East Midlands
Neonatal Operational Delivery Network

NETWORK GUIDELINE

Guideline:	**Exchange Transfusion**
Version:	**3**
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Approval:	**EMNODN Clinical Governance Group**
Authors:	**Joanna Preece** **Previous versions: V2 Chantelle Tomlinson, V1 Bala Subramaniam, Jo Behrsin**
Consultation:	**EMNODN Clinical Governance Group**
Distribution:	**Neonatal Units within EMNODN**
Risk Managed:	**Timely exchange transfusion to avoid long term consequences of hyperbilirubinaemia**

This document is a guideline. Its interpretation and application remains the responsibility of the individual clinician, particularly in view of its applicability across the different Trusts in the East Midlands Neonatal Operational Delivery Network. Please also consult any local policy/guideline document where appropriate and if in doubt contact a senior colleague.

Caution is advised when using guidelines after a review date.

REVIEW AND AMENDMENT LOG

Version	Type of Change	Date	Description of Change
1	N/A	May 2017	N/A
1	No change	Nov 2018	CNN & TPN Guideline combined and transferred to EMNODN Guideline format
2	Review of NICE updated and regional peer guidelines	January 2022	Reformat and clinical update
3	Further review of NICE and Cochrane review	March 2023	Reformat and update

Key Points

- **For Quick Reference Guide see Appendix 3**
- Babies who have demonstrated anaemia by cerebral artery Doppler, and those whose mother has high antibody titres should be managed on NICU
- If significant concern is identified antenatally, a multiprofessional discussion including the tertiary NICU neonatal/obstetric teams should be convened. Appropriate location for delivery/neonatal care should be determined and in-utero transfer organised if needed.
- NICE **specifically no longer recommend reliance on cord blood** bilirubin or DCT results to predict or manage significant jaundice. Therefore, **cord AND early infant samples for cases known to be intermediate or high risk** of exchange, should be obtained and sent for: Group & DCT, Cross match, FBC, SBR
- The decision to undertake an exchange transfusion should follow discussions with a consultant
- Rarely a single exchange transfusion may be indicated for severe anaemia
- **Calculate** the required **transfusion volume** and **Contact Blood Bank** (Transfusion Lab) to order required blood. This may take up to 3 hours to arriveSetting up will take longer than anticipated so prepare as soon as possible.
- **Exchange Transfusion Recording Sheet** should be used for documentation see Appendix 1.
- Precise set up will depend on vascular access available and should be planned as soon as possible
- To go home on Folic Acid 250 microgram/Kg/day for 3 months with repeat check Hb at two weeks and six weeks (risk of late onset anaemia)

Abbreviations used in this Document

DAT	Direct Antiglobulin Test
FBC	Full Blood Count
IVIG	Intravenous immunoglobulin
ODN	Operational Delivery Network
Rh-Neg	Rhesus negative
UAC	Umbilical arterial catheter
UVC	Umbilical venous catheter

Contents

1. Introduction

Jaundice in neonates is common. Phototherapy is effective in converting water insoluble bilirubin to its water soluble form and is usually sufficient to prevent dangerous accumulation of bilirubin in the brain. All clinically jaundiced babies should have a bilirubin level determined either by biochemical assay (blood) or transcutaneous photometry. In addition, **babies who have demonstrated anaemia by cerebral artery Doppler and those whose mother have high levels of red cell antibodies** (see box below) usually require management on NICU to facilitate intensive phototherapy and regular monitoring of bilirubin levels. Blood tests for serum bilirubin, Full Blood Count and Direct Antiglobulin Test need to be taken as soon as possible after birth. A point of care haemoglobin and bilirubin from a blood gas where available may provide an early indication of significant anemia and hyperbilirubinaemia.

On the occasions where haemolysis is at such a rate that phototherapy alone cannot reduce bilirubin concentrations, exchange transfusion is indicated. The exchange transfusion involves removal of patient blood in aliquots and replacement with donor blood while maintaining sufficient circulating blood volume. The **aim of the exchange transfusion** is to decrease the rate of haemolysis by reducing the amount of circulating anti-fetal blood cell antibodies, and also reduce the level of circulating bilirubin and thus the risk of kernicterus.

For “Rhesus negative” (Rh-neg) mothers, red cell antibody titres can be indicative of the risk of an exchange transfusion being required. Exchange transfusion may be needed even if antibody titres are not very high and therefore serum bilirubin should be monitored carefully. **Check the most recent maternal antibody titre.**

Levels <3 iu/ml	Low risk of needing exchange transfusion
Levels 4-15 iu/ml	Intermediate risk
Levels >15 iu/ml	High risk of needing an exchange transfusion

2. Indications for Exchange Transfusion

Exchange transfusion should be considered for <u>any one</u> of the following:

1. Measured serum bilirubin levels on or above the exchange transfusion line (NICE phototherapy charts) **not responding to intensive phototherapy**
2. Risk factors influencing risk of Kernicterus are present;
   - **Rapidly rising bilirubin** greater than 8.5 µmol/L per hour
   - Clinical features of **acute bilirubin encephalopathy** (lethargy/abnormal consciousness, irritability, abnormal tone/posture, apnoea and seizures).
3. There is evidence of acute **haemolysis**
   E.g. Rapidly falling Hb, reported blood film evidence
4. There is acute anaemia at birth (Hb <100 g/L)
5. Birth “0 hours” bilirubin > 100 µmol/L

3. Preparation and Assessment

3.1 Prenatal

3.1.1 If significant concern is identified antenatally, a multiprofessional discussion including the tertiary NICU neonatal and obstetric teams should be convened.

