 6.4.42. she was given the cells from 900 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	48% (7.68)	3.92	24%			120
After 15 mins.	62% (9.92)	4.89	35%			120
7.4.42.	62% (9.92)	4.76	35%			
8.4.42.	65% (10.4)	4.99	35%			
9.4.42.	65% (10.4)	4.58	35%			
11.4.42	65% (10.4)	4.72	35%			120
13.4.42	65% (10.4)	4.80	36%			



Reactions - Nil.

Transfusion. Case.

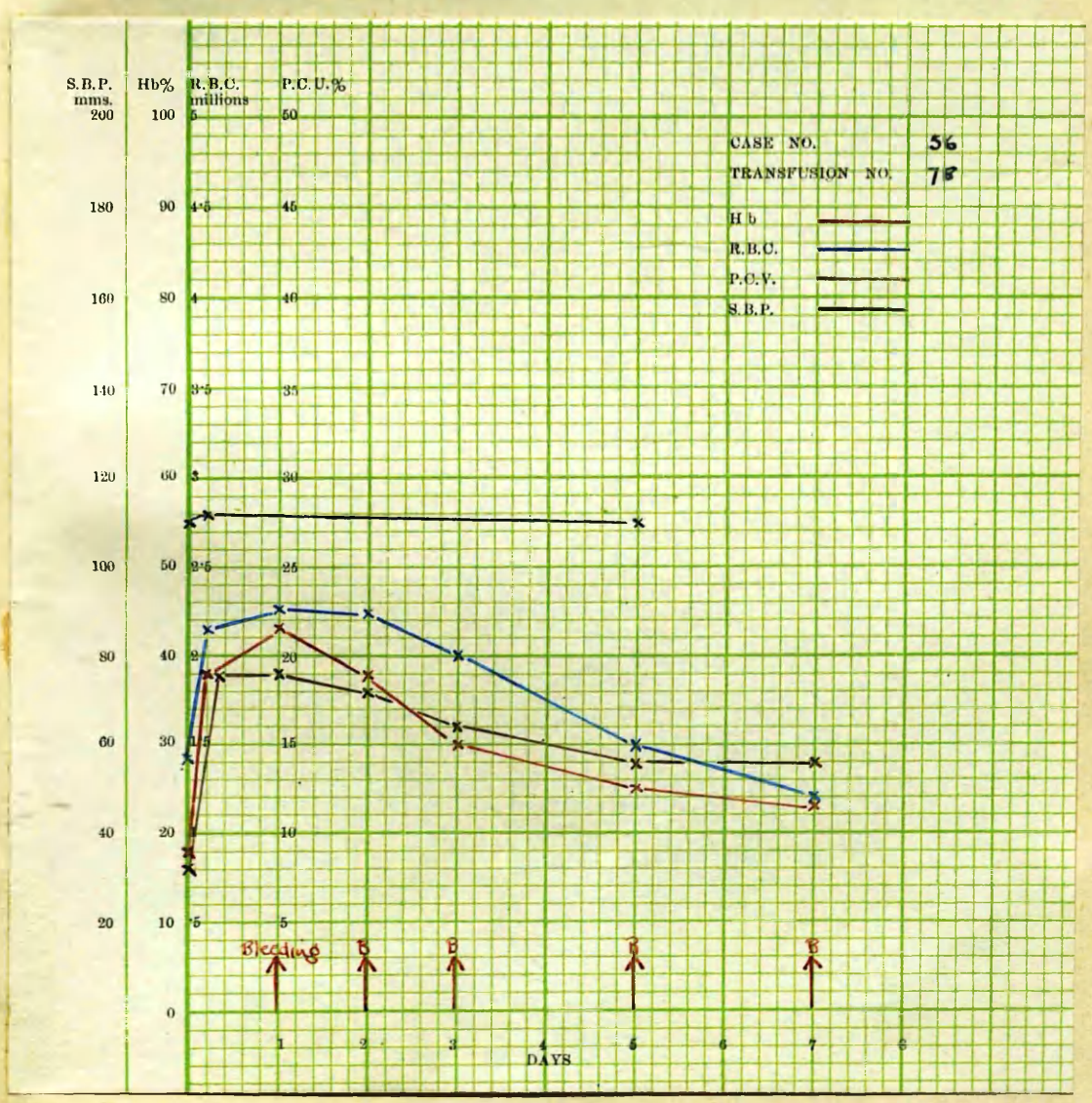
56. Mrs. A.S. (22 Years). Admitted 9.9.41.

Four months before admission this patient had an abortion at 2½ months. She bled for three weeks and became progressively listless and breathless. She had a purpuric rash over the whole body with bleeding from the gums. The heart sounds were very weak, and bleeding time was prolonged. B.P. 110/70.

On admission, blood examination showed Hb 15% (2.4), R.B.C. .76 millions per cu.mm., W.B.C. 2,000 per cu.mm. Group B. In the 24 hours following admission she had two transfusions of fresh Group B blood, which gave temporary improvement.

78. On 11.9.41. she was given the cells from 950 c.c. Group B blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	18% (2.88)	1.42	8%			110
After 15 mins.	38% (6.08)	2.14	18%			112
12.9.41	43% (5.88)	2.28	18%			
13.9.41	38% (6.08	2.24	18%			
14.9.41	30% (4.8)	2.00	16%			
16.9.41.	25% (4.0)	1.50	14%			110
18.9.41.	23% (3.68)	1.20	14%			



Reactions - Nil.

She started to bleed per vaginam on 12.9.41. and continued for the remainder of the observation.

Transfusion. Case.

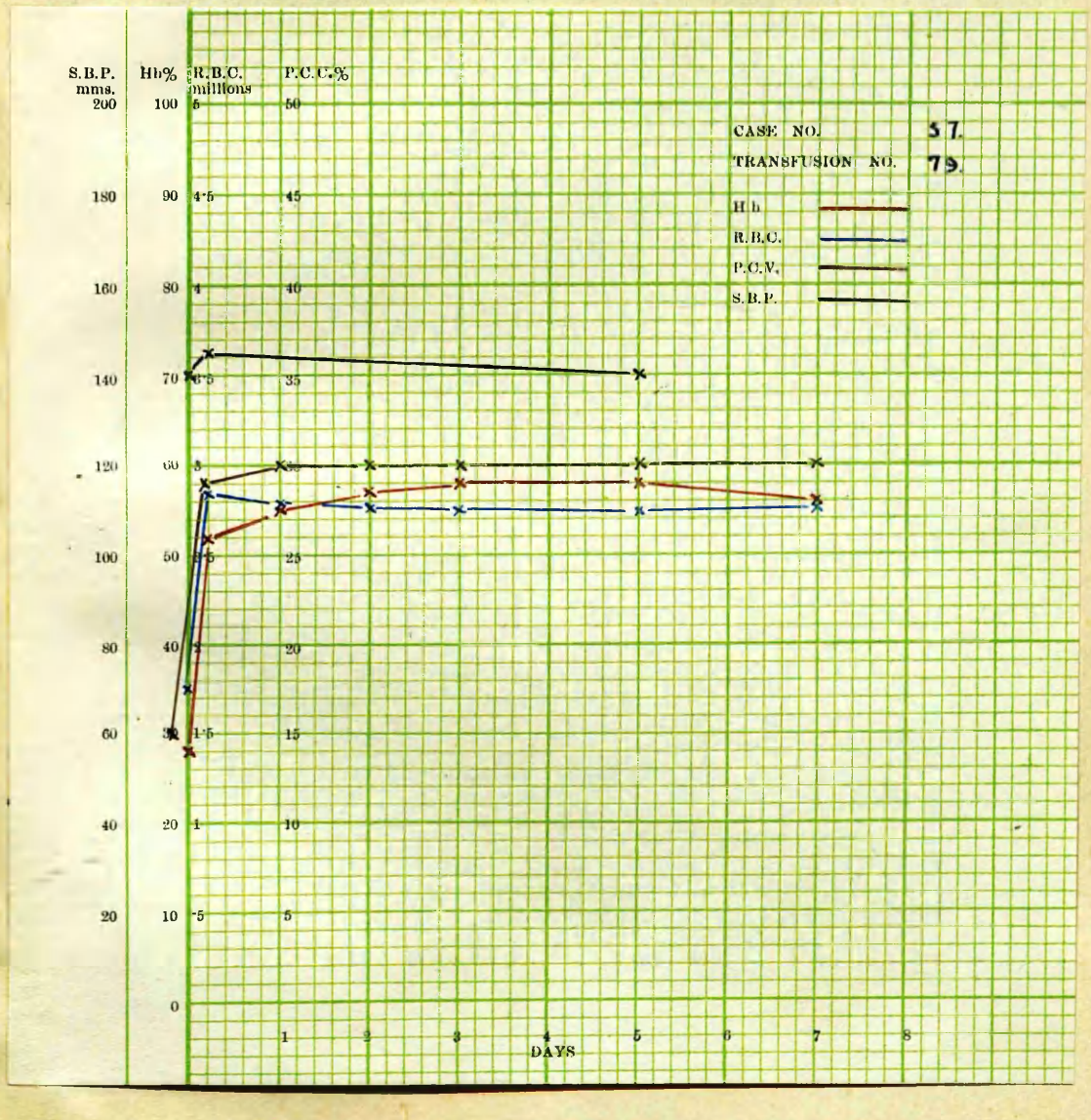
57. Mrs. M.S. (64 Years). Admitted 9.9.41.

This woman had nausea and vomiting for six months. Pallor and loss of weight were marked, but no abnormalities could be found, apart from slight tenderness in the epigastrium. Radiological investigation was negative.

Blood examination showed 30% (4.8), R.B.C. 1.26 millions per cu.mm., W.B.C. 3,200 per cu.mm. Group O.

79. On 11.9.41. she was given the cells from 900 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	28% (4.48)	1.74	15%			140
After 15 mins.	52% (8.32)	2.84	28%			145
12.9.41.	55% (8.8)	2.75	30%			
13.9.41.	57% (9.12)	2.78	30%			
14.9.41.	58% (9.28)	2.76	30%			
16.9.41.	58% (9.28)	2.74	30%			140
18.9.41	56% (8.96)	2.78	30%			



Reactions - Slight Grade II, probably due to cold blood.

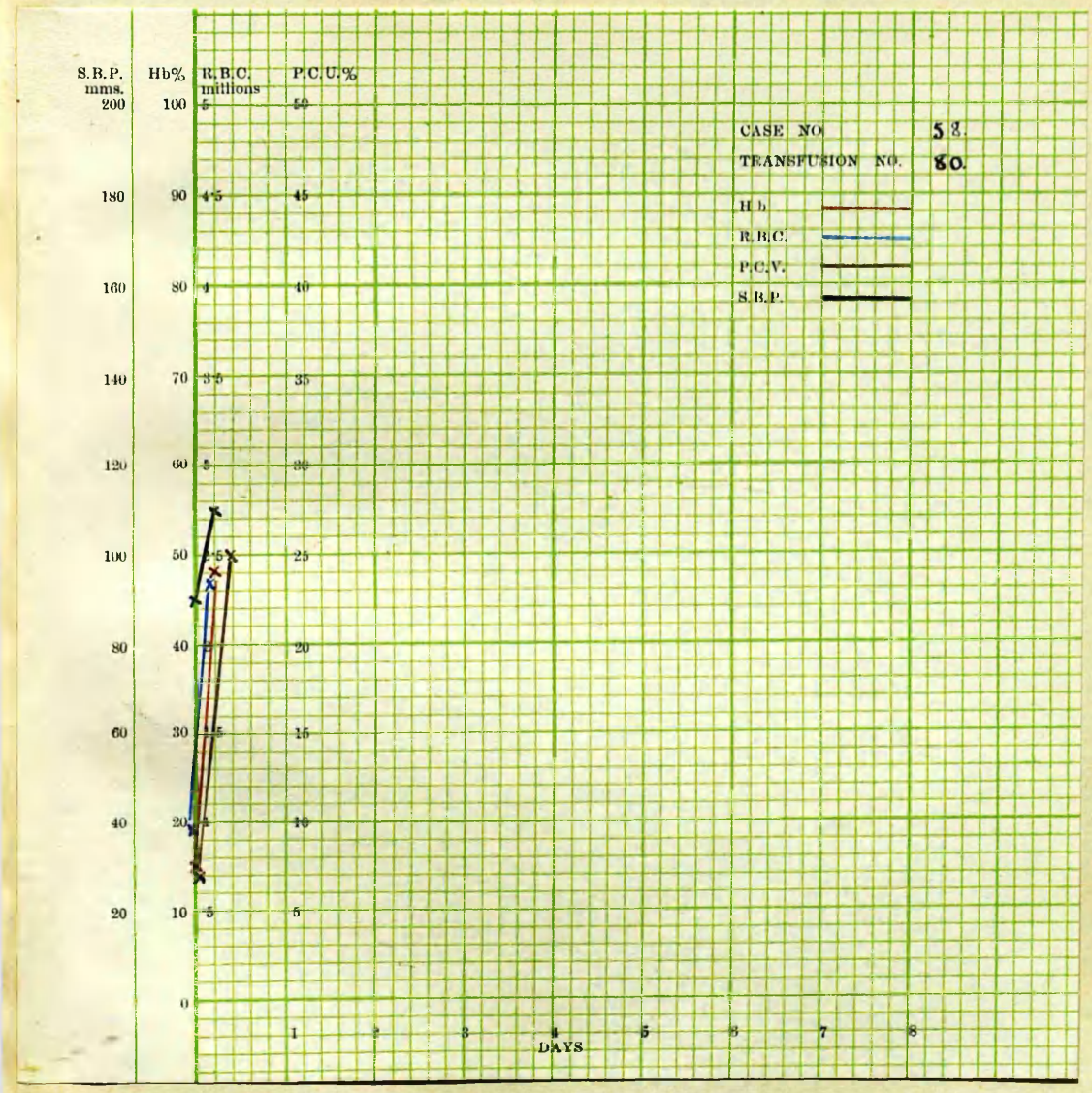
Transfusion. Case.

58. A.S. (35 Years). Admitted 12.8.41.

This man had a perforation of a gastric ulcer, which was sutured two weeks before admission to Glasgow Royal Infirmary. He recovered from the effects of operation, but had two serious haematemeses, treated by fresh blood transfusions on both occasions. Blood group O.

80. After a massive haematemesis on 19.9.41 he was given the cells from 900 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	15% (2.07)	.95	7%			90
After 15 mins.	48% (6.62)	2.35	25%			110



Reactions - Nil.

Transfusion. Case.

59. Mrs. M.S. (71 Years). Admitted 22.10.41.

This patient suffered from rheumatoid arthritis for ten years with gradually increasing pallor. Weakness and malaise became much more marked a month before admission. She was being treated with gold.

