

Clinical Guideline for the Care of Neonates with Hydrocephalus		Version: 1.0
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1. Executive Summary

The purpose of this document is to provide regional guidelines for doctors, nurses and allied professionals in the clinical management of Neonates with post haemorrhagic hydrocephalus (PHH) from the point of diagnosis on the neonatal unit through to referral and management at the local networked regional paediatric neuroscience unit.

Based on best available evidence, the guidelines aim to standardise management on the neonatal unit with this condition, to provide guidance and common criteria for referral to the local neurosurgical unit including agreeing temporising manoeuvres to control raised ICP, indications for referral and neurosurgical management including indications and guidance for ventricular tap, ventricular subgaleal shunting (VSS) and ventricular peritoneal shunting (VPS). Peri-operative and post-operative management guidance is also provided.

2. Scope and Purpose

This guideline applies to all Neonates who are being cared for on a Tier 1/2 Neonatal Unit. This guideline applies to all health providers in the regional and District General Hospitals (DGH) in the Cheshire and Merseyside, Manchester and Lancashire areas. The purpose is to provide standardised care throughout the region and improve patient safety and clinical outcomes.

3. Roles and Responsibilities

This guideline applies to all clinical staff employed or contracted to work within the Paediatric Neurosciences Network (Alder Hey and Royal Manchester Children's Hospital) and the North West Neonatal Network hospitals, who care for Neonates. Staff have a responsibility to ensure that they are aware of this guideline and its contents. They should clearly document their rationale if they have not complied with the recommendations detailed in this guideline. It is the responsibility of department managers, consultants, team leaders and education leaders to ensure staff are aware of this guideline.

4. Related Documents

Neonatal Transfer/transport guidelines should be followed at all times.

All referrals, whether antenatal or postnatal, emergency or planned, should be made using the North West Perinatal ODN Cot Bureau telephone number: 0300 330 9299

5. Communication Plan

The clinical guidelines will be tabled at the Neonatal Steering group and Neurosciences Board for ratification. Following this the guidelines will be circulated to all the units and shared on the Neonatal and Neurosciences Websites.

6. Process for Monitoring Compliance/Effectiveness

The purpose of monitoring is to provide assurance that the agreed approach in the guidance is being followed to ensure we get things right for patients, use resources well and protect our reputation. Our monitoring will therefore be proportionate, achievable and deal with specifics that can be assessed or measured.

Audit results will be circulated and presented at the multidisciplinary audit meetings, identified in the monitoring table. Any areas of non-compliance or gaps in assurance that arise from the monitoring of this guideline will result in an action plan detailing recommendations and proposals to address areas of non-compliance and/or embed learning. Monitoring of these plans will be coordinated by the group/committee identified in the monitoring table.

Those responsible for instigating the resulting actions will be identified in the audit meeting minutes and the action plans and results will also be reviewed. The resulting actions will be reviewed or followed up at the subsequent multidisciplinary audit meeting(s).

Key aspects of the procedural document that will be monitored:

What aspects of compliance with the document will be monitored	What will be reviewed to evidence this	How and how often will this be done	Detail sample size (if applicable)	Who will co-ordinate and report findings (1)	Which group or report will receive findings
Audit of referrals/pathways	Outcome data	Retrospectively Annually	TBA	Neonatal/Surgical Trainee	Neonatal Steering Group/Neurosciences Board

(1) State post not person.

Where monitoring identifies deficiencies actions plans will be developed to address them.

7. Arrangements for Review of the Policy

The clinical guidelines will be reviewed every 3 years.

Appendix A

Neonatal Pathway for intervention and referral in preterm babies with post-haemorrhagic ventricular dilation

Progressive post-haemorrhagic ventriculomegaly with abnormal rate of increase in head circumference +/- tense AF +/- separated sutures

Measure and plot head circumference (minimum twice-weekly)

Perform cranial US (minimum weekly): Measure ventricular index and plot on dedicated chart (see appendix)

Single ventricular index \leq 4mm above 97th centile for gestation

Increasing ventricular index above (or likely to cross) the threshold line at \geq 4mm above 97th centile for gestation

Single ventricular index above 97th centile for gestation with significant neurological features¹

Formatted: No underline

Ventricular tap to remove 10-15 ml/kg of CSF (send for cell count/culture/glucose/protein)²

Refer and transfer⁴ to NICU if expertise in performing ventricular tap not available locally

Measure and plot head circumference (daily) and ventricular index (weekly)

Increasing ventricular index above (or likely to cross) the threshold line at \geq 4mm above 97th centile for gestation +/- Significant neurological features¹

Complete neurosurgical referral pathway form

Refer to neurosurgical team (consultant-consultant, via cot bureau) at Alder Hey or MFT according to current network pathways^{3,4}

