Welcome to eSessions

This session contains audio.
Review the information on each slide before continuing.
BLOOD PRIME CONSIDERATIONS

COBE® SPECTRA APHERESIS SYSTEM
Getting Around

Click on these **TABS** to change the view of the left sidebar:

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This button toggles between **PLAY** and **PAUSE**. Click the **PLAY** button to continue.

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Summary Slide

- Presentation objectives
- What is a Blood Prime
- Why consider a Blood Prime
- When to consider a Blood Prime
- Blood Prime considerations
- Blood Prime options
- Rinseback
- Alternative: 5% albumin prime
- RBCX Blood Prime
Objectives

Participants will be able to state:

- When to consider a Blood Prime
- Two advantages to using a packed RBC unit
- One thing that contributes to how a Blood Prime affects the patient’s Hct
- Two options for RBCX blood prime
What is a Blood Prime?

- Blood Prime is a method of displacing the prime saline in the disposable tubing set with donor red cells.
- It must be done after the system has been primed with saline.

Connect access and return lines. Close access saline. Press CONTINUE to Run.
Why Consider a Blood Prime

The Blood Prime step can help maintain the patient’s hemodynamic stability.

“…may help to prevent intraprocedural hypovolemia and/or the effects of acute anemia in pediatric procedures and in susceptible adult patients.”¹

Changes in the patient’s blood volume and reduction in their circulating red cell volume during the procedure may not be well tolerated.
When to Consider a Blood Prime

Consider the patient’s:

- Hct
- Total blood volume (TBV)
- Medical condition
When to Consider a Blood Prime (cont)

Patient’s Hct
“The intraprocedure hematocrit (assuming the patient is maintained in an isovolemic state during apheresis) may be more predictive of the patient’s tolerance of temporary extracorporeal red cell loss than the extracorporeal percentages.”

Calculation for intraprocedural Hct:
\[100 \times (RCV^* - \text{extracorporeal RBC vol.})/\text{TBV}\].^2

*red cell volume
When to Consider a Blood Prime (cont)

Patient’s Hct

- The lower the RBC volume of the patient, the greater the possibility of a change in the patient’s Hct (RBC volume) after the Blood Prime.

Low patient TBV and Low patient Hct \( \implies \) Low patient RBC volume
When to Consider a Blood Prime (cont)

Patient’s Hct

- The effect on the patient’s Hct or RBC volume depends on a combination of the following factors:
  - Hct of the RBC unit used for the Blood Prime
  - Amount of volume processed during the Blood Prime
  - Procedure performed
When to Consider a Blood Prime (cont)

### Patient’s TBV

<table>
<thead>
<tr>
<th>COBE Spectra disposable tubing set: total equivalent whole blood volume</th>
<th>At 15% of TBV. If pt’s TBV is &lt; or =:</th>
<th>At 10% of TBV. If pt’s TBV is &lt; or =:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPE (170 mL)</td>
<td>1,133 mL</td>
<td>1,700 mL</td>
</tr>
<tr>
<td>RBCX (170 mL)</td>
<td>1,133 mL</td>
<td>1,700 mL</td>
</tr>
<tr>
<td>WBC (285 mL)</td>
<td>1,893 mL</td>
<td>2,840 mL</td>
</tr>
<tr>
<td>AutoPBSC (165 mL)</td>
<td>1,100 mL</td>
<td>1,650 mL</td>
</tr>
</tbody>
</table>

Total equivalent whole blood volume: The calculated average whole blood volume in the disposable tubing set during the run. This volume is equal to the total RBC volume in the disposable tubing set divided by the donor or patient Hct (based on an Hct of 40%). Different disposable tubing sets have different equivalent whole blood volumes based on the volume of RBCs needed to correctly position the interface.
When to Consider a Blood Prime (cont)

Patient’s medical condition

- Patients with acute anemia, such as those with thrombotic thrombocytopenia purpura (TTP), may be less tolerant of a lower intraprocedural Hct than patients (such as those with chronic renal failure) who have had time to adjust to anemia.³
Blood Prime Considerations

Additional volumes to consider:

- Tubing set volume
- Any additional devices being used:
  - Column
  - Blood warmer
- Blood samples that need to be drawn
Follow standard transfusion practices to ensure the Blood Prime unit is:

- Patient compatible
- As fresh as possible
- Leukoreduced or irradiated (to avoid transfusion reactions)
- CMV seronegative (to avoid infection)
- Washed (to avoid reactions to plasma or citrate)
- Filtered (to remove clots)
Blood Prime Options

RBC unit options:
- Packed RBC unit (PRBC)
- Diluted unit
PRBC Unit Considerations

- Blood Prime step
- Change in patient’s Hct
- Advantages and disadvantages
PRBC Unit Considerations: Blood Prime Steps

TPE/MNC/AutoPBSC procedures:

1. Prime the set with saline.
2. Enter the patient and procedure data, except enter the Hct of the Blood Prime unit instead of the patient’s Hct.
3. Connect the access line to the packed RBC unit.
4. Connect the return line to an empty transfer bag.
5. Press CONTINUE to start the run.

ℹ️ Verify the Hct of the unit before using.
6. Change the Inlet:AC ratio to 50 to increase the inlet flow rate.
7. Process the entire unit (~ 300 mL). Press PAUSE.
8. Change the Inlet:AC ratio to the appropriate value.
10. Adjust the target values, if necessary.
11. Disconnect the access and return lines from the bags.
12. Connect the patient and continue the run.

