

BED SIDE TRANSFUSION GUIDELINES

1.1 Introduction

Blood Transfusion Service is a vital part of the healthcare as there is no substitute for human blood and its components. However, apart being an important life saving measure, it is also a scarce resource. WHO recommendations not only emphasize on safe & adequate blood supply but also clinical transfusion process in areas, such as, appropriate use of blood, Collection of samples, patient ID, compatibility testing, administration of blood adverse event reporting. Hence, while availability of blood should be assured even to a needy patient, blood is also required to be used appropriately. The use of appropriate transfusion practice is critical to ensure quality of service provision. The appropriate use of blood and blood products means the transfusion of safe blood products only to treat a condition leading to significant morbidity or mortality that cannot be prevented or managed effectively by any other means. It is essential that our practice of blood transfusion is safe and based on evidence.

1.2 Wrong blood into patient' incidents are preventable and nearly always caused by human error. The root cause of most incidents is misidentification at the time of pre-transfusion blood sampling, laboratory testing, collecting the blood component from the blood bank or administration of the transfusion at the bedside. Potentially fatal ABO-incompatible transfusions still occur although improved clinical policies, staff training and introduction of methods to improve identification, resulting from the various, Better Blood Transfusion initiatives, has significantly reduced their number over the last decade. Avoiding unnecessary or inappropriate transfusions is an essential starting point for safe transfusion practice.

1.3 Bedside clinicians and medical interns are in the forefront of patient management. They are responsible for completing blood request forms, administering blood, monitoring transfusions and being vigilant for the signs and symptoms of adverse reactions. The key principles that underpin every stage of the blood administration process are:

- Positive patient identification
- Good documentation
- Good communication.

1.4 The decision to administer blood transfusion and/or other blood management strategies must be based on a thorough clinical assessment of the patient and his/her individual needs. The indication for transfusion, or other blood management strategies chosen, must certainly be documented in the patient medical/clinical record.

1.5 Some essential conditions for blood transfusion services include:

- (i) a written informed consent for transfusion obtained from the patient or relative. if patient is a minor or not in a condition to give consent.
- (ii) a trained paramedical person to monitor the patient during transfusion and respond immediately if any adverse effects occur. (Transfusion of blood and its components carries the risk of adverse reactions and transfusion-transmissible infections).
- (iii) Blood / components to be obtained only from a licensed blood bank. Blood should not be transfused unless it has been obtained from appropriately selected donors and screened for transfusion- transmissible infections and tested for compatibility between the donor's red cells and the antibodies in the patient's plasma.

1.6 The strategy for the appropriate use of blood should be based on a seamless liaison between Blood banks and storage centers to facilitate timely provision of blood to patients especially those suffering from maternal hemorrhage and trauma cases.

1.7 The need for blood transfusion can be combined with policies to prevent conditions that cause anaemia or correction of anemia and replacement of depleted iron stores before a planned surgery, use of and good anaesthetic and surgical management.

1.8 The blood bank/ blood centre should play a proactive role to educate the users regarding transfusion related adverse events and other scientific matters and this is an important responsibility of the blood bank in-charge.

1.9 These guidelines are intended to enhance the implementation of standard clinical transfusion practices for improved patient safety. The guidelines also provide a standardized approach to transfusion so that the potential for errors is minimized and the administration of safe and efficacious blood products in the health care setting is maximized.

2. PROCESS FOR BLOOD TRANSFUSION

Blood services management is a patient -based approach to the management and utilization of blood transfusion services and should be subject to an inherent standard of care

2.1 Prescription of Blood and Blood request form:

A request form for whole blood/components accompanied by the appropriately labeled blood samples of the recipients should contain the following information and should be filled before sending to blood bank:

- a. Two identification details of Recipient, namely. Hospital registration Number & full name.
- b. Name of hospital where patient is admitted, bed and ward No.
- c. Quantity, date and time of blood/ component needed/ required
- d. Whether Routine/ emergency
- e. Diagnosis
- f. Reason for transfusion - hemoglobin/ platelet count
- g. History of previous transfusion , reaction if any & if yes, details of reaction
- h. Obstetric history in case of female patient/ recipient
- i. Signature, name & MCI registration no. of the medical officer ordering blood/ component & under whose supervision the blood is to be transfused.
- j. Name and signature of the phlebotomist collecting patient/ sample of recipient, (both on the form and sample)

All requests for planned transfusions should be sent well in advance. Relatives of Patient should not be asked to arrange donors or blood. Instead blood bank should be contacted to avoid any malpractice. Blood in emergency can be prescribed as telephonic request which should be immediately followed by a written request accompanied by sample of the patient.