3.1.2 The appropriate location for delivery and neonatal care should be determined and a clear neonatal plan documented in an appropriate part of the maternal record. Organise an in-utero transfer if appropriate.

3.1.3 A fresh maternal blood sample (< 5 days old) will be required by the blood transfusion laboratory providing the exchange blood.

3.1.4 Parents should be offered the opportunity to discuss their baby's planned care with a Neonatologist or Paediatrician involved in neonatal care.

3.2 Investigation at Birth

3.2.1 NICE **specifically no longer recommend reliance on cord blood** bilirubin or DAT results to predict or manage significant jaundice. That said, it remains reasonable and standard practice in many contexts to send cord blood with the proviso that infant sample are sent for confirmation as quickly as is feasible. Therefore, **cord AND early infant samples for cases known to be intermediate or high risk** of exchange, should be obtained and sent for: **Group & DAT, Cross match, FBC, SBR**

3.2.2 Total serum bilirubin levels at or above the exchange transfusion threshold is a medical emergency. Discuss with the on-call consultant and double check that the level plotted is the correct value, and that the gestation-appropriate chart has been used.

3.2.3 Exchange transfusion is a consultant decision and should be discussed at the earliest suspicion.

3.2.4 Transfusion should ideally take place on the neonatal unit as opposed to general paediatric ward. If the child has been admitted from home, where possible, admission to an isolation room on the neonatal unit should be considered.

4. Early Management

4.1 Initial Treatment

4.1.1 **Start intensified phototherapy (at least double) and IV fluids** (one day ahead of usual fluid volumes) as soon as possible.

4.1.2 Phototherapy must continue throughout preparation for the procedure.

4.1.3 Recheck bilirubin at start of phototherapy as baseline.

4.2 Requesting Emergency Blood

4.2.1 **All blood used for exchange transfusion should be fully cross matched, CMV negative and irradiated.**

4.2.2 Blood for exchange is a specialist blood which comes from a different centre and therefore needs to be ordered as soon as possible.

4.2.3 Where severe anaemia is present with shock, emergency O negative blood should be used for resuscitation.

4.2.4 Where anaemia is severe but transfusion can wait until the baby reaches the neonatal unit, discuss requirements urgently with local blood transfusion laboratory and consultant haematologist as O negative CMV negative irradiated blood may be indicated.

4.3 Use of Intravenous Immunoglobulin- (IV Ig)

4.3.1 Evidence

The proposed mechanism of action of IVIG is by non specific blockade of Fc receptors on macrophages that are thought to mediate destruction of antibody coated red cells. There is some data that the use of IVIG may reduce the need for an exchange transfusion, however the evidence is of low quality and should be interpreted with caution as the studies demonstrating most efficacy were found to be at high risk of bias[3]. A Cochrane review in 2018 also proposed it is possible the volume of an IV Ig infusion (4-16ml/kg) may reduce bilirubin levels slightly through dilution thus allowing time for intensive phototherapy to have more effect.

2016 NICE guidelines recommend consideration for the use of intravenous immunoglobulin (IVIG) in cases of rhesus haemolytic disease or ABO incompatibility when the serum bilirubin continues to rise more than 8.5 micromol/ litre per hour *despite continuous intensive phototherapy*. IVIG could also be considered if initial bilirubin results indicate a high likelihood of the need for exchange transfusion or if there is a delay in commencing an exchange transfusion due to availability of suitable blood.

4.3.2 Side Effects

In the evidence available the use of IVIG appeared to be safe with no significant short term adverse effects. However, all babies receiving IVIG should be monitored for adverse effects in a similar way to other blood products. In the event of any suspected reaction during transfusion including fever, vomiting, hyper/hypotension or signs of anaphylaxis the infusion should be stopped immediately and the baby reviewed by the medical team.

4.3.3 Prescribing

If a decision is made to use **Intravenous Immunoglobulin (IVIG),** prescribe 500mg/kg over 4 hours as an adjunct to continuous intensive phototherapy. Conditions where this can be considered include Rh incompatibility haemolytic disease or ABO haemolytic disease or when the

serum bilirubin rises more than 8.5 µ/L per hour. The aim is to reduce the circulating antibodies while you await blood for transfusion. Try to arrange this early as it may take some time to arrive.
Intensive phototherapy and hydration should be in place early and prior to administration of IVIG.

The 'National Clinical Guidelines for Immunoglobulin Use' specify a formal process for requesting Immunoglobulins.

(https://www.gov.uk/government/publications/clinical-guidelines-for-immunoglobulin-use-second-edition-update).

