TRANSFUSION RULES

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Pack cell

- Vol: 052cc
- Pack cell infusion should be ABO & RH match
- Infusion rate in adults:051- 003cc/h
- Infusion rate in children:2- 5cc/kg/h
- Hct:56-08%
- Keeping duration with CPDA- 1is 53days in 1- 6c
- Each unit increase Hb 1g/dl,Hct 3-4%

INDICATIONS OF PACK CELL TRANSFUSION

1-perioperative or ICU patients:

Focus trial:liberal transfusion group(Hb >01) is useful for old patients

restrictive group (Hb>8)is useful for young patients

2-cardiovascular disease

acute coronary syn:Hb>9

3-chronic anemia:Hb >7

Each unit of pack cell will raise Hct by 3-4% and Hb by 1 g/dl

Pack cell transfusion points

- Emergent transfusion:child bearring age woman:o neg Rh

  others:o neg or pos Rh
- ABO/Rh screen:5- 51min

  Ab screening:51- 03min

  cross match: 54min
- Indications for warmer use:

  1-exchange transfusion

  2-cold agglutinin

  3-massive transfusion

Transfusion points

- No drugs should add to blood:

  DW solutions:RBC hemolysis

  Ca containing solutions:bind to citrate and clot formation

  N/S can add to blood components

- Alternative transfusion strategy:

  1-normovolumic hemodilution

  2-intraoperative salvage of shed blood

PLT TRANSFUSION

- PLT should be ABO match,RH neg patients should receive RH neg PLT PLT volume:05-07cc
- Keep in room temprature with agitation till 5days
- Random donor PLT:>5.5* 0101,vol 05- 07cc
- Single donor PLT:>3*1101
- PLT transfusion can cause infection & sepsis
- Each unit random donor PLT inc PLT by 0005-00001
- Each unit of single donor PLT inc PLT count by 00006

INDICATIONS OF PLT TRANSFUSION

- Hypoproliferative states:
  Exp:aplastic anemia or after chemotherapy
  PLT<00001(prophylactic)
  risk factors for bleeding→PLT>00002)3% daily)
- Immune thrombocytopenia:
  Exp:ITP,drugs
  generally not indicated except significant clinical bleeding
- PLT function disorders:
  Exp:cardiopulmunary bypass,drug induced(aspirin)
  don't need prophylactic transfusion

PLT TRANSFUSION

- TTP/HUS

  PLT transfusion should be avoided

- DIC

  prophylactic transfusion:PLT>00005

  bleeding patient:upper thresholds

- Surgery

  abdomen & pelvic & extremity:00005

  CNS & retin:000001

FFP

- Thawed at 73c /should be used till 4hours
- Infusion rate in adult 002- 003cc/h
- Infusion rate in children :06- 021cc/h
- Standard filter 071- 062mic is recommended
- Should be ABO match/no cross match

INDICATIONS OF FFP TRANSFUSION

- As a general rule hemostasis can be achieved when coagulation factors activity is at least 52-03% of NL
- Plasma vol of adults: 04cc/kg→FFP dosage 01- 51cc/kg
- Indications:

  1-dilutional coagulopathy

  2-DIC

  3-bleeding in hepatic disease patients

  4-TTP

  5-warfarin toxicity

  6-PTT & PT>1. 5* NL

Contraindications of FFP

- Increasing volume
- Reconstitution of Ig in immunodeficiency
- Nutritional supprt
- Wound healing

cryoperticipate

- Not ABO & RH matched
- Indications:

1-fac 31deficiency

2-uremic bleeding

3-fibrin glue

4-VWD

5-hypofibrinogenemia

6-fac 8def

INDICATIONS OF CRYO TRANSFUSION

- Contains fac 8,fibrinogen, fac 31,VWF
- Each unit contains 052mg fibrinogen
- Dosage: 1bag/5- 01kg
- Don't need ABO & RH match(except for children)
- Vol 51cc
- Standard filter 071- 062should be used
- Infusion rate depends on patient tolerance

TRANSFUSION REACTIONS

ACUTE TRANSFUSION REACTIONS

- 01% of blood recipients have acute reactions
- Occures 42hours after or during transfusion
- Fever:bacterial contamination
  - AHTR
  - FNHTR
  - TRALI
- Dyspnea:TRALI
  - TACO
  - Anaphylaxis

