PURPOSE: To provide a procedure for the use of a specifically designed system to collect and reinfuse autologous blood lost during surgery.

DEFINITION: Autologous: Related to self.

KNOWLEDGE BASE: The orthopedic drainage/reinfusion system is the collection, filtration, and reinfusion of the patient’s own blood. During surgery, the drainage system is connected to the closed wound drain. A vacuum source is used to aspirate blood into the unit. Then the collected blood can be reinfused following the usual blood transfusion procedure.

The advantages of this system are the elimination of disease transmission, transfusion reactions, isoimmunization, and the need for additional anticoagulants.

The indication for use is replacement of blood loss related to elective and non-elective surgery. The contraindications for use are abnormal renal and/or hepatic function, malignant lesions, contamination/ sepsis, infection, coagulation disorders, excessive hemolysis, potential for air embolism, microembolism, and fat embolism.

A physician’s order is required for the re-infusion.

Positive patient identification is required prior to performing the procedure. Refer to SMH Policy (01.PAT.09) Patient Identification: Inpatient/Outpatient.

PATIENT EDUCATION: Preoperatively, explain to the patient the reason for this procedure and describe the mechanics of its use.

EQUIPMENT:
1. Drainage/Reinfusion System (The patient will arrive from Surgery with this system in place. Extra systems available in Central Service or the OR).
2. Pall Filter (Microaggregate, 20-40 micron, blood transfusion filter from Central Service or the OR).
3. Bloodset IV tubing (C.S. Cart)
4. Normal Saline (Pharmacy)
5. IV pole
6. Gloves
PROCEDURE:

1. COLLECTION:
   a. Upon return from Surgery, the closed wound drain will be connected to the reservoir.
      NOTE: Keep the reservoir upright at all times and do not agitate. Saturation of the filter may cause the filter to occlude.
   b. Verify that the patient's name and the start time of collection is recorded on the reservoir.
   c. Check to ensure that a second IV site has been accessed in the event that existing IV fluids cannot be interrupted for blood transfusion.
   d. Attach the reservoir unit to the foot of the bed and secure with attached device.
      NOTE: To maintain accurate vacuum level setting, the pump unit must be at the level of the wound site.

2. REINFUSION:
   a. Identify patient.
   b. Re-infuse when: anytime the blood reservoir contains 300 ml within the five hours post activation time or at five hours post activation if there are 200 ml or more in the blood reservoir.
   c. Unband the blood bag and tubing. Elevate reservoir while keeping the blood bag lower than reservoir. Press and hold down the valve lever on top of the reservoir to transfer the blood into the reinfusion bag.
      NOTE: 100 ml of bloody components will remain in the reservoir at all times. This fluid may contain fats, which have risen to the top of the collected fluid and should not be reinfused.
   d. When the transfer of blood from the reservoir to the bag is complete (approximately one minute), release the lever and clamp off the blood bag tubing as close to the blood bag as possible.
      NOTE: Do not release the lever until the blood bag has finished all the way through the blood bag tubing into the blood bag. Once the lever is released, the pump unit will automatically turn ON to re-establish negative pressure in the reservoir.
   e. Follow the Sarasota Memorial Hospital Blood Transfusion Procedure - Red Blood Cells (blo03). Insert a PALL filter into the spike port and then attach the blood set IV tubing.
      Prime with normal saline.
   f. Reinfuse at 250 ml/hour
   g. All blood transfusions must be completed within six hours of initial activation.
3. **WOUND DRAINAGE:**

   a. At six hours post activation time, the connecting tubing (between the blood bag and the reservoir) will be cut two inches from the reservoir and discarded. Cap the end of the remaining tubing on the reservoir with the attached red cap.
   
   b. The blood reservoir continues to function as a Hemovac.
   
   c. It is recommended that the reservoir not be emptied unless necessary (drainage reaches 600 cc plus, patient leaving unit or hospital for a procedure, or for patient ambulation).
   
   NOTE: It is recommended to empty the reservoir prior to patient ambulation. It reduces the weight of the reservoir and reduces the likelihood of saturating the reservoir filter.
   
   d. In the event that the reservoir requires emptying, the lever on the lid is depressed and the blood is transferred. Remove red cap from tubing. Hold the container against the tubing when emptying to allow the blood to run down the side of the container rather than splash into the container.
   
   e. Discard the used blood product equipment as outlined in Nursing Procedure (blo03).
   
   f. See attached Troubleshooting Chart for problems.
   
   g. If problems, contact an RN on the Orthopedic Unit.

**DOCUMENTATION:**

1. **Nursing Reassessment:** Document the patient response to reinfusion, the duration of collection, and the characteristics of collected drainage. Drain section: Record type of drain, location, suction, and amount.

2. **EMR I&O Flowsheet:** Document the amount of blood product and saline collected and reinfused.

**REFERENCE:**

SMH Nursing Procedure.
Administration of Blood and Blood Components (blo03).
Sarasota, Florida: Author.

Kalamazoo, MI. Author.

**REVIEWING AUTHOR (S):**

Tonia Spenard, RN, Orthopedics
Maria Tepe, RN, ONC, Orthopedics

**TROUBLESHOOTING**
<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Blood will not transfer from reservoir to blood bag.</td>
<td>Reservoir filter saturated.</td>
<td>Replace reservoir.</td>
</tr>
<tr>
<td></td>
<td>Reservoir too low for gravity drainage into blood bag.</td>
<td>a. To facilitate the blood into the blood bag, hold the blood bag tubing so that it forms a half loop at the base of the reservoir. Once the loop is filled with blood, straightening the tubing will accelerate the blood flow out of the reservoir.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. A pumping action with the lever on the reservoir may assist with initiating the blood flow. Also “milking” the tubing while holding the lever down helps to overcome vacuum lock.</td>
</tr>
<tr>
<td>2. Clotting in the reservoir and the tubing.</td>
<td>Rapid bleeding, preventing defibrination of the blood.</td>
<td>Release the tourniquet and evacuate 100cc of initial drainage with O.R. suction prior to attaching the CBC reservoir.</td>
</tr>
<tr>
<td></td>
<td>Most likely with total knee replacement where the tourniquet is released after the wound is closed.</td>
<td></td>
</tr>
<tr>
<td>3. Blood will not flow into the administration set.</td>
<td>Microaggregate filter not sufficiently primed, air locked.</td>
<td>Pressurize bag, flow manually, until blood begins to flow. Then release pressure.</td>
</tr>
<tr>
<td></td>
<td>Improper drain placement</td>
<td>Contact physician</td>
</tr>
<tr>
<td></td>
<td>Patient</td>
<td>None</td>
</tr>
</tbody>
</table>