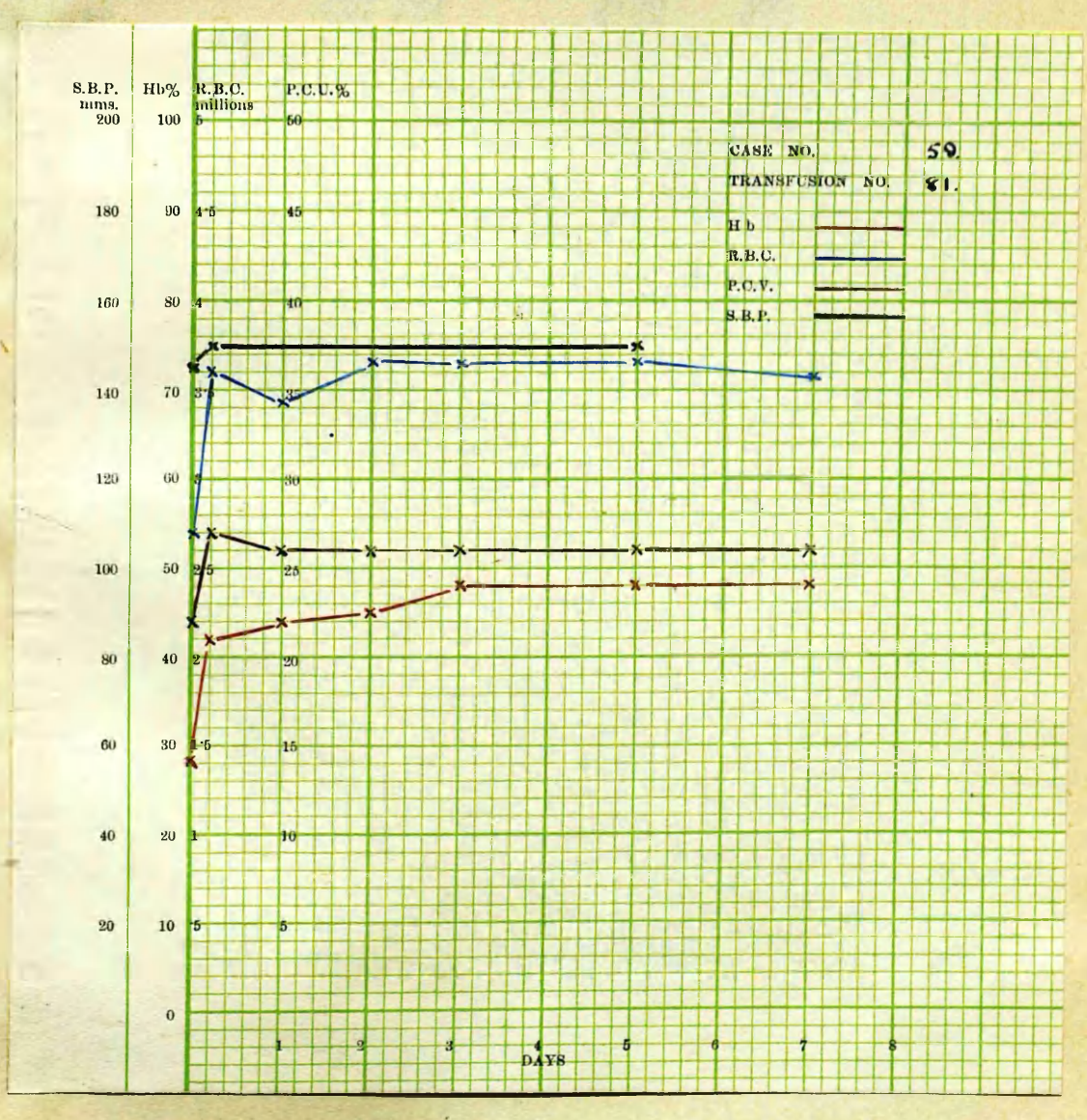
Blood examination showed Hb 27% (4.32), R.B.C. 2.27 millions per cu.mm., W.B.C. 1,400 per cu.mm. Group O.

81.

On 25.10.41. the cells from 900 c.c. Group O blood were given by Kimpton Tube.

Blood changes.

	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	28% (4.48)	2.7	22%			
After 15 mins.	42% (6.72)	3.6	27%			145
26.10.41.	44% (7.04)	3.42	26%			150
27.10.41.	45% (7.2)	3.67	26%			
28.10.41.	48% (7.68)	3.64	26%			
30.10.41.	48% (7.68)	3.66	26%			
1.11.41.	48% (7.68)	3.58	26%			150



Reactions - Nil.

Transfusion. Case.

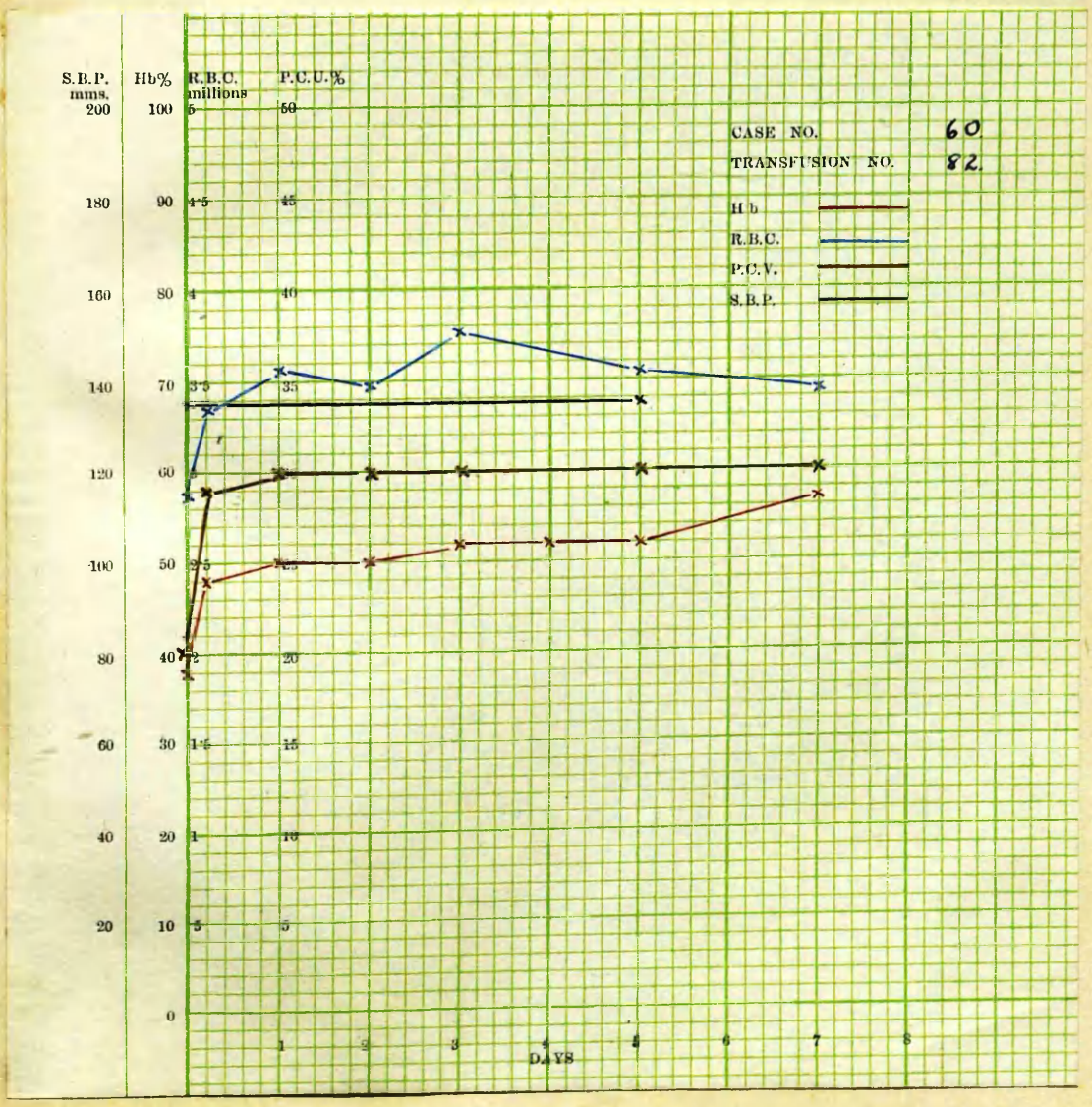
60. T.S. (42 Years). Admitted 15.4.42.

This man complained of pain in the left lumbar region posteriorally. He worked as a fireman which made the pain worse. He had lost two stones in weight, and malaise, anorexia and weakness were marked. The heart sounds were poor, and a V.S. murmur was present at the apex. B.P. 134/80. X-ray showed an old ulcer of the duodenum, but no lesion of the kidneys or spine.

Blood examination on admission showed Hb 47% (7.52), R.B.C. 2.46 millions per cu.mm., W.B.C. 8,000 per cu.mm. Group A. Blood films showed a marked secondary type of anaemia.

82. Throughout the following eight weeks, there was little response to treatment and, on 20.6.42, he was given the cells from 800 c.c. Group A blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	38% (6.08)	2.88	20%			135
After 15 mins.	48% (7.68)	3.35	29%			135
21.6.42.	50% (8)	3.56	30%			
22.6.42.	50% (8)	3.49	30%			
23.6.42.	52% (8.32)	3.78	30%			
25.6.42.	52% (8.32)	3.54	30%			135
27.6.42.	57% (9.12)	3.44	30%			



Reactions - Nil.

Transfusion. Case.

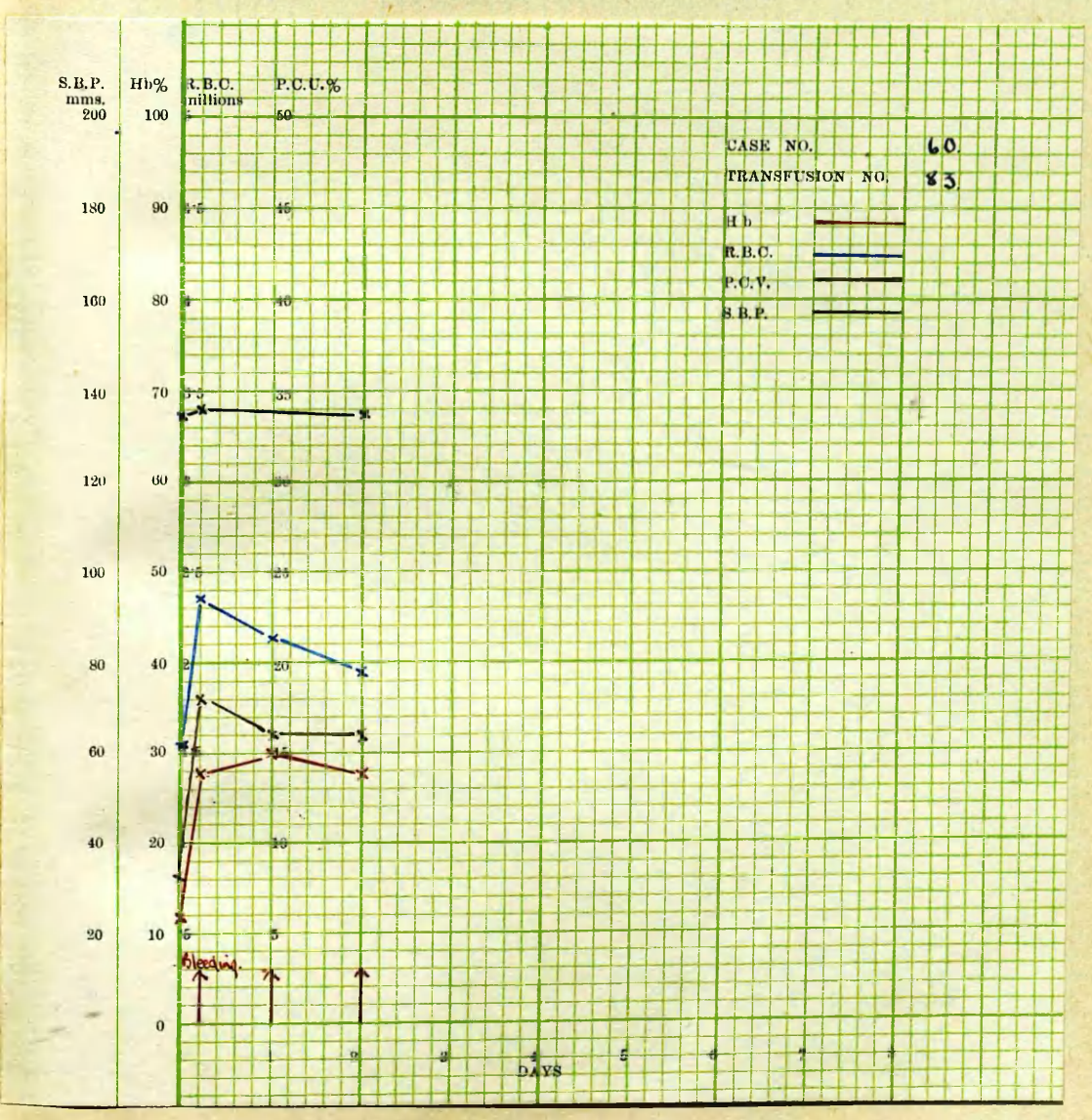
He kept well for some time, and then he began to have melaena with the test for faecal occult blood markedly positive.

His blood count dropped rapidly until, on 6.9.42. it had reached Hb 12% (1.92), R.B.C. 1.56 millions per cu.mm., W.B.C. 3,900 per cu.mm.

83.

On 6.9.42. he was given the cells from 900 c.c. Group A blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	12% (1.92)	1.54	8%			135
After 15 mins.	29% (4.64)	2.36	18%			138
7.9.42.	30% (4.8)	2.12	16%			135
8.9.42.	28% (4.48)	1.95	16%			



Reactions - Nil.

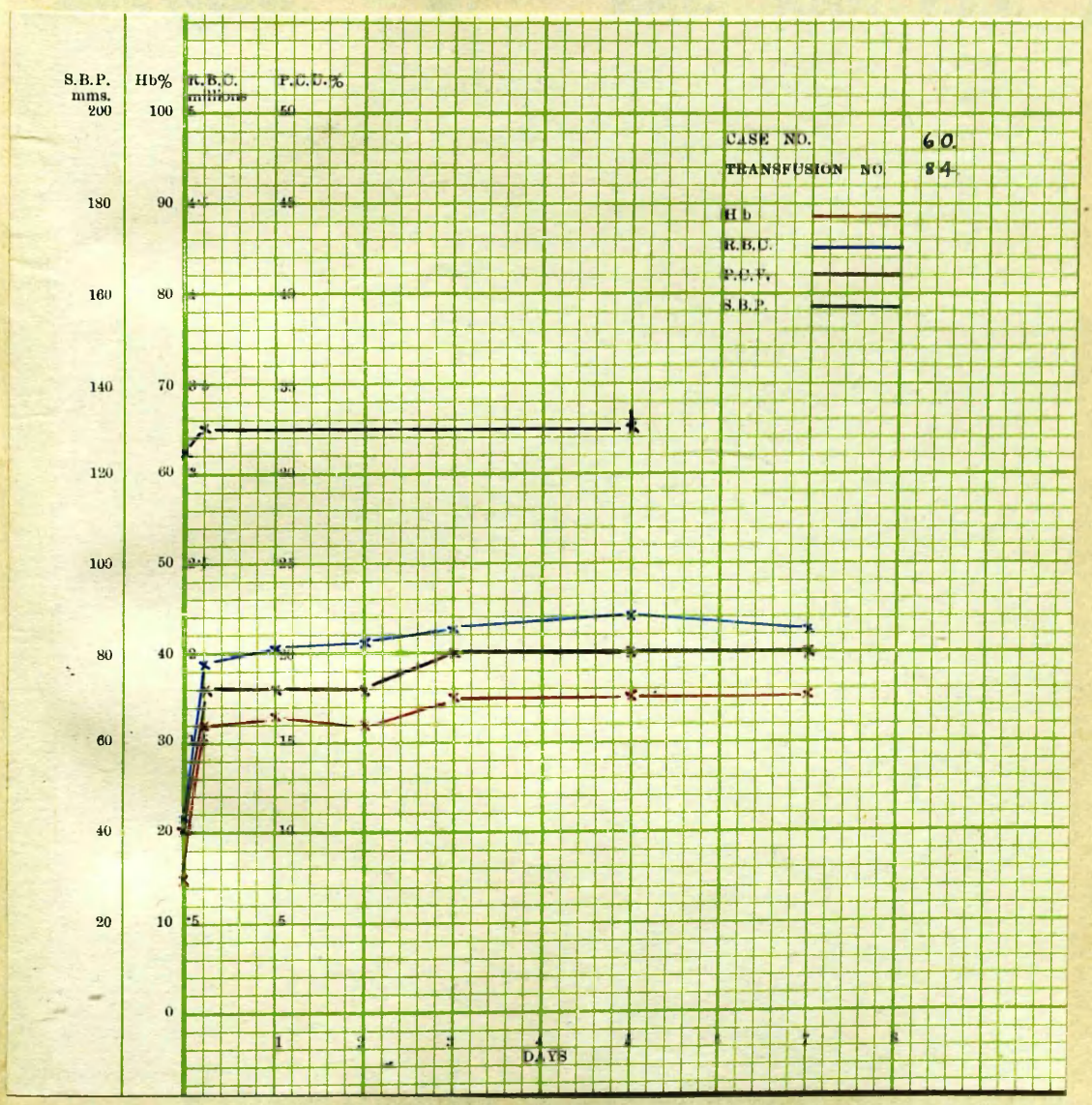
Transfusion. Case.

