External ventricular drainage CLINICAL GUIDELINE

Introduction

An External Ventricular Drainage (EVD) is the temporary drainage of cerebrospinal fluid (CSF) from the fluid filled cavities of the brain (lateral ventricles) to a closed collection system outside the body. (Terry 1991, Gibson 1995)

The EVD is inserted in theatre under a general anaesthetic.

Indications for External Ventricular Drainage are:

- To divert infected CSF. (Birdsall C, 1990 Scheinblum S, 1990)
- To divert bloodstained CSF following neurosurgery/haemorrhage. (Terry D, 1991 Birdsall C, 1990)
- To divert the flow of CSF

Two types of EVD system may be inserted:

1. The child’s existing shunt system is externalised at the distal end and connected to an external drainage system. This shunt system will contain a pressure valve, which controls the amount of drainage from the ventricles. (Terry D, 1991) (Rationale 1)

2. The most frequently used system is a new catheter placed into the ventricle through a small hole (burr hole) made in the skull. Once inserted, the scalp incision is sutured and covered with a sterile dressing (Ref 5). The new catheter is tunnelled under the skin, exiting on the abdominal wall and connects to an external drainage system. This system does not have a pressure valve so drainage depends upon gravity. The exit site must be planned carefully. (Birdsall C, 1990) (Rationale 2)

The ventricular catheter is connected to an external drainage system. The system has several components: (Terry D, 1991) See Appendix 1

- A self-sealing sampling & injection port. (Rationale 3)
- An anti reflux drip/collection chamber. (Rationale 4)
- A drainage bag. (Rationale 5)
- A pressure scale mounting panel or a tape measure. (Rationale 6)

Artery forceps, gauze and alcowipe MUST be positioned by the child’s bed to enable the system to be clamped and kept clean if the drainage system accidentally becomes disconnected. (Bird C, 1990) (Rationale 7 and Rationale 8)

The system should be changed every 24 hours, according to microbiological advice, until the CSF is sterile/infection free. (Rationale 8)

The system can then be used for up to 10 days.

However, the drainage bag should be changed when it is about three quarters full, in accordance with local policy (Woodward S 2002, Hazinski M F 1992) (Rationale 9)

The prescribed instructions of the neurosurgeons should be followed for: (Rationale 10)

- The positioning of the drain.
- The expected hourly amount CSF drainage (Terry D, 1991, Cummings R, 1992)
External Ventricular Drainage

Inform the child & family

Explain the entire procedure and management to the child and family avoiding medical and nursing jargon and language. Information must be given according to the child’s age, condition and developmental understanding. (Rationale 11)

Explain the following (Rationale 12):

- Why the EVD is necessary.
- The reason for the EVD.
- What it entails.
- The likely length of placement of an EVD.


If appropriate provide play preparation, involving the play specialist. (Terry D & Nisbett K 1991) (Rationale 13)

Consider involvement of a clinical psychologist if appropriate, particularly if previous procedures have been stressful for the child or if the child is known to have or exhibits signs of anticipatory anxiety or distress (Claar R, Walker L & Smith C 2002)

A factsheet on external ventricular drainage is available here.

Neurological assessment

The following observations should be carried out on return from theatre. (Rationales 14 and 15)

The observations must be performed at least 4 hourly. They may need to be performed more frequently and this will depend on the condition of the child and if the height of the drain is altered.

Observe for a change in the child’s neurological condition by assessing the following (Rationale 16):

- Level of consciousness
- Pupil reaction
- Limb movement and strength
- Heart rate
- Blood pressure
- Respiratory rate (Action for Sick Children 2003)
- A change in body temperature (Rationale 17)

Observe for under-drainage of CSF (Rationale 18):

- Bulging of fontanelle in infants
- Headaches
- Vomiting
- Irritability
- Lethargy

Observe for over-drainage of CSF (Rationale 19):

- Dipping of fontanelle in infants
- Headaches
- Irritability
- Pallor
The frequency, duration & severity of any headaches should be monitored.  
(Rationale 20)

