BLOOD TRANSFUSION FOR THE PRACTITIONER

A SIMPLE DOMICILIARY METHOD

BY

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Dr. Paolo Ravenna's (1939) recent observation, based on five years of blood transfusion service in Turin University Medical Clinic and in the Spanish War, that "the dramatic improvement which follows the pure-blood transfusion rarely appeared after stored-blood transfusion," prompts me to give a detailed account of whole-blood transfusion as it may be practised in the home, in the hope that it may afford convincing evidence of its simplicity and safety. The method cannot, however, be adapted for continuous administration, which in any case is best carried out in an institution. The technique is far from new, but its advantages, especially the relative ease of preserving sterility, to my mind make it the ideal, if not the only, method applicable to general practice.

As a house officer I was accustomed to using citrated blood by the gravity method, but since 1932 I have carried out about twenty-five transfusions of whole blood in the homes of patients suffering from conditions ranging from post-partum haemorrhage to traumatic shock and collapse, and from a ruptured varicose vein to recurrent bleeding from a tooth socket. Often there was no alternative to carrying on in the absence of skilled assistance, and the conditions were frequently far from ideal in rural districts. Only thrice was the transfusion carried out purely as a life-saving procedure (and in each case it was doubtful if the patient would have survived the disturbance and delay associated with removal from home), but the restorative value of transfusion in the other cases of blood loss was always very striking also. The following technique was used:

Method of Procedure

As soon as it is evident that transfusion may be advisable 1 c.cm. of the patient's blood—often obtainable without venepuncture—is placed in a small conical vessel (I have often used an egg-cup in an emergency) and allowed to clot. Relatives are nearly always to hand, and such as are agreeable to act as donors are asked to remain close by while instruments, sterile normal saline, and sterile liquid paraffin are prepared. This preparation usually occupies from ten minutes to a quarter of an hour, by which time enough of the recipient's serum has separated to enable the corpuscles of the prospective donor to be tested against it directly, on a glass slide with the aid of a low-powered microscope (or even a loupe). Time-consuming blood-grouping of both donors and recipient is thereby avoided, and the possibility of error reduced to a minimum.

Within twenty minutes, as a rule, the donor has been chosen and the instruments have been prepared. Meanwhile a second bed, or a couch, has been placed for the donor alongside the patient's bed, with a small table between, before which the operator, also between the beds, will sit. While the sterilized saline and paraffin are cooling, the skin over the median basilic veins of the adjacent arms of the donor and recipient is prepared, and a few minims of local anaesthetic are injected intradermally at the proposed puncture sites. The 5-c.cm. or 10-c.cm. Jubé two-way syringe, which is to the surgeon what the auxiliary fire-pump is to a member of the A.F.S., is securely attached to the two rubber connecting-tubes, each eight inches long, which are in turn securely connected to the needles supplied with the Jubé syringe. Tourniquets are applied.

The whole apparatus is filled with liquid paraffin, care being exercised not to allow the needles to touch any

unsterilized object. (Absolute sterility of the exterior of the syringe, of the rubber tubes, and of the hands is difficult to maintain under conditions in which blood transfusion is likely to be carried out at home, and in fact is not necessary.) The liquid paraffin is now rejected, leaving the whole system lined internally with paraffin to prevent clotting. The syringe is filled with normal saline and half emptied, the piston is rotated to a position halfway between the two cocks, and the syringe is placed on the table. By this time, with luck, the veins are prominent and the punctures can be made painlessly. An assistant is entrusted with preserving the surgical cleanliness of one needle while the other is passed into the recipient's vein. If the patient is collapsed this is not always easy, but the process should be simplified by the use of Mr. Ronald Edwards's (1939) recently described vein-seeker. The piston is rotated so that, on withdrawal, suction is exerted on blood in the punctured vein, in order to confirm that the needle is really in the vein, the tourniquet is loosened, and the piston is returned to the neutral position with the syringe again half full of saline and the needle in the vein. The process is now repeated in the donor's arm, though in this case the needle should be passed towards the donor's hand, and the tourniquet should not be removed until the transfusion is completed.

So far the patient has not benefited, but in favourable circumstances these preliminaries will not have occupied more than thirty minutes—in hospital they would have occupied only fifteen minutes, provided enough serum had separated by that time—and usually the need for transfusion of blood is not so extremely urgent that an interval of thirty minutes is dangerous. The syringe is now operated at such a rate that not less than fifteen minutes is expended in transfusing a pint of blood, care being taken that the blood flow is in the right direction—an easy source of error with a Jubé syringe, and obviously a very undesirable one. By counting the number of actions of the syringe piston the volume of blood given is controlled.

Comment

The rest of the procedure requires no description from me, as my object in describing the technique in detail up to this stage is to draw attention to the ease, speed, and safety with which whole-blood transfusions can be carried out even in extremely difficult surroundings. Contrary to expectation, there seems to be ample time in which to seek the second vein, for I have had practically no trouble from clotting in the first needle. Occasionally towards the end of the transfusion the syringe begins to work a little stiffly as blood finds its way between the piston and the barrel wall.

All the sterilized apparatus can be accommodated in the metal case in which the syringe itself is supplied, so that if the saline and paraffin are carried in the bottles in which they were previously sterilized the transfusion can be made under circumstances in which stored blood could not possibly be given—for example, where there is no running water and no source of heat (for, provided the rubber tubing is short, the donor's blood passes through the pumping system rapidly enough for the risk of rigor from the cooling of the blood before injection to be negligible). On one such occasion the transfusion was given in a tent on a gipsy encampment.

The method should be of great value in the event of unusual demands on the ambulance service in air raids causing dangerous delay in removal of the more distant casualties to hospital, for it can be used with perfect safety even in the absence of sterile towels, provided reasonable care is exercised.

REFERENCES

- Edwards, F. Ronald (1939). *British Medical Journal*, 2, 957.
Ravenna, P. (1939). *Ibid.*, 2, 1019.