Royal Cornwall Hospitals
NHS Trust

Performing a Cerebrospinal Fluid (CSF) Aspiration/Tap by Accessing a Ventricular Access Device (VAD) Standard Operating Procedure

V1.0

November 2025

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Data Protection Act 2018 (UK General Data Protection Regulation – GDPR) Legislation.

The Trust has a duty under the Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed, and documented. We cannot rely on opt out, it must be opt in.

Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 please see the Information Use Framework Policy or contact the Information Governance Team.

Royal Cornwall Hospital Trust rch-tr.infogov@nhs.net

1. Introduction

1.1. A ventricular access device (VAD) or an Ommaya reservoir is a permanent device, consisting of a catheter passed into the cerebral ventricles or cerebral cyst of a patient, and a reservoir sitting under the scalp allow access to a patients' cerebrospinal (CSF) or cyst space on a long-term repeatable basis.

1.1. Access to the VAD allows for:

- Aspiration of CSF or cyst fluid for analysis in a laboratory.
- Aspiration of CSF or cyst fluid for relief of pressure.
- Set up CSF drainage via an external ventricular drainage (EVD) system.
- Measure intracranial pressure (ICP) as a one-off procedure.
- Measure ICP with an attachment to a transducer on a longer-term basis (>24 hours).
- Administer intrathecal antibiotics or other medication.
- Undertake ventricular infusion studies.

1.2. In the Royal Cornwall Hospital Neonatal Unit (NNU), accessing a VAD is usually in relation to the relief of pressure following neurosurgical intervention for post-haemorrhagic ventricular dilatation (PHVD).

1.3. This SOP is to be used in conjunction with the South West Neonatal Network Guideline on Post-Haemorrhagic Ventricular Dilatation (PHVD) South West Neonatal Network Guideline and in discussion with the Paediatric Neurosurgical Team at the Bristol Royal Hospital for Children (BRCH).

2. Purpose of this Standard Operating Procedure

This Standard Operating Procedure (SOP) is to provide guidance on performing cerebrospinal fluid (CSF) aspiration/tap by accessing a ventricular access device (VAD)

3. Ownership and Responsibilities

3.1. Role of the Managers

Line managers are responsible for:

- Ensuring the SOP is disseminated to applicable staff and for compliance with the guidance.

3.2. Role of Individual Staff

All staff members are responsible for:

- Maintaining their mandatory aseptic non-touch technique competency.
- Adhering to the SOP within their sphere of practice.

- Documenting the procedure on log (see Appendix 3).

4. Standards and Practice

4.1. Accessing a ventricular access device to aspirate CSF to relieve pressure/e

4.2. **Procedure**

4.2.1. Explain the procedure to the parents/carers and gain verbal consent for the procedure documenting the consent in the medical notes.

4.2.2. Measure the infants' pre-procedure head circumference before you start and record in procedure chart.

4.2.3. Locate the VAD on the patient.

4.2.3.1. It is usually in the right frontal region, anterior to the coronal suture.

4.2.3.2. It is possible to be anywhere on the skull (for cyst access).

4.2.4. Prepare a trolley for an aseptic procedure, cleaning with detergent wipes.

4.2.5. Gather all equipment.

- Sterile dressing pack.
- Sterile gown.
- Second pair of sterile gloves.
- 1 x pack of 5cm by 5cm gauze swabs.
- 0.5% chlorhexidine solution.
- 1 x 25g butterfly needle (orange).
- 10ml syringes (work out the number you need depending on the volume of CSF to be removed).
- 2 x sterile universal containers to send CSF for MC and S and protein.
- 3-way tap.

4.2.6. Prepare the neonate, ensure lying comfortably in their height adjustable cot/incubator, swaddle if able with their head supported on oxygen saturation monitoring as a minimum. **If the patient has regular CSF aspirations and has been tolerating the procedure well then consider if it is suitable to have procedure undertaken while skin to skin or swaddled and in parents' arms.**

4.2.7. Wash your hands, prepare your trolley, opening your equipment in a sterile manner.

4.2.8. Put on your sterile gown and double glove, organize your trolley and prepare the equipment, attach 10ml syringe, 3-way tap and 25g orange butterfly needle together, and soak your pack of 5cm by 5cm gauze in 0.5% chlorhexidine solution and then separate the gauze for ease of use, ensure you have additional dry gauze available from the dressing pack for the end of the procedure.

