

BLOOD TRANSFUSIONS IN THE TREATMENT OF LEPROSY

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In response to a petition from all the European patients at the Pretoria Leper Institution seven cases of varying types were selected for treatment by blood transfusions. It was decided that six transfusions at intervals of one month would be given—the amounts at each transfusion were to be from 350 to 400 c.c.s. The final effects were to be noted three months after the last transfusion.

No specific effects on leprosy were anticipated as a result of the transfusion of strange blood, but it was hoped that it would either build up the patients' resistance or perhaps even stimulate their reticulo-endothelial system. It was not possible to obtain arrested cases of leprosy as donors, though it was decided to attempt this if the first experiment showed any promise.

The Rand Blood Transfusion Service undertook to donate, free of charge, not only the blood but also the services of their operators. This gift is acknowledged with gratitude not only by us but also by the patients.

The cases were found to belong to the following blood groups:—

Case 1	—	A	later corrected to O.
„ 2	—	O	
„ 3	—	A	
„ 4	—	A	
„ 5	—	O	
„ 6	—	O	
„ 7	—	O	

During the period of the investigation records were made of:—

- (1) Sedimentation index.
- (2) Red and white cell count.
- (3) Haemoglobin percentage.
- (4) Clinical appearance.
- (5) Condition of B. Leprae.

The cases selected included six cutaneous cases of the following stages of severity:

- (1) Early cutaneous.
- (2) Diffuse infiltration.
- (3) Discrete nodules.

- (4) Heavy infiltration with rugae.
- (5) Heavy infiltration with ulcers.
- (6) Infiltration with laryngeal stenosis and recurrent attacks of erythema nodosum leproticum.

Case 7 was a neural of the tuberculoid type.

Under routine antileprotic treatment the prognosis in the tuberculoid case would be very good but would be bad in the other cases.

UNTOWARD EFFECTS.

Case 1 had been reported to us as belonging to blood group "A." Before the transfusion a direct compatibility test was done at which three observers agreed that the bloods were compatible. The transfusion was started and when approximately 100 c.c.s. of blood was transfused the patient complained of severe pain in the small of the back with a constricting feeling in the chest. The transfusion was stopped. Pulse and respiration were normal and the patient appeared so normal that we suspected the complaints were neurotic in origin. A few minutes later she developed a rigor which quickly passed off. In 20 minutes she was fit enough to walk back to her quarters.

During the night she began to vomit and became pyrexial. The urine showed no blood, albumen or bile. There was no jaundice. Vomiting continued for 5 days and then ceased. An examination of the blood now showed an Icteric index of 6 and the ven den Bergh reaction was negative. A blood count showed no appreciable diminution of red cells.

Blood grouping was again performed and this patient was reported as belonging to group "O."

Conclusion. The reaction in this instance without a doubt was due to the transfusion of group "A" blood to a patient in group "O." The reaction seems to have been of a mild type in that there was no obvious jaundice. As a result of this it was decided to send specimens of all the patients' blood before each transfusion to the South African Institute for Medical Research for compatibility tests to be done there.

Case 4, after his fifth transfusion of 300 c.c.s, complained immediately of a blinding headache and nausea. For the following three days he stated he had haemoptysis but this was so slight he could produce no evidence to show us. He was found to have a frontal sinusitis. As his blood count was 5,000,000 red cells and his percentage of haemoglobin was 120 it was obvious that he was

not in need of additional blood. Therefore immediately prior to his next transfusion we withdrew 300 c.c.s. On this occasion there was no complaint.

CASE HISTORIES.

Case 1: (L.1 N.1). Duration 5 years, has never advanced beyond the stage of early diffuse infiltration of face—so slight as to be hardly perceptible though bacilli are always demonstrable. Diffuse erythema on thighs and back with erythematous lesions on abdomen. Transfusions given:—

14th July, 1939 ...	100 c.c's —	group A.
24th August, 1939 ...	250 " —	" O.
5th October, 1939 ...	250 " —	" O.
5th November, 1939...	300 " —	" O.
8th December, 1939...	300 " —	" O.
12th January, 1940 ...	300 " —	" O.

Results: Sedimentation index before treatment 25, dropped to 1 at conclusion of treatment. Haemoglobin percentage practically unaltered. Red cells remained stationary around 5,000,000. White cell count dropped from 16,000 to 12,000.