Haemolytic Disease of the Newborn is considered a 'Red' indication, that is to say that immunoglobulin may be ordered urgently without awaiting the approval of the local immunoglobulin panel. Local processes should be followed for ordering and recording the use of Immunoglobulin,

4.3.4 Vaccines
Live vaccines (e.g. rotavirus and BCG) should be avoided for 3 months following administration of IVIG as the efficacy may be impaired.

Ensure this is clearly documented in the baby's red book if possible or in the discharge summary and parents are aware.

5. Parents and Consent

Obtain informed parental consent and document this conversation. As per NICE recommendations, parental informed consent regarding IV immunoglobulin and exchange transfusion should include:

- Why treatment is indicated / being considered
- Why an exchange transfusion specifically may be required
- Anticipated duration of procedures and treatment
- Possible adverse effects
- There is a 3 in 1000 risk of death or other significant morbidity
- associated with the procedure.
- The need for Neonatal Unit admission (possible transfer to a level 3 NICU)
- When it will be possible to see & hold their baby

Written information should be provided in every case.

6. Requesting Blood for Exchange

6.1 Volume of transfusion required

- Double Volume – Performed for hyperbilirubinaemia/ kernicterus/ haemolysis
- Single Volume – Performed for anaemia

6.1.1 **Calculate** the required **transfusion volume** including accounting for lines and dead space volumes in the total you request. Normal Neonatal Blood Volume = 90mL/kg therefore:

Double Volume Exchange (ml) = 180 x Birth Weight
Single Volume Exchange (ml) = 90 x Birth Weight)

6.1.2 **Contact Blood Bank** (Transfusion Lab) to order required blood. This may take up to 4 hrs to arrive. Individual units may have local arrangements for obtaining blood for exchange transfusion.

6.1.3 **Explicitly state that the blood required is for exchange transfusion.**

6.2 Blood specifications:

- Fresh, Plasma reduced red cells
- CMV "safe" and HbS negative
- Ideally irradiated (MUST be irradiated following in-utero transfusions)

7. Staff

Ensure adequate **staff** available. 1-1 nurse to monitor and document procedure and provide support and at least one (ideally two) doctors full time- therefore make arrangements for another team member to hold bleep.

8. Intravascular Access

Use one of the following options: – see section 15 for further details

- UVC & UAC (Optimum)
- Peripheral Cannula & UAC
- Peripheral Cannula x 2 & a peripheral Arterial line
- UVC Only

9. Transfusion Rates and total transfusion time

9.1 Aliquots size is determined by gestation and are given over 5 minute intervals

- <28wks 5mL
- 28-32wks 10mL
- 33-36wks 15mL
- >36wks 20mL

9.2 Divide the number of ml by 5 to give your infusion speed

- <28wks 1mL/min
- 28-32wks 2mL/min
- 33-36wks 3mL/min
- >36wks 4mL/min

9.3 Divide the calculated total volume by the rate (ml/min) to calculate total transfusion time

E.g.: 4kg, term baby = 4kg x (90ml x 2) = 720ml

720ml / 4ml/min = 180min

9.4 Document how long you expect the complete transfusion to take.

10. Antibiotics

Commence prophylactic **antibiotics** (according to local guidelines)

11. Blood Spot and other diagnostic sample

11.1 Ensure a “blood spot” Guthrie card sample has been taken from the baby prior to the procedure.

11.2 Consider the need to take other diagnostic samples including potential later investigations (e.g. TORCH screen, metabolic investigations, Gal-1-Put, G6PD, genetic tests). This may be particularly relevant where the case is complicated by hydrops (See EMN-ODN Hydrops guideline).

12. Equipment and Documentation

This will be a **strictly aseptic procedure**. Make sure you have all necessary equipment (see below).

12.1 Pre procedure

Remember that setting up will take longer than anticipated so prepare as soon as possible.

- Full NICU monitoring equipment
- Resuscitation equipment readily available
- Intensive phototherapy
- Exchange transfusion monitoring chart**
- Protective eye wear
- Sterile gowns, towels and multiple sterile gloves
- Plastic aprons
- Blood warmer
- Blood warming extension set
- Infusion pump (e.g. Alaris signature, or Baxter pump)
- Blood administration set for compatible pump/s
- Water feed set
- Closed disposal system for blood e.g. large bile bag
- Sterile drape
- 3-way taps: multiple
- Syringes: Luerlock 5ml, 10ml 20ml multiple of each
- Blood gas syringes
- Drawing up needles
- Sleek tape
- 0.9% saline flushes
- Pathology collection bottles as required[#]
- Alcohol swabs
- Sterile gauze
- Blood for exchange transfusion

12.2 Documentation During Exchange Transfusion

****Exchange Transfusion Recording Sheet** (see appendix 1).
At the end of each aliquot the nurse should record:

- Blood pressure
- Heart rate
- Saturations
- General Condition
- Temperature
- Volume infused this aliquot, Total Infused Volume
- Volume withdrawn this aliquot, Total Withdrawn Volume

Have appropriate sample bottles at hand. Use the first and last aliquots of withdrawn blood for the samples required at the beginning and end.