Consider using a slower inlet flow rate for the first 10 minutes.
PRBC Unit Blood Prime
**PRBC Unit Considerations: Change in Patient’s Hct**

<table>
<thead>
<tr>
<th>Patient TBV (mL)</th>
<th>Patient Hct (L)</th>
<th>Prime Hct (L)</th>
<th>TPE</th>
<th>MNC</th>
<th>AutoPBSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 mL</td>
<td>25</td>
<td>60</td>
<td>5</td>
<td>5</td>
<td>4</td>
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<td></td>
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<td></td>
<td>45</td>
<td>60</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>100 mL</td>
<td>25</td>
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<td>3</td>
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<td></td>
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<tr>
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<td>45</td>
<td>60</td>
<td>0</td>
<td>0</td>
<td>1</td>
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</table>

Theoretical Prediction Using a **300 mL** Blood Prime
PRBC Unit Considerations

Advantages:
- Easier to use.
- Takes less time.
- Results in a stable or increased patient Hct.

Disadvantages:
- May increase the patient’s Hct too much.
Diluted Unit Considerations

- Blood Prime step
- Change in patient’s Hct
- Advantages and disadvantages
Diluted Unit Considerations: Blood Prime Steps

The PRBC unit may be diluted to the appropriate Hct with:

- Saline
- 5% albumin
- Fresh frozen plasma
Diluted Unit Considerations: Blood Prime Steps (cont)

1. Prime the set with saline.
2. Enter the patient and procedure data.
3. Connect the access line to the diluted unit.
4. Connect the return line to an empty transfer bag.
5. Press CONTINUE to start the run.
6. Change the Inlet:AC ratio to 50 to increase the inlet flow rate.

- Verify the Hct of the unit after the dilution.
Diluted Unit Considerations: Blood Prime Steps (cont)

7. Process the entire unit (~ 300 mL). Press PAUSE.
8. Change the Inlet:AC ratio to the appropriate value.
9. Adjust the target values, if necessary.
10. Disconnect the access and return lines from the bags.
11. Connect the patient and continue the run.

Consider using a slower inlet flow rate for the first 10 minutes.
Diluted Unit Blood Prime
Diluted Unit Considerations: Change in Patient’s Hct

<table>
<thead>
<tr>
<th>Patient TBV (mL)</th>
<th>Patient Hct</th>
<th>Prime Hct</th>
<th>TPE</th>
<th>MNC</th>
<th>AutoPBSC</th>
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<tbody>
<tr>
<td>600 mL</td>
<td>25</td>
<td>25</td>
<td>-1</td>
<td>-1</td>
<td>0</td>
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<td></td>
<td>30</td>
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<td>-1</td>
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<tr>
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<td>35</td>
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<td>-1</td>
<td>-1</td>
<td>0</td>
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<tr>
<td></td>
<td>40</td>
<td>40</td>
<td>-1</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>45</td>
<td>0</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>1000 mL</td>
<td>25</td>
<td>25</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td></td>
<td>30</td>
<td>30</td>
<td>0</td>
<td>-1</td>
<td>0</td>
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<tr>
<td></td>
<td>45</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Theoretical Prediction Using a **300 mL** Blood Prime.
Diluted Unit Considerations

Advantages:
- Blood Prime step can help maintain the patient’s hemodynamic stability.

Disadvantages:
- Unit must be diluted.
- Hct of the unit should be checked after it has been diluted.
- Takes extra time.
- May result in a decrease in the patient’s Hct.
Rinseback

To maintain the patient in an isovolemic state and in cellular equilibrium, DO NOT perform Rinseback.
Alternative: 5% Albumin Prime

Indications:
- Patient weight of 25 to 50 kg
- Use of priming columns
- Desire to avoid exposing the patient to blood product

Prime method:
- Same method as for a Blood Prime
  (Prime with saline first, then connect the albumin to the access line and a transfer bag to the return line)
RBCX Blood Prime

- Diluted Unit
- Albumin
RBCX Procedure: Diluted Unit

1. Prime the set with saline.
2. Enter the patient and procedure data.
3. Connect the access line to the diluted unit.
4. Connect the return line to an empty transfer bag.
5. Press CONTINUE to start the run.

⚠️ Verify the Hct of the unit after the dilution.
RBCX Procedure: Diluted Unit

6. Change the Inlet:AC ratio to 50 to increase the inlet flow rate.
7. Process until the RBCs from the replacement unit have displaced the saline in the return line (~40 to 50 mL).
9. Disconnect the access and return lines from the bags.
10. Connect the patient and continue the run.

ℹ️ The volume of the RBC unit used for the blood prime is in addition to the calculated replacement fluid volume.
RBCX Procedure: Diluted Unit

Access Line

Return Line
RBCX Procedure: Albumin

1. Prime the set with saline.
2. Enter the patient and procedure data.
3. Connect the access line to the bottle of albumin.
4. Connect the return line to an empty transfer bag.
5. Press CONTINUE to start the run.
6. Change the Inlet:AC ratio to 50 to increase the inlet flow rate.
7. Process 250 mL of albumin.
   This will allow 90 mL of the replacement unit to effectively displace the saline in the return line.
9. Disconnect the inlet from the albumin and the return line from the bag.
10. Connect the patient and continue the run.
Additional Resources

COBE® Spectra Apheresis System Operator’s Manual:
- Therapeutic Apheresis Guide (pg 1-2)
- Cell Therapy Guide (pg 1-2)

Apheresis Principles and Practice
Therapeutic Apheresis a Physician’s Handbook
Journal of Clinical Apheresis
Bibliography

- Therapeutic Apheresis, a Physician’s Handbook, (p.9).
- Therapeutic Apheresis, a Physician’s Handbook, (p.10).