84.

On 9.9.42. he developed severe haemorrhage from the nose and bowels.

On 10.9.42. he was given the cells from 800 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	15% (2.4)	1.08	10%	2.6	.24	125
After 15 mins.	32% (5.12)	1.95	18%	3.0	.86	130
11.9.42.	33% (5.25)	2.01	18%			
12.9.42.	32% (5.12)	2.04	18%			
13.9.42.	35% (5.6)	2.12	20%			
15.9.42.	35% (5.6)	2.20	20%			130
17.9.42.	35% (5.6)	2.12	20%	2.4	.72	



Reactions - Nil.

Transfusion. Case.

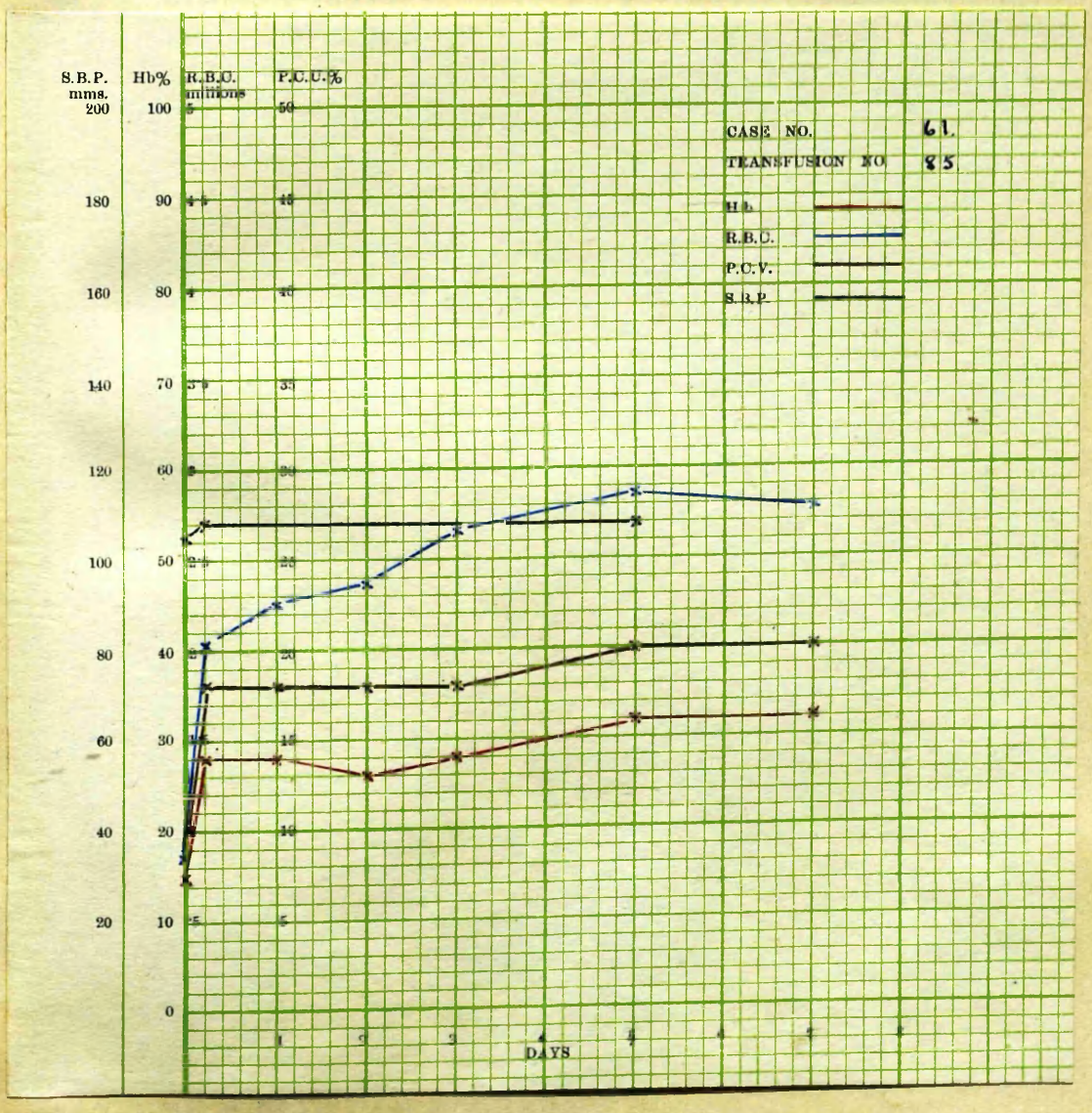
61. J.S. (33 Years). Admitted 5.3.42.

This patient had a duodenal ulcer from 1938. He suffered from haemoptysis from 1940. He had been losing weight and melaena was marked for five days before admission. There was a V.S. murmur at the pulmonic area with soft heart sounds. B.P. 105/50. Nothing abnormal could be found clinically in the abdomen. Rales were present at the right base.

Blood examination showed Hb 38% (6.08), R.B.C. 2.15 millions per cu.mm., W.B.C. 4,200 per cu.mm. Group O.

85. On 7.3.42. he was given the cells from 1,000 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	15% (2.4)	.86	10%			105
After 15 mins.	28% (4.48)	2.02	18%			108
8.3.42.	28% (4.48)	2.34	18%			
9.3.42.	26% (4.16)	2.46	18%			
10.3.42.	28% (4.48)	2.64	18%			
12.3.42.	32% (5.12)	2.86	20%			108
14.3.42.	32% (5.12)	2.78	20%			



Reactions - Nil.

Transfusion. Case.

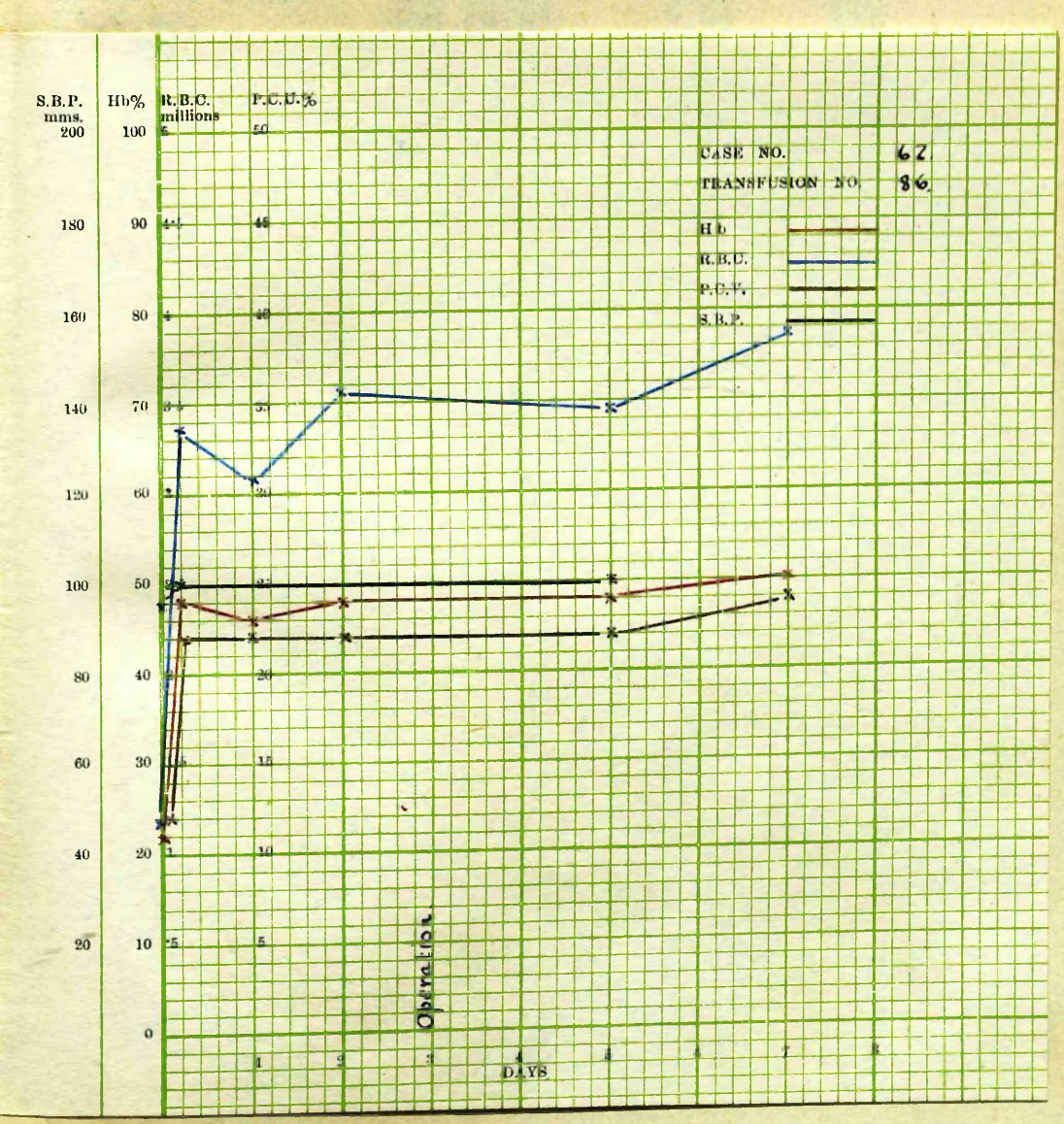
62. Mrs. E.T. (41 Years). Admitted 16.3.42.

This patient had her eighth child on 14.4.42., and thereafter developed acute mastitis and an abscess of the buttock. The heart sounds were weak but pure.

Blood examination showed Hb 25% (4.0), R.B.C. 1.09 millions per cu.mm., W.B.C. 6.400 per cu.mm. Group O.

86. On 21.3.42., she was given the cells from 900 c.c. Group O blood by the drip method.

Blood Changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	22% (3.52)	1.14	12%			95
After 15 mins.	48% (7.68)	3.34	22%			100
22.3.42.	46% (7.36)	3.08	22%			
23.3.42.	48% (7.68)	3.56	22%			
24.3.42.	Both abscesses opened under general anaesthesia.					
26.3.42.	48% (7.68)	3.46	22%			100
28.3.42.	50% (8.0)	3.88	24%			



Reactions - Nil.

Transfusion. Case.

63. J.T. (65 Years). Admitted 2.8.42.

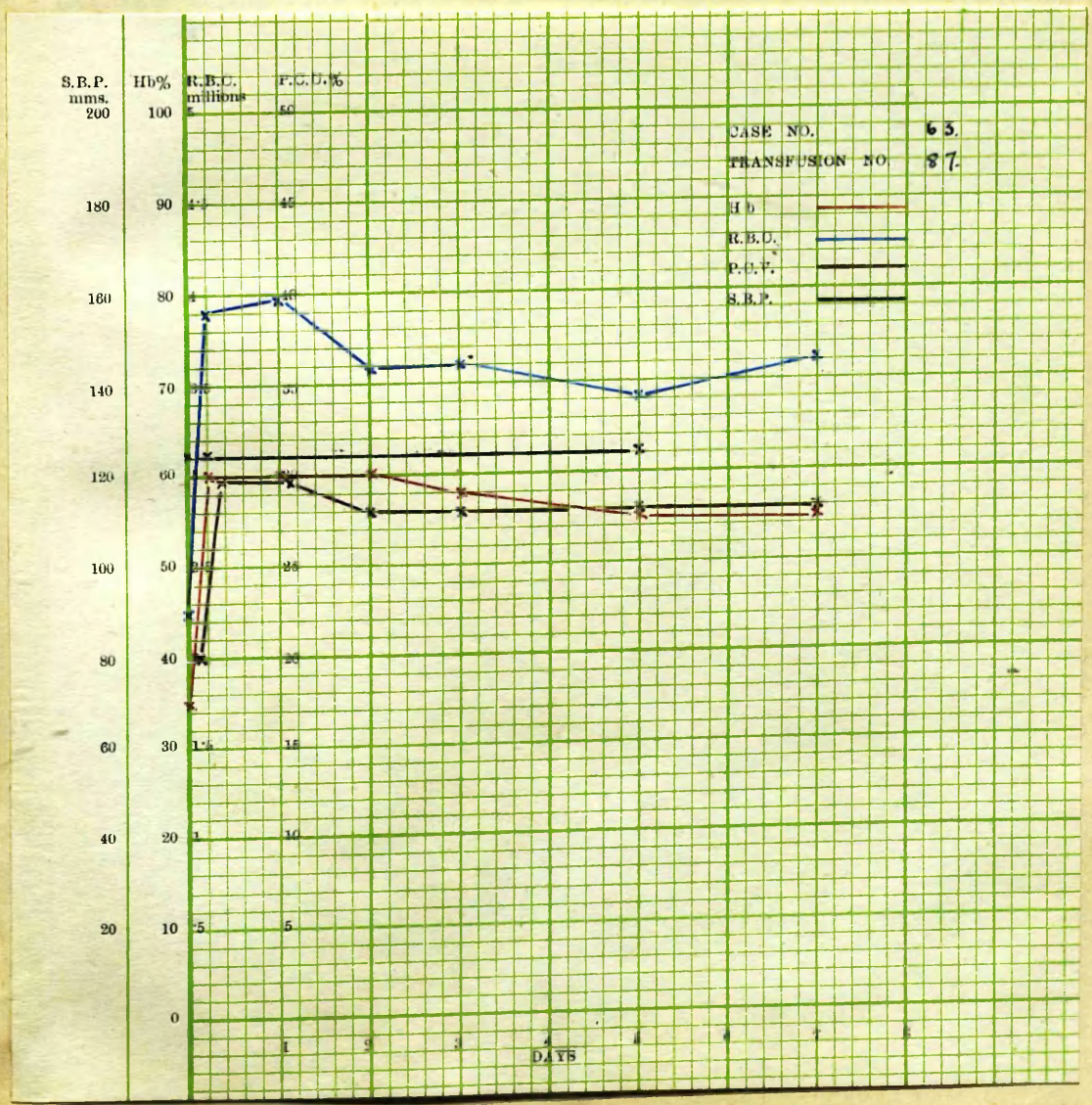
This man had intermittent diarrhoea for three months. There was epistaxis, but no bleeding per rectum was obvious, though faecal occult blood was found. The heart sounds were poor. B.P. 125/70. Radiology and sigmoidoscopy showed no abnormality of the gastro-intestinal tract. The test meal was achlorhydric.

