Benchmark No. 6
Cerebrospinal Fluid Management
(3rd Edition)

British Association of Neuroscience Nurses

Neuroscience Safe Staffing Benchmark Statements

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History

The Neuroscience Nursing Benchmarking Group (NNBG) was established in the 1990`s as a result of increasing concerns over inconsistencies in practices as part of a subsidiary of BANN. The group aims to improve on the quality of care by comparing and sharing practice with each other, and set explicit standards for comparison of current practice against the ideal standard. The group is committed to searching for the best evidence related to specific areas of neuroscience practice. Membership of the group consists of representatives from neuroscience units within the UK and Ireland, together with educational colleagues from both the NHS/HSC and Higher Educational Institutes. The group is further subdivided into regions and the first edition of this benchmark was developed by the North West regional group of the NNBG in 2006.

In 2016, the NNBG consolidated back into BANN and further information about NNBG can be found on the BANN website www.BANN.org.uk . This second edition of the benchmark has been developed by the restructured NNBG working group under BANN.

BANN would like to acknowledge the leadership and significant contribution made by the NNBG, and all its contributors, to neuroscience nursing over the years.

Benchmark No. 6 Cerebrospinal Fluid (CSF) Management

KEY POINTS

- Always establish correct zero reference to ensure consistency and accuracy in all readings of External Ventricular Drain (EVD). Measurement is to be achieved with the use of a spirit level or laser device.
- Ensure all connections and tubing are secured and clearly labelled as EVD to avoid accidental removal, leakage and/or usage.
- The wound/entry site must be continually monitored for signs of infection (leaking CSF, erythema, purulence).
- Medical staff must prescribe the height or pressure level that the drain is to be set at. If a specific amount of drainage is expected, this must be documented in the patient's notes.
- The nursing staff must monitor and promptly report any deviations (e.g. over or under drainage) to the medical staff.
- Neurological observations and vital signs must be recorded in order to ensure early detection of signs of infection within the CSF or raised Intracranial Pressure (ICP) (i.e. headache, nausea, neck stiffness, pyrexia).
- The amount of drainage & appearance of the CSF (i.e. colour and clarity) must be recorded hourly.
- If the system becomes disconnected, clamp the line, stay with the patient and call for assistance.
- Asepsis must be maintained at all times when handling the drainage system.
- Ensure the patient & their relatives/ carers are informed of the rationale for the EVD insertion and the possible risks and side effects.
- All connections to the EVD/Lumbar drain must comply with NRFit^{tm} NHS Improvement regulations, 2017, preventing the inadvertent use of universal Leur lock connectors.

FACTOR 1 – Documentation

STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
1.0 There are evidence/research based guidelines/protocols available for the care of a patient with an external CSF drainage system in situ. These include the following: a) Insertion b) CSF sampling c) Equipment-NRFit™ compliant d) Medication insertion e) Changing the bags and the system f) Removal of the CSF draining system g) Transferring a patient with a CSF drainage system in place h) Managing a blocked drainage system/accidental break in the system as per local protocol i) Documentation	NHSI, 2017 Surveillance Report, Wales. 2018 Humphreys *et al,* 2015 Woodward & Mestecky, 2011 De Brún, 2013			
1.1 Accurate documentation includes: a) The recognised zero reference point (documented in the nursing and medical records): i. External lumbar drainage systems- level at the exit site (or as indicated by medical instructions) ii External cranial drainage system- tragus (level of foramen of Monro)				

STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
b) The following is documented: i. CSF drainage – hourly volume ii. CSF description -colour and clarity iii. Prescribed chamber level iv. Presence of Oscillation				
1.2 Physiological observations:- a) Early Warning Score is recorded at least four hourly for early detection of infection and bacterial meningitis. b) Neurological observation are recorded at least four hourly to detect neurological deterioration or evidence of infection (i.e. neck stiffness, headache, nausea).	NEWS2, 2017 Freathy, *et al,* 2019			
1.3 The benchmark and local policy has been reviewed within the last two years), unless there is significant changes in practice.	Epic3, 2014 Muralidharan, 2015			