All referrals, whether antenatal or postnatal, emergency or planned, should be made using the North West Perinatal ODN Cot Bureau telephone number:

0300 330 9299

Footnotes:

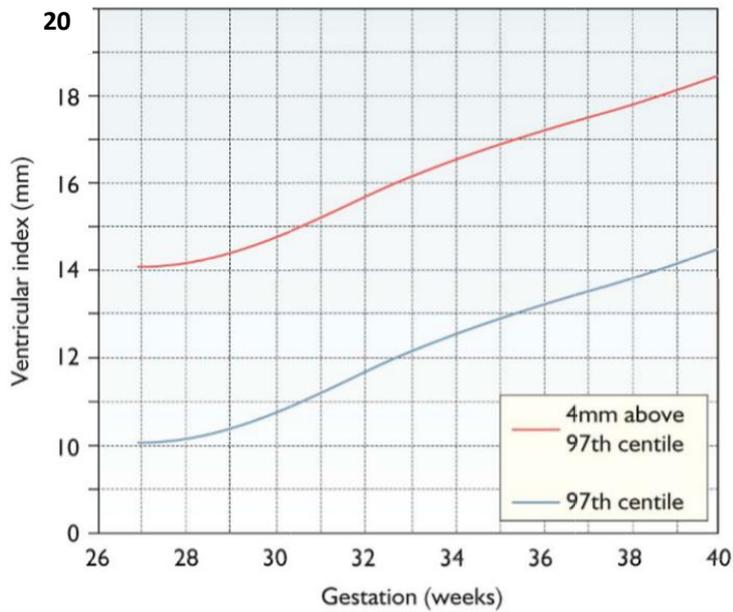
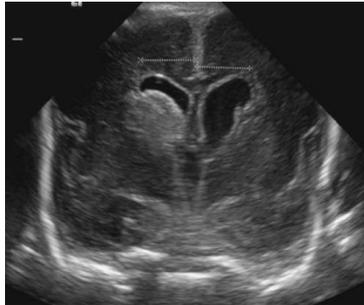
¹ It is not necessary to perform LP prior to ventricular tap or to measure CSF pressure.

² Significant neurological features include apnoea, bradycardia, seizures and poor feeding or feeding intolerance without alternative explanation.

³ MR not required prior to referral to neurosurgical team.

⁴ Referral to neurosurgery should follow the NW ODN Surgical Referral Pathway process:

- All acute neurosurgical referrals and neurosurgical advice calls should be routed via the NW Perinatal Cot Bureau [Tel: 0300 330 9299] at the outset. This will ensure all referrals, whether they are for a transfer request or advice, are logged, a conference call set up and a cot location process initiated in the early phase of referral. Connect North West (CNW), the NWNODN Neonatal transport team, will be made aware of the patient).
- Conference calling is an integral part of the referral/advice process. The call should include the neurosurgical team (including consultant neurosurgeon), medical staff at the referring and receiving units, bed manager (if applicable), CNW transport team and other specialist staff as required. If a member of the senior team is not available, a deputy from the speciality/service should participate in the call and the consultant subsequently informed of the plan of care.