Clinically the lesions on the face are less evident but the trunk lesions are very much more erythematous. Bacilli are just as numerous.

Conclusion—not benefited.

Case 2: (L.2). Duration 8 years. Diffuse erythematous infiltration on face with infiltrated plaques on arm and buttocks. Transfusions given:—

July, 1939 ...	250 c.c's —	group O.
August, 1939 ...	250 " —	" O.
October, 1939 ...	250 " —	" O.
November, 1939 ...	257 " —	" O.
December, 1939 ...	300 " —	" O.
January, 1940 ...	300 " —	" O.

Results: Sedimentation index was 1 now 30. Red cells dropped from 5 to $3\frac{1}{2}$ million. White cell count risen from 12,000 to 14,000. Haemoglobin percentage was 125 now 110.

Clinically the lesions on the face appear more active while there is no change in the condition on the trunk. Unchanged bacilli remain plentiful.

Conclusion—worse.

Case 3: (L.3). Duration 5 years. Discrete nodules over firm infiltration of face. Erythematous infiltration of forearms and

back with occasional nodules. Transfusions given:—

July, 1939	...	...	250 c.c.'s	—	group A.
August, 1939	...	...	250 "	—	" O.
October, 1939	...	...	500 "	—	" A.
November, 1939	...	...	400 "	—	" A.
December, 1939	...	...	500 "	—	" O.
January, 1940	...	...	300 "	—	" A.

Results: Sedimentation index remains high. Red cells dropped from 3 to 2,000,000. White cell count dropped from 30,000 to 12,000. Haemoglobin percentage was 70%—now 100%. L. Bacilli always present.

Clinically no change.

Conclusion—not benefited.

Case 4: (L.3). Duration 3 years. Heavy infiltration of face which is very erythematous. Face shows rugae. Slight diffuse infiltration chest and back. Transfusions given:—

July, 1939	...	...	250 c.c.'s	—	group A.
August, 1939	...	...	250 "	—	" A.
October, 1939	...	...	250 "	—	" A.
November, 1939	...	...	350 "	—	" A.
December, 1939	...	...	300 "	—	" A.
January, 1940	...	...	300 "	—	" A.

(Comment—patient had cholecystitis in September and frontal sinusitis in January.)

Results: Sedimentation index has remained at all times below 10. Red cells around 5,000,000. White cell count has fluctuated with his infections—started at 7,500 and is now 11,000. Haemoglobin percentage has remained high, i.e. 120%. Leprosy bacilli unaltered.

Clinically no change.

Conclusion—not benefited.

Case 5: (L.3). Duration 15 years. An advanced cutaneous case with heavy infiltration of face, trunk and limbs, which has broken down into multiple leprotic ulcers, especially on the buttocks and thighs. Transfusions given:

July, 1939	...	...	250 c.c.'s	—	group O.
August, 1939	...	...	250 "	—	" O.
October, 1939	...	...	400 "	—	" O.
November, 1939	...	...	300 "	—	" O.
December, 1939	...	...	300 "	—	" O.
January, 1940	...	...	300 "	—	" O.

Results: Sedimentation index has remained in neighbourhood of 60 to 65. Red cells (in spite of adjuvant iron therapy) have

risen only to 3,000,000. White cell count has dropped from 20,000 to 12,500. Haemoglobin percentage has risen from 55% to 75%. Leprosy bacilli remain plentiful and unchanged.

Comment. The response of this case, to a blood transfusion was extraordinarily promising. Within a week of each transfusion the ulcers would change from grey sloughs to healthy granulations. In a fortnight the majority would be healed or healing. But, before the month was up and the next transfusion was due new ulcers would appear. He also gained greatly in health and strength. It is perhaps feasible that the transfusions were spaced at too long intervals and that he would be greatly benefited by weekly or even daily transfusions.

Clinically no change.

Conclusion—fleeting benefits only.

Case 6: (L.3). Duration 7 years. Diffuse infiltration of face, trunk and limbs with laryngeal ulceration. Patient also frequently has outcrops of fleeting nodules (erythema nodosum leproticum). Transfusions given:—

July, 1939	...	...	250 c.c.'s	—	group O.
August, 1939	...	...	250	..	— .. O.
October, 1939	...	...	250	..	— .. O.
November, 1939	...	...	325	..	— .. O.
December, 1939	...	...	300	..	— .. O.
January, 1940	...	...	300	..	— .. O.