The family should be included in general observation of child.  
(Terry D & Nisbett K 1991)  
(Rationale 21)

See CPC Guidelines – Neurological observations

and

Great Ormond Street Hospital for Children NHS Trust Paediatric Coma Charts - A Guide to Assessment.  
A Video Teaching Guide for the Multi-Disciplinary Team  
(GOSH 1997)

**Drain management: positioning of drain**

The system must be positioned accurately.  
(Rationale 22)

The level of the ventricles must be estimated:

- Draw an imaginary line between the outer aspect of the child’s eye and the external auditory meatus  
  (Gibson I 1995)  
  (Rationale 23).
- The midpoint of this line is the zero point for the EVD system.  
  See Appendix 1
- Use a levelling device e.g. spirit level to estimate the zero point position against the pressure scale, 
  which is either mounted on an Intravenous (IV) pole or on a pressure scale mounting panel.  
  See Appendix 2  
  (Not sure that this was added correctly)  
  (Reference 24)
- Position and secure the pressure scale, on either the IV pole or the system mounting panel with 0cms 
  being the estimated zero point.  
  (Terry D & Nisbett K 1991)  
  (Rationale 25)
- Position the pressure level arrow at the top of the drip chamber at the prescribed height, e.g. +5, +10 
  (above) or -2 cmsH²O (below) the zero point/ the ventricles & secure with Velcro straps or the locking 
  bracket.  
  (Rationales 26 and 27)
- The position of drain should be indicated on the child’s fluid chart.  
  (Rationale 28)

When moving or repositioning the child  
(Rationale 29):

- Clamp drain
- Re-zero drain
- Unclamp drain immediately  

Parents should be taught the following care of the drain  
(Rationale 30):

- The importance of repositioning the drain with their child.  
  (Rationale 31)
- To clamp the drain if  
  (Rationale 32):
  - Moving their child
  - If their child is crying excessively.
- To ask for the assistance of a health care professional who has been trained and has achieved 
  competency in EVD management, to rezero/reposition the drain once their child has been moved.  
  (Rationale 33)
- That the drain should not be clamped for longer than 1 hour.  
  (Rationale 34)

This instruction must be documented in the child’s health care record.  
(Rationale 35)

**Drain management: drainage**

Once the drain is connected and positioned an initial assessment of CSF drainage should be made.  
(Rationale 36)

Subsequently hourly checks should be made of  
(Rationale 37):
- Amount of drainage. (Rationales 38, 39 and 40)
- Colour of CSF - should be colourless. (Rationales 41 and 42)
- Exit site. (Rationale 43)

Record hourly on the child’s fluid balance chart (Rationales 38, 44 and 45):
- The amount of CSF drainage
- The position of the EVD

Neurosurgeons will specify and prescribe a drain height post-operatively and that the drain height is to be either (Rationales 46 and 47):
- Maintained OR
- Altered, to drain a certain amount of CSF an hour.

If the child is crying excessively the drain should be clamped off. (Rationale 48)

It must not be clamped off for more than one hour. (Rationale 49)

Contact the neurosurgical team if there are concerns about (Rationale 50):
- The amount of drainage
- The condition of the child.

Drain management: connecting or changing the system

Newly inserted EVD’s will be connected to the drainage system in theatres. (Terry D & Nisbett K 1991, Scheinblum S & Hammond M 1990) (Rationale 51)

Inform the child & family that the procedure is to be performed. (Rationale 52)

The system should be connected by, or under the supervision of a health care professional who has been trained and has achieved competency. Two practitioners are required, one to perform the sterile procedure & the other to assist. (Rationale 53 and 51)

Prepare equipment:
- Dressing trolley. (Rationale 54)
- Clamps and gauze.
- A pair of sterile gloves & an apron. (Rationale 51)
- EVD system.
- Two alcohol impregnated wipes, e.g. Alcowipes®. (Rationale 51)