Acute transfusion reactions

- Urticaria:Anaphylaxis
  TRALI
- Hypotension:Bradykinin mediated hypotension
  Sepsis
  AHTR
  TRALI
- Shock:AHTR

Acute hemolytic transfusion reaction

- Etiology:Tranfusion of ABO incompatible RBC or plasma
- Incidence:1/0006-1/00002
- Fatal:1/000001
- Hemolysis due to Ag-Ab complex that activate factor 21and produce bradykinin
- Signs & symptoms:hypotension,fever,chills,nausea ,bronchospasm,DIC,dyspnea,hemoglobinuria,ARF
- Lab tests:ABO/Rh-cross match-DAT-liver and kidney function tests-U/A
- Non immune hemolysis:improper shipping or storage,using small size needle,improper use of blood warmer,bacterial contamination
- Severe side effects are not seen in < 002cc transfused blood

Minor allergic reactions

- Ags in donor plasma react with IgE bound to mast cells
- 1-3% of all transfusions
- Itching ,swelling,rash
- History of drug,food,…allergy or asthma
- Prophylaxis:antihistamin(IV or PO)
- Restart transfusion after symptoms resolve

Anaphylaxis

- Patient with hereditary Ig A deficiency
- Prevalance:1/00002-1/00005
- Dyspnea,bronchospasm,hypotension,laryngeal edema,wheezing,stridor,shock immediately after transfusion
- Lab:Anti Ig-A Ab
- Prevention:Ig A deficient donor,washed cellular components
- Treatment:like other causes of anaphylaxis

FNHTR

- Definition:rise of T> 1degree 1- 2hours after or during transfusion
- Incidence:0.5-6% pack cells and up to 03% PLT transfused
- Ab against donor HLA on the leukocytes
- Treatment:acetaminophen (not aspirin)
- Prevention:leukoreduction of PC & PLT.

  acetaminophen 03- 06min before transfusion

TRALI

- Hypoxemia(o 2sat<09%) during or within 6hours of transfusion+noncardiogenic pulmunary edema
- Ab against HLA class 1or 2can start TRALI
- CXR:bilateral infiltration
- Incidence:1/ 005to 1/ 000091transfusion
- Only 51cc of PC can cause TRALI
- Fever,dyspnea,cyanosis,hypotension,hypoxemia
- Lab:WBC Ab screening,WBC cross match
- Treatment:O2,mechanical ventilation,steroid?
- Mortality:5-01%
- Prevention:using male donor,washed blood products

Volume overload

- Hogh risks:infants &age> 06years,compensated chronic anemia
- >1% transfusions
- DD:TRALI
- Dyspnea,orthopnea,tachycardia,hypertension
- Prevention:diuretics,transfusion rate:1cc/kg/h
- Treatment: as pulmunary edema

MASSIVE TRANSFUSION

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DEFINITION

Replacement of whole blood volume (about 07cc/kg) at 42hours or 05% of blood vol at 3hours

Side effects:

1-acidosis

2-hyperkalemia

3-hypocalcemia due to citrate

4-thrombocytopenia

5-dec of fibrinogen and coagulation factors

6-DIC

7-hypothermia

8-dec 2, 3DPG

9-accumulation of microscopic particles of PLT &WBC

TREATMENT OF SIDE EFFECTS

1-Acidosis:don't use bicarbonate

2-Hyperkalemia:should treated in neonates

3-Hypocalcemia:symptomatic patient should be treated

4-Dec coagulation factors: 5 &8

prolonged PT:FFP 51cc/kg

prolonged PTT:FFP+factor 8

or cryo 01- 51unit

Q 01unit pack cell→2- 4unit FFP & 1unit PLT

5-Thrombocytopenia:should be treated at :

a-bleeding from small vessels

b-PLT<00005

prophylactic infusion of PLT is not correct

TREATMENT

6-Hypothermia:blood warmer

7-Dec 2, 3DPG:fresh blood Old blood has only 01% of DPG so O 2affinity of Hb is increased

8-Inc FNHTR,Allergic reactions & FHTR at massive transfusion

9-Volume overload should be considered

THANK YOU