Results: Sedimentation index remained bad ranging between 60 and 70 until April, 1940. At this stage even though we did not wish to complicate our findings by additional treatments it was obvious that the transfusions had had no beneficial effect. A course of Fouadin—15 injections totalling 52.5 c.c.s brought the sedimentation index down to 28. Red cell improved slightly from 2,800,000 to 3,000,000. White cells remained in the neighbourhood of 16,000. Haemoglobin percentage improved from 55 to 100%. Bacilli remained plentiful but have become more beaded. Outcrops of erythema nodosum leproticum continue to occur. Voice has become less husky but the laryngeal stenosis persists. No change in leprotic infiltration.

Conclusion—not benefited.

Case 7: (N.2). Duration 11 years. Large tuberculoid minor macule over buttocks. This macule is erythematous and slightly elevated throughout its whole extent. No bacilli can be found. A faintly erythematous macule is present below left eye. Repeated skin and nasal smears showed no bacilli before the transfusions.

No transfusion given in December owing to blood of donor coagulating.

In December patient had acute pyelitis followed by outcrops of evanescent macules. In March new permanent macules appeared on face and shoulders. The nasal smear became positive once only in January. Transfusions given:—

July, 1939	...	...	250 c.c's	—	group O.
August, 1939	...	...	250 "	—	" O.
October, 1939	...	...	300 "	—	" O.
November, 1939	...	...	275 "	—	" O.
December, 1939	...	...	none	given.	
January, 1940	...	...	300 c.c's	—	" O.

Results: Sedimentation index has remained good. Red cells started at 5,000,000 and have dropped to 3,000,000 (due to menorrhagia). White cells have dropped from 10,000 to 7,500. Haemoglobin percentage remains above 100.

Clinically the lesions on the buttocks are improved but the new lesions show that the patient's general condition has deteriorated.

Conclusion—worse.

THE RECORDS OF THE SEDIMENTATION INDEX SHOW

A study of the illustrative graphs reveals:—

- (1) There has been improvement in only one case of the sedimentation indices during the period of the blood transfusions or for the following three months.
- (2) Sedimentation indices taken before and after transfusions were not altered.
- (3) Only cases 1, 4 and 7 show satisfactory sedimentation indices, but in each case the clinical lesions are more obvious.
- (4) The sedimentation index has become worse in case 2.

THE RECORDS OF THE RED CELL COUNT SHOW

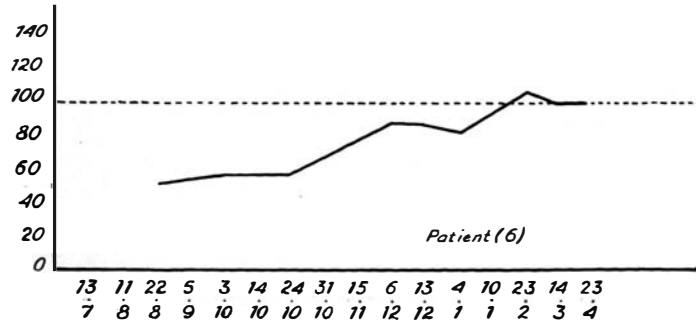
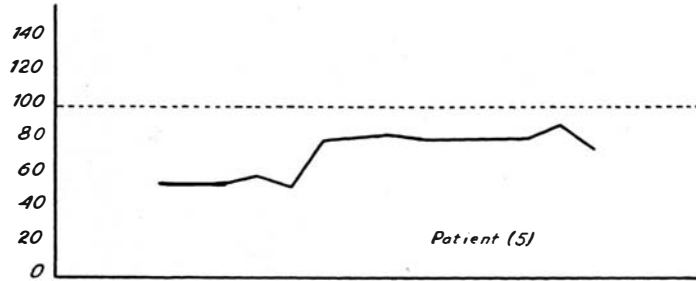
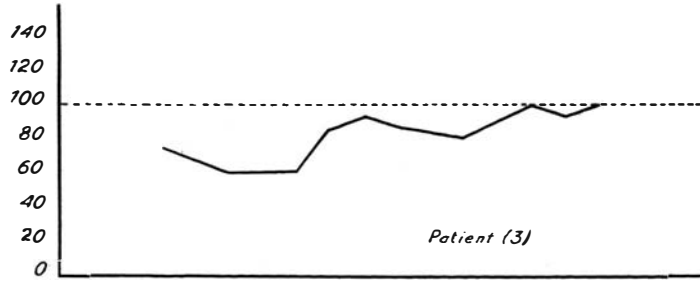
The graphs of the red cell counts reveal:—

