

Research Article

Transfusion Reactions: A clinical audit

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Abstract

Aim

- Stabilize blood volume, when essential
- Improve tissue oxygenation
- Ensure adequate hemostasis
- Ensure right blood of right quality to the right patient at the right time

Methods and methodology

1. Sep 2023 to Feb 2024 – 59 patients were given Avil and Dexamethasone either as premedication or after reaction occurred.
2. Out of 6000 transfusion 59 transfusions (1%) had reactions (documented).
3. Under reporting?
4. Not classifying the type of reaction

Background

The study, transfusion reactions from blood components, was conducted in

this population to validate the rational drug usage and scarce resource associated complications.

Blood components

1. Packed red blood cells (PRBCs)
2. Fresh Frozen Plasma (FFP)
3. Platelet Concentrates (PCs)
4. Cryoprecipitate (Cryo)

Challenges with Storage of Whole Blood at 40°C

Red cells: O₂ carrying capacity decreases within 7-10 days

Platelets: Lose viability within 12 hours

Granulocytes: Disintegrate within 24 hours

FVIII Levels: Decrease to 20-30% within a week

WBCs: Release cytokines, RBC damage

Component preparation

Principle - Differential centrifugation

- Red cells
- Plasma - Fresh frozen
- Platelets
- Cryoprecipitate

Parameters of Blood Components

S . N o	Blood products	Unit volume (ml)	Storage temperature	Shelf life
1	WB (Hct 35–40%)	400/500	2 – 6°C	35 days
2	PRBCs (Hct 55–75%)	160 – 350	2 – 6°C	35 days/42 days in AS
3	PCs (5×10 ¹⁰ or 3×10 ¹¹)	60 – 90/200 – 300	20 – 24°C	5 days
4	FFP	160 – 250	< 20°C	One year
5	Cryoprecipitate	20 – 40	< 20°C	One year

Appropriate Transfusion of Red Cells

1. Symptomatic anemia – oxygen deficit
2. Co-existing conditions – age, general health, determine hemoglobin trigger.
3. Not for treatable conditions – Iron/B12/Folate deficiency
4. Avoid single unit transfusions as far as possible

Appropriate Transfusion of Fresh Frozen Plasma

1. Replacement of multiple factors: DIC, liver disease, warfarin reversal
2. Replacement of single factors when appropriate substitute is not available
3. Dose: 10-15 ml/kg
4. Not for “maintaining CVP”
5. Not for protein content

Appropriate Transfusion of Platelet Concentrates

1. Symptomatic platelet problems
2. Do not treat the number in isolation –
 - eg Chronic ITP with no bleeds

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3. Prophylactic in specific situations
 - CNS, eye surgery, other major surgeries, acute leukemia, patients on chemoradiotherapy
4. Dose: 1 RDP/10 Kg or 1 SDP

Appropriate Transfusion of Cryoprecipitate

1. Deficiency of
 - Factor VIII, Fibrinogen, vWF, F XIII
 - Consumption coagulopathies
2. Volume is an important consideration
 - WB – FVIII 0.3 u/ml; 120 u/400 ml
 - FFP – FVIII 1 u/ml; 200 u/200 ml
 - Cryo ppt – FVIII 8-10 u/ml; 80 u/10 ml
3. Dose: 1 bag/10 kg

Bedside Component Administration

1. Identify the type of component (mentioned in the reaction form)
2. Positive identification of intended recipient and the blood component

3. Visual colour change – dark blackish/brown, gaseous distention/frothing, clots.
4. Check expiry date
5. Record vital of the patient
6. Do not add any medication to the bag /administration line.
7. Leukocyte contamination in blood components ranges from 10⁹ – 10⁵
8. Blood filters
 - Standard (170-260 μm)
 - Leukoreduction filters

Storage temperatures and maximum bedside storage time allowed

Compon ent type	Storage tempera ture	Administer	
		minutes of issue	Wit hin 4 hr
Whole blood/Pa cked red cell	2-6 ⁰ C	≤30 minu tes of issue	Wit hin 4 hr
Platelet - Random PC, SDP	22±2 ⁰ C	≤30 minu tes of issue	Wit hin 4 hr
Plasma, Cryo, CPP	≤-20 ⁰ C	<30 minu tes	< 6 hr

During Transfusion

1. Closely observe, monitor and document patient's vitals including urine output and colour
2. Every 5 min for first 15 min
3. Every 15 min for next ½ hr
4. Every 30 min for next 1 hr
5. Every hr till the end of transfusion
6. 30 min post transfusion.

Neonatal transfusion

1. RBC ABO and Rh typing; no serum grouping
2. Cross match with maternal serum
3. WB or PRBCs within 7 days of collection
4. CMV seronegative, if possible
5. Blood bags with small satellite bags

Issue of blood units

Clinical urgency		
Immediate	Minutes	Within an hour
Group O Rh Negative Packed RBCs	ABO and Rh type Group specific blood	ABO and Rh type cross match

Special issues in obstetrics transfusion

1. Irregular Antibodies
2. DIC often complicates abruption placentae
3. Thrombocytopenia, impaired LFT complicates pre-eclampsia/eclampsia

Reaction type	Immunologic	Non immunologic
Acute Transfusion Reactions	Hemolytic Febrile non-hemolytic Urticaria Anaphylactic Trali	Transfusion associated sepsis Hypotension associated with ACE inhibitors Taco Non immune hemolysis Air embolism

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		Hypocalcemia Hypothermia
Delayed Transfusion Reactions	Alloimmunization- RBC antigen Alloimmunization- HLA antigens Hemolytic GVHD Post transfusion purpura Transfusion related immunomodulation	Iron overload Disease transmission

- Complete blood count (CBC)
- Coagulation screen
- Renal function test (Urea, creatinine and electrolytes)
- Liver function tests (bilirubin, ALT and AST)
- Plasma Hb
- Urine Hb
- Blood culture in special blood culture bottles

Blood Bank Requirements

- Blood bag with BT set
- Post transfusion samples (EDTA & Plain)
- Completely filled and signed reaction form

Blood Bank Investigations

1. Visual check of pre, post and Blood Bag samples
2. Repeat ABO & Rh (D) grouping
3. Repeat antibody screen and crossmatch
4. Direct antiglobulin test

Precautions for Post Transfusion

In case of any untoward reactions;

1. Stop transfusion immediately
2. Keep the I/V line patent
3. Take necessary resuscitative measure
4. Investigations to be done

Complications of Massive Transfusion

1. Citrate toxicity
2. Hyperkalemia

3. Hypothermia
4. Dilutional thrombocytopenia
5. Coagulopathy

Preventive measures

1. Do not transfuse if at all possible
2. Use screened blood
3. Compatibility testing
4. Specially processed blood/components
5. Hemovigilance

Optimizing Clinical Benefit of Transfusion

1. Start transfusion within 30 minutes of removal from blood bank refrigerator
2. Check ABO and Rh (D) compatibility in case of PRBC, ABO in case of FFP.
3. Do not refrigerate in case of Platelets
4. Complete transfusion within 4 hours
5. Never add medication