

We have used Plasmagel for more than two years, both in the laboratory and in current practice.

As regards animal tests in the laboratory, we can but confirm the favourable conclusions reported by other authors.

We must also emphasize the good results of our tests when carrying out reanimation. We must insist on the good tolerance to the preparation which has appeared satisfactory to us, even outside the anesthesia period, as well as the preparation's definite power of *maintaining the integrity of the volemia*.

We should like to point out that it is not advisable to mix whole blood and Plasmagel *in vitro*. On the other hand, when treating shock, we have no hesitation in mixing, in a single patient, Plasmagel and blood products given separately or together.

Although we recognise the qualities of this preparation we have never decided to perfuse Plasmagel on its own in the case of patients with a severe state of anemia.

It appears interesting that Plasmagel even if entering the circulation *in vivo* does not appear to greatly disturb the patient's electrolyte equilibrium and, if it does, does not seem to influence the functional testing of proteins; however, it is advisable not to perform serological studies and, particularly, to carry out blood grouping on a sample of blood coming from an individual who has received GFM solution.

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Why We Give Direct Blood Transfusions

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Since 1940, more than 10,000 direct blood transfusions have been given in Australia. A technique has been developed which is simple and reliable^{1,2}. The Julian Smith double roller rotary pump is used.

Most of the direct blood transfusions (in Australia) have been carried out at two Victorian Hospitals, namely the Alfred Hospital, Melbourne, and the Mooropna Hospital, Shepparton. Direct transfusions are given as a routine to patients attending the Haematological Clinic Alfred Hospital, but there is a blood bank for general use. However at the Mooropna Hospital, which is situated in the Goulburn Valley, about 100 miles from Melbourne, all transfusions are given by the direct method.

Besides the central bank in Melbourne there are regional banks throughout rural Victoria. All banks store blood except at Shepparton.

At the Mooropna Hospital where direct transfusions are given, there is the most economical use of blood in Victoria as indicated by the lowest Donation Bed ratio. Dr. MacKellar, who is the Honorary Medical Officer of the Shepparton Blood Transfusion Service, has found the transfusion of unmodified blood to be of value

in the treatment of burns as well as in haemorrhagic shock. Bleeding ulcers have responded well to treatment by direct transfusion. It is thought that large transfusions of citrated blood in recurrent haematemesis may be a factor in continual bleeding. In a number of instances, when subsequently direct transfusions have been given, bleeding has stopped.

Since 1947 when a haematological clinic was established at the Alfred Hospital, most of the direct transfusions have been given to patients with blood disorders.

Table I

Direct Blood Transfusions Given at Alfred Hospital, 1949–1957

	In-patients	Out-patients	Total
Leukaemia and lymphoma	340	566	906
Aplastic anaemia	153	400	553
Bleeding disorders, etc.	600	161	761
			2220

Table I shows a number of transfusions given during the period 1949–57. More than half of the transfusions were performed on out-patients, who were ambulant. They attended regularly for transfusion and apart from such short interruptions were able to carry on normal activities.

A patient aged 54 years, suffering from acute leukaemia had 29 direct transfusions over a period of 18 months. He had no other treatment and was not admitted into hospital until a final septicaemia.

A man aged 67 years was a saddler by occupation. He developed aplastic anaemia from contact with the aniline dye Bismarck Brown. He had 18 direct transfusions over a period of 2 years and made a complete recovery.

A young woman aged 29 years suffering from paroxysmal nocturnal haemoglobinuria has had more than 120 direct transfusions. Haemosiderosis has developed and to lessen iron storage, six exchange transfusions were given. A preliminary venesection was followed immediately by a direct transfusion. Her clinical condition improved and serum iron fell from 260 micro gram per cent to less than 100 micro gram per cent.

The rotary pump can be used for three methods of exchange transfusion, which are illustrated in fig. 1.

1. Venesection of patient followed immediately by direct transfusion.

2. By changing direction of rotation of pump between donor and recipient there is an alternating flow of blood and exchange transfusion of 1–1½ litres can be performed in 10–15 minutes.

3. The use of two pumps, blood is simultaneously withdrawn and transfused into patient. Several donors (5–10) give blood consecutively.

The first method has been useful in treatment of patients suffering from haemosiderosis after blood transfusion and also in patients suffering from leukaemia. The abnormal leukaemic cells are removed by this method and the transfusion of unmodified blood from direct donors has produced prolonged remissions.

