

Yorkshire Neonatal Network

Guidelines for Neonatal Stabilisation Prior to Transfer

April 2007

COMMUNICATION

Receiving a call

- The referral unit **must contact the cot bureau first** to find an available cot on 0113 3928499
- The referral unit contact the transport team based on NICU at LGI on 0113 3927166 to advise of possible transfer from where, to where, and with details of baby and condition.
- Transport team to start filling in information and audit sheet.
- The referring unit contacts receiving unit (if not LGI) with information, both units (referring and receiving) to complete information and audit sheet
 - This must be used by doctors to discuss current management at time of referral request
 - Referring unit to fax completed information and audit sheet to transport team (if receiving unit not LGI) on 0113 3926068 so transport team aware of baby's status.
- If severely unstable, transport doctor/ consultant at referring unit to discuss whether transfer of baby is appropriate with
 - consultant neonatologist on-call at receiving hospital
 - sub-specialist on-call at receiving end (Surgical, Cardiac)
- Referring hospital must inform transport team of any deterioration after initial telephone discussion
- Referring hospital must inform cot bureau if transfer need changes e.g. baby now staying in referring hospital and transfer not required.

Once transfer agreed

- Cot Bureau will contact ambulance control to arrange vehicle
- Transport nurse/cot bureau to ring referring unit when team setting off with expected time of arrival for retrieval

- Transport nurse to contact receiving unit with further details of baby and inform of possible expected time of arrival

Upon arrival at referring hospital

- Team will introduce themselves to staff on unit
- Transport team to obtain detailed history + careful review of information available
- Transport nurse to receive completed transport documentation including
 - summary letter, including most recent laboratory results
 - overview of current medications and infusions
 - most recent X-Rays
 - photocopy of patients notes (where practicable)

Time-critical transfers

- e.g. - Transposition of Great Arteries
- acute surgical emergency (perforation, GI bleeding)
- do not excessively delay transfer to specialist centre although attempts should be made to stabilise (may be difficult or even impossible to achieve)
- if baby still unstable at point of departure, transport doctor always to discuss with receiving neonatal / specialist consultant appropriateness of transport prior to departure
- transport team to communicate with parents

Upon arrival at receiving hospital

- Transport team to provide review of transport details to receiving hospital staff and history of baby
- Transport team to photocopy transport
- Transport nurse to provide feedback to referring hospital on day 1,2,3,4,7 post-transfer
- X-rays to be returned + letter during back-transfer to referring hospital

For PDA cases

- Ensure that most recent CXR (or copy of) **must** be sent with baby to LGI
- Maternal blood sample must accompany baby if mum not visiting baby pre-operatively.
- Consent will be obtained by surgeon in person at LGI or over the phone by surgeon.

AIRWAY

There should be a **low threshold** for intubation and ventilation, as transfer may be associated with clinical deterioration. Hence, problems should be anticipated and stability must be achieved prior to transfer.

Absolute indications for intubation in newborns are:

- grunting
- $\text{SaO}_2 < 90\%$
- $\text{PaO}_2 < 6.5 \text{ kPa}$
- $\text{PaCO}_2 > 7 \text{ kPa}$
- Recurrent apnoeas
- Mean BP < (post-conceptual age in weeks) mm Hg.
- Also consider intubation when $\text{FiO}_2 > 50\%$.

ET Tube

Gestation	Weight	Diameter (mm)	Length Nasal (cm)	Length Oral (cm)
23-24	0.6 kg	2.5	7.0	6.0
25-26	0.75 kg	2.5	7.5	6.5
27-29	1.0 kg	2.5	8.0	7.0
30-31	1.5 kg	2.5	8.5	7.5
32-33	1.7 kg	3.0	9.0	8.0
34-35	2.0 kg	3.0	9.5	8.0
36-37	2.5 kg	3.0 – 3.5	10	8.5
38-39	3.0 kg	3.0 – 3.5	11	9.0
40	3.5 kg	3.5	12	9.5

- Diameter: the largest size practically possible and not smaller than 2.5 mm as virtually impossible to suction through
- Length: see guide above - always confirm position clinically and on X-ray
- Type of tube: whether oral or nasal, must be secure - a well stabilised baby should never extubate during transfer
 - tied, taped or fixed with referring unit fixation
 - transport team will not re-intubate unless ET tube cannot be secured using current tube