- (1) Anaemia was not benefited by the transfusion.
- (2) Anaemia was a marked feature of cases 3, 5 and 6.
- (3) Progressive anaemia occurred in cases 2 and 7. In case 7 there was menorrhagia during January and February.

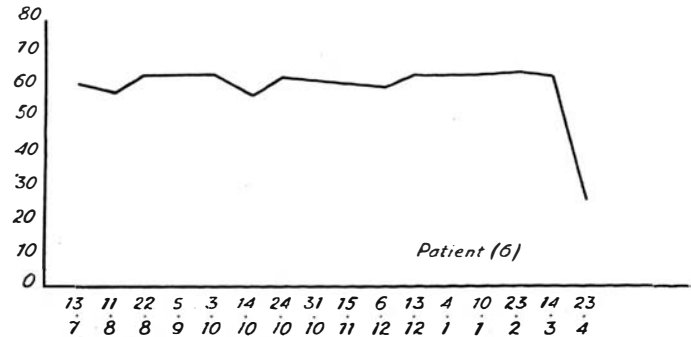
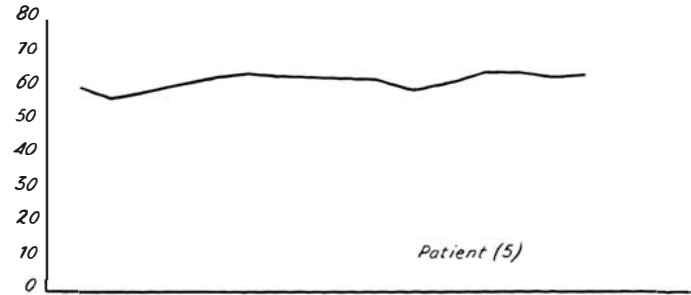
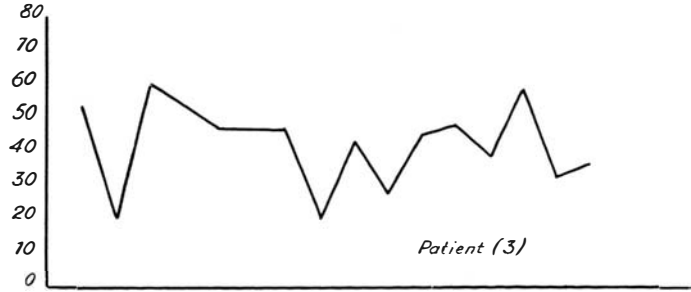
GRAPHS ILLUSTRATING THE WHITE CELL COUNT.

- (1) All the cases showed a leucocytosis at some period or other during the course of the transfusions, though only case 5 had obvious septic lesions.
- (2) The white cell count showed no correlation with the transfusions or with the clinical appearances.

GRAPHS ILLUSTRATING THE PERCENTAGE HAEMOGLOBIN.