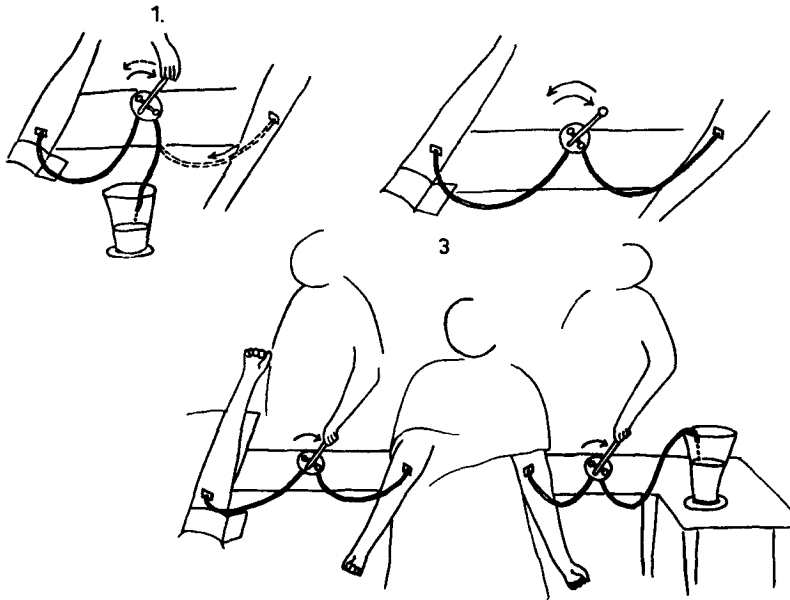


Fig. 1. Three methods of exchange transfusion with rotary pump.

The second method has been performed between patients suffering from aplastic anaemia and polycythaemia respectively with benefit to both.

Patients suffering from acute leukaemia have been given exchange transfusion by the third method.

A boy aged 8 years suffering from acute leukaemia had a partial remission after treatment with anti folic drugs. A relapse occurred, there were 90% blasts in the bone marrow and there was no further response to chemotherapy. He was given an exchange transfusion (6 donors), after which there was a complete remission for 9 months.

A man aged 34 years suffering from acute monocytic leukaemia did not respond to chemotherapy. But after 2 exchange transfusions (15 donors), the leukocyte count fell from 120,000 per mm^3 to 5000 per mm^3 and there was a complete remission for 5 months.

The success of a direct blood transfusion service depends on readily available donors. The Red Cross Society has organized special voluntary direct donor panels in Melbourne and Shepparton, and donors are on call day and night.

However, the provision of direct donors is a relatively small service of the Red Cross Society, which has organized the free distribution of blood and blood products throughout the State of Victoria.

In conclusion, the reasons why we give direct blood transfusions are as follows:

1. The technique is simple and with experience is quickly performed.
2. There are very few untoward reactions and beneficial effects are immediate.
3. Unmodified blood is more haemostatic than stored blood.
4. Exchange transfusions with unmodified blood from direct donors can be performed. In acute leukaemia prolonged remission has been produced.

References

1. *McLean, J. A.*: The use of unmodified blood in direct and exchange transfusions. Alfred Hospital clin. Reports 2: 72 (1951).
2. *McLean, J. A.*: Direct blood transfusion to ambulant patients. Alfred Hospital clin. Reports 8: 55 (1958).

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Electrocardiographic Observations Regarding Transfusions in Geriatrics

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Abstract

Possible modifications of cardiac activity in old patients (over 70 years of age) were studied electrocardiographically during and after transfusion of quantities of blood normally used in hospital practice (an average of about 200 cc of blood).

The blood was collected in evacuated jars holding 340 cc of blood and 62 cc of ACD solution (1.32 g of sodium citrate per cent), and transfused after storage from 1 to 4 days.

No changes worth mentioning were seen in the ECG tracing, not even in the case of patients with cardiac affections (myocardiosclerosis, bundle block infarction sequelae, etc.).

Likewise, slow intravenous injection of 30 cc of the ACD solution used never produced any changes of the tracing in the same patients and in others with cardiopathy or pulmonary lesions (emphysema, neoplasms). It is therefore concluded that citrated blood is well tolerated in geriatrics after short storage, if it is transfused slowly and in moderate quantities.