

Autologus blood transfusion - recent concepts

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Abstract

Autologus blood donation is considered prior to elective surgery where significant blood loss is expected. This has been encouraged to avoid transmission of transfusion-borne diseases.

Keywords: autologus; CPDA-1; processing of autologus blood.

Transfusion is needed for the replacement of circulating volume, correction of haemostatic defects and replacement of oxygen carrying capacity. Autologus blood donation is better in some respects.

History

Early history of autologus transfusion is confined to description of salvage and reinfusion of blood shed by surgical and obstetric patients.¹ As a life saving measure in haemothorax, technique appears in American surgical literature, 1931. Vague ideas about this topic got a support when Symbas² published a series of autologus blood transfusion in 400 cases of acute traumatic haemothorax between 1966 and 1978. Reports of instrumentation developed specifically for intraoperative salvage and autologus transfusion appeared first in 1966.³ In 1969 continuous flow centrifuge bowl capable of separating erythrocytes contained in irrigating fluid returned during TUR of Prostate, was reported.⁴ Bentley Laboratories were the first to introduce an apparatus for intraoperative salvage of blood and reinfusion.

Patient selection

Criteria for autologus donors are not as strict as for homologus donors.⁵

- i. There is no age limit.
- ii. Patients weighing 50 kg or more may donate 450 ± 50 ml. Those weighing less should bleed proportionately less.
- iii. The Hb should be 11 gm%, or haematocrit of 33%.
- iv. Autologus blood with any positive viral marker can be accepted for transfusion, though blood centre and transfusion service policies differ.
- v. Children under 10 years of age can donate blood.⁶ The factors limiting predonation by paediatric patients are patient co-operation and vascular access.
- vi. Elderly patients can also safely donate blood.⁷
- vii. Predonation by Pregnant patients does not have adverse effect on foetus or mother⁸, provided the placental circulation and foetal supply are not altered. Its need is only justified in patients with placenta praevia.

Contraindications

- i. Bacteraemia
- ii. Unstable angina, left anterior descending coronary disease and severe aortic stenosis.
- iii. Prior Cerebrovascular accident or Cerebrovascular insufficiency.
- iv. Renal dysfunction.
- v. Hepatic dysfunction with coagulation disorder.

method

A total of 6-8 units of blood can be donated by a healthy donor provided blood collection starts early, ie. 6-8 weeks prior to a schedule of 1 unit/wk.

Oral iron preparations like Ferrous sulphate are prescribed to avoid anaemia. Marrow production increases in response to anaemia⁹ so produced, by 2 to 3 times, in the patients losing 10-20% of RBC mass. If haematocrit falls below 30%, marrow production accelerates to 5 times in the presence of exogenous iron.¹⁰

Some physicians administer recombinant human erythropoietin to increase donations.¹¹ The dose given in a healthy adult is 600 iu/kg body weight, intravenously, twice a week. It needs to be given two weeks prior to commencement of donation programme to achieve a rise in haematocrit. Exogenous erythropoietin suppresses endogenous erythropoietin production for up to a week after stopping exogenous administration. There is also an increased risk of thrombosis with the use of this drug.

Processing of autologous blood

If CPDA-1 preservative is employed and blood is stored as liquified whole blood, the shelf life is 35 days at 4°C. The plasma can be frozen or retained in liquid state. Hence delay in surgery beyond this limit poses considerable problem. Method of "Leap Frogging" has been attempted to overcome this, whereby the oldest unit is infused back and a fresh unit is taken out.¹²

Pre-donated blood is labelled as autologous with patients name identifying number on the bag. Blood is tested for ABO typing and Rh type as confirmation of patients' identification. Testing for infectious diseases is not mandatory. Cross matching is done to avoid clerical errors.

Complications

Potential complication of transfusion of predonated blood include overload, clerical error leading to transfusion of wrong unit, sepsis as a result of bacterial contamination during collection and storage of blood. Acute Haemolysis is reported with transfusion of inadequately deglycerolized frozen RBCs.¹³

Transient vasovagal reaction requiring no treatment are common.¹⁴ The reaction rate is similar to homologous blood donors of 1.5-5.5%. Rate is more in young donors, among first time donors and in females. Elderly autologous donors experience fewer reactions. They exhibit Hypotension, arrhythmias, ST-T wave changes, syncope and tachycardia. Saline infusion with or without drug treatment of atropine and or ephedrine is needed.

The need for autologous blood transfusion aroused probably because of lack of donors in emergencies and now it has become an established safe technique.

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