BLOOD PRODUCT UTILIZATION

Who gets what & when

- Blood given only when necessary
- Specimen for crossmatch required
- Specimen for crossmatch MUST be properly identified
  - Name of patient
  - Unit Number
  - Date
  - Initials of phlebotomist on tube & requisition
BLOOD PRODUCT UTILIZATION

- Autologous blood best
- If autologous blood not available, then blood from the general donor pool is next safest
- Designated donors to be discouraged strongly

BLOOD PRODUCT UTILIZATION

Why not to give blood?

- Volume Expander
- For specific number (except as related to procedures)
- To patients with religious objections to blood transfusions
BLOOD PRODUCT UTILIZATION

- Whole blood - Virtually never used
- Platelets
- Fresh frozen plasma
- Cryoprecipitate
- Packed RBCs
- Concentrates

BLOOD PRODUCT UTILIZATION

- Irradiation - To prevent graft vs host disease - Kills lymphocytes in transfused unit
**Leukodepletion Filtration**
- Removes WBCs
- Decreases sensitization
- Prevents CMV spread
- Mostly done at point of processing at present
- All products currently given here are leukodepleted

**CMV-Negative Products**
- 50% of population CMV Negative
- CMV Negative blood reserved for:
  - Neonates
  - Transplant Patients
    - Allogeneic Bone Marrow Transplant
    - Heart/Lung/Liver/Pancreas/Gut Transplants
    - Autologous Bone Marrow Transplant
    - Renal Transplant
- If CMV Negative Products not available, leukodepletion filtration as good for removing CMV
Used for patients with thrombocytopenia
- < 20,000 prophylactically, or
- < 50,000 & bleeding or in need of a procedure

20,000 figure comes from acute leukemia data, & consists of 1 poorly done study

In aplastic anemia patients, not infected, CNS bleeding did not increase until platelets < 5000
BLOOD PRODUCT UTILIZATION

Platelet Transfusions - Prophylactic

- If not febrile, < 10,000/µl
- If febrile, < 20,000/µl

BLOOD PRODUCT UTILIZATION

Platelets - Exceptions to 10,000 rule

- ITP, TTP, Myelodysplastic syndromes, or aplastic anemia
  - Platelets for bleeding or procedures ONLY
- Platelets with known thrombocytopenia may require platelets even with normal count
  - Patients who have received Reopro® may require double dose
- In general, for patient in ER, use platelets only for bleeding problems
**BLOOD PRODUCT UTILIZATION**

**Platelets - Special Needs**
- Single donor platelets – Mostly for leukodepleted units; most of what is now given
- Random donor platelets – rarely used anymore
- HLA Matched platelets - only for sensitized patients
- Platelet Cross-Match

**BLOOD PRODUCT UTILIZATION**

**Fresh Frozen Plasma**
- For repletion of clotting factors
- TAKES ½ HOUR TO THAW!
- Usual dose for adult is 4-6 units (2 units virtually useless)
- Should not be used for volume resuscitation alone
- Only good for 4-6 hours
**BLOOD PRODUCT UTILIZATION**

**Cryoprecipitate**
- Fraction of blood that doesn’t dissolve on thawing at 4°C
- Rich in fibrinogen, fibronectin, factor VIII, von Willebrand factor
- For correcting hypofibrinogenemia, treating von Willebrand disease
- Also used in renal dysfunction to correct uremic thrombocytopeny

**Packed Red Blood Cells**
- Used to increase oxygen carrying capacity
- Transfuse for symptoms, not for number
- No blood/hemoglobin substitute currently available
BLOOD PRODUCT UTILIZATION

Red Blood Cells

- Products available:
  - Packed red blood cells - Usual product
  - Washed RBC’s - For sensitized patient or IgA deficient patient
  - Frozen washed RBC’s - For highly sensitized patient &/or patients with antibodies against very common antigens

BLOOD PRODUCT UTILIZATION

Massive Bleeding/Hemodilution

- Usually surgical bleed
- Try to tailor products to studies - esp PT, fibrinogen, platelet count; based on fact that 30% of normal value of any clotting factor is ordinarily hemostatic
  - FFP for PT > 21 seconds
  - Platelets for count < 50,000
  - Cryoprecipitate for fibrinogen < 100
PT Dilution Curve for Current PT Reagent

- PT Dilution Curve for Current PT Reagent (PT ISI=1.31)
- Old reagent (PT ISI=2.079 pre-1998)
- Current Plasma Transfusion Audit Guideline = 40% Plasma Factors
- Old Plasma Transfusion Guideline = 1.5 mean

DILUTIONAL COAGULOPATHY

**Guided by numbers:**
- Platelets - 6 unit packs; 1 pack should raise count of average sized adult by 40,000-50,000
- FFP - 4 units at a time minimum; sometimes 6-8 units depending on coags & volume of bleeding
- Cryoprecipitate - For raising fibrinogen quickly, & in cases of fibrinolysis
- Factor concentrates - To be avoided if possible b/o high risk of DIC
BLOOD PRODUCT UTILIZATION

Uncrossmatched or Type O Blood
- Used in exsanguination
- Prefer Type specific (takes 5 minutes)
- If no time for typing, O positive should be used for males & females beyond child-bearing years; O negative reserved for females of childbearing years
- Crossmatching is done retrospectively

BLOOD PRODUCT UTILIZATION

Crossmatch-Incompatible Blood
- Usually arises in setting of patient with autoimmune hemolytic anemia
- Need help from blood bank RE: probable cause of incompatibility
- Should start transfusion slowly, and stop if signs of major transfusion reaction
- More die from failure to transfuse than from transfusion reaction
BLOOD PRODUCT UTILIZATION

Factor Concentrates

- Used for specific clotting factor deficiencies
  - Hemophilia A
  - Hemophilia B
  - Von Willebrand disease
  - Factor XI deficiency (Israel only)
  - Recombinant Factor VIIa
  - Other clotting factor deficiencies

BLOOD PRODUCT UTILIZATION

Factor Concentrates

- Small volume of administration
- Safest products on market RE: viral disease transmission
- Exact product to be used depends on patient’s deficiency
- **ALL REQUIRE HEMATOLOGY APPROVAL!**
BLOOD PRODUCT UTILIZATION

Designated vs Random Donors

- Donor pool safer than designated donors:
  - Greater than 90% of donor pool is repeat donors, eliminating window period for many tests
  - > 95% of designated donors are first time donors
  - People are not always honest RE: risk factors