Blood Transfusion in Pregnancy

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SLCOG Guideline

Blood transfusion in pregnancy

A Abeywardane, L Rajapakse, S Marleen, T Kadotgajan, S Lanerolle, S H Dodampahala on behalf of the Sri Lanka College of Obstetricians and Gynaecologists

Correspondence: Sri Lanka College of Obstetricians and Gynaecologists, No. 112, Model Farm Road, Colombo 08. E-mail: slcogoffice@gmail.com

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1. Purpose and scope

Blood transfusion is an essential component of emergency obstetric care and, at times, lifesaving, but it is not without risks. This guideline aims to provide guidance on the appropriate use of blood products, which would neither compromise nor expose the patient to unnecessary risks associated with transfusion. Strategies to optimise the haemoglobin (Hb) level at delivery and minimise blood loss at delivery are also discussed.

2. Introduction

Obstetric haemorrhage remains a leading cause of direct maternal deaths in Sri Lanka, accounting for 15.4% of total maternal deaths in 2020. Even though a large majority of patients with obstetric haemorrhage survive uneventfully with timely interventions, it remains an important cause of severe maternal morbidity.

In 2022, the prevalence of anaemia among pregnant women in Sri Lanka was 29.1%. A significant proportion of pregnant women with anaemia may require blood transfusion if it is not addressed in a timely manner. Transfusion services in Sri Lanka are rapidly improving, with all blood components prepared with 100% volunteer donations, which are mandatorily tested for HIV 1 and 2, Hepatitis B, Hepatitis C, Syphilis and Malaria.

3. Strategies to minimise the requirement for transfusion

3.1. Optimisation of haemoglobin during the antenatal period

3.1.1. Diagnosis

All pregnant women should be screened for anaemia at the booking visit and 28 weeks. Anaemia in pregnancy is defined as first-trimester Hb less than 11g/dL, second and third-trimester Hb less than 10.5g/dL, and postpartum Hb less than 10g/dL according to the British Committee for Standards in Haematology. If the Hb level is less than the relevant thresholds, consider haematinic deficiency once haemoglobinopathies have been excluded.

3.1.2. Treatment and management

Oral iron should be the preferred first-line treatment for iron deficiency anaemia. Parenteral iron is indicated when oral iron is not tolerated or absorbed, patient compliance is in doubt or if the woman is approaching term when there is insufficient time for oral supplementation to be effective. Women should receive information on improving dietary iron intake and the factors affecting the absorption of dietary iron.

Meta-analysis of randomised trials on the antenatal use of iron, with or without folic acid, showed a 50%
reduction in the risk of anaemia in the third trimester or at delivery. Parenteral iron therapy offers a shorter duration of treatment and a quicker response but is more invasive. Intravenous iron preparation should be administered with all resuscitation facilities available immediately, as severe allergic reactions are possible. Anaemia not due to haematonic deficiency should be managed in close conjunction with a haematologist and transfusion physician.

3.2. Strategies to minimise blood loss at delivery
Women at high risk of haemorrhage should be delivered in a hospital with facilities to manage massive bleeding. Active management of the third stage of labour is recommended to reduce postpartum blood loss.

4. General principles of blood transfusion
4.1. Consent
Valid informed consent should be obtained where possible before blood transfusion. In case of an emergency, where it is not feasible to get consent prior to transfusion, transfusions should not be delayed, but information on blood transfusion should be provided retrospectively.

Where transfusion of all or a specific blood component is refused, or an advanced directive exists, detailed counselling should be arranged with a transfusion physician where available. This should be documented in the patient’s clinical records and communicated to all relevant healthcare professionals. Following detailed counselling, should the patient not consent for transfusion of blood and blood products, legal guidance should be sought.

4.2. Requirements for group and screen samples and cross-matching
All women should have their blood group and red cell antibody status checked at booking and 28 weeks gestation. If red cell antibodies are detected in the booking sample, further testing of maternal blood should be done to determine the specificity and the titre of antibody/antibodies detected and to assess the likelihood of haemolytic disease of the foetus and newborn.

Group and screen samples used for the provision of blood in pregnancy should be less than 3 days old. This should accompany a separate sample for blood group confirmation if the blood group has not been done before. In a woman at high risk of emergency transfusion, e.g., placenta previa, with no clinically significant alloantibodies, group and screen samples should be sent once a week to exclude or to identify any new antibody formation and to keep blood available if necessary. Close liaison with the transfusion physician/team is essential.

4.3. Blood product specifications in pregnancy and puerperium
ABO and RhD identical or compatible red cell units should be transfused. If clinically significant red cell antibodies are present, blood negative for the relevant red cell antigen should be cross-matched for transfusion. Where complex antibodies or rare red cell phenotypes are identified, provision of compatible blood may take time, and when transfusions are needed in such instances, inform the transfusion laboratory in advance to avoid potential delays in the provision of blood. All patients receiving transfusions should be closely monitored throughout the transfusion to identify signs of transfusion reactions and adverse events early and act promptly.