To change the drainage system:
- Clamp catheter close to patient using non-sterile gauze & clamps. (Rationales 55 and 56)
- Put on apron & perform a ward aseptic procedures hand wash. (Rationale 57)
- Open new drainage system and put on sterile gloves. (Rationale 58)
- Assemble drainage set closing clamps. (Rationale 59)
- Remove last 3-way tap on drainage set. (Rationale 60)
- The assistant cleans the catheter connection with an alcohol-impregnated wipe & allows for it to dry. (Rationale 51)
- The “sterile” practitioner disconnects the old system & cleans the newly exposed catheter end with an alcohol-impregnated wipe & allows for it to dry. (Rationale 51)
- Connect new system. (Rationale 61)
- Check connections. (Rationale 62)
• Position system as prescribed by the neurosurgeon. (Rationale 63)
• Release clamps on new system & those close to the patient. (Rationale 64)
• Clear away equipment according to Waste Policy. (Rationale 65)
• Wash hands. (Rationale 66)
• Record the procedure in the child’s health care records. (Rationale 67)

Drain management: patency of drain - general

EVD drainage systems will be connected in theatres. (Rationale 68)

If it is not connected in theatre, the drainage system should be connected to the catheter within 15 minutes post operatively. (Rationale 69)

The drain should not be clamped for periods of longer than 1 hour unless specifically instructed. (Rationale 70)

Observe the CSF drainage hourly to ensure the drain is patent. (Gibson I 1995, Scheinblum S & Hammond M 1990) (Rationale 71)

The volume of CSF drainage & drain position must be recorded on the child’s fluid balance chart hourly. (Terry D & Nisbett K 1991, Birdsall C & Grief L 1990) (Rationale 72)

If there is no CSF in chamber:
• Observe for movement of CSF in system. (Birdsall C & Grief L 1990) (Rationale 73)
• Ensure system is not clamped or kinked. (Terry D & Nisbett K 1991) (Rationale 74)
• Lower chamber momentarily below head level. (Birdsall C & Grief L 1990) (Rationale 75)
• Advise medical team if no drainage. (Rationale 76)

If a catheter becomes disconnected (Scheinblum S & Hammond M 1990):
• Clamp catheter close to patient. (Rationale 77)
• Place end in sterile wrapping/container. (Rationale 68)
• Lie patient down. (Rationale 77)
• Thoroughly clean exposed tip using a sterile alcohol impregnated swab & connect a new system aseptically. (Rationale 68)
• Record event in child’s health care records & inform the child’s doctor. (Rationale 72)

Drain management: patency of drain - repairing a split catheter

If a catheter splits:
• Clamp catheter close to patient. (Rationale 78)
• Place end in sterile wrapping/container. (Rationale 79)
• Lie patient down. (Rationale 78)

Catheter should be repaired by, or under the supervision of health care professional who has been trained and has achieved competency. Two practitioners are required, one to perform the sterile procedure and the other to assist. (Rationales 79 and 80)

Gather & prepare the following equipment:
• Dressing trolley. (Rationale 81)
• A pair of sterile gloves & an apron. (Rationale 79)
• EVD system. (Rationale 82)
• EVD connector (Rationale 83)
• Sterile scissors. (Rationale 79)
- Alcohol impregnated wipes, e.g. Alcowipes®

To repair a split catheter:
- Put on apron and perform a ward aseptic procedures hand wash. (Rationale 79)
- Open new drainage system and put on sterile gloves. (Rationale 84)
- Assemble new drainage set closing clamps. (Rationale 85)
- Remove last 3-way tap on drainage set. (Rationale 86)
- The “sterile” practitioner cleans the exposed catheter end with a sterile alcohol impregnated wipe & allows for it to dry. (Rationale 79)
- Using sterile scissors cut just above the split. (Rationale 87)
- Insert EVD connector into the catheter lumen.
- Connect new system. (Rationale 88)
- Check connections. (Rationale 89)
- Position system as prescribed by the neurosurgeon. (Rationale 90)
- Release clamps on new system & those close to the patient. (Rationale 91)
- Clear away equipment according to Waste Policy. (Rationale 92)
- Wash hands. (Rationale 93)
- Record the procedure in the child’s health care records. (Rationale 94)