Blood examination showed Hb 50% (8.0), R.B.C. 2.65 millions per cu.mm., W.B.C. 9,600 per cu.mm. Group O.

He developed an abscess of the groin with orchitis, and his blood count fell.

87. On 14.9.42. he was given the cells from 1,000 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	35% (5.6)	2.24	20%			125
After 15 mins.	60% (9.6)	3.90	30%			125
15.9.42.	60% (9.6)	3.98	30%			
16.9.42.	60% (9.6)	3.58	28%			
17.9.42.	58% (9.28)	3.60	28%			
19.9.42.	55% (8.8)	3.42	28%			125
21.9.42.	55% (8.8)	3.62	28%			



Reactions - Nil.

Transfusion. Case.

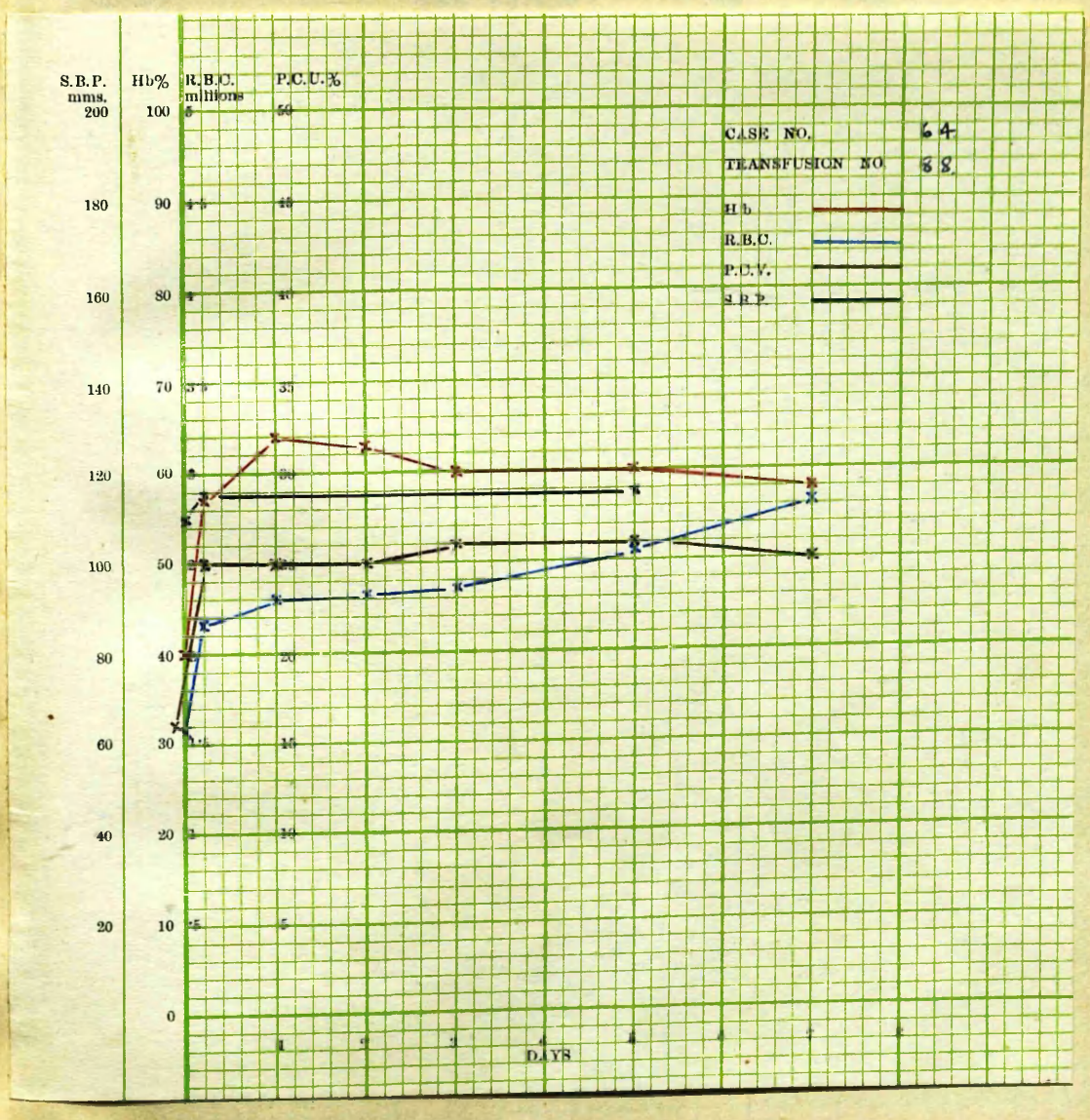
64. Mrs. M.T. (59 Years). Admitted 10.8.41.

This woman had marked weakness and lassitude for five weeks. Breathlessness, loss of weight and weakness were noted. The heart sounds were poor, and a V.S. murmur was present at the apex. B.P. 108/60. The test meal was achlorhydric.

Blood examination showed Hb 31% (4.96), R.B.C. 1.35 millions per cu.mm., W.B.C. 3,600 per cu.mm. Group A. Megalocytosis, anisocytosis and poikylocytosis were marked on examination of blood films.

88. On 11.8.41. she was given the cells from 900 c.c. Group O blood by the Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	40% (5.52)	1.58	16%	2.0	.13	110
After 15 mins.	57% (7.87)	2.17	25%	2.5	.85	115
12.8.41.	64% (8.83)	2.30	25%			
13.8.41.	63% (8.69)	2.32	25%			
14.8.41.	60% (8.28)	2.36	26%			
16.8.41.	60% (8.28)	2.55	26%			115
18.8.41.	58% (8.00)	2.82	25%	2.0	.82	



Reactions - Slight Grade I.

Transfusion. Case.

65 L.T. (70 Years). Admitted 13.3.42.

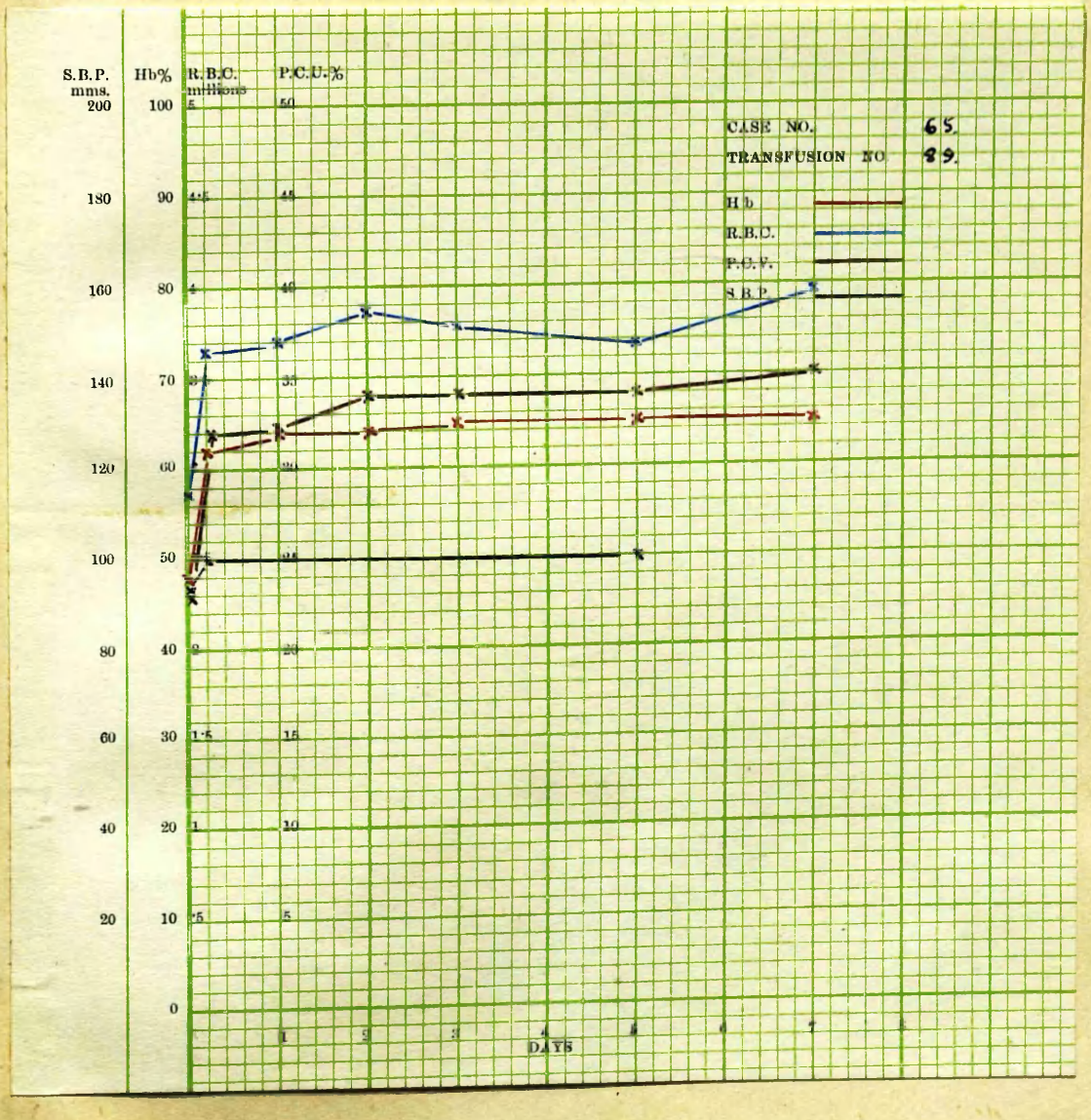
This man had indigestion and colicy pain for six weeks before admission. Distension and vomiting were marked.

On 15.3.42. he had a laparatomy performed when dense adhesions in the jejuno-ileal region were found with a pathological anastomosis which required double resection. He recovered fairly well from his operation, but his general condition remained poor.

Blood examination showed Hb 50% (8.0), R.B.C. 2.94 millions per cu.mm., W.B.C. 3,500 per cu.mm. Group O.

89. On 31.3.42., he was given the cells from 900 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	48% (7.68)	2.86	23%			95
After 15 mins.	62% (9.92)	3.64	32%			100
1.4.42.	64% (10.24)	3.70	32%			
2.4.42.	64% (10.24)	3.87	34%			
3.4.42.	65% (10.4)	3.78	34%			
5.4.42.	65% (10.4)	3.69	34%			100
7.4.42.	65% (10.4)	3.98	35%			



Reactions - Nil.

Transfusion. Case.

He gradually relapsed in the next week until his blood count was Hb 50% (8.0), R.B.C. 3.06 millions per cu.mm., W.B.C. 9,000 per cu.mm.

90. On 14.4.42. a transfusion was set up with the cells from 900 c.c. Group O blood by the drip method. In the middle of this, after the patient had had about 250 c.c. he had a slight rigor and became cyanosed. There was no rise of temperature. The transfusion was stopped, but the patient died.

A careful enquiry was made as to possible fallacies in technique. One of the bloods used was derived from a case of hyperiesia, and was not one of the regular donors. Owing to this fact, it was grouped, and its compatibility tested against the other blood and the recipient, by a technician. There is therefore, a possibility that the blood was incompatible.

Further possibilities are (1) a sub-group incompatibility (2) an Rh factor incompatibility (3) a sensitisation phenomenon following the first transfusion (4) the effect of an extra load on a poor myocardium.

My own impression is that a mistake was made in the grouping and cross-matching of one of the bloods.

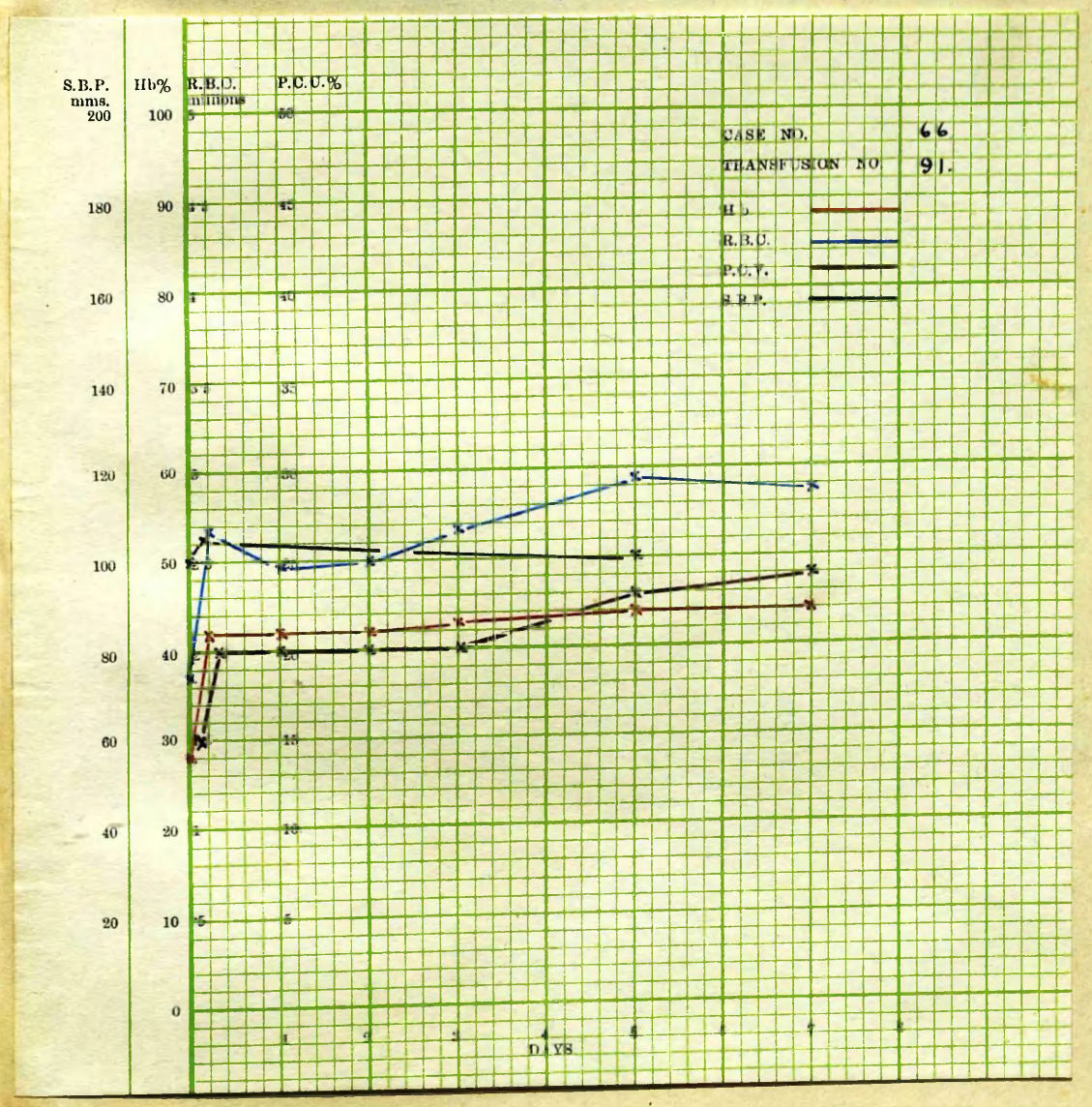
Transfusion. Case.