FACTOR 2 – Protocol

STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
2.0 The drain is clearly labelled in order to distinguish it from other invasive lines.				
2.1 On- going management of the drain must include: a) The system is 'primed' by a trained and competent practitioner in accordance with local policy b) To enable visualisation, a transparent adhesive dressing is applied to the entry site. c) The dressing remains undisturbed for the first 48hours and only changed if required. d) Observe for signs of infection (i.e. leaking CSF, erythema, induration and purulence). e) The CSF drainage system is securely attached to a stand. f) A laser system or appropriate levelling device is available at the bedside. g) Medical staff have prescribed the height and pressure level that the drain is to be set to (this must only be adjusted following instruction from the medical team). h) The medical team clearly prescribe and document whether the drain is to be managed via volume-led pressure-led drainage protocol. i) CSF drainage is monitored and any deviations (e.g. over or under drainage) promptly reported to medical staff).	AANN, 2011 Humphrey, 2018 Kubilay *et al,* 2013 Jamjoo *et al,* 2018 Chatzi *et al* 2014			

STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
2.2 **Clamping the drain** a) Clamping of the drain either to challenge normal flow or following administration of intrathecal antibiotics must be monitored closely and any deviations escalated to the medical staff. b) **Pressure led drainage:** I. Observe for over-drainage of CSF when repositioning the patient or significant movement activities are anticipated II. ii) Clamping of the drain must only be undertaken when a patient is being transferred (e.g. bed to chair) or if the drain needs to be laid on the bed (e.g. transfer to CT scan/theatre). c) **Volume led drainage** I. Clamping of the drain, as part of volume-led drainage, is undertaken with caution and by a competent practitioner. II. Medical staff have prescribed the amount of drainage per hour.	Humphrey, 2018			
2.3 **CSF sampling** a) CSF sampling is performed using strict aseptic technique b) Sampling is undertaken by trained and competent practitioners. c) Intra-thecal medication is given by trained and competent practitioners and documented accordingly.	Humphreys *et al,* 2015			

STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
2.4 **Changing bags** a) Bags are changed under strict aseptic technique observing infection control measures and in accordance with manufacturer's guidelines and local policy. b) The bag is changed when ¾ full to reduce the risk of introducing infection into a closed circuit (overfilling of the drainage bag impairs drainage).				
2.5 **Removal** The EVD is removed by a trained and competent practitioner (a suture is recommended to reduce the risk of infection).				

FACTOR 3 – Education

STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
3.0 All registered nurses involved in the management of external drainage systems are provided with a structured competency-based training and education programme.				
3.1 Formal assessment of competency is undertaken and documented includes: a) Awareness of the rationale for the external CSF drainage system b) The nurse's responsibilities in the management CSF drainage systems c) Identification of safeguard measures when caring for a patient with a CSF drainage system d) Knowledge of potential risk factors for infection (including duration of catheter placement) e) Knowledge of the clinical and laboratory parameters that indicate a CSF infection f) Knowledge of the procedure following accidental disconnection	Epic3, 2014 Fried H. *et al* 2016 Camacho *et al* 2011 Humphrey, 2018			
3.2 Protocols and guidance and all relevant documentation is easily accessible and visible in the appropriate clinical area				

FACTOR 4 – Patient Information

STATEMENT OF BEST PRACTICE	EVIDENCE & REFERENCES	ACHIEVED	NOT ACHIEVED	VARIABLES
4.0 Current and evidence based written information is available for patients & carers and alternative methods of communication are available.				
4.1 The patient and family are given the following information: • Details of the CSF drainage system and how the drainage system works. • Details of any associated equipment that they are likely to encounter. • Likely duration of the treatment. • The importance of checking with healthcare professionals prior to any change in the patient's position. • The importance of reporting any changes in the patient's neurology to a healthcare professional	MHRA, 2020			
4.2 Any information verbal /written that is given to the patient/carers is documented in the patient notes				

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