4.4. Intraoperative cell salvage
Intraoperative cell salvage could be considered in patients who are expected to have a blood loss of more than 500ml or more than 10% of the patient’s estimated blood volume if facilities are available. However, such facilities are currently unavailable in Sri Lanka.

5. Management of obstetric haemorrhage with blood components
Clinicians should familiarise themselves with the existing guidelines on the management of PPH and protocols for managing major obstetric haemorrhage, including the mechanical strategies employed to reduce postpartum blood loss.

5.1. When should red cells be used?
The decision to transfuse should be made on clinical and haematological grounds. Although the aim of blood transfusion in a bleeding patient is to maintain Hb more than 8g/dL, patients with acute haemorrhage can have normal Hb and clinical evaluation in this situation is extremely important.
In an emergency where the patient’s blood group is unknown, group O RhD-negative red cells should be given until the blood group is established and then switch to group-specific red cells. In case of a severe haemorrhage, if there is a history of clinically significant red cell antibodies being present, close liaison with the transfusion physician is essential to avoid delay in transfusion. Once bleeding is controlled, restoring Hb to physiological levels with red cell transfusions is not indicated.

5.2. In what circumstances should fresh frozen plasma (FFP) and cryoprecipitate be used?

When available, point-of-care testing-guided FFP and cryoprecipitate transfusions are preferable to optimise haemostatic management. If results of point-of-care or haemostatic testing are unavailable and haemorrhage continues, FFP at a dose of 12-15 ml/kg should be administered for every six units of red cell concentrates (RCC). Early use of FFP should be considered for conditions with a suspected coagulopathy, such as placental abruption or amniotic fluid embolism, or where detection of PPH has been delayed.

If the haemorrhage is ongoing, subsequent FFP transfusion should be guided by the results of clotting tests aiming to maintain prothrombin time (PT) and activated partial thromboplastin time (APTT) ratios at less than 1.5 times normal. It is essential that regular full blood counts and coagulation screens (PT, APTT and fibrinogen) are performed during the bleeding episode. The drawbacks of early FFP are that the majority of women with PPH will have normal coagulation at the time of FFP administration and that it is associated with an increased risk of transfusion-associated circulatory overload (TACO) and transfusion-related acute lung injury (TRALI). FFP results in a relatively small increment in fibrinogen level.

Cryoprecipitate at a standard dose of 10 units should be administered relatively early in major obstetric haemorrhage. Subsequent cryoprecipitate transfusion should be guided by fibrinogen results, aiming to keep levels above 2g/l. RCTs do not support the early unselected use of fibrinogen replacement therapy, and administering fibrinogen supplementation to women with PPH who have fibrinogen levels of >2 g/l is unlikely to have added benefit.

FFP should ideally be of the same ABO group as the recipient. If unavailable, FFP of a compatible ABO group is acceptable. The blood group of cryoprecipitate is not considered in the local context, considering the production method.

Clinicians should be aware that these blood components must be ordered as soon as a need for them is anticipated, as there will always be a short delay in supply because of the need for thawing and reconstituting.

5.3. When should platelets be used?

Aim to maintain the platelet count above 50×10⁹/l in an acutely bleeding patient. A platelet transfusion trigger of 75×10⁹/l is recommended to provide a margin of safety. If results of point-of-care testing or haemostatic testing are not available and haemorrhage is continuing, four units of platelet concentrates should be administered after eight or more units of red cell concentrates.

The platelets should be ABO group identical or compatible. To avoid the development of anti-D antibodies, RhD-negative platelet concentrates should be given where possible to RhD-negative women of childbearing potential.

Platelets may not be readily available in some hospitals; therefore, their need should be anticipated, and good communication with the transfusion team should be maintained. The platelet count should not be allowed to fall below 50×10⁹/l in the acutely bleeding patient, as this represents the critical level for haemostasis. Such a low platelet count may be anticipated when approximately two blood volumes have been replaced by fluid or blood components. A platelet transfusion trigger of 75×10⁹/l is recommended in a patient with ongoing bleeding to provide a margin of safety.

If RhD-positive platelets are transfused to a RhD-negative woman of childbearing potential, anti-D immunoglobulin should be administered. A dose of 250 iu anti-D immunoglobulin is sufficient to cover 5 adult therapeutic doses of platelets given within a 6-week period. This may be given subcutaneously to minimise bruising and haematomas in thrombocytopenic women.
6. How should intrapartum anaemia be managed?
In anaemic women who are not actively bleeding, if the Hb is less than 8g/dL in labour or in the immediate postpartum period, the decision to transfuse should be made according to the individual’s medical history and symptoms. Where transfusion is indicated, transfusion of a single unit of red cell concentrate should be followed by clinical reassessment to determine the need for further transfusions.