4.2.9. Ask the parent, nurse or assistant to give some of the patients' mother's expressed breast milk, sucrose, or non-nutritive sucking as a comfort measure to the neonate.

4.2.10. Clean the VAD in a circular motion from the centre of the VAD outwards with the 0.5% chlorhexidine-soaked gauze at least 10 seconds using each of the 5 chlorhexidine-soaked gauze pieces separately and allow to dry naturally.

4.2.11. Make a small hole in the sterile field and overlay the sterile field with the hole over the VAD.

4.2.12. Discard outer gloves.

4.2.13. Gently move skin over the VAD slightly (to avoid puncturing the skin and VAD directly above each other) and then access the VAD with a 25G orange butterfly needle with the 3-way tap and 10ml syringe already attached. The needle should be inserted at a 90-degree angle (perpendicular) to the reservoir. This allows the self-sealing silicone to seal after the procedure ensuring a leak free access more than 300 times. Having a syringe attached at access will prevent air entering the reservoir and subsequently the ventricle (pnuemocephaly).

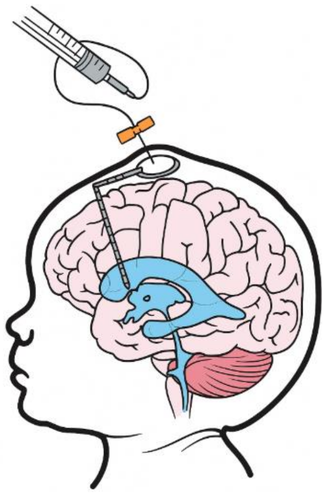

Image generated via AI by Rachel Bailey.

4.2.14. CSF should now be easily aspirated via the syringe. There is no requirement for excessive force as CSF should flow with minimal suction. If CSF does not flow easily, consider the following and contact the on-call neurosurgical registrar at Bristol Royal Hospital for Children:

- Size of ventricles – if very small, CSF may not be free flowing.
- The VAD is blocked.
- The butterfly is not in the correct space.

4.2.15. Aspirate CSF volume as per paediatric neurosurgical instruction (usually 10ml/kg but can occasionally be increased to 15ml/kg if advised by paediatric neurosurgeon).

4.2.16. Aspirate CSF at a maximum rate of 1ml/minute if babies are >/=1kg and 1ml/kg/minute if <1kg. **The maximum rate ever used should be 1ml/minute and it should be lower in tiny babies.** If removed quicker, there is an increased risk of secondary bleeding, ventricular collapse, or circulatory shock. If the procedure is poorly tolerated at 1ml/kg/minute then the infant may tolerate the procedure better at a slower rate.

4.2.17. To swap syringes, turn off 3-way tap to the infant before disconnecting and reconnecting a new syringe to avoid air entering the reservoir and subsequently the ventricle (pnuemocephaly).

4.2.18. At the end of the procedure, de-access the VAD by removing the orange butterfly needle in an upwards fluid motion.

4.2.19. Apply light pressure with dry sterile gauze to stop any light bleeding from the skin. There is no need to apply Derma-S Film or a dressing after the procedure as the CAD is self-sealing.

4.2.20. Discard sharps safely as per local Trust policy.

4.2.21. Discard dressing pack as per local Trust policy.

4.2.22. Measure post procedure head circumference and record in procedure log.

4.2.23. Record procedure in infants' notes/procedure log (see Appendix 3).

4.3. Send a CSF sample by aspirating CSF as per steps above, ensuring that the CSF to be sent is in a new syringe after at least 3-5mls has been aspirated (this is called a discard) to ensure the CSF you are sending is ventricular CSF and not fluid within the VAD. If the infant requires less than 11mls of CSF aspirating in total, then aspirate half the total volume required in the first 10ml syringe and then second half of the total volume required in the second 10ml syringe. Send your CSF samples using the CSF from your second syringe.

4.4. Send CSF each time device is accessed for microscopy, culture and sensitivity (MC and S) and protein.

4.5. Ensure infant is pain scored regularly and consider administering a dose of paracetamol as soon as possible following the procedure.