66. Mrs. M.W. (41 Years). Admitted 16.3.42.

This woman had a double acute mastitis six years before admission. She was untreated at that time, and the swelling remained. Six months before admission her breasts became very hard and painful, and she began to lose weight. 3½ weeks before admission, she had a left radical mastectomy, and the breast was found to be the seat of extensive scirrhous carcinoma involving the mediastinum. The other breast was not operated on but was also the seat of carinoma. Her blood picture was Hb 34% (5.44), R.B.C. 1.98 millions per cu. mm., W.B.C. 4,700 per cu.mm. Group O.

91. On 7.3.42., she was given the cells from 1,000 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	28% (4.48)	1,86	15%	1.2		100
After 15 mins.	42% (6.72)	2.68	20%	1.4		105
8.3.42.	42% (6.72)	2.47	20%			
9.3.42.	42% (6.72)	2.50	20%			
10.3.42.	43% (6.88)	2.69	20%			
12.3.42.	45% (7.2)	2.94	23%			100
14.3.42.	45% (7.2)	2.88	24%	1.0		



Reactions - Nil.

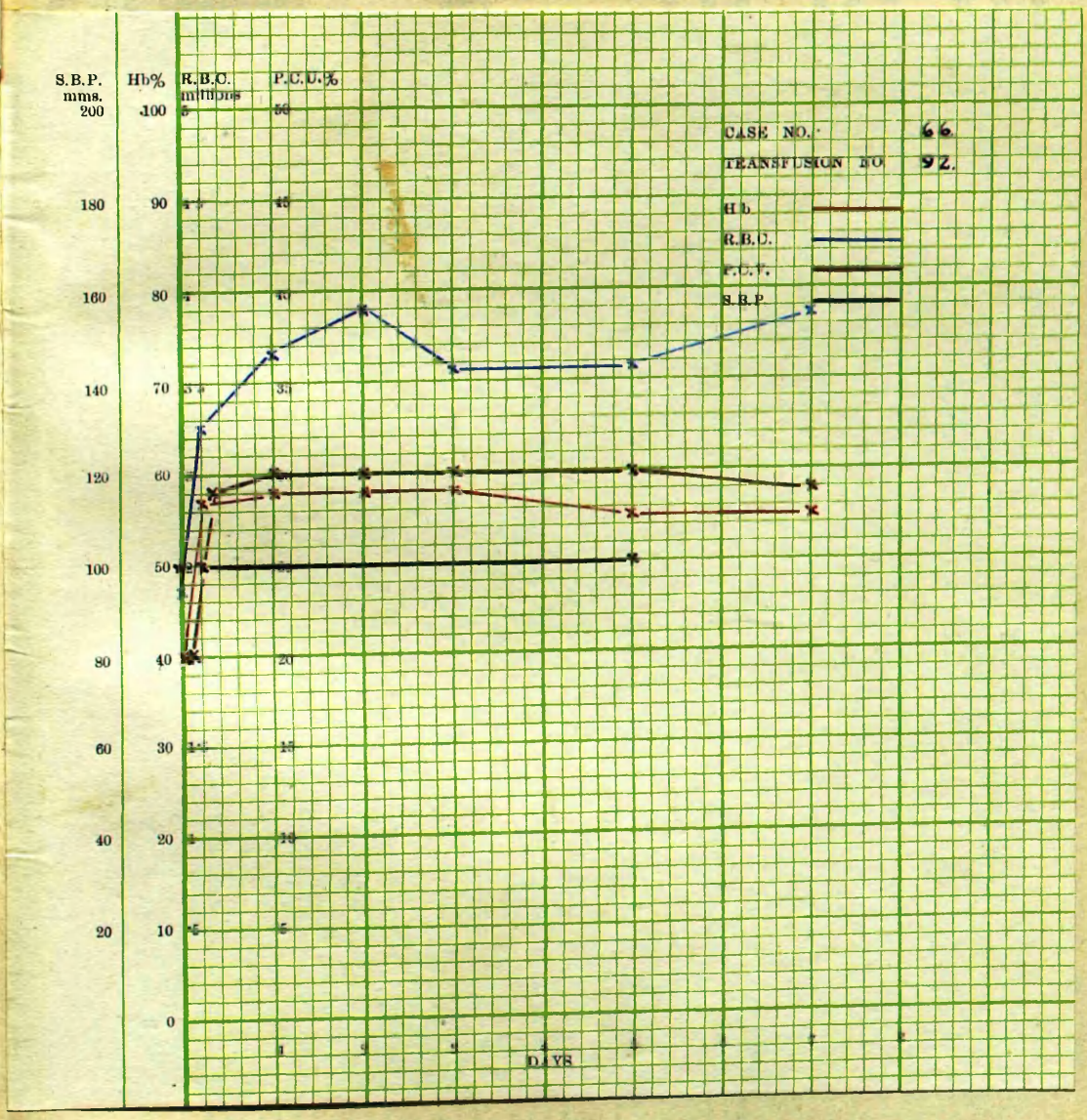
Transfusion. Case.

She had a course of deep X-ray therapy, and her blood count gradually fell.

92.

On 17.4.42., she was given the cells from 800 c.c. Group O blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P
Before	40% (6.4)	2.37	20%			100
After 15 mins.	57% (9.12)	3.24	29%			100
18.4.42.	58% (9.28)	3.65	30%			
19.4.42.	58% (9.28)	3.90	30%			
20.4.42.	58% (9.28)	3.56	30%			
22.4.42.	55% (8.8)	3.58	30%			100
24.4.42.	55% (8.8)	3.87	29%			



Reactions - Nil.

Transfusion. Case.

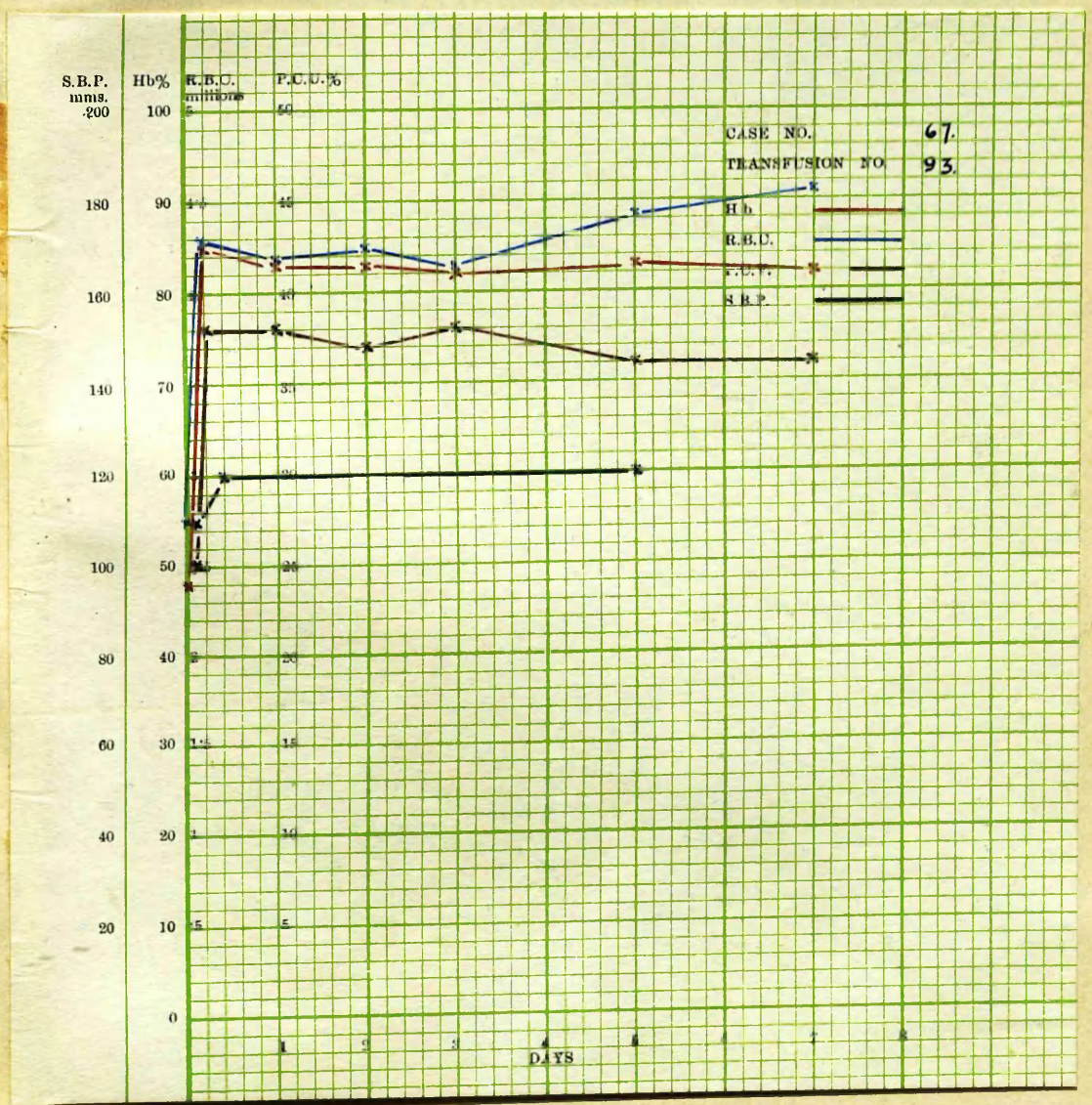
67. D.W. (40 years). Admitted 4.10.41.

This man had haematemesis one day before admission without any history or previous gastric upset. There was tenderness to the right of the epigastrium, but no other signs were present. The heart sounds were good and pure. B.P. 110/75.

On 7.10.41. blood examination showed Hb 33% (5.28) R.B.C. 1.88 millions per cu.mm., W.B.C. 11,000 per cu.mm. Group A.

93. On 11.10.41., he was given the cells from 1,400 c.c. Group O blood by the Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	48% (7.68)	2.76	25%	1.2	.34	110
After 15 mins.	85% (13.6)	4.27	38%	1.4	2.42	120
12.10.41.	83% (13.28)	4.18	38%			
13.10.41.	83% (13.28)	4.24	37%			
14.10.41.	82% (13.12)	4.07	38%			
16.10.41.	83% (13.28)	4.42	36%			120
18.10.41.	82% (13.12)	4.56	36%	1.2	2.14	



Reactions - Nil.

Transfusion. Case.

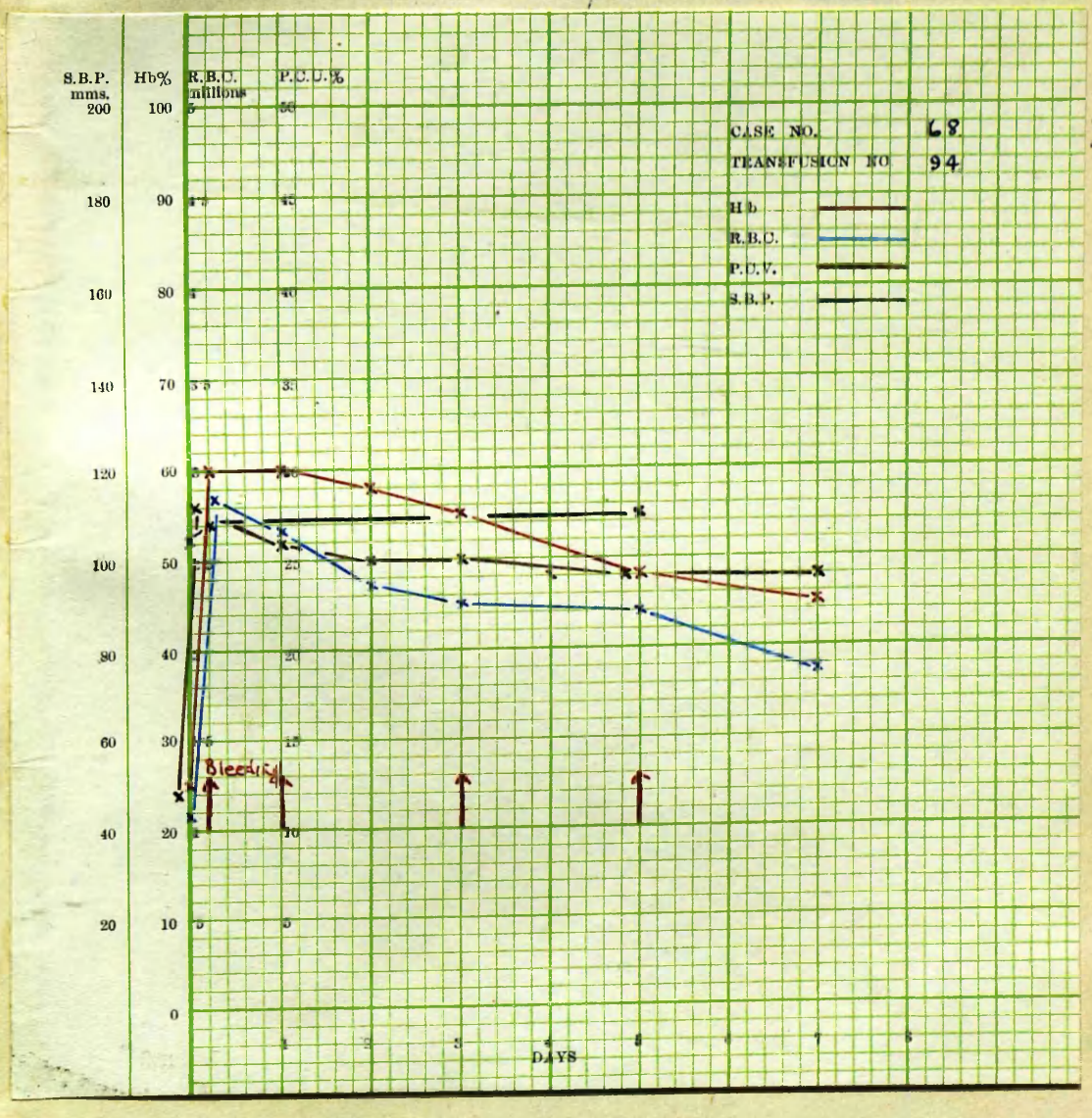
68. Mrs. J.W. 58 Years. Admitted 23.8.41.

This patient complained of weakness for three weeks with recent dyspnoea and loss of appetite. She had purpuric spots with bruising of the left hip and haematomata of both legs. The heart sounds were good with a V.S. murmur at the apex. B.P. 105/70.