2.2. Blood sample collection & labeling:

Blood sample collection & labeling is a critical step for safe transfusion. After patient identification, at least 2 ml blood sample shall be collected for blood grouping and cross matching (EDTA / Plain sample as per blood bank SOP requirement). Sample should be labeled at bedside of the patient with details such as patient name, Hospital registration no., date of collection & signature of phlebotomist.

For infants less than 6 months of age sample of mother should also be sent along for compatibility testing.

2.3. Rate of transfusion

The desirable rate of infusion depends upon the blood volume, cardiac status, and hemodynamic condition of the patient. Most RBC units are transfused within 1 to 2 hours, whereas platelet or plasma transfusions are commonly administered over a shorter period (20 - 30 minutes). Administration rates are calculated by counting the drops per minute in the drip chamber and dividing this number by the “drop/mL” rating of the infusion system. To summarize, the following needs to be kept in mind for desirable rate of infusion:

- a) rate of infusion varies with
 - a. Blood volume /urgency of volume replacement
 - b. Hemodynamic condition
 - c. Cardiac status
- b) Infusion initially – 2 ml / minute in adults and 1 ml / minute in smaller paediatric patients - 4 ml/ min after 15 mins of observation . In Paediatric patients according to weight of the patient : 10-20 ml / kg over 30-60 minutes (1ml ~ 20 drops)
- c) The time limit is maximum 4 hours for whole blood or packed red blood cells (Ask for smaller volume split units prepared by blood bank under closed system when required).
- d) transfusion set needs to be changed every 4 hours or with each unit of blood.

2.4. Preparing for Transfusion and Pre Blood administration checks

In the blood banks, blood is stored in monitored refrigerator and temperature is controlled. Blood should therefore be only brought to ward or operation theatre from blood bank / blood storage at the time it is required to be transfused. All preparations for transfusion should be done before bringing the blood from blood bank and transfusion should begin within 30 minutes of blood being out of blood bank refrigerator as at higher temperatures bacteria in blood can multiply and cause septic shock.

2.5 Packed RBCs /Whole Blood

(a) Storage Conditions

- a) Packed RBCs/Whole blood should be stored in monitored blood bank refrigerators only. It should be issued only when transfusion is planned.

- b) In case emergency storage in domestic refrigerator is required, it should be stored in the middle shelf below the chiller but not more than 2 hours.
- c) Packed RBCs/Whole blood should never be stored in freezer / chiller or at the bedside of the patient.

(b) **Bedside Checks:** The bedside checks to be carried out **before transfusion** are as follows:

- a. Re-check identification of the patient.
- b. For Blood group – Check ABO and D as written in transfusion form with the record of ABO (D) of patient. Cross check with blood bank if it does not match.
- c. Type of component – The label on the unit provides information on type and volume of component.
- d. The name, regn no. and unit no, on the prescription form and the label on the bag should tally.
- e. Visual inspection of the bag for colour change, visual clots or froth. Such bags are not to be transfused and returned to blood bank immediately.
- f. Check expiry of blood component (PRBC-35 days, SAGM-RBCs-42 days)
- g. Record/document - (i) Pre-transfusion vitals of patient (ii) time of starting the transfusion.
- h. Not to warm blood in an unmonitored water bath or in direct contact with a hot water bottle.
- i. Not to add any medication to the blood bag.

Note: Blood should be transfused only through a 'BT' set (Blood Transfusion Set) and ideally transfusion should start within 30 minutes of issue from Blood Bank.