13. Investigations During Exchange Transfusion

13.1 Blood Samples

The following bloods need to be sent at the start, middle and end of the procedure:

- Full Blood Count
- Urea & Electrolytes
- Bilirubin (Split & Total)
- Blood glucose
- Calcium & Magnesium
- Blood Gas
- Coagulation and Fibrinogen

Where large delays in obtaining results from the lab are anticipated, results on a blood gas, if available and regularly calibrated, may be used to guide treatment pending lab results being obtained.

13.2 Calcium Correction Threshold

Hypocalcaemia is a known side effect of exchange transfusion. Calcium gluconate treatment should be given in cases of symptomatic hypocalcaemia or when the ionised calcium is <0.8 at any time during the exchange. Routine administration of calcium gluconate during exchange transfusion is not advised.

13.3 Hypoglycaemia

This should be managed promptly with intravenous fluid, as an affected baby should not receive enteral feeds during the exchange.

13.4 Thrombocytopaenia

It is very common for a baby to become thrombocytopaenic during an exchange transfusion. Discuss with the duty consultant regarding the threshold to transfuse.

14. Complications of Exchange Transfusion

14.1 The most commonly reported adverse events during or soon after exchange transfusion:

- Catheter related complications; air emboli; thrombosis; haemorrhage
- Haemodynamic (related to excess removal or injection of blood): hypo or hypertension, intraventricular haemorrhage (preterm)
- Thrombocytopaenia (if moderate tends to resolve spontaneously over days)
- Hypo or hyperglycaemia
- Hypocalcaemia, hyperkalaemia, acidaemia (consider with the consultant on call whether these require correction or can be observed for spontaneous improvement)

Less common complications related to exchange transfusion:

- Arrhythmias
- Bradycardia
- Neutropenia, dilutional coagulopathy
- Feed intolerance, Necrotizing enterocolitis
- Septicaemia, blood born infection
- Hypo or hyperthermia
- Death approximately 3/1000 procedures

14.2 Responding to Clinical Signs of Adverse Events:

Vomiting or crying during infusion	Too rapid? Stop and review
Cyanosis or pallor	Too rapid? Altered circulation? Stop and review Check temp, pH, PaCO2, HR, BP
Aspirated blood becomes dark	UVC in portal vein? Adjust catheter Patient unwell? Stop and review Check temp, pH, PaCO2, HR, BP
Air bubble/s identified in the line/s	Immediately turn line taps OFF to baby if air is identified in the lines. Review lines set up and tap position with team to identify best way of removing bubbles.
Tachycardia or bradycardia	Volume, pH or electrolyte abnormality? Stop and review Check temp, pH, PaCO2, HR, BP, K+, Ca+
ECG abnormalities	Cold blood or altered K+/Ca+? Stop and review Check temp, pH, PaCO2, HR, BP, K+, Ca+ Manage hyperkalaemia, Hypocalcaemia
Cardiac arrest	Air embolism? Cold blood or altered K+? Rapid injection of calcium gluconate? Hypovolaemia?