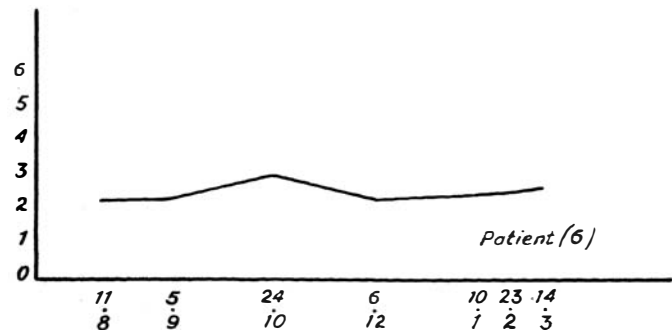
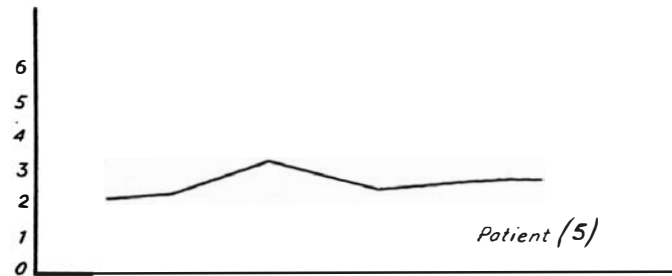
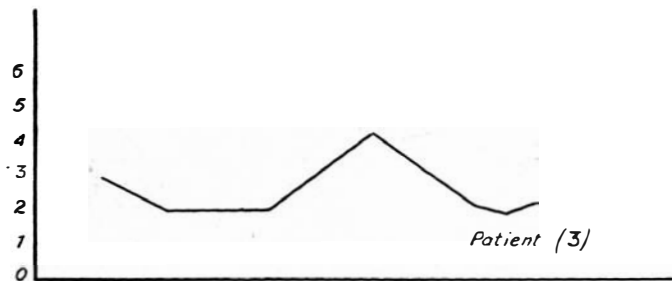
GRAPHS ILLUSTRATING THE SEDIMENTATION INDICES.



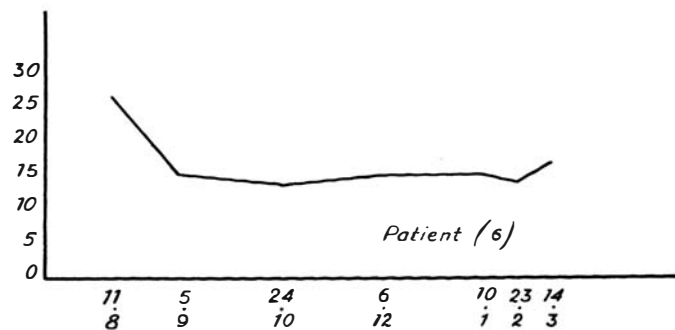
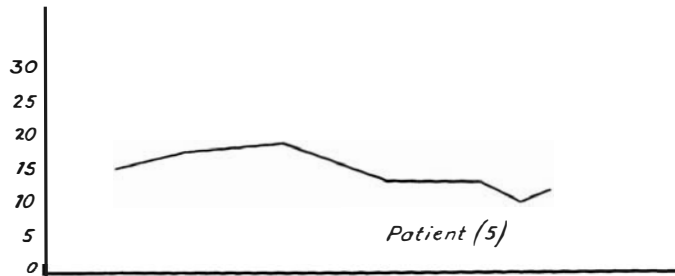
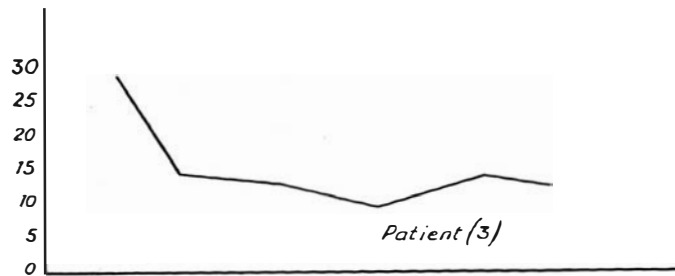
13 11 22 5 3 14 24 31 15 6 13 4 10 23 14 23
7 8 8 9 10 10 10 10 11 12 12 7 7 10 2 3 4

13 11 22 5 3 14 24 31 15 6 13 4 10 23 14 23
7 8 8 9 10 10 10 10 11 12 12 7 7 10 2 3 4

GRAPHS ILLUSTRATING THE RED CELL COUNTS (IN MILLIONS)
Per cub. m.m.



GRAPHS ILLUSTRATING THE WHITE CELL COUNTS (IN THOUSANDS)
Per cub. m.m.



THE RESULT OF THE PERCENTAGE OF HAEMOGLOBIN SHOW

(The Haemoglobin percentages were read on a " Haemometer Sicca " in which the normal range is from 100 to 120.)

(1) A definite improvement is revealed in cases 3, 5 and 6 as a result of the transfusions.

Illustrative graph of cases 3, 5 and 6 are shown.

SUMMARY.

Six monthly transfusions were given to seven leprosy patients. Nine months after starting the treatment no improvement could be found.