What? My Patient needs Dialysis and Apheresis?

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University of Virginia Acute Dialysis and Apheresis Unit
History of Apheresis
History of Dialysis
Extracorporeal Therapies

....diversion of blood through an external artificial circuit for......blood purification, gas exchange, or correction of metabolic abnormalities.

Extracorporeal Therapies
Hemodialysis vs Apheresis

Hemodialysis

• Removal of waste
• Removal of water, excessive fluid
• Salt retention/removal
• Use of artificial kidney
• Protein retention

Apheresis

• Removal of pathological material form the body
• No role in water removal
• No role in salt removal
• Centrifuge of filter
• Protein removal
Renal Indications for TPE

- Goodpasture’s disease
- IgA Nephritis
- Focal segmental glomerulosclerosis
- Transplantation, antibody
- Multiple myeloma
- TTP/HUS
- Cryoglobulinemia
- Lupus Nephritis
- Sickle Cell Disease
Dialysis or Apheresis?

- Perform apheresis procedure first
- Fluid balance
- Correct electrolytes
Circuits
Dialysis Filter

Patients' blood circulates through a synthetic membrane where osmosis and diffusion occurs through a semipermeable membrane. Dialysate is an electrolyte solution with counter current flow from the blood.
Vascular Access

AVF Pros

• Considered best
• Less chance of infection
• Often lasts many years
• Fast blood flow, allows the best blood cleaning

AVF Cons

• Visible under the skin
• May take weeks to months to develop
• Requires planning and surgery
• May require a catheter during development
• Bleeding
• Some may fail to mature
Vascular Access

**Graft Pros**

- Easily placed
- Can be used 3-4 weeks after surgery
- Can be converted to AVF if stops working well

**Graft Cons**

- Increased potential for clotting
- Increased potential for clotting
- Usually doesn’t last as long as AVF
Vascular Access

Fistula

Graft
Vascular Access

Catheter Pros

• Can be used immediately
• Easily inserted as outpatient
• Can be removed and replaced
• Avoids need for needle stick

Catheter Cons

• Not ideal for long-term access
• High infection rates
• May not provide adequate blood flow
• May cause narrowed veins
• Bleeding
• Baths and swimming are not recommended
Central Line

Temporary

Cuffed
Vortex Port

Suture hole

Catheter

Septum
<table>
<thead>
<tr>
<th>Type of Therapy</th>
<th>HD</th>
<th>TA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticoagulation</td>
<td>Heparin</td>
<td>Citrate or Heparin</td>
</tr>
<tr>
<td>Blood Flow Rate</td>
<td>&gt;300 ml/min</td>
<td>50-100 ml/min</td>
</tr>
<tr>
<td>Peripheral veins</td>
<td>Never</td>
<td>Short-term Use</td>
</tr>
<tr>
<td>Duration of Tx</td>
<td>3-4 hours</td>
<td>&lt;3 hours</td>
</tr>
<tr>
<td>Frequency of Tx</td>
<td>Thrice Weekly</td>
<td>Weekly to Monthly</td>
</tr>
<tr>
<td>Care Coordination</td>
<td>Nephrologist/nephrology nurses</td>
<td>Hematologist, oncologist, neurologist, blood bank, nephrologist, specialty nurses</td>
</tr>
</tbody>
</table>
Peripheral Access

- Apheresis only
- 16-18 gauge needle
- Antecubital
- May be unable to maintain good flow rates depending on disease
- High Hct or hyperviscous patients may need 16g
- Soft cannulas will collapse
- Separate arms if possible
- Same arm, return line above draw line
Anticoagulation

- Heparin preferred anticoagulant for hemodialysis
- Prevent clotting of dialysis bloodlines, dialyzer
- MD orders dosage, some units are protocol driven
- Monitor for bleeding at needle sites, too much
- Streaking dialyzer, clot in venous chamber, increased venous pressure, not enough
- No heparin dialysis, NS flushes every 15-30 minutes
- Can provide less effective dialysis
Anticoagulation

- Citrate is the preferred anticoagulant for apheresis
- Minimize activation of platelets and clotting factor
- Ensure extracorporeal circuit remains patent
- Chelates calcium
- May require replacement of calcium
- Monitor for circumoral paresthesia
- Monitor ionized calcium
- Most of infused citrate is discarded with separated plasma
- Duration of procedure increases risk of symptoms
Complications

Hemodialysis
- Hypotension
- Cramps
- Nausea and Vomiting
- H/A
- Chest Pain/SOB
- Anaphylaxis
- Air embolism
- Circuit clotting
- Hemolysis

Apheresis
- Hypotension
- Vasovagal event
- Nausea and Vomiting
- Transfusion reaction
- Citrate/calcium
- Anaphylaxis
- Air embolism
- Circuit clotting
- Hemolysis
Intervention/Prevention

- Ultrafiltration should either be stopped or the rate decreased.
- The patient should be placed in the Trendelenburg position.
- The blood flow rate should be reduced.
- Intravascular volume may be replaced with normal saline.
- Midodrine pre-treatment
- Avoidance of food intake
- Pre-medicate
Questions?

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