BREATHING

CPAP

- CPAP < 24 hrs → intubate prior to transport team arrival
- CPAP > 24 hrs + clinically stable → intubation may not be indicated; discuss with transport team before arrival

Chest X-Ray

- as soon as transport team sets off to referring hospital
- check
 - most recent ET tube in acceptable position ?
 - lung fields, pneumothorax ?
 - position of naso-gastric tube ?
- extra X-Ray *only* if clinical deterioration or ET tube change upon arrival of transport team

Naso-gastric tube

- compulsory during transfers
- leave on free drainage
- regular aspiration → avoid gastric distension

Pneumothorax

- must be drained with a formal chest drain before the journey in any infant on positive pressure ventilation
- secure fixation of drains
- paralysis compulsory

Blood gas

- preferably arterial, prior to arrival of transport team + immediately before departure

DRUGS

Neuromuscular blockade

- Discuss with transport team at time of referral
- Preferred option in any acutely unstable infant
- May not be required in stable preterm infant requiring minimal ventilation

Pancuronium

- to start as transport team on their way if required
- dose 100 microg/kg - repeat if necessary

Sedation in ventilated patients

Morphine

- dose bolus 100micrograms/kg
- infusion 10-40 micrograms/kg/hr
- usual rate 24 micrograms/kg/hr

Surfactant

Type according to unit policy (preferably Curosurf)

- 1st dose to administer if
 - < 28 weeks + ventilated
 - 29-31 weeks + ventilated with PIP \geq 20 mm Hg and FiO₂ >30%
- 2nd dose if
 - likely to be given during transfer, then administer ½ hr before arrival transport team and have blood gas ready for when team arrives.

CIRCULATION

- All syringes labelled with dose, volume and type of infusion
- All fluids to be infused via 50 ml syringes
- The transport team will use Alaris pumps
 - If available - please have fluids drawn up in Alaris compatible giving sets
 - If not- please use a 50ml syringe and a routine giving set

Vascular access

- Minimum of 2 routes of iv access
 - at least 1 more cannula available than required at time of departure
 - 2 peripheral or 1 central + 1 peripheral
 - Peripheral access- transparent fixation so that site can be observed
- Central access
 - umbilical vein catheterization if haemodynamically unstable
 - umbilical artery catheterization if haemodynamically unstable
 - low position = below L4/L5 or
 - high position = above diaphragm (T8-12)
 - transport team will gain access if referral hospital not experienced
 - secure with suture + tape as minimum
 - check line fixation carefully before departure
- Transport team will check
 - patency of all lines before departure
 - position of central lines prior to departure (X-ray)

Fluids

Maintenance Fluids

Type

- clear fluids during transfer
- if TPN already available: not to start but give to transport team

Volume

- as per individual unit protocol
- asphyxia: restrict to 60 ml/kg/day
- monitor urinary output if necessary
 - if fluids at > 20 ml/hr ,prepare extra 50 ml syringe for possible use during transfer

Check blood sugar prior to team arriving

Extra fluids

- Resuscitation
 - bolus of 0.9% saline - 10 ml/kg - repeat once if necessary
 - 4.5% Human Albumin Solution if protein losing condition
 - Add inotropic support if no improvement
 - prepare extra 50 ml syringe for possible use during transfer
 - Anaemia or acute blood loss
 - Use blood 15ml/kg
 - NEC/gastroschisis
 - anticipate sufficient volume replacement - may need up to 50 ml/kg fluid during resuscitation
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DRUGS

Antibiotics

- 1st line antibiotics
 - as per unit protocol, preferably amoxicillin/penicillin + gentamicin
 - add metronidazole if suspicion of NEC/ volvulus
- Ensure antibiotics are always given prior to arrival of transport team (i.e. do not delay administration)

Inotropes

- start if insufficient response to 2 x 10 ml/kg volume bolus and mean BP < GA in weeks
- must be given through a central line
- 1st line - Dopamine
 - start with 5 micrograms/kg/min - increase by 5 micrograms/kg/min - allow 30 min for steady state - up 15 micrograms/kg/min
- 2nd line - Dobutamine
 - start with 5 micrograms/kg/min once dopamine at 15 micrograms/kg/min - increase by 5 micrograms/kg/min - allow 30 min for steady state - max 20 micrograms/kg/min
 - Only increase dopamine to max of 20 micrograms/kg/min when on maximum dose of dobutamine
- 3rd line - discuss with transport team
 - Hydrocortisone 2.5mg/kg/dose 4-6 hourly