Drain management: patency of a drain - unblocking a catheter

If a catheter appears to be blocked:
- Exclude damage to the EVD system (Rationale 95)
- Lower drain & observe for CSF movement. (Birdsall C & Grief L 1990) (Rationale 96)
- Change EVD. (Rationale 97)

If no CSF movement is observed, seek urgent advice from a neurosurgeon who may instruct the EVD to be “milked” or aspirated. (Rationale 98)

Catheters must only be aspirated by an experienced nurse or doctor. Two practitioners are required, one to perform the sterile procedure & the other to assist. (Rationales 99, 100 and 101)

All EVD’s may be aspirated including those with a valve. (Rationale 102)

Gather & prepare the following equipment:
- Dressing trolley. (Rationale 103)
- A pair of sterile gloves & an apron. (Rationale 101)
- EVD system.
- Sodium Chloride 0.9% for injection.
- Alcohol impregnated wipes.
- Blue needle. (Rationale 104)

To aspirate an EVD:
- Clamp catheter close to patient. (Rationale 106)
- Lie patient down. (Rationale 107)
- Put on apron & perform a ward aseptic procedures handwash. (Rationale 108)
- Open new drainage system and put on sterile gloves. (Rationale 109)
- Assemble new drainage set closing clamps. (Rationale 110)
- Remove last 3-way tap on drainage set. (Rationale 111)
- The assistant cleans the catheter connection with an alcohol-impregnated wipe & allows for it to dry. (Rationale 101)
- The “sterile” practitioner disconnects the old system & cleans the exposed catheter end with an alcohol-impregnated wipe & allows for it to dry. (Rationale 101)
- Insert syringe into end of catheter. (Rationale 112)
- The assistant should release the clamps close to the patient. (Rationale 112)
- Very gently attempt to aspirate CSF. (Rationale 113)
- The assistant should close the clamps close to the patient. (Rationale 107)

If the aspiration has been unsuccessful the EVD should be flushed. This MUST ONLY be done by an experienced doctor. Two practitioners are required, one to perform the sterile procedure & the other to assist. (Rationale 114)

**To flush the EVD:**
- The doctor should draw up 1-2mls of 0.9% sodium chloride into a syringe.
- Insert syringe into the exposed end of catheter.
- The assistant should release the clamps close to the patient. (Rationale 115)
- Gently attempt to inject the sodium chloride. (Rationale 116)
- If the sodium chloride can be injected the assistant should close the clamps that are close to the patient. (Rationales 117, 118 and 119)

**Continue after aspirating and/or flushing by:**
- Discard syringe.
- Connect new system. (Rationale 120)
- Check connections. (Rationale 119)
- Release clamps on new system & those close to the patient. (Rationale 121)
- Gradually lower system to check for drainage. (Rationale 122)
- Position system as instructed by the neurosurgeon. (Rationale 123)
- Clear away equipment according to Waste Policy. (Rationale 124)
- Wash hands. (Rationale 125)
- Record the procedure in the child’s health care records. (Rationale 126)

If the “flushing” has not been successful the neurosurgeons must be contacted. (Rationale 127)

**Drain management: fluid and electrolyte balance**

Cerebrospinal fluid (CSF) losses should be replaced ml/ml unless otherwise indicated. (Birdsall C & Grief L 1990, Scheinblum S & Hammond M 1990) (Rationale 128)

The losses are usually replaced with intravenous 0.9% sodium chloride. (Birdsall C & Grief L 1990, Scheinblum S & Hammond M 1990) (Rationale 129)

Oral sodium chloride can be used. (Rationale 130)

Cerebrospinal Fluid (CSF) losses and intravenous fluid replacement should be recorded hourly on a fluid balance chart and reviewed every shift by the nurse in charge. (Rationale 131)

**Accessing the drain: CSF sampling**

CSF samples should be taken (Rationales 132 and 133):
- Every 24 hours, according to microbiological advice, until the CSF is sterile/infection free.
Every 48 hours for infection free CSF.

The amount of CSF that can be sampled is the same for all ages including neonates.