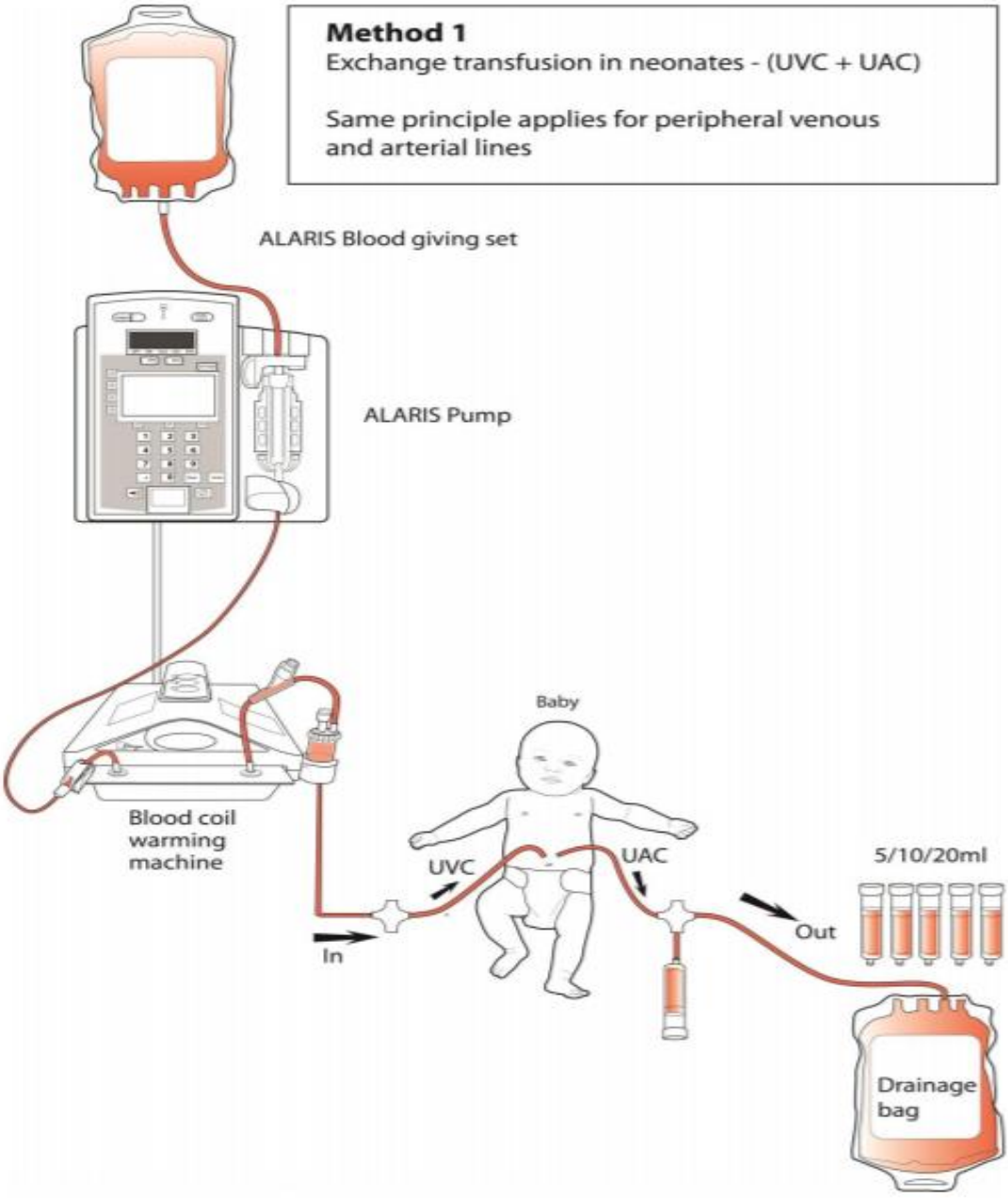
Convulsions	Stop and manage seizure Check pH, glucose, calcium and magnesium

15. Exchange Transfusion

Always confirm blood can be safely aspirated for the first aliquot BEFORE infusion is commenced. Aspirate stomach contents prior to starting exchange.

15.1 UVC & UAC

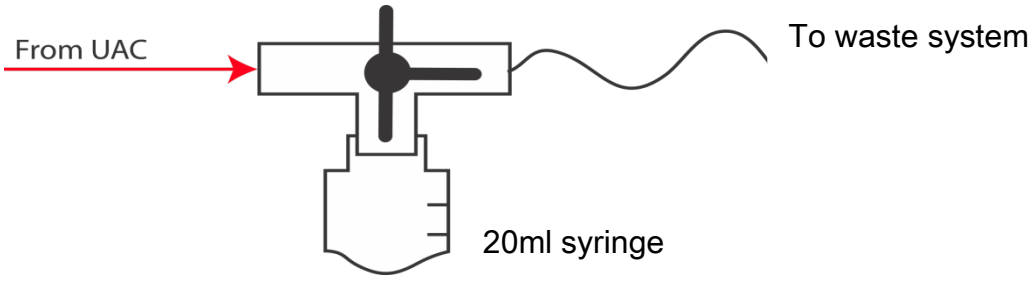
Blood is transfused IN via UVC and **simultaneously** withdrawn OUT via UAC.



Exchange Transfusion in Neonates with UAC and UVC (Courtesy of Cardiff & Vale University Health Board clinical guideline).

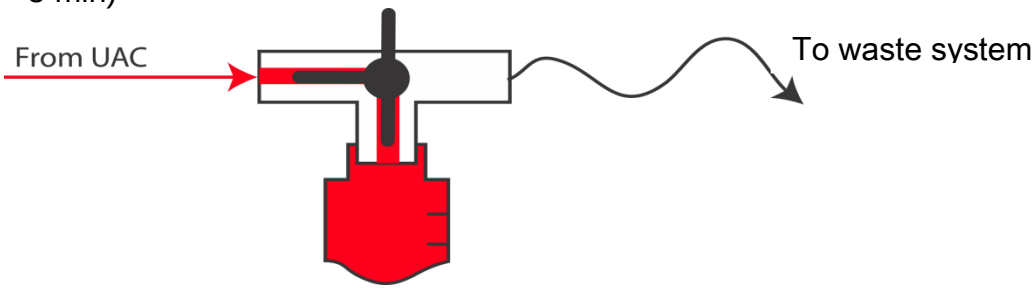
15.1.1 Connect the blood, via blood warmer, to an infusion pump (e.g.; Baxter pump). Depending on the pump available and the infusion rate required, more than one pump may need to run simultaneously. Connect the tubing to the UVC.

15.1.2 Connect a 20ml syringe to one lumen of the three way tap and the "closed blood waste system to the other e.g. adult catheter bag. Connect the 3rd port of the 3-way tap onto the UAC's 3-way tap (where normally connect to the fluids/transducer).