Dinoprostone

- starting dose 12.5 nanograms/kg/min unless instructed otherwise by cardiologist
 - increase to 50 nanograms/kg/min if no initial response
- Need to elective intubate & ventilate?
 - Yes -if infant is to be transferred immediately after starting Dinoprostone
 - No - if infant not having apnoeic episodes after several hours of Dinoprostone infusion

Anti-convulsants

Seizure activity must be controlled prior to transfer (beware of masking seizure activity with muscle relaxants)

- Phenobarbitone
 - Loading dose 20 mg/kg over 20 min
 - if persistent fits after 1-2 hrs: further dose of 10 mg/kg over 20 minutes
 - dose can be repeated
 - Maintenance (12 hrs after loading) 3 mg/kg/dose 12 hourly

- Phenytoin
 - Loading dose 20 mg/kg over 20 min
 - No maintenance dose

- Midazolam
 - Loading dose 150 micrograms/kg over 30 min
 - Maintenance 50-200 micrograms/kg/hr

Others

- Please confirm whether Vitamin K has been given, how and when

 - **Don't Ever Forget Glucose:** always check BM prior to departure to accepting hospital
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ENVIRONMENT

- Maintain adequate temperature throughout stabilisation process - preferably do not clothe infant for acute transfer (nappy and hat sufficient if ventilated)
 - Obtain maternal blood if < 1 month (1 tube, EDTA bottle, with full name, date of birth and hospital number)
 - Consent for transfer - parents will be spoken to by transport team – if not possible then need to confirm parents are aware of transfer
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References

- Newborn Life Support Provider Course Manual (Resuscitation Council UK)
- Guidelines for good practice in the management of neonatal respiratory distress syndrome. Report of the second working group of the British Association of Perinatal Medicine (<http://www.bapm.org/documents/publications/rds.pdf> - 2002)
- Jaimovich DG, Vidyasagar D. Handbook of Pediatric and Neonatal transport medicine. Hanley & Belfus, 2002, Philadelphia.
- The American Academy of Pediatrics. Guidelines for air and ground transport of neonatal and pediatric patients. BMJ Books, 1999, London.
- Leslie A, Barry PW. Paediatric and neonatal critical care transport. BMJ Books, 2003, London.
- Levene MI. The clinical conundrum of neonatal seizures. Arch Dis Childh 2002;86:F75-F77.
- Wright JD. Before the transport team arrives: neonatal stabilisation. J Perinat Neonat Nurs 2000;13:87-107.

STANDARD INFUSION SYRINGE PREPARATION DETAILS

For information and guidance only

These are the standard syringe preparations as used by the Yorkshire Neonatal Transport Team.

MORPHINE

- Vial presentation = 10 mg in 1 ml

- Morphine 3 mg in 50 ml
 - o take 0.3 ml of vial and transfer to syringe containing 49.7 ml of suitable diluent (0.9% saline, 5% dextrose, 10% dextrose). Mix well.
 - o loading 100 microgram/kg/hr for 2 hrs
 - o maintenance 25 microgram/kg/hr

DOPAMINE

- Vial presentation = 200 mg in 5 ml
- Dopamine 1200 microgr/ml
 - o take 1.5 ml of vial and transfer to syringe containing 48.5 ml of suitable diluent (0.9% saline, 5% dextrose, 10% dextrose). Mix well.
 - o dose 5 10 15 20 (microgr/kg/min)
 - o rate of infusion 0.25 0.50 0.75 1.00 (ml/kg/hr)

DOBUTAMINE

- Vial presentation = 250 mg in 20 ml
- Dobutamine 1200 microgr/ml
 - o take 4.8 ml of vial and transfer to syringe containing 45.2 ml of suitable diluent (0.9% saline, 5% dextrose, 10% dextrose). Mix well.
 - o dose 5 10 15 20 (microgr/kg/min)
 - o rate of infusion 0.25 0.50 0.75 1.00 (ml/kg/hr)

DINOPROSTONE (Prostaglandin E2, Prostin E2)

- Vial presentation = 1 mg in 1 ml
- Dinoprostone 150 microgr in 50 ml
 - o take 0.15 ml of vial and transfer to syringe containing 49.85 ml of suitable diluent (5% dextrose and 0.9% saline). Mix well.
 - o dose 50 20 10 5 (nanogr/kg/min)
 - o rate of infusion 1.00 0.40 0.20 0.10 (ml/kg/hr)