Antibiotic levels should be as follows (Rationales 134 and 135):

- Vancomycin: less or equivalent to 15 mg/litre
- Gentamicin: less than 3 mg/litre.

Gather the following equipment:

- Sterile paper (Rationale 136)
- Alcohol impregnated wipe
- Two Universal specimen container (Rationale 138)
  - 1 x Container = Protein Count
  - 1 x Container = Cell Count & Antibiotic level (if required)
- Glucose Specimen bottle. (Rationale 139)
- Sterile gloves & an apron. (Rationale 140)
- Computer generated request form.

CSF samples should be obtained by, or under the supervision of a health care professional who has been trained and has achieved competency. Two practitioners are required, one to perform the sterile procedure & the other to assist. (Rationales 140 and 141)

To obtain a CSF specimen:

- Close clamps on drainage system close to injection port. (Rationale 142)
- Wash hands & put on apron. (Rationale 143)
- Prepare sterile field. (Scheinblum S & Hammond M 1990) (Rationale 143)
- Perform a ward aseptic procedures hand wash & put on gloves. (Rationale 140)
- An assistant should hold the injection port. (Rationale 140)
- Clean injection port on EVD system with an alcohol impregnated wipe & allow to dry. (Rationale 140)
- Insert syringe into port. (Rationale 144)
- Slowly withdraw 2 mls of CSF, remove syringe & discard. (Rationale 145)
- Insert second syringe into port. (Rationale 144)
- Slowly withdraw 2 mls of CSF. (Terry D & Nisbett K 1991) (Rationale 146)
- Place 1 ml of CSF into the glucose specimen container and 0.5 ml into each universal specimen container. (Rationale 147)
- Open clamps on drainage system close to injection port. (Rationale 148)
- Label samples and send them with completed request forms to the correct laboratory in accordance with local policy. (Rationale 147)
- Dispose of all used equipment according to Waste Policy. (Rationale 149)
- Wash hands according to hospital policy. (Rationale 150)
- Record the procedure in the child’s health care records. (Rationale 151)

Accessing the drain: giving intrathecal drugs

Intrathecal drugs, e.g. antibiotics, are administered to enable local treatment of the CSF. (Cummings R 1992)

Intrathecal antibiotics must only be administered by a suitably trained doctor.

Gather the following equipment:
- Sterile gloves and an apron (Rationale 152)
- Sterile paper (Rationale 153)
- Alcohol impregnated wipe
- 1 or 2ml syringe (Rationale 154)
- Blue needle
- Prescribed antibiotics
- Sodium Chloride 0.9% for injection (Rationale 156)
- Child's prescription chart (Rationale 157)

To administer intrathecal antibiotics:

- Close clamps on drainage system close to injection port. (Rationale 158)
- Put on apron & wash hands. (Rationale 159)
- Prepare sterile field. (Scheinblum S & Hammond M 1990) (Rationale 160)
- Perform a ward aseptic procedures hand wash and put on gloves. (Rationale 159)
- Check drugs according to hospital drug policy. (Rationale 161)
- Prepare drugs using aseptic non-touch technique. (Rationale 152)
- Check patient's identity according to the Drug Policy. (Rationale 161)
- Clean injection port on EVD system with an alcohol impregnated wipe and allow to dry. (Rationale 152)
- Slowly withdraw 2 mls of CSF, remove syringe & discard. (Rationale 162)
- Insert syringe containing the antibiotic into injection port.
- Inject antibiotic according to manufacturer's guidelines. (Rationale 163)
- Remove syringe.
- Insert syringe containing 0.9% sodium chloride into port & gently flush catheter with 2mls 0.9% sodium chloride. (Rationales 164 and 165)
- Remove syringe.
- Keep drainage system clamped for one hour only. (Rationale 166)
- Dispose of all used equipment according to Waste Policy. (Rationale 167)
- Wash hands according to hospital policy. (Rationale 168)
- Record the procedure in the child's health care records. (Rationale 169)

Exit site care

The child will return from theatre with a dressing over the exit site. (Rationale 170)

If exit site is dry it should be dressed with a sterile dressing. (Rationales 171 and 172)

Change the dressing weekly unless contaminated. (Rationale 171)

The dressing should be changed if it becomes contaminated with CSF or blood. (Rationale 171) (Cummings R 1992)

If the exit site is oozing it should be dressed with sterile gauze pads and surgical tape. (Rationales 173 and 174)

A microbiological swab may need to be taken for culture & sensitivity. (Rationale 175)

The child's doctor should be kept informed.