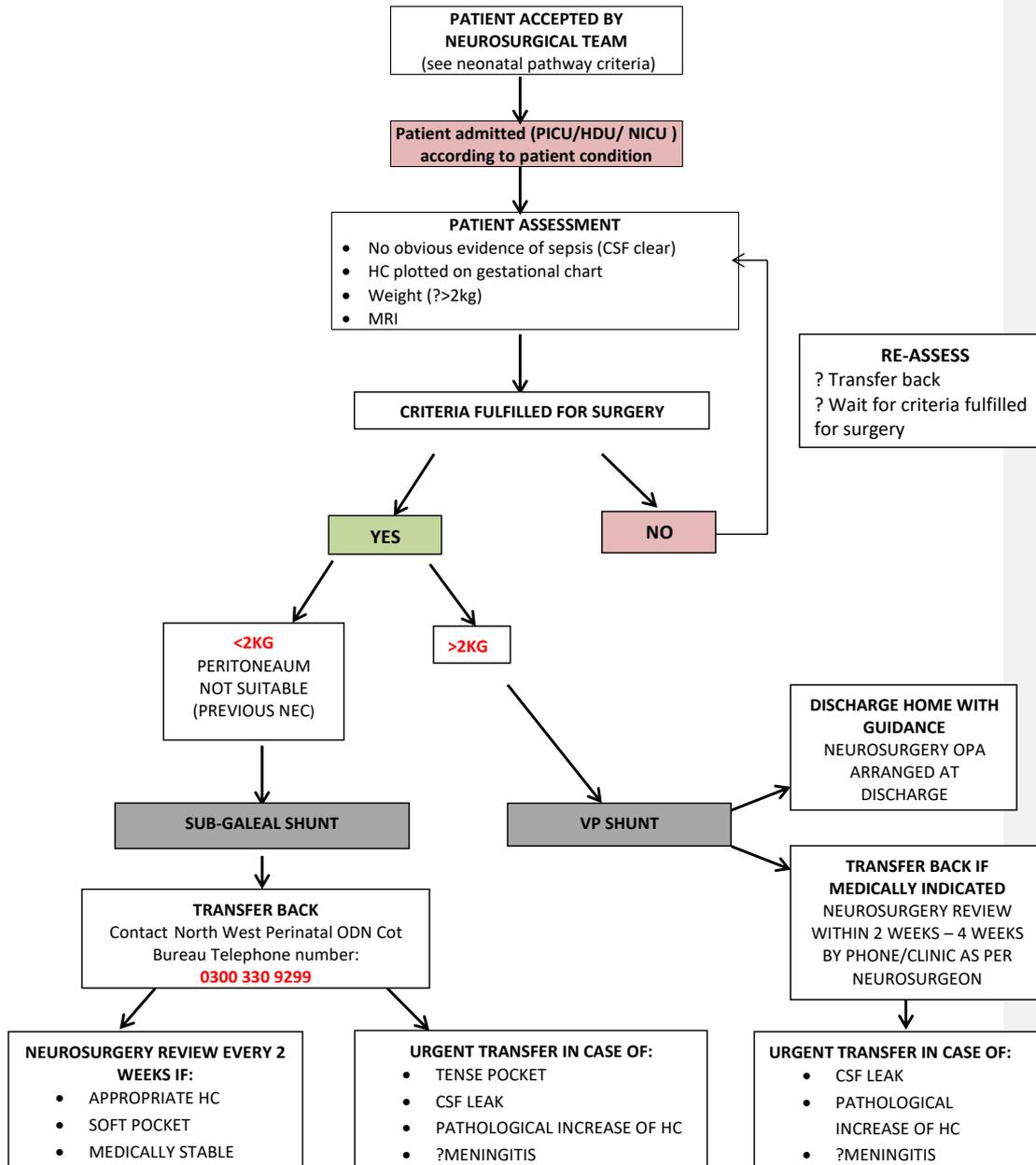


Levene M.I., Starke D.R.: A longitudinal study of post haemorrhagic ventricular dilatation in the newborn. Arch Dis Child. 1981. 56:905-910.

Note: This ventricular index chart aligns closely with data from a more recent reference range in infants 24-42 weeks' gestation [Brouwer MJ et al. New Reference Values for the Neonatal Cerebral Ventricles, Radiology 2012; 262:224-233]

Appendix B

Surgical Management of a Neonate



Appendix C

NWNODN Combined Neurosurgical & Neonatal Pathway
Post-Haemorrhagic Ventricular Dilatation
Data Collection/Referral Form

- This form is for the referral of preterm neonates with post-haemorrhagic ventricular dilatation.
- The neonatal pathway for management of these infants should be referred to and appropriate steps followed **PRIOR** to referral.
- Please ensure that a cot bureau conference telephone call referral is made to accompany this document (**Cot bureau 0300 330 9299**).
- Patient identifiable information should only be sent between two NHS.Net email accounts. **This form contains patient identifiable information so can only be sent from an nhs.net email account.**
- **Please send a copy of this form with the patient**

Patient Demographics			
Name			
Sex		D.O.B	
Gestation at birth		Post-menstrual Age	
Birth Weight		Current Weight	
Address:		NHS No./ Local URN/Badger ID	

Referring Unit		
Hospital		
Referring Consultant	Name:	Contact Details:

Clinical Details:			
Resp:	(Ventilator dependence, oxygen requirement...)		
Cardiac:	(Known congenital heart defects, PDA...)		
Abdominal:	(*Concerns with NEC, previous surgery, short-gut ...)		
Sepsis:	(*Current sepsis, significant previous sepsis/colonisation...)		
Other:			
Birth OFC:		Centile	
Current OFC:		Centile:	

**Please send HC chart

NWNODN Combined Neurosurgical & Neonatal Pathway
Post-Haemorrhagic Ventricular Dilatation
Data Collection/Referral Form

Criteria for Referral (please tick as appropriate)	
	Infant with non-physiological enlargement of head circumference:
	+ Persistent ventricular index >4mm above 97 th centile for gestation (see chart)
	+ Rapidly increasing ventricular index likely to cross threshold line >4mm above 97 th centile for gestation
	+ Ventricular index >97 th centile for gestational age with significant neurological features (please detail below)