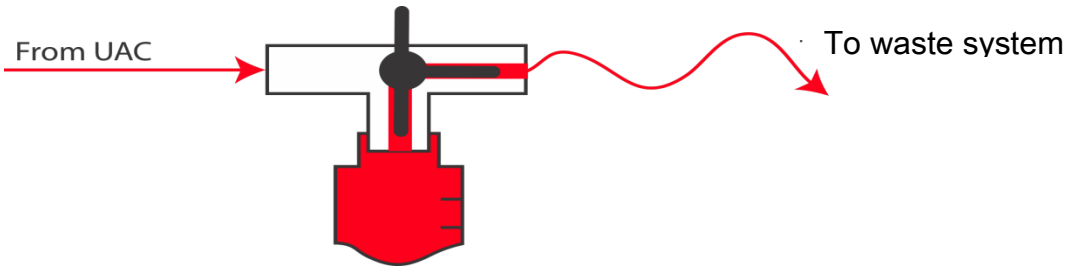


15.1.3 Make sure you are comfortable (i.e. have used the toilet, had a drink etc…). The nurse should be stationed with a view of both a clock and the baby's vital signs.

15.1.4 **Start the infusion via the infusion pump/s and start a timer.** Turn the 3-way tap OFF to the waste, and gradually withdraw blood from the UAC into the syringe. This should be performed slowly, at the same rate as the calculated infusion rate (For example in a 4kg term baby: Blood infused at 4mls/min via UVC, so withdrawing 20mls of blood via UAC over 5 min)



15.1.5 For intermediate aliquots (i.e. those where bloods are not required for analysis) discard the blood by turning the tap OFF to the UAC, and flushing into the closed waste system.



15.1.6 It may become necessary during the procedure to replace the 3-way connectors due to clot. The arterial line may also require flushing with a normal saline.

15.2 Peripheral Cannula & UAC:

15.2.1 This procedure is the same as the above, but with the blood transfusion connected to the peripheral cannula, not the UVC.

15.2.2 Depending upon infusion rates calculated, infusion into a minimum of two cannulae simultaneously is likely to be required.

15.2.3 Particular care must be taken to check for tissuing of the cannula.

15.3 Peripheral Cannula & Peripheral Arterial Line:

15.3.1 Similar to the UAC/UVC procedure but the 3-way tap for withdrawing blood is connected to the peripheral art-line.

15.3.2 Maintaining function of the peripheral line can be challenging for the duration of a full exchange transfusion. Perfusion to the extremities should be regularly monitored if using peripheral arterial line.

15.3.3 **A back up plan should be in place in case of failure or perfusion concerns** regarding the art-line.

15.3.4 Depending upon infusion rates calculated, infusion into a minimum of two cannulae simultaneously is likely to be required.

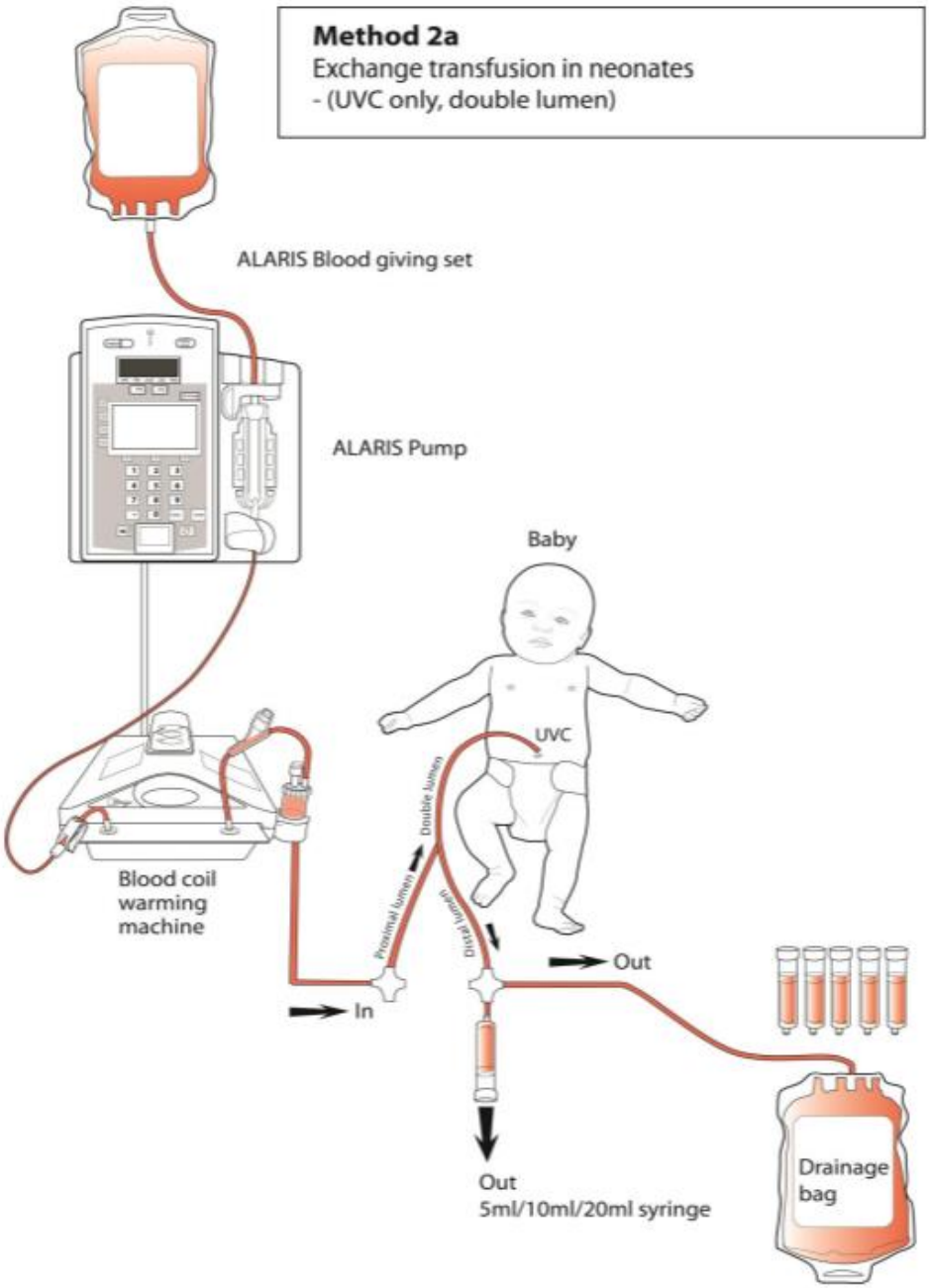
15.3.5 Particular care must be taken to check for tissuing of the cannula.

