

PROCEDURE FOR: Exchange Transfusion: Care of the Infant Receiving

SUPPORTIVE DATA: The diligent assessments required in this protocol relate to an exchange transfusion only. A partial exchange transfusion removes blood and instills as crystalloid. Assessments for a partial exchange transfusion should be done before, after completion, and then as often as deemed necessary by physician/Advanced Practitioner.

Exchange transfusion may be indicated for correction of severe anemia, removal of antibody-coated red blood cells in hemolytic disease, removal of excessive unconjugated bilirubin, toxin removal, neutropenia associated with sepsis, or coagulation defects nonresponsive to single component replacement. An exchange transfusion is a sterile procedure requiring close assessment for potential complications, including:

1. Vascular (embolization, thrombus, NEC, hypo and hypervolemia)
2. Cardiac (dysrhythmias, cardiac arrest)
3. Electrolyte imbalances (hyponatremia, hyperkalemia, hypocalcemia)
4. Acid-base imbalance
5. Coagulation (thrombocytopenia, overheparinization and bleeding)
6. Infection (bacteremia, serum hepatitis)
7. Hypoglycemia
8. Hypothermia

DESIRED PATIENT

- OUTCOMES:**
1. Will have blood volume maintained during procedure.
 2. Will have neutral thermal environment maintained.
 3. Will be free of associated complications or have complications readily identified.

EQUIPMENT: Disposable Exchange Tray (contains blood filter set)
Cut down tray with umbilical catheter
Blood warmer
Sterile water
Hemacoil
Sterile gloves
Betadine solution
Cardiac monitor with BP transducer: or non-invasive BP monitor
Pulse oximeter
Radiant warmer
Restraints
IV pole
Sterile towel
Sterile gowns
Surgical caps and masks
Packed Red Blood Cells and FFP, combined in the Blood Bank and delivered to the NICU in a transfer pack
Ca Gluconate (optional)

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PROCEDURE:

<u>ACTION</u>	<u>POINTS OF EMPHASIS</u>
1. Insure that parental consent form has been signed. If parents refuse, see Hospital Administrative Manual Policy, "Refusal of Blood and/or Blood Products".	1. Attending physician will counsel parents as to the need for and details of this procedure.
2. Call blood bank to see if there is blood available and inform that exchange transfusion is needed.	2. The freshest blood available, irradiated and less than 8 days old, will be provided by the Blood Bank. If blood greater than 8 days old must be used (example, blood that is negative for a common antigen) the neonatal M.D. will be notified.
a. If infant has not been type and screened on the current admission, draw specimen at this time and send to the Blood Bank.	
3. Preparation of Infant	
a. Place infant on radiant heater.	a. May not be able to place ISC probe on infant's abdomen. Place on chest and monitor temp until stable. You will most likely have to raise the ISC setting slightly.
b. Soak umbilical cord with sterile normal saline soak for 1 hour prior to exchange.	
c. Monitor with cardiac monitor and pulse oximeter continuously during procedure.	
1) <i>Report tachypnea, tachycardia and dysrhythmias.</i>	
d. Take complete set of vital signs.	d. If infant has <u>UAC</u> : and it is not used for exchange, use BP transducer and set appropriate alarms or attach BP monitor for 15-minute cycles. If both UAC and UVC are used for exchange, peripheral blood pressures will need to be followed.
e. Aspirate infant's stomach.	e. If possible, ensure that infant is NPO x 2 hours prior to exchange.
f. Immobilize all four extremities.	

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- g. UVC will be inserted by physician or Advanced Practitioner according to unit procedure.
4. Preparation of Equipment
- a. Make available clean surfaces for:
- 1) Transfusion Pack
 - 2) Exchange Transfusion Tray
 - 3) Cut down Tray
- b. Open Exchange Transfusion Tray. Obtain "Blood filter" and deposit extension tubing on tray.
- c. Cover open exchange tray with sterile towel.
- d. Fill blood warmer half full with sterile water.
- e. Plug blood warmer in to begin to warm approximately one-half hour prior to exchange.
- f. Place hemacoil in warmer.
- g. When blood is available, set up according to hospital policy.
- h. Connect infusion system according to Appendix A.
5. Exchange Procedure
- a. Preparation for total or partial exchange:
- 1) Volumes of donor blood needed and infant blood to be exchanged will be determined by MD/Advanced Practitioner.
- a. Maintain asepsis during procedure.
- b. This will need to be done before exchange so that blood can be warmed. The exchange tray must then be covered.
- d. Make sure temperature gauge of warmer is in clear view for monitoring.
- e. Check temperature of blood warmer every 15 minutes.
- g. Make sure blood forms are signed and witnessed. There will be one sheet for PRBCs and one for FFP for each bag of blood that will need to be checked and witnessed.
- h. Set-ups are closed systems. Avoid breaking into the system.
- a. Exchange blood HCT should be 45-60% depending on desired post HCT.
- 1) DOUBLE VOLUME: removal of bilirubin/antibodies.

SINGLE VOLUME: correction of coagulopathies, anemia, or removal of antibodies/antigens.

PARTIAL VOLUME: Polycythemia volume calculated dependent on observed and desired hematocrits.

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- 2) Volume of blood to be withdrawn and replaced with each draw will be determined by MD/Advanced Practitioner.
- 3) Initial blood withdraw to be sent for lab analysis.
- 3) Pre and Post exchange labs generally include:
 - a) Hgb, HCT, Plts
 - b) Lytes, Ca
 - c) Glucose
 - d) Bilirubin Total and Direct
 - e) Coag Profile (optional)
 - f) Drug Levels (optional)
- 4) Record heart rate, respiratory rate, blood pressure, perfusion, and skin temp every 15 minutes. Obtain axillary temp every 30 minutes.
- 4) Report tachycardia, apnea, tachypnea, dysrhythmia, hypotension, hypertension, cyanosis or any changes in clinical condition or suspected transfusion reaction.
- 5) Agitate blood every 10-15 minutes.
- 6) Blood is withdrawn slowly over a minute during each draw and discarded into discard bag. Replacement blood is pushed slowly over 1 minute as tolerated.
- 6) Blood can be withdrawn and replaced using one line or may be withdrawn via UAC and replaced via UVC or peripheral IV simultaneously.
 - a. Transfused blood should not be given into UAC!
- 7) At midpoint of exchange a dose of 100mg/kg Ca gluconate may be given, per MD/Advanced Practitioner order. This infusion usually occurs over 30 minutes to avoid complications.
- 7) Report tremors or seizure activity, which may suggest hypocalcemia.
- 8) All pre-exchange orders are generally rewritten by AP or MD and drug dosages adjusted to compensate for removal by exchange.
- 9) Following procedure, take vital signs:
 - a) Every 30 minutes x 2, then
 - b) Every 1 hour x 2, then
 - c) Every 2 hours x 2, then

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- d) Every 4 hours until 24 hours have elapsed since completion of exchange transfusion.
- 10) Obtain glucose meter reading immediately after procedure, then every 1 hour x 2, then as ordered by MD/AP.
- 11) Dispose of blood components and tubings according to infection control guidelines.

DOCUMENTATION: Record vital signs, blood in and out, blood warmer temperature on Exchange Transfusion Record, which accompanies transfusion tray. Blood Bank transfusion record.

APPROVAL: Nursing Standards Committee
Blood Bank

EFFECTIVE DATE: 6/89

REVISION DATE: 8/90, 6/91, 7/92, 8/93, 4/96, 4/97, 5/99, 12/02, 1/03, 12/06

REVIEWED DATES: 12/08

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APPENDIX A