Steps for Transfusion

- a. Wash hands.
- b. Verify special needs e.g. Use of filters as in case of Thalassemia patients
- c. Avoid any delay in transfusion and potential wastage of blood components, venous access should be established. Use 18 or 20 G needle for transfusion.
- d. If a pre-existing line is to be used, it should be checked for patency; signs of infiltration, inflammation, or infection; and the compatibility of any intravenous solutions
- e. After final patient identity and blood unit check and baseline medical check at the bedside, start transfusion.
- f. Ensure skin antisepsis prior to venepuncture.
- g. Immediately before transfusion mix the unit of blood thoroughly by gentle inversion.

- h. Use Set with Filters (170 micron) to remove blood clots and other debris.

Compatible IV solutions

- a. Only isotonic normal saline is compatible solution recommended to be used with blood components.
- b. Do not prime the administration set with 5% Dextrose or Ringer Lactate solutions.
- c. Dextrose will cause hemolysis of the red cells and calcium in Ringer Lactate will cause clot formation.
- d. Before administering blood completely flush all the incompatible IV fluids and drugs with normal saline or preferably change the set.

During Transfusion:

After transfusion, closely observe the patient and monitor the vitals of patient for early detection of any untoward reaction at the following frequency:

- a. Every 5 minutes for the 1st 15minutes
- b. Every 15 minutes for the next ½ hr
- c. Every 30 minutes for the next 1 hr
- d. Every hour till transfusion is complete
- e. 30 minutes post transfusion and 6 hours post transfusion for any transfusion reactions
- f. In case of any S/S of transfusion reaction immediately stop the transfusion but keep the line open with slow saline infusion. Inform consultant in-charge of patient immediately for reaction management and work up as per SOP.

Note: If a patient is under anesthesia, observe for any unusual oozing of blood, hypotension, and colour of urine in urine bag.

After transfusion

- a) Monitor the patient for signs or symptoms of transfusion reactions such as fever, chills, sudden hypotension, chest tightness, allergic skin rashes, cola colored urine, jaundice etc.
- b) All observations should be duly recorded in the patient file.
- c) The reaction form should be filled up and should be attached to the patient file and transfusion reactions should be also reported to the blood bank

3. BLOOD COMPONENTS

PLATELETS:

The platelet preparations usually of two types -Platelet Concentrate (PC) and Single donor apheresis platelets (SDAP)

Storage Conditions: The storage conditions are as follows:

- Temperature for storage of PC/SDAP is $22\pm 2^{\circ}\text{C}$ with constant agitation
- Platelets should be kept in an platelet agitator and incubator
- Platelets should not be kept in refrigerator

Shelf Life: The shelf life of platelets is 5 days

Bedside Checks for Platelets transfusion

- a. Recheck identification of patient
- b. Recheck blood group of patient from file and on component bag.(Random donor platelets need not be ABO & RhD specific)
- c. Check component for colour change/froth/swelling- if detected return bag to blood bag immediately.
- d. Check expiry date of component (5 days)
- e. Check and record the vitals of the patient prior to transfusion.

During Transfusion:

- a. Platelets should be transfused as soon as possible after issue from the Department. (Within 30 minutes)
- b. Platelets are to be administered through a BT set with a $170\mu\text{L}$ filter.
- c. Check vitals of patient at 15 minutes and every $\frac{1}{2}$ hr there-after up to half an hour after transfusion.
- d. Platelets are to be transfused over 20 minutes to 1 hour.
- e. Monitor the patient for signs or symptoms of transfusion reactions such as fever, chills, sudden hypotension, chest tightness, allergic skin rashes etc.
- f. All observations should be duly recorded in the patient file.
- g. Reaction form should be filled and it should be attached to the patient file and in case of reaction the blood banks should be informed for the same.

PLASMA:

Preparations:

The whole blood which is a mixture of cells, colloids and crystalloids can be separated into different blood components including, fresh frozen plasma Single Donor Plasma (**SDP**) and cryoprecipitate.

Storage:

- a. Storage of FFP/Cryo- Below -30°C for a period of 1 year
- b. Storage of SDP/CPD- Below -20°C for a period of 1 year
- c. Plasma is to be thawed before issue and once thawed, it is not to be refrozen and must be transfused or discarded.

Bedside Check:

- a. Recheck the identification of the patient.
- b. Recheck blood group of the patient from the file and on the component bag.(Should be ABO group identical or AB which is universal plasma, RhD matching is not required for plasma components)
- c. Inspect component bag for any tears or leaks, colour and clots; if defective return to blood bank immediately.
- d. Check and record the vitals of the patient prior to transfusion.

