

Guideline

Stabilisation of Neonates in Preparation for Emergency Transfer

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1 Scope

This guideline is for use by the PaNDR team for neonatal patients requiring transfer for uplift of care.

2 Purpose

The aim of this document is to support clinicians preparing and stabilising babies in preparation for transfer.

3 Definitions and abbreviations

BP	Blood pressure
EBS	Emergency Bed Service
ECG	Electrocardiogram
ETT	Endotracheal Tube
FiO ₂	Fraction Inspired Oxygen
HIE	Hypoxic-Ischaemic Encephalopathy
HR	Heart Rate
IV	Intravenous
N-PASS	Neonatal Pain Agitation and Sedation Scale
PaNDR	Paediatric and Neonatal Decision Support Retrieval Service
PCO ₂	Partial pressure carbon dioxide
PEEP	Positive End Expiratory Pressure
PO ₂	Partial pressure oxygen
PPHN	Persistent Pulmonary Hypertension of the Newborn

PVL	Peripheral Venous Line
UAC	Umbilical arterial catheter
UVC	Umbilical venous catheter
VG	Volume Guarantee

4 Introduction

Transfer of neonatal patients, particularly those who are critically unwell, is a complex process. It is important to consider the potential for deterioration during transfer, bearing in mind that it is more challenging to care for a baby in the back of an ambulance than in a hospital environment. Appropriate stabilisation reduces the risk of deterioration enroute and means babies are more likely to arrive at their destination in good condition.

It should be remembered that the aim is stabilisation for transfer **not** definitive treatment. The aim should be to facilitate a safe, timely transfer. The decision to perform any procedure should balance the risks and benefits, considering any time delays involved.

5 Main Body:

5.1 Taking a referral:

Introduction	• Open the correct encounter, and select the correct referral type i.e. EMERGENCY VS ELECTIVE REFERRAL • Introduce yourself to the referring team: ◦ Your name and role, confirm the name, role, and location of referrer • Inform the referring team that it is a conference call, and introduce other team members listening
Information Gathering	• Use the EPIC referral form as a prompt for information gathering • Ensure key data (observations, most recent gas, current treatment) is obtained • If referrer has been deputised whilst senior clinicians are stabilising the patient, or if patient is very unwell, consider curtailing discussion to facilitate faster dispatch
Discussion and Plan	• Define clear stabilisation aims for referring team ◦ Agree on a list of actions for stabilisation to be completed before the arrival of the PaNDR team ◦ Prioritise which interventions are most important ◦ Plan in case of deterioration and anticipate how to manage ◦ Prepare for transfer- anticipate and request medications, fluids, blood products etc be drawn up • If relevant, agree a time for further discussion. E.g. if there will be a delay before the PaNDR team.

	• Ask the referring team to call back if there are any major changes in the patient's condition. • Ask the team to prepare: ○ Discharge paperwork and photocopies ○ A maternal blood sample ○ Day 1 newborn blood spot (+/- day 5 blood spot if appropriate) • Agree with the consultant whether the team will travel on blue lights to the referring unit
Dispatch	• Dispatch as promptly as possible If meets immediate dispatch criteria, and at base, this should be within 30 mins • Equipment: ○ The incubator should have been checked at the start of the shift; a full check is not needed if immediate dispatch is required ○ Sign drugs out of the drugs cupboard ○ Sign out laptops and Wi-Fi pouch ○ Print out and bring drug calculator if dispatching from base • Whole team to complete the pre-dispatch transfer checklist together before dispatching • In the ambulance the nurse should call to update EBS, and go through to the local team: ○ Give ETA ○ Remind team to complete paperwork ○ Remind team draw up mediations/fluids etc (support local team as needed with the preparation of drugs they are unfamiliar with)

5.2 Stabilisation of infants at the referring unit:

Suggested target stabilisation times	
Baby not on respiratory support	45 minutes
Baby on non-invasive support	60 minutes
Stable ventilated baby	90 minutes
Unstable ventilated baby	2 hours

5.3 ADAPT Framework

On Arrival:

- Introduce yourself to team and parents if present
- Plug in:
 - Incubator to mains
 - Gasses to the wall
- Wash hands, and don appropriate PPE, paying attention to infection control concerns (e.g. isolation)
- Set up laptop/Wi-Fi if appropriate
- Receive handover from referring team
- Start setting up any additional equipment
 - Cooling system/ Nitric system can take time to prepare
- Complete your initial assessment as below
- **Update the consultant within 30 minutes of your arrival** using the ADAPT framework outlined below.