4.6. Monitor electrolytes twice weekly as a minimum– there is an increased risk of hyponatremia with repeated CSF drainage. Maintain sodium within normal range- supplement intake as necessary.

5. Dissemination and Implementation

5.1. This SOP will be shared with stakeholders involved in the care of this group of patients. The document will be available on the Documents Library under Newborn. Senior neonatal and maternity staff will discuss the SOP at Safety Briefs and Huddles as part of the safety bulletin.

5.2. The Neonatal Practice Education Lead, Neonatal Clinical Skills Facilitator, and Transitional Care Clinical Skill Facilitator will utilise this document during refresher training of existing neonatal and maternity staff and during induction/supernumerary periods to underpin knowledge and skills with new staff.

6. Monitoring compliance and effectiveness

Information Category	Detail of process and methodology for monitoring compliance
Element to be monitored	Compliance with policy/ley changes to practice.
Lead	Neonatal Audit and Guidelines Lead
Tool	Adherence to guidelines will be monitored as part of the ongoing audit process on a Word or Excel template.
Frequency	As dictated by audit findings.
Reporting arrangements	Neonatal Audit and Guidelines Group
Acting on recommendations and Lead(s)	NNU Consultants, Clinical Directors.
Change in practice and lessons to be shared	Required changes to practice will be identified and actioned within 3 months, immediately if required. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant staff/stakeholders.

7. Updating and Review

This document will be reviewed every 3 years, unless changes to practice are identified.

8. Equality and Diversity

8.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the Equality Diversity And Inclusion Policy or the Equality and Diversity website.

8.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.

Appendix 1. Governance Information

Information Category	Detailed Information
Document Title:	Performing a Cerebrospinal Fluid (CSF) Aspiration/Tap by Accessing a Ventricular Access Device (VAD) Standard Operating Procedure V1.0
This document replaces (exact title of previous version):	New Document
Date Issued /Approved:	November 2025
Date Valid From:	November 2025
Date Valid To:	November 2028
Author /Owner:	Rachel Bailey: Advanced Neonatal Nurse Practitioner
Contact details:	01872 252667
Brief summary of contents:	To provide guidance on performing cerebrospinal fluid (CSF) aspiration/tap by accessing a ventricular access device (VAD).
Suggested Keywords:	Ventricular Access Device, VAD, Cerebrospinal fluid aspiration, CSF aspiration, Ommaya Reservoir, CSF tap. Post-haemorrhagic ventricular dilatation, PHVD.
Target Audience:	**RCHT:** Yes **CFT:** No **CIOS ICB:** No
Executive Director responsible for Policy:	Chief Medical Officer
Approval route for consultation and ratification:	Neonatal Audit and Guidelines Group
Manager confirming approval processes:	Caroline Chappel
Name of Governance Lead confirming consultation and ratification:	Michael Cross
Links to key external standards:	None required

Information Category	Detailed Information
Related Documents:	South West Neonatal Network Guideline on Post-Haemorrhagic Ventricular Dilatation (PHVD). South West Neonatal Network Guideline.
Training Need Identified:	No
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet and Intranet
Document Library Folder/Sub Folder:	Clinical/Neonatal

Version Control Table

Date	Version Number	Summary of Changes	Changes Made by
October 2025	V1.0	Initial issue.	Rachel Bailey, Advanced Neonatal Nurse Practitioner

All or part of this document can be released under the Freedom of Information Act 2000.

All Policies, Strategies and Operating Procedures, including Business Plans, are to be kept for the lifetime of the organisation plus 6 years.

This document is only valid on the day of printing.

Controlled Document.

This document has been created following the Royal Cornwall Hospitals NHS Trust The Policy on Policies (Development and Management of Knowledge Procedural and Web Documents Policy). It should not be altered in any way without the express permission of the author or their Line Manager.

Appendix 2. Equality Impact Assessment

Section 1: Equality Impact Assessment (EIA) Form

The EIA process allows the Trust to identify where a policy or service may have a negative impact on an individual or particular group of people.