Blood examination showed Hb 30% (4.8), R.B.C. 1.01 millions per cu.mm., W.B.C. 2,800 per cu.mm. Group A.

94. On 23.8.41. she was given the cells from 1,400 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	25% (3.45)	1.09	12%	1.6	.56	105
After 15 mins.	60% (8.28)	2.86	28%	1.4	1.94	110
24.8.41	60% (8.28)	2.68	26%			
25.8.41.	58% (8.00)	2.37	25%			
26.8.41	55% (7.59)	2.23	25%			
28.8.41.	48% (6.62)	2.20	24%			110
30.8.41.	45% (6.21)	1.88	24%	1.4	1.34	

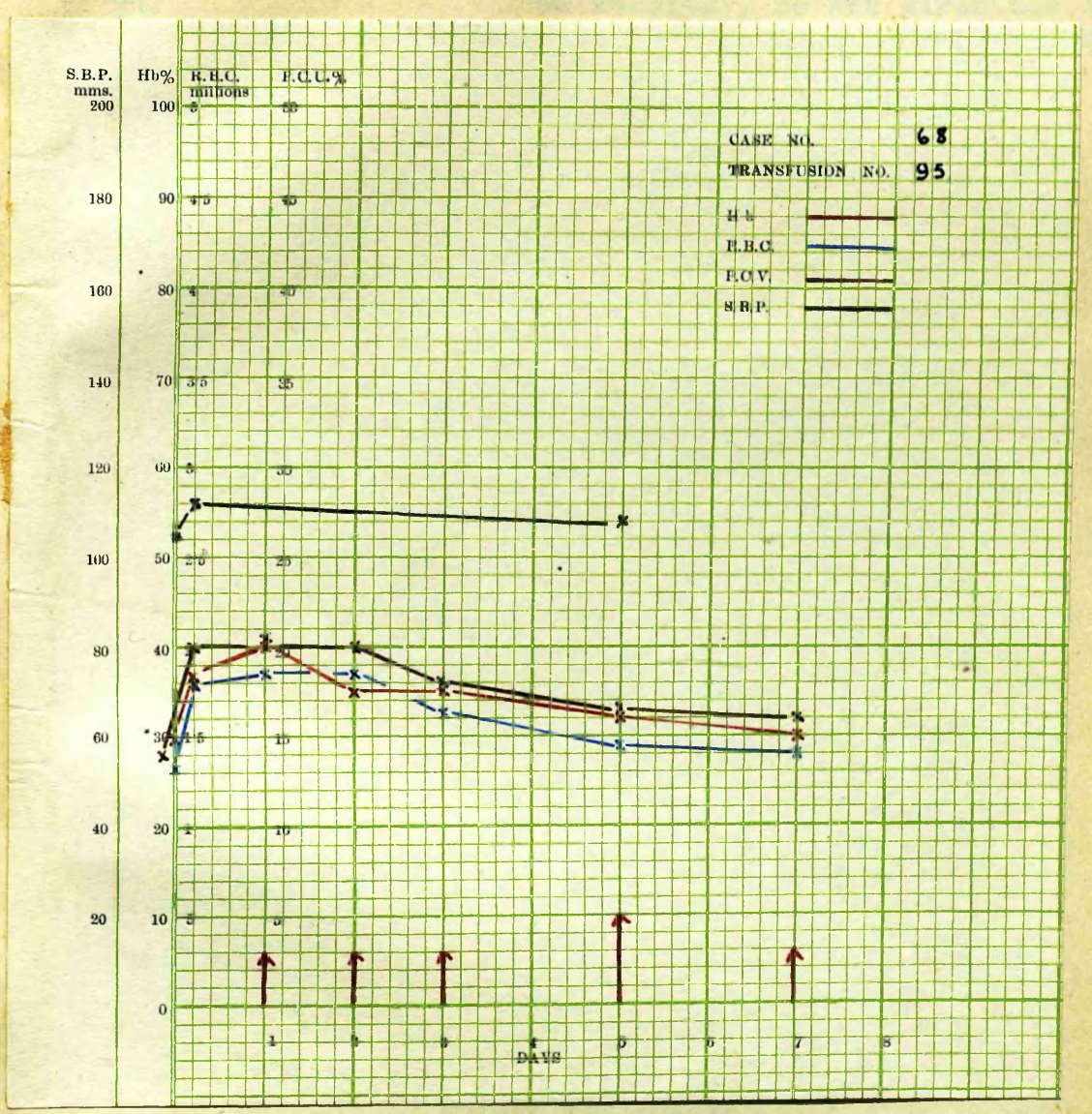


Reactions - Nil.

Transfusion. Case.

95. Her blood count continued to fall and on 6.9.41., she was given the cells from 750 cc. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P
Before	30% (4.8)	1.32	14%	1.8	.92	105
After 15 mins.	37% (5.92)	1.81	20%	1.6	1.50	112
7.9.41	40% (6.4)	1.83	20%			
8.9.41	35% (5.6)	1.85	20%			
9.9.41.	35% (5.6)	1.62	18%			
11.9.41.	32% (5.12)	1.46	16%			108
13.9.41.	30% (4.8)	1.40	16%	1.4	1.16	



Reactions - Very slight Grade I.

This patient had several epistaxes during observation, a severe one on 11.9.41.

Transfusion. Case.

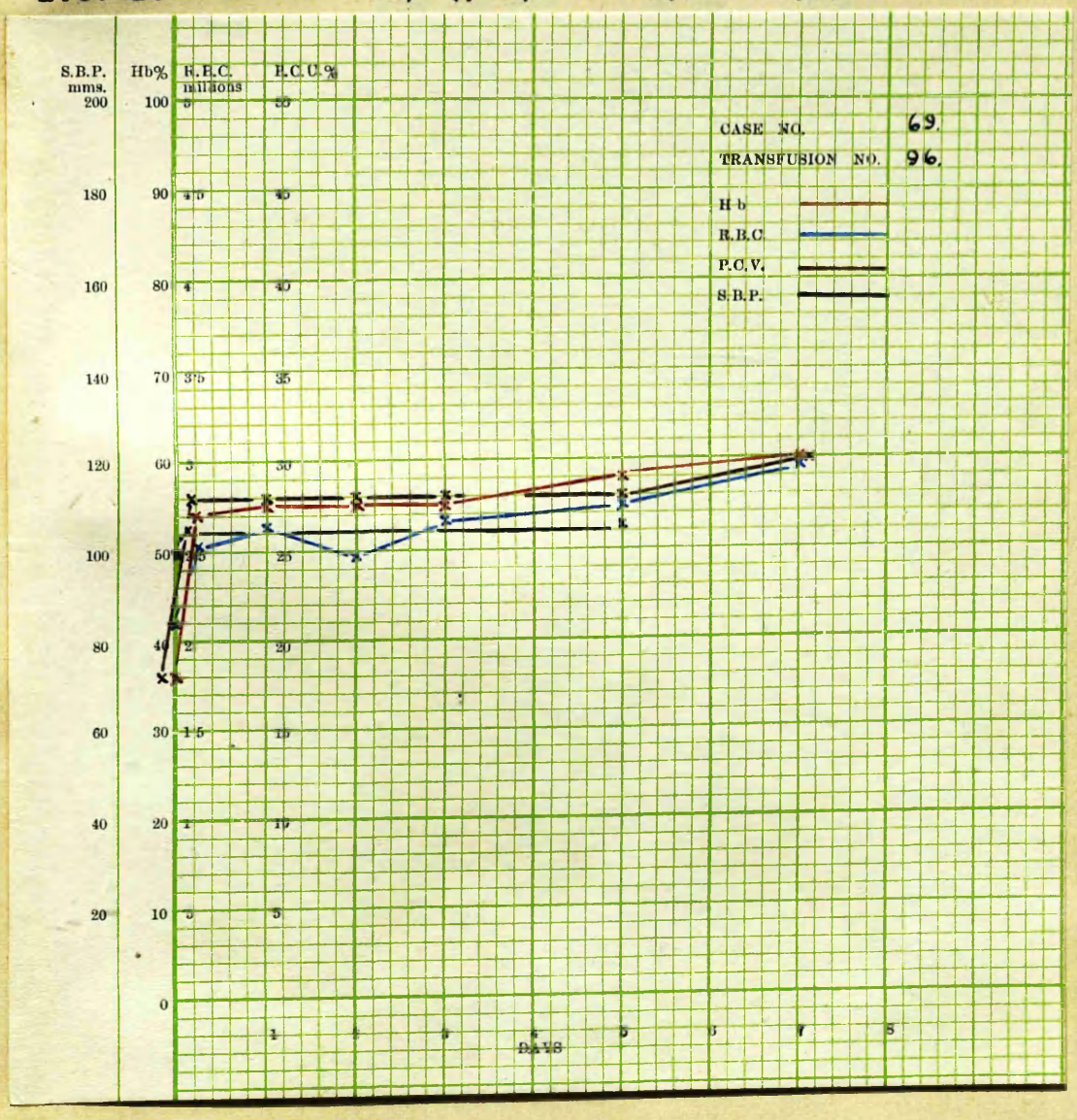
69. J.W. (37 Years) Admitted 6.5.42.

This man had his arm caught in a rolling machine. The whole arm was severely crushed and lacerated, but there was no obvious injury to nerves or blood vessels. No fracture was present. The wound was excised and closed.

On 13.5.42. he had a secondary haemorrhage treated by one pint of fresh Group O blood. The arm had the appearance of incipient gangrene, and was amputated and loosely stitched. Blood Group B.

96. On 25.5.42., he was given the cells from 700 c.c. Group B blood by the drip method.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	36% (5.76)	2.10	18%			100
After 15 mins.	54% (8.64)	2.52	28%			105
26.5.42.	55% (8.8)	2.63	28%			
27.5.42.	55% (8.8)	2.48	28%			
28.5.42.	55% (8.8)	2.68	28%			
30.5.42.	58% (9.28)	2.74	28%			105
1.6.42.	60% (9.6)	2.98	30%			



Reactions - Nil.

Transfusion. Case.

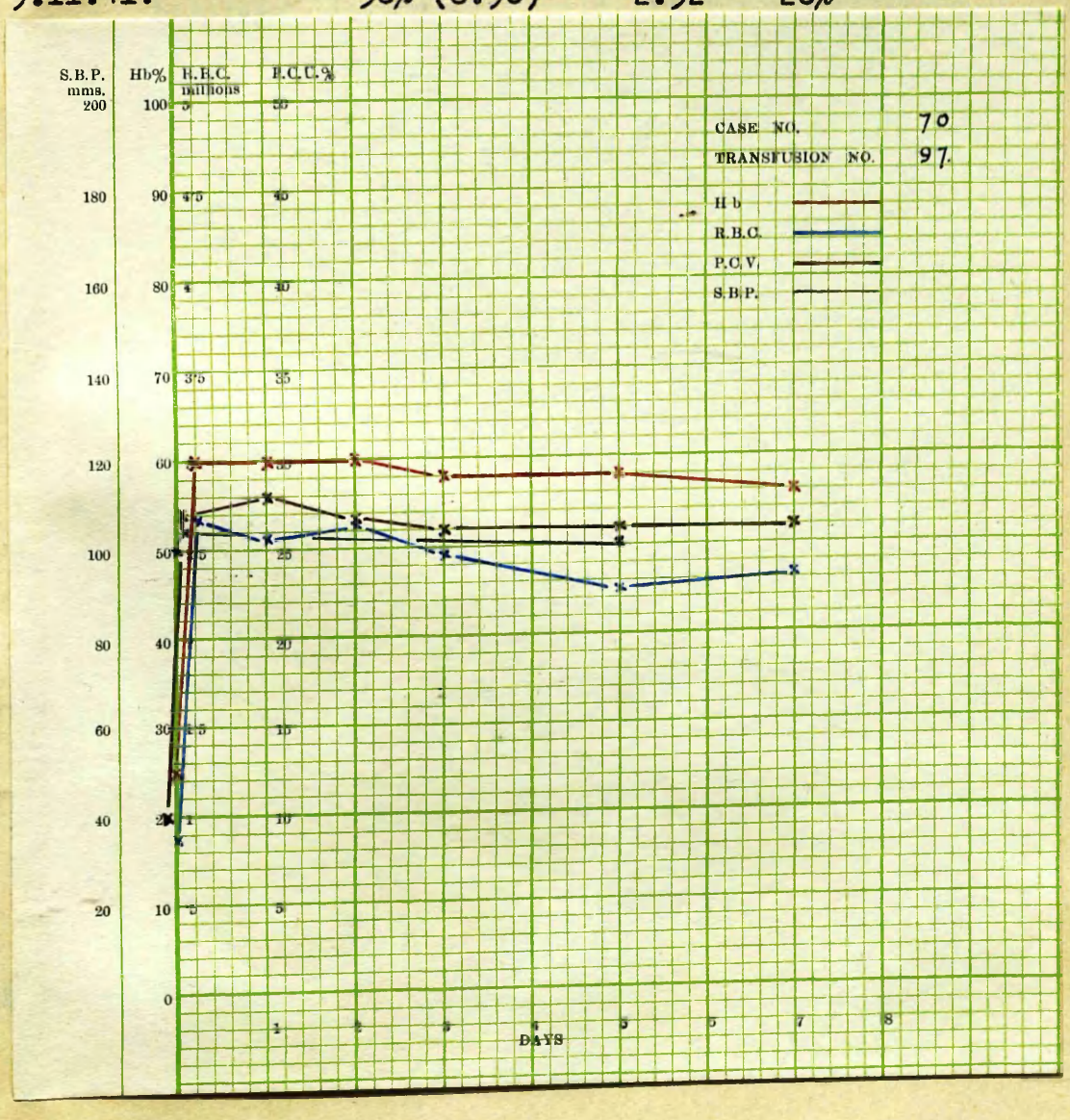
70. Mrs. A.W. (35 Years). Admitted 21.8.41.

This patient, for two months, had had fatigue, anorexia, sickness, sore tongue and loss of weight. She was very pale. The heart sounds were soft, and a V.S. murmur was present at the apex. B.P. 100/35. Her test meal was achlorhydric.

Her blood count on admission was Hb 24% (3.84), R.B.C. .99 millions per cu.mm., W.B.C. 1,200 per cu.mm. Group O. This fell to Hb 16%, and she was transfused with fresh blood on three occasions.

