



NCCU CLINICAL GUIDELINES
SECTION: 13

SURGICAL CONDITIONS

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Insertion or Revision of Ventriculoperitoneal Shunt
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Neonatology Clinical Guidelines
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INSERTION OR REVISION OF VENTRICULOPERITONEAL SHUNT

Insertion of a VP (Ventriculoperitoneal) shunt is indicated for the management of infantile hydrocephalus. Hydrocephalus is defined as excess cerebrospinal fluid (CSF) accumulation in the brain caused by disturbance of the formation, flow or absorption of CSF.

Infantile hydrocephalus is associated with the following:

- Congenital Abnormalities, i.e. Aqueductal Stenosis, Spina Bifida and Chiari II malformation.
- Less common conditions are Dandy-Walker syndrome, Encephaloceles, Viral or Parasitic infections, Arachnoid Cysts, Intracranial Neoplasm's, Vascular Problems, Nutritional Deficiencies and Poisonings.
- Acquired conditions such as Perinatal Intraventricular Hemorrhage (IVH) and Meningitis.
- Trauma, closed head injury.
(Aqueductal Stenosis and myelomeningocele are the most frequent of these causes).

KEY POINTS

- Swabs from the nose and any wounds are sent for MRSA & MSSA screening prior to surgery
- Antibiotic prophylaxis with vancomycin and cefotaxime should be commenced 2 hours prior to surgery and then continue for 48 hours
- Contact neurosurgeon if any bogginess/swelling at shunt site
- Hourly neuro-observations for 24 hours post-op
- Ensure parents have received education and written information about infection or blockage of shunt and on the care of their infant at home after discharge as this will enable parents to identify the signs of infection and malfunction of the shunt early.

SHUNT CHARACTERISATION

The VP Shunts that are used are antibiotic impregnated (Rifampicin and Clindamycin). Meta-analysis of observational studies have shown that antibiotic impregnated catheters may decrease the risk of CSF shunt infections. Shunts usually consist of three parts:

1. **Proximal end** that is radiopaque and is placed into the ventricle of the brain. This end has multiple small perforations.
2. **Valve** – this allows for unidirectional flow. Can adjust various opening pressures. Usually has a reservoir that allows for checking shunt pressure and sampling CSF.
3. **Distal end** that is placed into the peritoneum by tracking the tubing subcutaneously.

PREOPERATIVE INVESTIGATIONS AND MANAGEMENT

Preferably start 7 days prior to surgery. However, urgent shunt surgeries should not be postponed for the sake of preoperative investigations.

1. All Infants requiring shunt surgery for open spina bifida must be managed with **Latex Free** care and latex free products i.e. dummies, dressing etc.
2. Screen nasal and any skin lesions for the presence of Methicillin Resistant Staphylococcus aureus (MRSA) and Methicillin Sensitive Staphylococcus Aureus (MSSA) – Consult with a clinical microbiologist if results are positive before proceeding to surgery.
3. 2 hours prior to surgery, administer IV Vancomycin 15mg/kg. See NCCU medication protocol.

INTRAOPERATIVE MANAGEMENT

During surgery, after induction of anaesthesia, ensure that Vancomycin has been completed and flushed through the line. Then administer IV Cefotaxime 50mg/kg. If Vancomycin has not been administered preoperatively, reverse the order of antibiotics given.

POSTOPERATIVE MANAGEMENT

1. Continue with Latex Free care.
2. 48 hours postoperatively, give 8 hourly Cefotaxime 50mg/kg (first dose to be given 8 hours post the intraoperative dose).
3. Administer IV Vancomycin at 15mg/kg/dose 8 hourly irrespective of gestation. The first dose is to be given 8 hours post the administration of the intraoperative dose. Intraoperative antibiotics have been shown to reduce the risk of shunt infections (Cochrane library 2009).
4. Ensure head and abdominal dressings remain dry and intact. Observe for the accumulation of CSF beneath the skin leading to soft 'boggy' swelling near the surgical wound on the scalp. A CSF leak or blockage is associated with the increased risk of shunt infection. If swelling is noted, call the neurosurgeon for review immediately.
5. To minimise the colonisation of bacteria near the surgical wound clean the area surrounding the surgical sites with 1% chlorhexidine wipes three times a day for five days or until discharged (if before 5 days).
6. Neurological observations (using the neurological observations chart, MR872 to be commenced on return to the unit every hour for the first 24 hours post surgery.
7. Scalp and abdominal dressings are to be taken down on day 2 post surgery. Dressings can be removed earlier if the wound is soaked through with blood or there is concern for the wound.
8. All sutures are dissolvable. Keep the wound dry for 7 days. Sponging around the area is allowed, if the wound becomes wet then, dry off immediately. If the dressing becomes wet then change the dressings.

REFERENCES

- Bernardo O Ratilal, João Costa, Cristina Sampaio. Antibiotic prophylaxis for surgical introduction of intracranial ventricular shunts. Cochrane library; 2009
- Hubballah MY, Hoffman HJ. Early repair of myelomeningocele and simultaneous insertion of ventriculoperitoneal shunt: technique and results. Neurosurgery. Jan 1987;20(1):21-3
- Tamburrini G, Frsasanito P, Jakavaki K et al. Myelomeningocele: the management of the associated hydrocephalus. Child's Nervous System 2013 Sep;29(9):1569-79
- Thomas R, Lee S, Patole S, Rao S. Antibiotic-impregnated catheters for the prevention of CSF shunt infections: a systematic review and meta-analysis. Br J Neurosurg. 2012 Apr;26(2):175-84.