Check exit site hourly for:
Redness (Rationale 176)
Inflammation (Rationale 176)
Oozing of blood
 Leakage of CSF (Rationale 177)

Loop catheter once at exit site under dressing. (Rationale 178)

Removal of the drain

The EVD should remain in situ for no longer than 10 days. (Rationale 179)

After this time the entire system should be removed or changed in theatre.

Pre-operatively the nurse may be asked to clamp the drain for a specified time prior to surgery. (Rationale 180)

If the child’s condition deteriorates due to clamping pre-operatively, unclamp the drain and contact the neurosurgical team. (Rationale 181)

Post operatively assess the child and dress the exit site.

Appendix 1: External ventricular drainage system

Appendix 2: Zero reference point
Rationale

Rationale 1: This system must not be aspirated as damage to the valve may occur.
Rationale 2: To prevent an unsightly scar, reduce the risk of infection and reduce risk of accidental removal (Woodward S 2002).
Rationale 3: To provide access to the catheter.
Rationale 4: To observe CSF drainage.
Rationale 5: To enable on-going collection of CSF.
Rationale 6: To facilitate accurate positioning.
Rationale 7: To prevent loss of CSF.
Rationale 8: To reduce risk of infection/further infection. (Woodward 2002)
Rationale 9: Overfilling of the drainage bag impairs drainage (Woodward 2002)
Rationale 10: To ensure desired CSF drainage.
Rationale 11: To ensure that the child and family understand the procedure and are psychologically prepared.
Rationale 12: To ensure informed consent is obtained.
Rationale 13: To give the child the opportunity to express fears in a familiar environment (Broome M 1990, Lansdown R 1993, Action for Sick Children 2003)
Rationale 14: To establish the baseline for future observations
Rationale 15: To monitor change
Rationale 16: These can alter following: neurosurgery, a change in intracranial pressure
Rationale 17: It could indicate an infection
Rationale 18: These may indicate raised intracranial pressure
Rationale 19: These may indicate low intracranial pressure
Rationale 20: To provide accurate information
Rationale 21: To use their knowledge of what is "normal" for the child
Rationale 22: To ensure desired amount of CSF drainage
Rationale 23: To calibrate/determine the zero reference point for the drain, i.e. the level of the ventricles for positioning of the system (Bisnaire D & Robinson L 1997)
Rationale 24: To ensure accuracy
Rationale 25: For ease of accurate positioning
Rationale 26: To ensure correct CSF drainage
Rationale 27: The difference in height between the child's ventricles and the drip chamber creates both a pressure gradient and a safety valve. The height of the drip chamber equates to the pressure inside of the head or intracranial pressure (ICP). This pressure must be reached before any CSF will drain into the drip chamber (Woodward S et al. 2002).
Rationale 28: To ensure an accurate record
Rationale 29: So the position of the drain always corresponds to the child's ventricles
Rationale 30: To encourage parental involvement
Rationale 31: To ensure CSF drains as required
Rationale 32: To prevent over-drainage of CSF
Rationale 33: For correct CSF drainage
Rationale 34: To minimise risk of blocked catheter and to prevent raised intracranial pressure
Rationale 35: To provide an accurate record
Rationale 36: To ensure CSF is draining at the correct rate
Rationale 37: To promote safe management of the child
Rationale 38: To ensure CSF drainage rate is as prescribed
Rationale 39: A sudden increase in drainage may result from inaccurate zeroing of the drain or could signify a rise in ICP
Rationale 40: A decrease in drainage could also indicate inaccurate zeroing of the drain or that the tubing may be kinked, blocked, disconnected or the ports are closed (Woodward S et al. 2002)
Rationale 41: Bloodstained CSF could indicate blood in the ventricles
Rationale 42: Cloudy CSF may indicate the presence of an infection (Woodward S et al. 2002, Hazinski MF 1992)
Rationale 43: To ensure CSF is not leaking
Rationale 44: To ensure position of drain is correct