97. On 2.11.41., she was given the cells from 1,400 c.c. Group O blood by the Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	25% (4)	.88	10%			100
After 15 mins.	60% (9.6)	2.69	27%			105
3.11.41.	60% (9.6)	2.54	28%			
4.11.41.	60% (9.6)	2.62	26%			
5.11.41.	58% (9.28)	2.46	26%			
7.11.41.	58% (9.28)	2.24	26%			100
9.11.41.	56% (8.96)	2.32	26%			



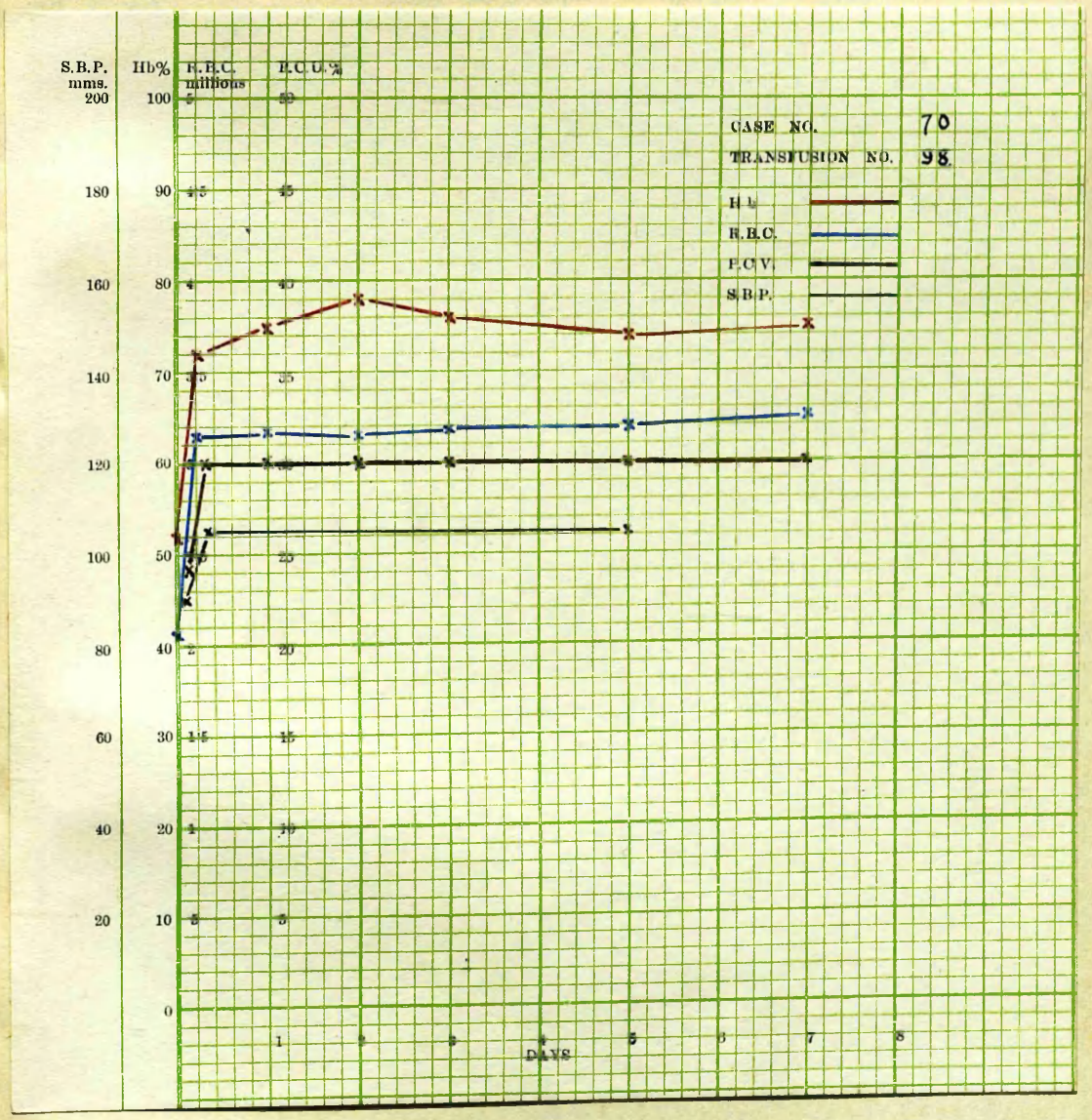
Reactions - Nil.

Transfusion. Case.

98

She deteriorated slightly and, on 20.11.41., was given the cells from 1,400 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	52% (8.32)	2.04	24%			90
After 15 mins.	72% (11.52)	3.13	30%			105
21.11.41.	75% (12.0)	3.18	30%			
22.11.41.	78% (12.48)	3.16	30%			
23.11.41.	76% (12.16)	3.19	30%			
25.11.41.	74% (11.84)	3.20	30%			105
27.11.41.	75% (12.0)	3.26	30%			



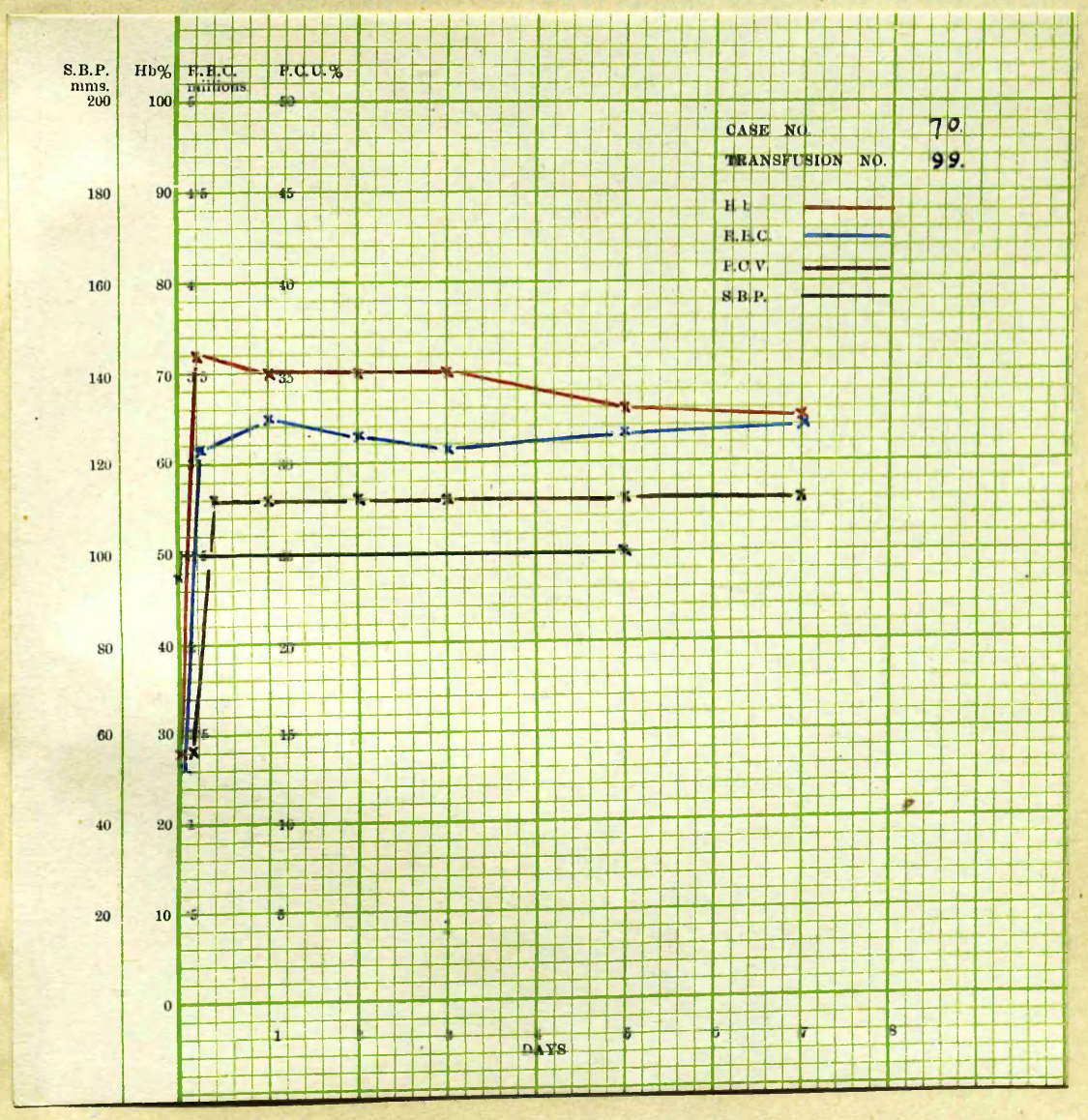
Reactions - Nil.

Transfusion. Case.

She was dismissed but gradually relapsed. On 20.1.42. she had a massive epistaxis, bleeding for twelve hours, and was readmitted.

99. On 22.1.42., she was given the cells from 1,850 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	28% (4.48)	1.31	14%			90%
After 15 mins.	72% (11.52)	3.19	28%			100
23.1.42.	70% (11.2)	3.24	28%			
24.1.42.	70% (11.2)	3.14	28%			
25.1.42.	70% (11.2)	3.08	28%			
27.1.42.	66% (10.56)	3.16	28%			100
29.1.42.	65% (10.4)	3.24	28%			



Reactions - Nil.

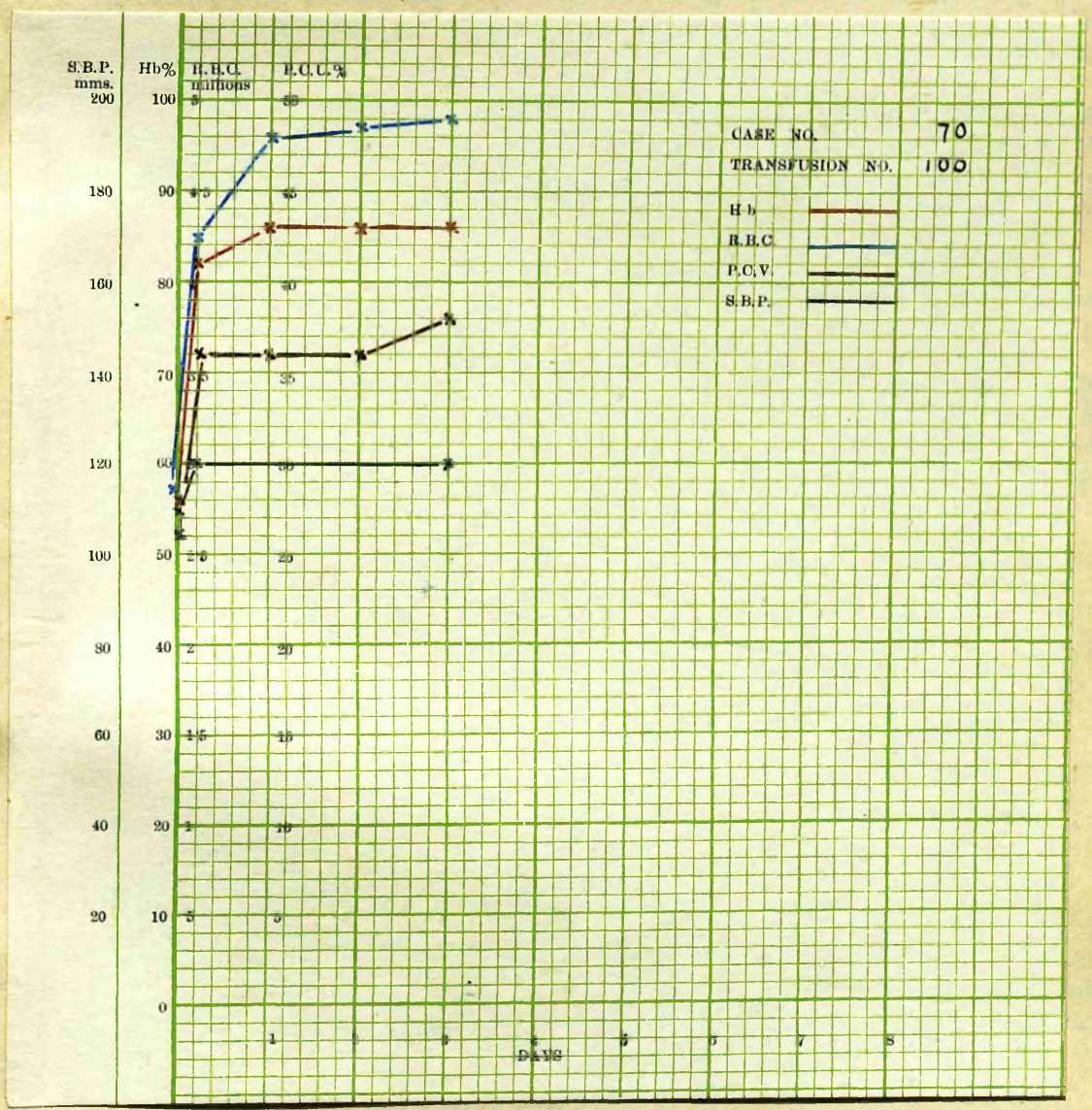
Transfusion. Case.

Again she began to lose way, no reticulocytes being found on repeated examination.

100.

On 2.2.42., she was given the cells from 1,400 c.c. Group O blood by Kimpton tube.

Blood changes.	Hb.	R.B.C.	P.C.V.	V.D.B.	A.	S.B.P.
Before	56% (8.96)	2.84	26%			95
After 15 mins.	82% (13.12)	4.23	36%			100
3.2.42.	86% (13.76)	4.80	38%			
4.2.42.	86% (13.76)	4.86	38%			95
5.2.42.	86% (13.76)	4.90	38%			
7.2.42.	Patient was dismissed feeling well.					
9.2.42.						



Reactions - Nil.

In this case the V.S. murmur disappeared, and the blood level was restored.

This was a case of interest showing that the blood picture can be restored almost to normal from very low levels without untoward incidents.

5) EFFECTS

(a) RISE IN HAEMOGLOBIN.

In assessing the alterations in blood picture following erythro-transfusion, the usual custom has been to measure changes per 500 c.c. of cell concentrate given. This is an unfortunate method for the volume of concentrate depends on many factors. Notably, the sedimentation rate of the donor, and the length of time and conditions of storage will affect the result. In dealing with a blood bank, it is very marked how the volume of cells obtained from the same quantity of blood varies from donor to donor by gravitational sedimentation methods. It seems more reasonable, if we postulate that the donors are healthy and comparable in haematological criteria, to measure the volume of blood from which the cells are obtained, and this is the method which is used in this thesis. All changes are measured per cells from 500 c.c. of blood. To standardise the other method would require a blood count of every sample of concentrate.

The Haemoglobin estimations were done by Sahli's method, and are comparable to each other although not perhaps with other workers. By standardisation of the comparator tube, the results were reduced to grams of haemoglobin per 100 c.c.

The mean rise of haemoglobin per cells from 500 c.c. blood was 9.3% (1.49 gms. per 100 c.c.) with a standard deviation of 2.8% (.45 gms. per 100 c.c.).

In an effort to obtain a more accurate figure with a smaller standard deviation, the result was calculated for 31 surgical cases with no blood disease and was found to be 9.2% (1.47 gms. per 100 c.c.) with a standard deviation of 1.5% (.24 gms. per 100 c.c.).

(b) RISE IN ERYTHROCYTE COUNT.

The mean rise in red blood cell count was 480,000 cells per cu. mm. per cells from 500 c.c. blood. The standard deviation was 190,000. In the selected group of surgical cases, the mean rise was 420,000 with a standard deviation of 90,000.

(c) RISE IN PACKED CELL VOLUME.

The packed cell volume was measured by spinning a column of blood at 1,500 revolutions per minute for 45 minutes.

The mean rise per cells from 500 c.c. blood was 4.49% with a standard deviation of 1.5%. In the selected group of surgical cases the mean rise was 4.46% with a standard deviation of 1.1%.

There/

There are many factors operating in the change of blood picture after erythrotransfusion, and these serve to cause the rather high standard deviations found.

The blood volume must first be considered. Obviously, the same amount of concentrate will cause a greater rise in a patient with a low blood volume than in a patient with a high blood volume. In an attempt to assess this factor, the blood volume of three patients before and after erythrotransfusion was estimated. Unfortunately, standard methods of blood volume estimation were found not to be sufficiently accurate to make further enquiry along these lines profitable.