During Transfusion:

- a. Check vitals at 15 minutes and every $\frac{1}{2}$ hr there-after up to half an hour after transfusion.
- b. Plasma is to be transfused through a BT set
- c. Monitor the patient for signs or symptoms of transfusion reactions such as fever, chills, sudden hypotension, chest tightness, allergic skin rashes etc.
- d. All observations should be duly recorded in the patient file.
- e. Reaction form should be filled and sent to the blood bank if more components are required, otherwise it should be attached to the patient file.

Note: Blood/ Blood component should be issued just prior to transfusion as components which are stored at suboptimal temperatures are at risk of bacterial contamination.

2.8 Problems in flow of blood during Transfusion:

Blood may flow more slowly than desired as a result of obstruction of the filter or when there is excessive viscosity of the component. Steps to investigate and correct the problem include the following:

- a. Elevate the blood container to increase hydrostatic pressure.
- b. Check the patency of the needle & IV line.
- c. Examine the filter of the administration set for excessive debris.
- d. Consider the addition of 50 to 100 mL of saline to a preparation of red cells, if there is an order permitting such addition.

4. MONITORING FOR ADVERSE EVENTS OR REACTIONS DURING TRANSFUSIONS

Clinical observations should include heart rate, blood pressure, temperature and respiratory rate, as per guidelines issued in this regard. If there are any signs of a transfusion reaction, such as tachycardia, rash, breathlessness, hypotension or fever, stop the transfusion and contact the laboratory immediately. If concern arises, the documentation should be double-checked for administration errors and further analysis performed.

Suspected transfusion reactions should be worked up and categorized from the given list. Final transfusion reaction defined should be noted in patient file:

1. Immunological Haemolysis due to ABO incompatibility.
2. Immunological Haemolysis due to other allo- antibodies.
3. Non immunological haemolysis.
4. Transfusion Transmitted Bacterial infections.
5. Anaphylaxis/ Hypersensitivity
6. Transfusion Related Acute Lung Injury (TRALI)
7. Transfusion Transmitted Viral Infection (HBV)
8. Transfusion Transmitted Viral Infection (HCV)
9. Transfusion Transmitted Viral Infection (HIV ½)
10. Transfusion Transmitted Viral Infection (specify)
11. Transfusion Transmitted Parasitic Infection (Malaria)
12. Transfusion Transmitted Parasitic Infection (Malaria) Post Transfusion Purpura
13. Transfusion Associated Graft versus Host disease (TAGvHD)
14. Febrile Non Haemolytic Transfusion Reaction (FNHTR)
15. Transfusion Associated Dyspnea (TAD)
16. Transfusion Associated Circulatory Overload (TACO)
17. Other Reactions

Strategy for suspected adverse reactions:

- a. Most transfusions proceed without complication, but when adverse reactions do occur, medical and nursing staff must be prepared to deal with them immediately.
- b. Because severity can vary significantly and symptoms are not specific, all transfusions must be carefully monitored.
- c. As soon as a reaction is suspected stop the transfusion.
- d. Follow the standard operating procedure for management of transfusion reaction.
- e. If and when a reaction occurs, bags, tubing, and attached solutions should be returned to the blood bank for investigations.

All the above measures reduce the risks associated with the use of blood and blood components

Some Interesting Conclusions from haemovigilance data indicate that blood transfusion is relatively safe compared to medicinal drugs, mmajority of adverse events (AEs) occur in Hospitals and mmajority of preventable AEs are due to clerical errors.

References:

1. *AABB Technical Manual Edited by: Mark K. Fung, MD, PhD; Brenda J. Grossman, , MPH; Christopher Hillyer, MD; Connie M. Westhoff, PhD, MT(ASCP)SBB*
18th ed. Bethesda (MD): AABB, 2014.
2. *Transfusion Medicine Technical Manual, 2nd edition, 2003, sponsored by WHO in liaison with DCG(I), CDSCO, DGHS, MOHFW, New Delhi.*
3. *The Clinical Use of Blood. Blood Transfusion Safety. Department of Essential Health Technologies. World Health Organization.*