BLOOD PRIME
Fluid Balance Considerations in Pediatric Procedures

- Extracorporeal volume
- Intraprocedural Hematocrit
- Cobe Spectra
  - TPE
  - RBCX
  - WBC procedures
- Spectra Optia
  - TPE
  - MNC collection *
- Cellex
*No personal experience with blood prime in Optia MNC

Information about that procedure was provided by Terumo BCT
Extracorporeal Volume

• AABB recommends maximum ECV of 15%
  – Volume of apheresis kit + all accessory tubing must be less than 15% of patient’s TBV
  • Operators should calculate prior to pediatric procedures
  • Consider more conservative parameters
TBV Calculations

• Neonates 0-4 weeks: 100mL/kg
• Infants 1 month - 1 year: 80mL/kg
• Children 1-18 years: 70mL/kg
• Adults over 18 years: accept instrument calculations
Intraprocedural Hematocrit

• Drop in circulating red blood cells that results from whole blood in tubing + red cell packing in the centrifuge
• Inversely proportional to patient Hct
• TBV x Hct - red cell volume of kit ÷ TBV
General Considerations
Plan for Fluid Balance

• Divert prime saline at start of procedures results in negative fluid balance
  – 100-150mL in Spectra, less in newer devices
• Rinseback results in positive fluid balance achieved as a bolus at end of procedure
  – +195-263mL in Specta, less in newer devices
• Fluid balance programmable in some procedures, but not all!
Procedure and Instrument Specific Considerations
SPECTRA
NOTE:
Spectra does NOT account for divert prime saline or rinseback in fluid balance calculations
Spectra Red Cell Exchange

- Kit volume=170mL
- RBC volume=68mL
- Divert Prime Saline=100mL
- Return prime to avoid negative fluid balance
- No rinseback = 100% fluid balance
Modified Blood Prime

- Specific for Spectra Red Cell exchange
- Involves priming return line with donor unit.
- Start procedure with transfer pack attached to return line and Inlet saline open
- Run until return line dark red in color to end
Tolerating Poorly?

• Consider programming 105% fluid balance
• Consider Albumin Prime
  – Performed as a standard secondary prime
  – Attach albumin to access line, transfer pack to return line, RUN until plasma noted at end of return line (~250mL)
Spectra Plasma Exchange

- Kit volume = 170mL
- Red cell volume = 68mL
- Divert Prime saline = 150mL
- Rinseback = 345mL (net + 195mL)
- Consider intraprocedural Hct
• Standard red cell prime:
• Attach red cell unit to access line, transfer pack to return line, RUN until red cells noted at end of return line (~250mL)
• Patients<15kg: consider diluting unit to approximate patient’s hct
• Consider citrate content of red cells: adjust AC ratio during prime or start slowly
Optia Plasma Exchange

- Kit volume=185mL
- Red Cell Volume=58mL
- Divert prime=40ml
- Fluid balance programmable and take into account volume of projected rinseback
• Optia prompts red cell prime when programmed ECV or ECRCV exceeds 10-15% of patient’s TBV or RCV
• Takes into account citrate content of red cell unit when setting up initial flow rates
  - Starts very slowly
Spectra MNC

- Kit volume = 285mL
- Red Cell volume = 114mL
- Divert Prime = 150mL
- Rinseback = 413mL (net +263mL)
Spectra MNC fluid balance is NOT programmable!

- Procedures can result in large negative fluid balance
  - High AC ratios
  - Plasma collection
  - High collect pump flow rates
Spectra MNC fluid balance is NOT programmable

• Can also result in large positive fluid balance
  – Default AC ratio
  – Large rinseback if not blood primed
Spectra MNC Blood prime

- Undiluted unit in donor <15kg may raise Hct by 1-2%
- Program Hct of red cell unit, then change to donor’s Hct once donor connected
- Attach red cell unit to access line, transfer pack to return line, RUN until red cells noted at end of return line (~250mL)
- Consider citrate content of red cell unit: adjust ratio or start slowly
Other MNC blood prime considerations

- It takes a while to achieve interface optimal for collection
- Manually close collect valve after quickstart until interface visually achieved
Other MNC blood prime considerations

- No rinseback or physician prescribed rinseback if donor Hct low
- Watch albumin in small donors after multiple collection days.
Leukoreduction

• Spectra Operator’s manual contains a table and set of calculations for collect pump flow rates based on WBC count
• Result in large fluid volume deficits
• Have additional IV access and replacement fluids on hand BEFORE procedure starts
Optia MNC

- Kit volume = 191mL
- Red Cell volume =
- Divert prime = 40mL
- Optia prompts red cell prime when ECV or ECRCV exceeds 10-15% of patients TBV or RCV
- Takes into account citrate content of donor unit. Starts slowly
Cellex Photopheresis

- Kit volume not fixed
- Table in Operator’s Manual lists ECV based on patient Hct
- Indication for blood prime dependent on Hct as well as TBV
Cellex Blood Prime

• Blood prime uses a donor unit to fill the bowl with red cells at the start of the procedure, and to harvest the buffy coat at the end of the collection portion of the procedure
Cellex Blood Prime

- A multi-step process in which access is transferred from donor unit to patient, and back to donor unit
- Allows operator to program fluid balance parameter
- Does not give a reading of actual fluid balance during a blood prime procedure
Other Cellex blood prime considerations

- Ending fluid balance is about +200-220mL
- Can be minimized if negative fluid balance during procedure is acceptable
- Consider citrate content of red cell unit
Monitor for transfusion reaction

- Premedicate if indicated
- Every 15 minutes for first hour
- First hour and at the end of Cellex procedures
Plan for fluid balance in Pediatric procedures!

KNOW:

• ECV, ECRCV, rinseback and divert prime volumes of the instrument you plan to use
• Patient’s TBV and RCV
• Patient history and nature of illness
3 P’s of Pediatric Apheresis

- Planning
- Patience
- Persistence