The blood volume can be worked out roughly by calculating the number of cells transfused, and their dilution by the recipient's blood, but this is a most inaccurate method depending upon the assumption that the transfused cells are immediately used in the circulation.

The calculation is

Let x	=	blood volume of recipient
" b	=	R.B.C. of recipient
Then xb	=	total cells of recipient
Let v	=	volume of concentrate transfused
" B	=	R.B.C. of concentrate transfused
Then x + v	=	blood volume after transfusion
vB	=	cells transfused
Let C	=	R.B.C. after transfusion
Then		
(x + v) C	=	xb + vB
and x	=	$\frac{v(B - C)}{C - b}$

Bushby, Kekwick and Whitby (1940) suggest that the blood volume is equal to

$$x = \frac{\text{volume transfused by new haematocrit reading}}{\text{difference between haematocrit readings}}$$

Hill (1941) suggests

$$B^V = \frac{x(Hb_2 - Hb_3)}{(Hb_3 - Hb_1)}$$

This is criticised by Florey (1942) as inaccurate, and it appears that a more accurate method of estimating blood volume will be required before conclusions can be drawn from these results.

The erythrocyte count of the concentrate is not constant, and this is another factor operating against uniformity of results.

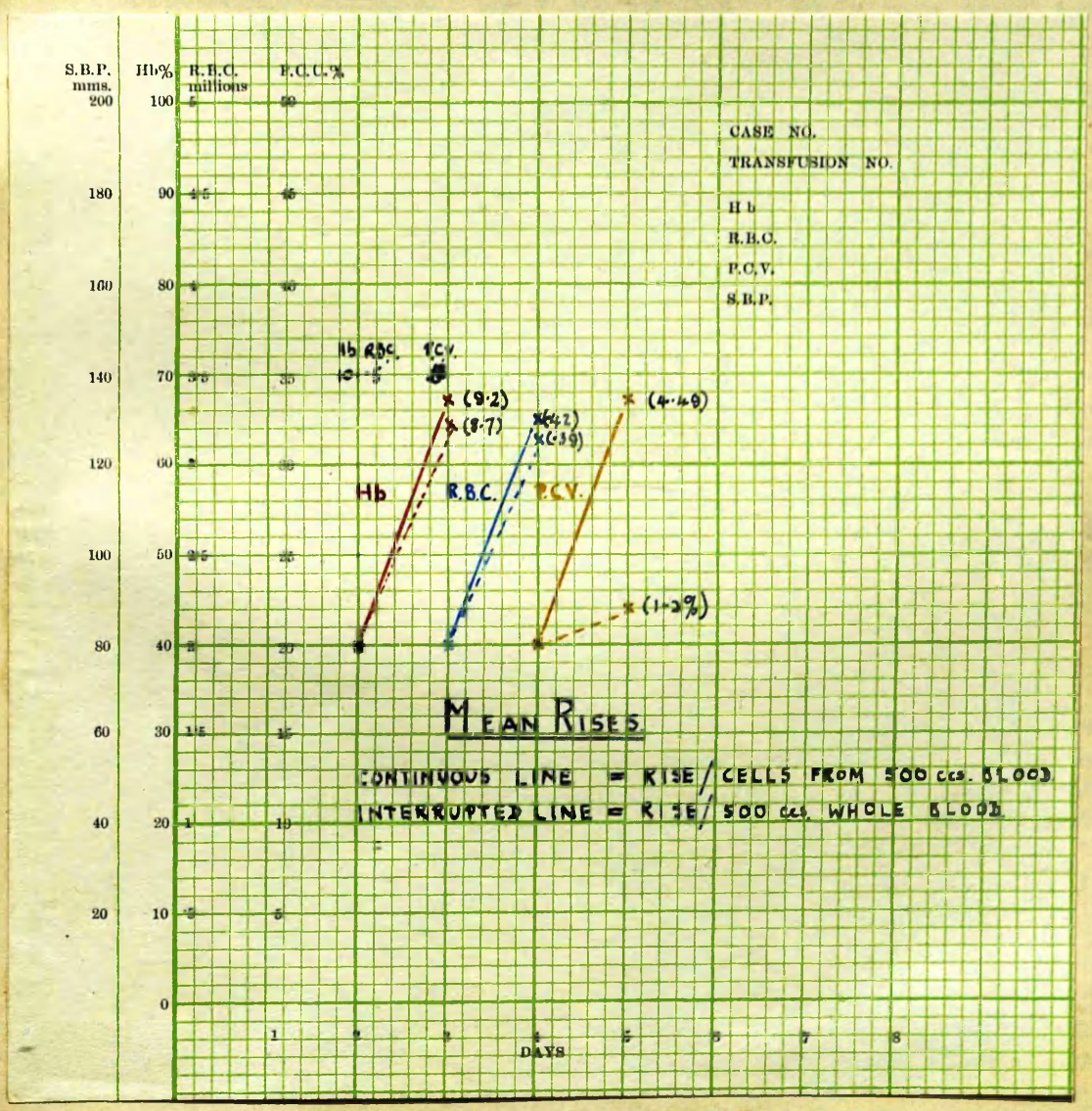
Rogers/

Rogers (1941) suggested that the age of the concentrate may have some effect on the results. This factor was checked in 54 cases, and it was found that, with blood up to 5 days storage, there was little significant difference in the value obtained. With blood stored for more than 5 days, the rises obtained did not appear to be so high, but this was not marked enough nor invariable enough to allow statistical analysis.

I have pointed out elsewhere (Goodall, 1941) that we can only assume that all the transfused cells are utilised immediately by the body, and that there is a possibility that transfused cells are stored for some time to make up the depleted stores of the recipient.

Considering all these factors, it is not surprising that the standard deviations of rises in blood counts after erythrotransfusion are high. We can state, however, that the rises are

	per cells from 500 c.c. blood
Haemoglobin	9.2% ± 1.5% (1.47 ± .24 gms.per 100 c.c.)
Erythrocyte count	420,000 ± 90,000
Packed cell volume	4.46% ± 1.1%



The only comparable figures are those of McQuaide and Mollison (1940) and Williams and David (1941). The former workers stated that the rise in haemoglobin was 10% to 15% per bottle, presumably 500 c.c. of concentrate, which would be derived from about 800 to 900 c.c. blood. The latter workers gave the rise as 10% to 12% per 500 c.c. concentrate.

(d) ALTERATIONS IN BLOOD PRESSURE.

The changes in blood pressure are considered from two points of view.

(a) The avoidance of rise of blood pressure in cases with a poor cardiovascular system.

(b) The importance of raising blood pressure in other cases. The changes found in the transfusion of concentrate depended on

1. the method of administering concentrate.
2. the pathological condition of the recipient.

All cases transfused by the Kimpton tube showed a rise of systolic blood pressure of 5 to 15 mms. This was most marked in the surgical cases especially those suffering from shock.

The rise in blood pressure of those transfused by the drip method was not so marked, and was not significant in the medical cases.

In general it can be said that the introduction of concentrate slowly is not contra-indicated even in cases where the myo-cardial condition is poor. For restoration of blood pressure in shocked cases, the use of concentrate is not so efficient as that of some other fluid which can be given more rapidly such as plasma, serum or whole blood. In the modern method of giving large quantities of intravenous fluid for shock, concentrate, unless resuspended in saline, is not advisable.

On the other hand, in medical conditions for which concentrate is most indicated, there is no contra-indication to a slow drip transfusion even in those with poor cardiac function.

(6) CHANGES IN CARDIAC SOUNDS.

The V.S. murmur which one finds so frequently in severe anaemias has been attributed to loss of viscosity of the blood. Levine (1940) attributes it to the increased speed of ejection of the blood from the aorta and pulmonary arteries, but as this increase of speed is due to the low cell/plasma ratio of the blood, it can be indirectly attributed again to loss of viscosity. One would therefore, expect the V.S. murmur to disappear when the packed cell volume is restored to normal.

In this series the V.S. murmur did disappear in four cases, Nos. 7, 28, 34 and 100. All these had large amounts of concentrate administered, and their packed cell volumes were finally over 30%. In the others, no change was found in the murmur, but this was not to be expected, as their bloods, while improved, were not restored to within normal limits.

(7)/

(7) REACTION RATE.

There were four Grade I reactions and one Grade II reaction in the series. Two patients died shortly after transfusion.

This reaction rate (5%) compares very favourably with a control series of 270 cases where the reaction rate was 17%. Unfortunately, the latter series of whole blood transfusions was not entirely under the control of the observer and no accurate division into Grades can be made.

The best recorded figures for reactions after blood transfusion are those of Zimmerman et al. who, by careful technique, reached the low figure of 2.2%. This was a reduction from their previous rate of 7.8% and they do not specify what are their criteria for reaction. Most workers ignore a slight pyrexia without rigor..

One of the fatal cases (No.32) was probably due to the overloading of a very poor heart muscle. The other (No.65) is of some interest and warrants further discussion.

This man had a second transfusion 14 days after the first. One of the bloods used in the preparation of the concentrate was derived from a hyperpietic patient and was not personally grouped or cross-matched. It may, therefore, have been incompatible.

From recent work (Landsteiner and Weiner, 1941; Boorman, Dodd and Mollison, 1942; Mollison and Taylor, 1942) it appears possible that this was a reaction to Rh factor to which the patient became sensitised at his first transfusion. As no anti-Rh serum is available here, it was impossible to confirm this theory, but it cannot be ruled out. Vaughan (personal communication) has also had a fatal case due to this factor.

It is also possible that some toxic substance was present in the hyperpietic blood.

In one case, by a mistake, citrate solution was given instead of saline prior to the use of the Kimpton tube. It was extraordinary how the patient complained of all the symptoms which are ascribed to the transfusion of incompatible blood. She had a rigor, tingling of the lips, pains in the chest and dyspnoea. There was pyrexia for some hours thereafter. It seems that with the elimination of citrate from the transfused fluid, the reaction rate will notably fall as in this series.

All the reactions might equally have occurred with the use of whole blood and none of them can be considered as contra-indications to erythrotransfusion.

(8) COMPARISON WITH WHOLE BLOOD TRANSFUSION.

A series of over 300 whole blood transfusions was carried out coincidentally with the erythrotransfusions. Only 184 of these were, however, adequately observed.

In these, the rises after transfusion were

	per 500 ccs. blood
Haemoglobin	3%-11% mean 8.7% (1.39 gms.)
Erythrocyte count	100,000-500,000 mean 390,000
Packed cell volume	1%-2%

The reaction rate was, as shown above, markedly reduced in erythrotransfusion.

The effect on reticulocytosis was similar in both methods. It was invariably depressant in its immediate action. This fact suggests that transfusion should be reserved for cases who are in immediate danger of ill effects from lack of blood cells and should not be used as a routine to restore the blood count. In most cases the erythroblastic tissues rapidly recovered and reticulocytosis returned to normal or higher in 1 to 3 days.

(9) LIFE OF TRANSFUSED CELLS.

This was mainly assessed by the Ashby differential agglutination technique. The method was first described by Ashby (1919, 1921, 1924) and modified by Maizels and Paterson (1940).

It depends on the fact that Group O blood can be given to Group A, Group B or Group AB patients without effect. The Group A, B or AB cells may then be agglutinated by their corresponding anti-sera and the rise in non-agglutinated cells gives the number of transfused cells present.

The technique used was that of Bushby, Kekwick, Marriott and Whitby (1940). In this, the usual 1.0 cu.mm. of blood was drawn up into a red cell pipette and diluted with the corresponding anti-serum of a titre of about 1/320. The contents were mixed, expelled into a corked tube and incubated at 37°C. for one hour, being shaken every 15 minutes. The non-agglutinated cells were then counted on a Thoma-Zeiss haemocytometer. Three counts were done on each patient; one before transfusion to ascertain the patient's normal non-agglutinable count, one immediately after and one on the eighth day after transfusion.

In my hands, this technique was not very accurate but it did show that nearly 80% of the transfused cells were still in the circulation eight days after transfusion.

Mollison and Vaughan (personal communications) have evolved a modification of the Ashby technique which gives results within 1% of the theoretical values expected, but it requires an extreme standardisation of detail which is impossible in the ordinary laboratory.

Isaacs (1924) attacked the Ashby method and suggested that it was completely inaccurate. Maizels and Paterson (1940) refute his suggestions and claim that it is a useful method.

A search was made for an intravitam stain which would enable the identification of transfused red cells directly but no useful stain was found. This was not unexpected theoretically but Vaughan has recently been using radioactive iron. This work, when published should give us more accurate figures for the life of transfused erythrocytes.

In support of the suggestion that transfused cells are not rapidly destroyed are the figures of the van den Berg reactions which show practically no rise. Haemolysis, at least is not rapid.

(10) OPTIMUM CONDITIONS OF STORAGE.

In the great majority of cases, the blood was drawn off into 50 ccs. of 3.8% sodium citrate until a total volume of 540 ccs. was reached i.e. 490 ccs. of blood. This gives a final concentration of .35% sodium citrate. It was found that clotting occasionally took place in this concentration after storage and it is advised that the final citrate concentration should be brought up to .5%. As most of the citrate is withdrawn in the plasma, there is no contraindication to this increase in blood withdrawn for erythrotransfusion.

The addition of glucose to stored blood is indicated when the blood will be kept longer than seven days. When plasma is regularly manufactured from all blood left for seven days, as it is in the Glasgow Royal Infirmary, it seems unimportant whether glucose is added or not.

The blood is stored at 2°C-4°C. As little disturbance as possible is caused. The plasma is withdrawn immediately before erythrotransfusion, but there seems no adequate reason why the cells after plasma withdrawal should not be filtered and stored for use.

(11) TYPES OF CASE MOST SUITABLE FOR ERYTHROTRANSFUSION.

The case most suitable for erythrotransfusion is the severe anaemia with a low packed cell volume. This is a very constant finding in any severe anaemia suffering from a blood dysfunction.

Any severe anaemia has some dysfunction of the cardiovascular system especially if the condition has been of long standing and erythrotransfusion throws less strain on the heart than whole blood transfusion.

It is also useful in sepsis when the concentrate is prepared from reasonably fresh blood.

Erythrotransfusion is not advised for shocked cases or dehydrated patients where fluid is required.

Marriott and Kekwick (1940) suggest the following levels as desirable for the types of cases noted.

	Raise to Hb
Severe anaemias	45%
Severe anaemias in emergency	80%
Severe anaemias where recovery urgent	100%
Aplasia etc.	60%-80%
Infection	100%

(12) SUMMARY.

(1) It has been shown that erythrotransfusion is not only a safe method of treatment but also preferable in some cases to whole blood transfusion. This makes the plasma available for other purposes.

(2)/

(2) The previous work on erythrotransfusion is summarised.

(3) The technique of erythrotransfusion is described.

(4) 100 transfusions of cell concentrate are described in detail. The mean rise of haemoglobin per cells from 500 ccs. blood was 9.2% (1.47 gms. per 100 ccs.); of erythrocyte count 420,000; of packed cell volume 4.46%.

The reaction rate was low.

(5) The effect of erythrotransfusion on blood pressure, blood volume and abnormal heart sounds is noted.

(6) An attempt was made to assess the life of transfused cells.

(7) The best conditions for storage are mentioned.

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