For guidance please refer to the Equality Impact Assessment Policy (available from the document library) or contact the Equality, Diversity, and Inclusion Team rcht.inclusion@nhs.net

Information Category	Detailed Information
Name of the strategy /policy /proposal /service function to be assessed:	Performing a Cerebrospinal Fluid (CSF) Aspiration/Tap by Accessing a Ventricular Access Device (VAD) Standard Operating Procedure V1.0
Department and Service Area:	Neonatal
Is this a new or existing document?	New
Name of individual completing EIA (Should be completed by an individual with a good understanding of the Service/Policy):	Neonatal Audit and Guidelines Group
Contact details:	01872 252667

Information Category	Detailed Information
1. Policy Aim - Who is the Policy aimed at? (The Policy is the Strategy, Policy, Proposal or Service Change to be assessed)	Neonatal Unit medical team/Advanced Neonatal Nurse Practitioners.
2. Policy Objectives	Ensuring infants who have a ventricular access device.
3. Policy Intended Outcomes	To standardise the procedure of cerebrospinal fluid (CSF) aspiration for pressure relief for infants with a ventricular access device (VAD).
4. How will you measure each outcome?	Audit/Multidisciplinary team weekly discussion/incidents/risk management.
5. Who is intended to benefit from the policy?	Infants with a ventricular access device and their families.

Information Category	Detailed Information
6a. Who did you consult with? (Please select Yes or No for each category)	• Workforce: Yes • Patients/visitors: No • Local groups/system partners: No • External organisations: No • Other: No
6b. Please list the individuals/groups who have been consulted about this policy.	**Please record specific names of individuals/groups:** Neonatal Audit and Guidelines Group.
6c. What was the outcome of the consultation?	Approved.
6d. Have you used any of the following to assist your assessment?	**National or local statistics, audits, activity reports, process maps, complaints, staff, or patient surveys:** No.

7. The Impact

Following consultation with key groups, has a negative impact been identified for any protected characteristic? Please note that a rationale is required for each one.

Where a negative impact is identified without rationale, the key groups will need to be consulted again.

Protected Characteristic	(Yes or No)	Rationale
Age	No	
Sex (male or female)	No	
Gender reassignment (Transgender, non-binary, gender fluid etc.)	No	
Race	No	Any information provided should be in an accessible format for the parent/carer/patient's needs- i.e., available in different languages if required/access to an interpreter if required.

Protected Characteristic	(Yes or No)	Rationale
Disability (e.g. physical or cognitive impairment, mental health, long term conditions etc.)	No	Those parent/carer/patients with any identified additional needs will be referred for additional support as appropriate- i.e., to the Liaison Team or for specialised equipment. Written information will be provided in a format to meet the family's needs e.g., easy read, audio etc.
Religion or belief	No	All staff should be aware of any beliefs that may impact on the decision to treat and should respond accordingly.
Marriage and civil partnership	No	All staff should be aware of any marital arrangements that may have an impact on care (for example: separated parents, domestic abuse).
Pregnancy and maternity	No	
Sexual orientation (e.g. gay, straight, bisexual, lesbian etc.)	No	

A robust rationale must be in place for all protected characteristics. If a negative impact has been identified, please complete section 2. If no negative impact has been identified and if this is not a major service change, you can end the assessment here.

I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.

Name of person confirming result of initial impact assessment: Neonatal Audit and Guidelines Group.

If a negative impact has been identified above OR this is a major service change, you will need to complete section 2 of the EIA form available here:
Section 2. Full Equality Analysis.

Appendix 3. CSF Aspiration from VAD Procedure Log

Affix patient sticker here

Date and Time	Current Weight (kg)	Head Circumference (cm)	Volume in ml/kg and total mls	Duration (minutes)	CSF Description	Procedure Notes	CSF Sent for MC and S and Protein (Yes/No)	CSF Results	Sign and Print
		Pre = Post =						WCC: Protein: CSF Culture: CSF Viral PCR:	
		Pre = Post =						WCC: Protein: CSF Culture: CSF Viral PCR:	
		Pre = Post =						WCC: Protein: CSF Culture: CSF Viral PCR:	
		Pre = Post =						WCC: Protein: CSF Culture: CSF Viral PCR:	
		Pre = Post =						WCC: Protein: CSF Culture: CSF Viral PCR:	