

Introduction to Transfusion Medicine

Jeffrey S. Jhang, MD
Assistant Director, Transfusion
Medicine



History



- 1492 ?first transfusion to Pope Innocent VIII
- 1616 description of circulation William Harvey
- 1600's Animal to Animal; Animal to Human
- 1818 Human to Human James Blundell
- 1900 Landsteiner ABO groups (ABC); later AB by DeCastello and Sturli

History

- WWI Bottles with Citrate
- 1932 Leningrad First Blood Bank; Cook County Hospital in USA
- 1938 Hemolytic Disease of Newborn Levine and Stetson; Rh Landsteiner and Weiner
- WWII “Plasma for Britain”
- 1950 Plastic Bags Carl/Separation of Components Walter
- 1960’s anti-Rh prevents alloimmunization

History

- 1960-2005
 - Identification of hundred of red cell antigens and molecular typing
 - Fractionation; recombinant factors
 - improved preservation
 - leukocyte and platelet antigens
 - apheresis technology
 - Automation
 - infectious disease screening testing
 - Cellular Therapies

What do we do?

- Blood Bank
- Stem Cell/Cellular Therapy
- Therapeutic Apheresis
- Stem Cell Collection
- Blood Collection



Donor Evaluation

- Protect Donor and Recipient
 - Donor History Questionnaire/Physical Exam
 - Donor Testing (Infectious Disease Markers)
- See handout

Blood Tests

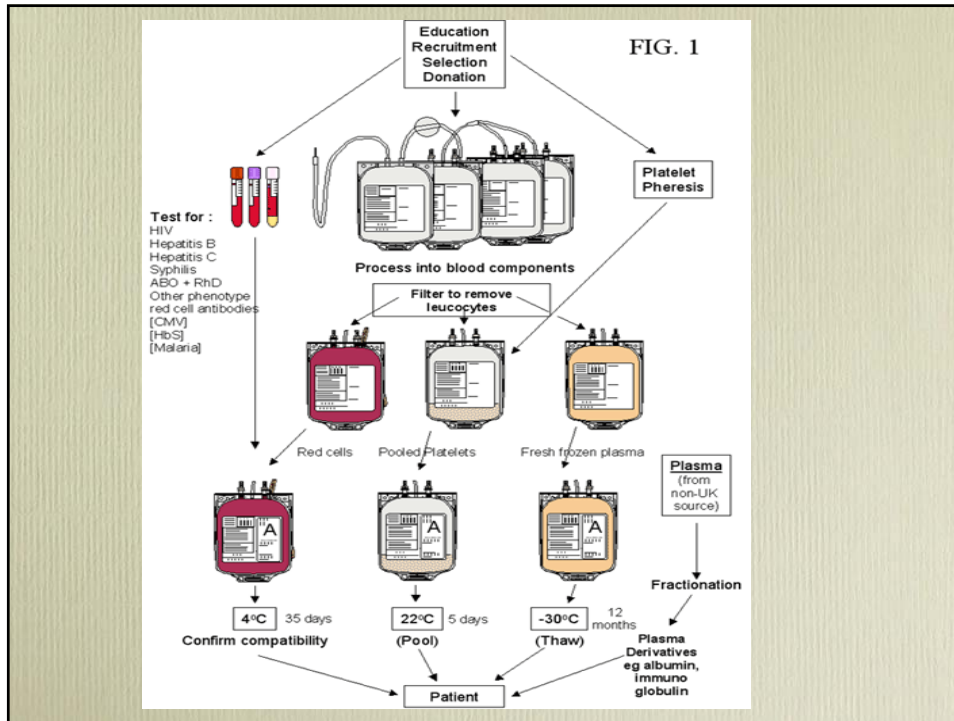
- ABO/Rh; antibody screen
- Hepatitis B (1 in 63,000)
- Hepatitis C (1 in 1.6 million)
- HIV (1 in 1.9 million)
- HTLV (1 in 641,000)
- WNV
- STS
- CMV

Collection of Blood

- Blood Containers
- Phlebotomy
- Treatment of Adverse Donor Reaction
 - Nausea/Vomiting
 - Syncope
 - Hyperventilation
 - Hematoma
 - More Serious
- Meets FDA regulations
- Manages Inventory and Distribution

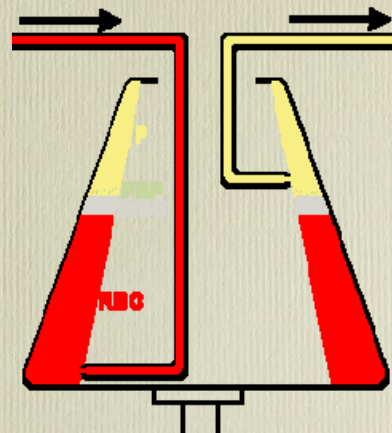
Component Production

- Collect in ACD
- Soft Spin and take off platelet rich plasma
- Red cells finished add adsol → Fridge
- Platelet rich plasma hard spin
- Express off plasma → freeze as FFP
- Platelet concentrate → RT
- Freeze FFP, thaw at 4C, express off supernatant
→ cryopoor plasma, cryoprecipitate



Apheresis Technology

- Single Donor Platelets (6-8 U)
 - Double Plt
 - Double Red
 - FFP and Red
- But need HES



Red Cells



- Homologous
- Autologous
- Packed Red Cells
- Frozen thawed
- Irradiated
- CMV negative
- Antigen Negative
- Sickle negative
- Leukoreduced Platelet

Plasma



- Repletion of all known clotting factors
- Short half-life of coagulation factors (some <4 hours)
- Takes 1 hour to thaw
- Good for 24 hours post thaw
- 200-300 ml per unit
- 4-6 units is the appropriate dose (large volume load!)
- Vitamin K!
- TRALI

Platelets



- Random vs Apheresis
- kept at room temperature increasing risk of bacterial contamination
- 5 day outdate
- Always in short supply
- Apheresis SDP is 200-400 ml (6-8 units)

Cryoprecipitate



- Fraction of blood that does not dissolve on thawing at 4 degC
- Rich in fibrinogen, factor VIII, vWF, fibronectin
- 15ml/unit; dose is 10 units; NOT concentrated plasma!
- Treats low fibrinogen (\uparrow 50-100g/dl)
- Can be used to treat uremic thrombocytopeny

Blood Bank

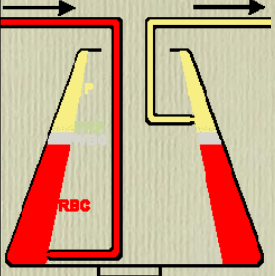


- Pretransfusion Testing:
 - Blood Typing
 - Antibody Screening and Identification
 - Direct Antiglobulin Test
 - Indirect Antiglobulin Test
- Inventory Management PRBC, PLT, FFP, Cryo..etc Autologous Program Directed Blood
 - RhoGAM, Novoseven, Factors
 - Rare Blood


Blood Bank

- Transfusion Reaction Evaluation
 - Acute Hemolytic
 - Delayed Hemolytic
 - Allergic/Anaphylactic
 - TRALI
 - Transfusion related volume overload
 - FNHTR
 - Transfusion Transmitted Disease
- Meets regulations (FDA, NYSDOH, AABB, CAP, JCAHO)

Hemotherapy



- Therapeutic
 - TTP
 - AIDP/CIDP
 - Sickle Cell Disease
 - Leukostasis
- Collections
 - Single Donor Platelets; FFP; Red cells
 - Peripheral Blood Stem Cell Collections



Stem Cell Processing and Transplantation



Cord Blood Transplants