15.4 UVC Only:

15.4.1 This is a “single access push pull” technique.

15.4.2 This requires withdrawal of aliquots of blood from the UVC, disposal into the waste system, and then administration of new blood for transfusion also via the UVC.

15.4.3 As this method depletes and repletes total volume repeatedly it is not recommended. However, this may be used if arterial access is not able to be obtained and would delay exchange.



Exchange Transfusion in Neonates with Double Lumen UVC only (Courtesy of Cardiff & Vale University Health Board clinical guideline).

16. After the Procedure

16.1 Phototherapy should continue after the procedure and the bilirubin should be rechecked within 2 hours of completion, then 4-6hrly thereafter.

16.2 Intensive monitoring should be continued for a MINIMUM of 2-4 hours post transfusion. This should include observation of neurological status

16.3 It may be necessary to repeat the exchange transfusion if bilirubin continues to rise.

16.4 Do not remove the lines until no further exchanges are likely.

16.5 Consider keeping nil by mouth for 12 hours after the procedure, as the risk of Necrotising Enterocolitis is increased by alteration of gut perfusion.

16.6 Monitor blood sugars hourly for 4 hours following exchange. Exchanged blood may have high dextrose levels and can cause rebound hypoglycaemia following the exchange.

16.7 Calcium and other electrolyte levels should be checked. As transfusion blood contains citrate to prevent clotting it binds free calcium and so levels can fall dangerously low. Prophylactic administration of calcium gluconate is, however, not currently common practice.

16.8 The baby must receive irradiated blood for 6 months post transfusion to eliminate the risk of graft vs. host disease.

17. Follow up

- To go home on Folic Acid 250 microgram/Kg/day for 3 months. This can be commenced at the time full enteral feeds are reached whilst an inpatient.
- Repeat check Hb at two weeks and six weeks (risk of late onset anaemia).
- If the Hb is < 65g/dL it is likely the baby will need a top up transfusion especially if symptomatic (lethargy, breathlessness, tachycardia etc)
- If requiring further transfusion, the baby must receive irradiated blood for 6 months post transfusion to eliminate the risk of graft vs. host disease.
- Audiology brain stem response testing
- Paediatric or neonatal outpatient follow up and 2-year neurodevelopmental follow-up