Rationale 45: To provide an accurate record
Rationale 46: The child's age and condition, and what is prescribed, dictates the amount of drainage
Rationale 47: An approximate guide to CSF drainage is (Birdsall C & Grief L 1990, Scheinblum S & Hammond M 1990): infants 2-5ml/hour, children 5-10ml/hour, adolescents 10-15ml/hour
Rationale 48: May cause over drainage
Rationale 49: To prevent an increase in ICP
Rationale 50: The position of the drain may need to be re-evaluated
Rationale 51: To minimise the risk of infection
Rationale 52: To gain understanding and co-operation
Rationale 53: To promote asepsis
Rationale 54: To provide a clean work surface
Rationale 55: To prevent loss of CSF on disconnection
Rationale 56: To protect tubing
Rationale 57: To prevent contamination
Rationale 58: To prepare for procedure
Rationale 59: To prevent CSF drainage until re-positioned
Rationale 60: It is not required
Rationale 61: To establish new system
Rationale 62: To prevent CSF loss
Rationale 63: To establish instructed drainage
Rationale 64: To commence CSF drainage
Rationale 65: To meet Hospital Policy
Rationale 66: To minimise the risk of cross infection
Rationale 67: To provide an accurate record
Rationale 68: To minimise the risk of infection
Rationale 69: To prevent blockage of catheter
Rationale 70: To prevent: blockage of catheter, change in ICP
Rationale 71: To observe for blockage before the ICP is affected
Rationale 72: To provide an accurate record
Rationale 73: Drainage may be slow
Rationale 74: This will reduce or stop flow
Rationale 75: To encourage flow and/or release an air lock
Rationale 76: They may need to aspirate the system
Rationale 77: To prevent excess CSF loss
Rationale 78: To prevent excess CSF loss
Rationale 79: To reduce risk of infection
Rationale 80: To promote asepsis
Rationale 81: To provide a clean work surface
Rationale 82: To allow CSF drainage
Rationale 83: To connect system safely
Rationale 84: To prepare for procedure
Rationale 85: To prevent loss of CSF until repositioned
Rationale 86: It is not required
Rationale 87: To create a clean end for infection
Rationale 88: To establish new system
Rationale 89: To prevent CSF loss
Rationale 90: To establish instructed drainage
Rationale 91: To commence CSF drainage
Rationale 92: To meet Hospital Policy
Rationale 93: To minimise the risk of cross infection
Rationale 94: To maintain an accurate record
Rationale 95: Connections may be faulty
Rationale 96: Air lock may be present
Rationale 97: Air filter may be wet
Rationale 98: The catheter may be blocked resulting in raised intracranial pressure
Rationale 99: To minimise the potential risks of the procedure
Rationale 100: To promote asepsis
Rationale 101: To minimise the risk of infection
Rationale 102: The valve does not prevent aspiration
Rationale 103: To provide a clean work surface
Rationale 104: To draw up sodium chloride 0.9%
Rationale 105: Large syringe sizes reduce pressure exerted on catheter
Rationale 106: To prevent CSF loss on disconnection
Rationale 107: To prevent excess CSF loss
Rationale 108: To prevent contamination
Rationale 109: To prepare for procedure
Rationale 110: To prevent CSF drainage until repositioned
Rationale 111: It is not required
Rationale 112: To enable aspiration of CSF
Rationale 113: To obtain CSF sample/confirm patency
Rationale 114: THIS IS A HIGH RISK PROCEDURE
Rationale 115: To enable catheter to be flushed
Rationale 116: To flush system
Rationale 117: To enable system to be accessed
Rationale 118: To clear catheter
Rationale 119: To prevent CSF loss
Rationale 120: To establish new system
Rationale 121: To establish instructed drainage
Rationale 122: To check for drainage
Rationale 123: To commence CSF drainage
Rationale 124: To meet Hospital Policy
Rationale 125: To minimise the risk of cross infection
Rationale 126: To maintain an accurate record
Rationale 127: A CT scan will need to be performed
Rationale 128: To maintain fluid and electrolyte balance.
Rationale 129: Cerebrospinal fluid (CSF) contains sodium.
Rationale 130: If the child's oral intake is adequate
Rationale 131: To ensure fluid balance is being maintained