7. How should women with postpartum anaemia be managed in the postnatal period?
If the Hb is more than 7g/dL in the postnatal period, where there is no ongoing or threat of bleeding, the decision to transfuse should be made on an informed individual basis. The risk of RBC alloimmunisation and the potential clinical impact should be considered when balancing the risks and benefits of RBC transfusion. Non-transfusion therapies, such as iron, should be considered as a part of the treatment of postpartum anaemia.

8. How should women who decline blood products be managed?
Hb should be optimised prior to delivery to prevent avoidable anaemia. Consent/refusal of blood components or other transfusion-sparing techniques should be discussed in detail and clearly documented during the antenatal period. The use of pharmacological, mechanical and surgical procedures to avert the use of banked blood and blood components should be considered early. Medically, withholding blood products in life-saving situations is not permitted.
Appendix 1. Massive obstetric haemorrhage protocol

**MASSIVE OBSTETRIC HAEMORRHAGE PROTOCOL**

Activation of Massive Obstetric Transfusion Protocol should be considered when:
- Bleeding >1000ml, with severe ongoing bleeding with/without signs and symptoms of hypovolemia
- Rate of blood loss is >150ml/min
- Bleeding which leads to a SBP < 90 mmHg or HR>110 bpm

Identification of the requirement of massive transfusion is the responsibility of the attending clinician

- Give tranexamic acid 1g in 10 ml of 0.9% saline over 10 minutes
- Send blood for Crossmatch, FBC, Coagulation Screen, ROTEM, Biochemistry & ABG analysis

Give 2 units of Red Cell Concentrate
- Group O Rh D negative uncrossmatched RCC – when blood group is not known
- Switch to ABO group specific uncrossmatched RCC as soon as blood group is known
- Use crossmatched blood if available

This request can be made over the phone - Dial: .......

Clinician informs the Blood Bank / Consultant Transfusion Physician to activate the Massive Obstetric Transfusion Protocol – Dial: .........

Monitor coagulation regularly (ROTEM, PT, APTT, Fibrinogen, FBC, Ca\(^{++}\), Arterial blood gases)

Consider factor Vila (if indicated)

Continue cycle of clinical & laboratory monitoring & administration of goal directed blood component therapy until bleeding stops

**BOX ONE : 2 RCC**

ROTEM available: ROTEM guided Blood Component Therapy

If still bleeding, Consider second dose of Tranexamic acid 1g after 30 min of first dose

**BOX TWO: 4 units RCC, 4 units (1.2-15ml/kg) FFP, 10 units of Cryoprecipitate**

If still bleeding

**BOX THREE: 4 units RBC, 4 units (12-15ml/kg) FFP, 10 units of Cryoprecipitate**

1 adult dose of Platelets if the platelet count is < 75 X 10^9/l to maintain platelets > 50 X 10^9/l

Repeat Box 2 and 3 alternatively until bleeding stops

Clinician decides to terminate the MTP and informs the Blood Bank (usually when active bleeding has stopped)

Any unused components should be returned to the blood bank immediately

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Appendix 2. Algorithm for Rotem-guided PPH management

Algorithm for Rotem-guided PPH management

1. Blood loss > 1000ml after delivery with ongoing bleeding
   - Consider Tranexamic acid 1g

2. A5 EK < 35mm or CTfib > 600s or ML > 10%
   - YES
   - Give tranexamic acid 1g as a bolus & repeat if indicated
   - NO
   - A5 EK < 35mm
   - YES
   - 1 or 2 ATD of Cryo precipitateor Fibrinogen concentrate Target: A5 fib > 16mm
   - NO
   - A5 EK < 35mm & A5 fib > 12mm
   - YES
   - 1 ATD of platelet concentrate

3. CT EK > 80mm & A5 fib > 12mm
   - YES
   - FFP 12-15ml/kg or 4F-PCC 10-15 IU/kg
   - NO
   - CT I EK > 240mm
   - YES
   - CT I EK/CT HEP > 1.25
     - Consider Protamine 25-50mg
   - NO
     - Consider FFP 12-15ml/kg or rVIIa 90mcg/kg
   - NO
     - Ongoing bleeding
     - Recheck after 10-15 min with a new blood sample

4. Consider RCC to maintain Hb > 8g/dl

Maintain
- Hb > 8g/dl
- pH > 7.2
- Ca²⁺ > 2.0 mmol/l
- Core body temperature > 35°C
Appendix 3. Sample consent form for transfusion of blood and blood components

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References