18. References

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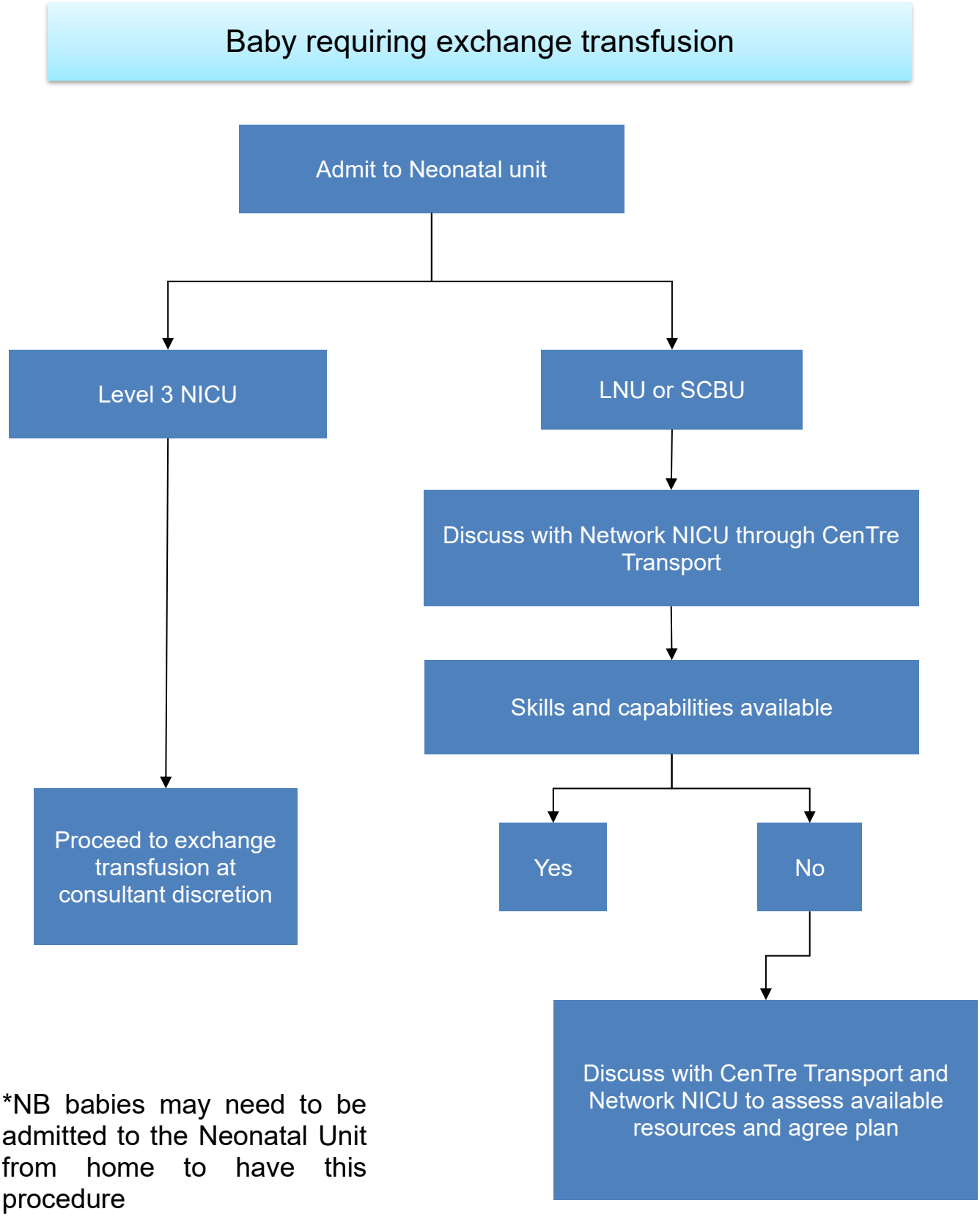
Appendix 1: Exchange Transfusion Monitoring Chart

Patient details/Patient sticker

Aliquot Size: Rate:

Time	BP	HR	SpO_2	Condition	Temp	Volume In		Volume Out	
						Aliquot	Total	Aliquot	Total

Appendix 2: ODN Admission / Referral Pathway



*NB babies may need to be admitted to the Neonatal Unit from home to have this procedure

Appendix 3: Exchange Transfusion – Quick Reference Guide

Indications:

- Double volume Exchange (mls) = 180 x Birth weight (kg)
  - Bilirubin at or above Exchange transfusion line
  - Rapid Rise of Bilirubin >8.5 micromol/lit/hr
  - Clinical features and/or signs of acute bilirubin encephalopathy
  - *Anaemia at birth Hb <100g/L (consider)*

- **Inform Consultant on call**
- Order urgent blood at the above volume *specifically suitable for exchange*
- Start Intensive phototherapy (Double or greater)
- Start IV fluids (one day ahead)
- Consider if IV immunoglobulin (500mg/kg over 4 hours) is indicated
- Obtain informed consent from parents

- Obtain access (Ideally UVC to infuse blood, UAC to withdraw blood)
- Send initial bloods – FBC, UE, Split Bilirubin, Blood Glucose, calcium, Blood gas and Coagulation screen + fibrinogen
- Initial observation – BP, HR, Sats, temperature (and also after every aliquot)

Determine aliquot size. **For example:** A term baby weighing 4kg

- *Total volume for Double exchange = 4kg x 180 = 720mls*

UVC - Infuse 720mls over 180min (4mls/min) – review guideline text to calculate this
UAC - Withdraw 20mls every 5min cycle via UAC

- Observations after every aliquot (or 5 min)
- Continue intensive phototherapy throughout the procedure
- Ensure the volume infused is equating to blood withdrawn
- Repeat bloods (FBC, UE, Split Bilirubin, Blood Glucose, calcium, Blood gas) in the middle and at the end of the procedure (use last aliquot)

- Continue phototherapy
- Recheck Bilirubin within 2 hrs of completion, then every 4- 6 hrs
- Monitor Blood glucose and calcium and treat if abnormal
- Start Folic acid 250 microgram/kg/day for 3 months
- Repeat check Hb at two weeks and six weeks (risk of late onset anaemia)
- Arrange outpatient clinic appointment and formal Audiology testing