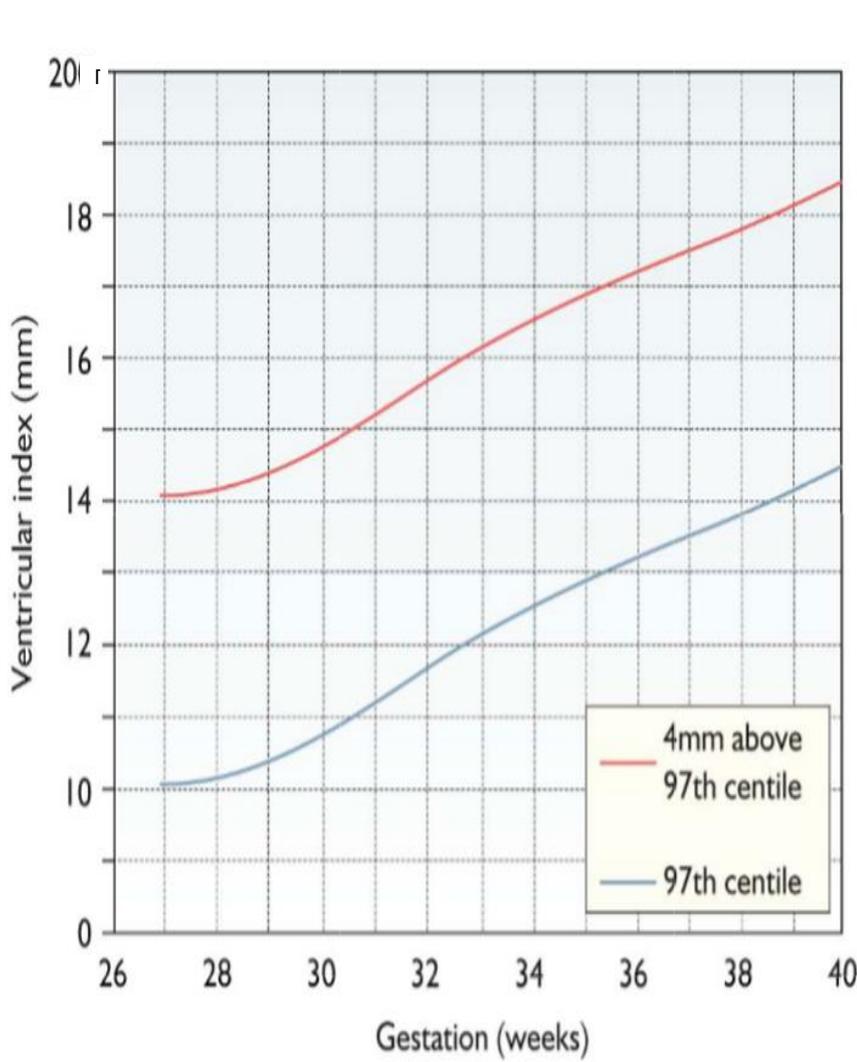
Neurological Features (please tick as appropriate):	
Bradycardia (+/- apnoea)	Eye deviation/sun-setting
Widening sutures/anterior fontanelle	Sleepiness/irritability
Vomiting/poor feeding (unexplained)	Seizures

Interventions		
Date	1 st :	2 nd : (if performed)
Latest CSF tap	<input type="radio"/> LP <input type="radio"/> Ventricular Tap (preferred)	Volume removed:
Microscopy/ Biochemistry	(if available)	

***Please plot ventricular index on chart attached**

***Please attach copy of head circumference chart prior to sending**

NWNODN Combined Neurosurgical & Neonatal Pathway
Post-Haemorrhagic Ventricular Dilatation Data Collection/Referral Form



References

Safe & Sustainable - CHILDREN'S NEUROSCIENCE NETWORKS (FOR THE NEUROSURGICAL CHILD) - A FRAMEWORK FOR SERVICES IN ENGLAND

http://www.webarchive.org.uk/wayback/archive/20130328001627/http://www.specialisedservices.nhs.uk/library/31/Childrens_Neuroscience_Networks_for_the_Neurosurgical_child_A_Framework_for_services_in_England_February_2012_1.pdf

Levene M.I., Starte D.R. A longitudinal study of post haemorrhagic ventricular dilatation in the newborn. Arch Dis Child. 1981. 56:905-910.

http://www.webarchive.org.uk/wayback/archive/20130328001629/http://www.specialisedservices.nhs.uk/library/31/Childrens_Neuroscience_Networks_for_the_Neurosurgical_child_Specification_Standards_February_2012_1.pdf

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Document Monitoring Information	
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