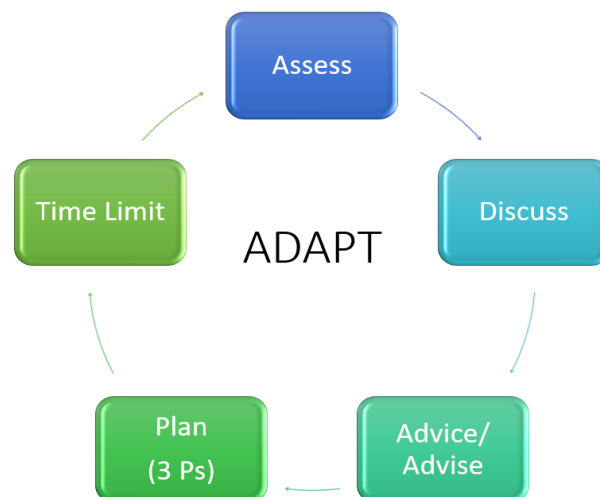
Assess: Using the A-E assessment, explained below. Complete physical examination, review imaging, lab results, vital signs, ventilator settings.

Discuss: *No question is a stupid question* – discuss with the team on the scene, verbalise any concerns

Advice/Advise:

Advice from your consultant: Aim to update on-call consultant within 30 mins using the **3 P's** (see below)

Advise: Update parents, local team, and receiving unit if needed



Plan using 3P's:

- **Prioritise:** What is urgent? Who will do this? What can happen in parallel
- **Postpone:** Our aim is not definitive treatment, but stability
- **Predict:** What could go wrong? Plan for mitigation – 2nd inotrope? Anticonvulsants? Bolus? Neohelp for temperature control

Time limit: Set a time to complete tasks, re-assess, check in with consultant again if appropriate, and restart cycle. Time check should be planned for **1 hour**, agree with team how this alert will be set (phone alarm/technician check in)

What can I postpone for receiving unit?

CrUSS can almost always be delayed, unless:

- The baby may need ECMO
- The outcome may impact direction of care (i.e. palliation)
- Specific consultant request.

Repeat X-ray after line or ETT adjustment are rarely needed

5.4 Assessment –

AIRWAY	
Intubated baby - ETT size, and length (compare to documentation) Position on most recent CXR - ideal ETT tip position is above carina (guide for length = weight + 6cm) - Check ETT fixings are secure - Review leak – is it compromising ventilation? The hamilton ventilators struggle with VG if leak is >50% - Ensure a gastric tube is present <i>If any doubts about the position of the ETT, use Paediacap or end tidal CO₂ to confirm position.</i>	Non-intubated baby: Should the baby be intubated? Discuss with the PaNDR consultant and consider intubation if: <27 weeks - Rising oxygen requirement >40% - Rising PCO₂ - Apnoeas - Concerns about ability to maintain airway (e.g. seizures)
BREATHING	
Ventilated babies - Review chest wall movement, air entry, saturations, blood gasses - Change settings as required, discuss with consultant if needed - Promptly start transcutaneous or end tidal CO₂ monitoring - Consider: - Appropriate blood gas targets - Surfactant dose - nitric oxide – This takes time, so ask ambulance tech to bring the pouch from the ambulance early. - Set up transport ventilator, and transfer baby across if ventilator tubing allows, The Hamilton does not always generate the VG as set in the sickest babies, consider need to increase VG.	Babies on non-invasive respiratory support - Ensure appropriate size and fit of mask/prongs - Review settings and stability - If signs of instability, is there a need for intubation? - Change to transport circuit - Consider optimal positioning e.g. transferring prone. Babies not on respiratory support - Review respiratory effort - If any concerns, have a low threshold for support
Ventilated babies who are hard to ventilate, or suddenly deteriorate - THINK DOPES: Displaced ETT – check position Obstructed ETT – may need suction Pneumothorax – review imaging, cold light, do they need needle decompression or chest drain insertion? Equipment – check the ventilation circuit and ventilator settings. If there is a large leak around ETT, does it need upsizing? Splinting – e.g. stomach distension – decompress NGT Sedation - Think about the baby-ventilator interaction. Does the baby	