Rationale 132: CSF may be sampled to monitor: CSF values; for signs of a new infection; progress in treatment of a known infection; antibiotic levels in the CSF.
Rationale 133: An infection is determined by: a raised cell and protein count; a lowered glucose count
Rationale 134: The levels are checked to determine subsequent doses of antibiotics
Rationale 135: This must be done in consultation with the microbiologist to avoid overdose of antibiotics
Rationale 136: To provide a sterile field
Rationale 137: Large syringe sizes reduce pressure exerted on catheter
Rationale 138: To collect CSF specimen to determine the cell and protein count, and the antibiotic level
Rationale 139: To collect CSF specimen for a glucose count
Rationale 140: To minimise the risk of infection
Rationale 141: To promote asepsis
Rationale 142: To prevent CSF aspiration from the drainage system
Rationale 143: To prevent contamination
Rationale 144: To access system
Rationale 145: To remove contaminated CSF sample
Rationale 146: To obtain CSF sample for analysis
Rationale 147: To facilitate analysis
Rationale 148: To continue drainage of CSF
Rationale 149: To meet hospital policy
Rationale 150: To minimise risk of cross infection
Rationale 151: To maintain an accurate record
Rationale 152: To minimise the risk of infection
Rationale 153: To provide a sterile field
Rationale 154: To administer small volumes of drugs
Rationale 155: Large syringe sizes reduce pressure exerted on catheter
Rationale 156: To flush catheter after antibiotics
Rationale 157: To check drugs prescribed
Rationale 158: To prevent drug entering drainage system
Rationale 159: To prevent contamination
Rationale 160: To prepare for procedure
Rationale 161: To maintain hospital policy
Rationale 162: To facilitate drug administration
Rationale 163: To meet prescription guidelines
Rationale 164: To facilitate flushing of the system
Rationale 165: To ensure drug given
Rationale 166: To ensure absorption of antibiotic
Rationale 167: To maintain safe environment
Rationale 168: To minimise risk of cross infection
Rationale 169: To provide an accurate record
Rationale 170: To keep wound clean and dry
Rationale 171: To reduce the risk of infection
Rationale 172: It prevents an excess build up of bacteria
Rationale 173: To exert a small amount of pressure to reduce drainage
Rationale 174: To soak up any oozing
Rationale 175: To identify any infective organisms
Rationale 176: An indicator of infection
Rationale 177: The drain may need repositioning
Rationale 178: To reduce the risk of the catheter being accidentally removed
Rationale 179: To reduce the risk of further infection
Rationale 180: To enlarge the ventricles for surgery
Rationale 181: The child is likely to have raised ICP

References/Bibliography

Reference 1:

Reference 2:

Reference 3:

Reference 4:

Reference 5:

Reference 6:
Reference 7:

Reference 8:

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Reference 10:
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Reference 11:

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These guidelines are intended to guide and facilitate the care of patients at Great Ormond Street Hospital for Children NHS Trust (GOSH). The guidance contained therein is not intended to replace individual assessment and personalised treatment of the patient. The authors attempt to base the guidance on best available evidence and ensure that content is up to date. The guidelines may not necessarily represent the views of all clinicians at GOSH. This information may be used for private education, research and institutional education but if used for any other purposes, consent must first be obtained from GOSH. Any person intending to use the guidelines should assess the suitability of use. GOSH will not accept any responsibility for use by external agencies or individuals. No part of this publication may be reproduced, stored in or introduced into a retrieval system or transmitted in any form without prior consent and acknowledgment of GOSH. GOSH retains copyright.

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