need more sedation or muscle relaxation?
CIRCULATION
Cardiovascular monitoring and treatment - Heart rate is assessed with continuous ECG monitoring - Blood pressure: - Make sure the cuff is the correct size. Check at least every 30 mins during stabilisation, and 15 minutes during transfer - Relative indications for arterial access: unstable BP, needing inotropes, PPHN, - Perfusion: - Assess with CRT, colour and lactate - Support: - Have they had boluses or inotropes - Do they need any escalation of support? - Consider preparing boluses or inotropes for transfer - Saturations: - Consider pre and post ductal saturations, and keep in mind cardiac abnormalities, which may need a prostin infusion
DISABILITY (Neurology)
- Cooling: - Does the baby meet cooling criteria? - Start cooling as soon as possible, and complete epic flowsheet - Sedation and analgesia: - Is this adequate? - Assess using the N-PASS score - Sedation and analgesia should be adequate before muscle relaxation is started - If there are suspected seizures, consider anticonvulsants if it has been confirmed with CFM or causing cardiorespiratory compromise.
EXPOSURE
- Think temperature control. Aim for normothermia (unless therapeutic hypothermia indicated). - Adjust transport incubator temperature - If <30 weeks, <1kg, use Neohelp suit. Consider if 30-32 weeks or <1.5kg - Have a naso/orogastric tube in situ, aspirate to confirm correct position.
FLUIDS & GLUCOSE
- Monitor blood glucose - Increase dextrose concentration, or rate if low blood glucose - Maintenance fluids - Check rate, ensure this is adequate, and move across to transport incubator. - Ensure you have enough volume for whole journey. Ask for 2nd syringe of fluids especially if it is running at a high rate, or if the transfer time is greater than 2 hours - In babies with HIE, think about fluid restricting if blood glucose allows
HAEMATOLOGY & INFECTION
- Make sure vitamin K has been given - Make sure day 1 bloodspot has been taken

- Request blood products early if required as this takes time
- Check if antibiotics have been given, and clarify dose (25/50mg/kg of Benzylpenicillin) and timing of doses
- Check for infection control concerns
 - Update receiving unit
 - It will have an impact on post transfer cleaning level

JAUNDICE, KIDNEYS, LINES

- **Jaundice**
 - Check blood group, and maternal blood group
 - Consider early if they may need phototherapy on transfer, logistics of where to source unit, how to secure it, and how to return it will need to be considered
 - Do you need to take a maternal blood sample with you?
- **Kidneys**
 - Ask about fluid balance and urine output, and think about renal function
- **Lines**
 - Secure 2 points of access, flush to ensure patency.
- **Umbilical access:**
 - **Relative indications:** inotropic support, dextrose infusion concentration 15% or greater, prostin infusion, unstable baby with estimated journey time >1hr
 - **Ideal UVC position is T8-T9** outside of cardiac silhouette
 - **UAC position is T6-10** but a low or high lying catheter might be acceptable for the purpose of transfer.
 - If repositioning: X-rays can take time and can significantly delay transfer. This is not usually necessary but can be decided case by case.
 - prepare an arterial transducer compatible with the PaNDR monitor
 - Ensure all catheters are adequately secured and labelled
 - **Do not** delay transfer to insert lines that are not required for safe transfer, consider clinical condition and duration of transfer.
 - **Do not** delay initiation of cooling for imaging for line position

EQUIPMENT AND SPECIAL CONSIDERATIONS

Start monitoring as is compatible with the transport incubator

All babies

Saturation probe (pre- and post-ductal if suspected PPHN)
ECG leads
BP cuff or arterial blood pressure transducer
Skin temperature probe

If required

Rectal temperature probe (if active cooling in progress)
Transcutaneous CO₂ (if ventilated and on a case-by-case basis for other babies on respiratory support)

Special considerations:

- If gut pathology if suspected, have a large bore (8Fr for a term baby, or 1F above the standard size in preterm) gastric tube in situ on free

drainage • If chest drain in situ, discuss whether to use Heimlich (flutter) valve or atrium drain with PaNDR consultant • Ensure adequate supply of gases available before leaving referring unit
FAMILY
• Local team can help to communicate with parents while the PaNDR team stabilise the baby • Utilise the local unit's interpretation services (e.g. language line) as required • Information to give ○ Introduce yourself and the team ○ Give them a copy of the PaNDR parent information leaflet ○ Make sure parents know planned destination, and contact details ○ Offer for them to travel with team if appropriate ○ Update parents before departure • Information to get ○ Parent's contact details ○ Safeguarding concerns ○ Document both in the safeguarding section on epic
DEPARTURE FROM REFERRING UNIT
• A blood gas must be taken on transport respiratory circuit if ventilated before departure from referring unit • Reassess the baby as a team in preparation for departure • Update PANDR consultant before departure and agree whether blue lights will be required • Complete Pre-departure Checklist with all team members • Once loaded on to ambulance, team member should inform EBS and receiving unit of departure, and ETA • Ensure you document your stabilisation

Acknowledgements:

Special acknowledgement and thanks should be given to Lee Collier and STORKS charity for the ADAPT framework used in this guideline

6 Monitoring compliance with and the effectiveness of this document

Audit standards:

The PaNDR team will monitor compliance with this document by undertaking regular audits which will be reported back to the consultants and lead nurse.

The effectiveness of the document will be monitored by review of any reported incidents by the lead consultant and nurse for risk

Equality and diversity statement

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Document management

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