1.0 Introduction

Patients with hydrocephalus requiring cerebrospinal fluid diversion via a shunt were identified as a population that Neurosurgery cared for that required streamlining of care due to high volumes and complications such as infection which were relatively high compared to other procedures. This clinical practice guideline has been updated to reflect emerging changes in evidence (initial document developed 1997/98).

Target Population

- Inclusion: (May include cysto-peritoneal shunting and subdural peritoneal shunts)
- Infant/child with hydrocephalus requiring 1st shunt intervention.
- Child with existing shunt for hydrocephalus management.
- Newborn to 18 years of age with signs/symptoms of shunt malfunction (i.e. nausea/vomiting, headache, lethargy, irritability &/or altered level of consciousness (LOC))

Target Users

- All health care providers who may encounter a patient with a shunt or requiring a shunt.

2.0 Definitions

- **Shunt**: Referring only to a ventricular-peritoneal shunt
- **Shunt Revision**: Surgical replacement or change to an existing shunt

3.0 Clinical Practice Recommendations
## Ventricular Peritoneal Shunt Insertion or Revision

**Expected Date of Discharge: Post-op Day (POD) #2**

### Pre-admission
- History & physical assessment (including fontanels assessment and head circumferences if less than 10 months)
- CT scan of MRI (new diagnostic should have a 4d MRI, otherwise could just be an MRI on a head or infant if clinically appropriate)
- Short series if CT/MRI is essential, abnormal or short sequences out of phase. Could be targeted fields short series looking at specific area if recent revisions
- Abdominal ultrasound (recent shunt insertion, abdominal examination)
- Pregnancy screening as per policy: [PreDavid, Pregnancy Policy]
- Routine labs including CBC, EIA, PT/INR and Typology
- If suspected sepsis medical team to consider initiating the empiric antibiotic
- Shunt infection should be suspected in patients who have had a shunt surgery within the past 8 months
- If sequestered drainage medical team to consider debridement, irrigation
- Call neurosurgery immediately if the symptoms are noted or rapidly progressive
- Pre-op bathing as per policy [Pre-op bathing policy]
- Assess pre-operative holding and hydration status
- Assess family understanding of plan of care

### Intra-operative
- Neurological Valsalva Q 1-4h if the patient meets discharge/intervention evaluation and notify unit if required
- 8-10 months of age, check and recheck ventricular Q 2-4h and head circumference daily
- Monitor for signs & symptoms of increased ICP
- Neurosurgeon to review bloodwork results (consult anesthesia services if any abnormalities)
- Pre-op bathing as per policy [Pre-op bathing policy]
- See [Post-op Infusion Protocol Checklist] to be completed in OR (sewing room staff only)
- OR Infurop
- Limited by signs on door
- Number of people scrubbed/knowing not limited
- Patient position feet closer to door than head
- Call Admit O.D.: 20 mg/dL IV (max 2g)
- One pre-op dose
- One per hour dose 6-8 hrs later to be optimized with post op orders
- Use clamped as needed, not clamped
- Formal sends required by each participant
- Dacarazine required for each participant
- Skin preparation
- Remove hair, debride, & adhesive material
- Chlorhexidine applied in surgical field & not washed off
- SteriPore™ over surgical field
- Encour Valzian™ was administered
- Shunt implanted or revised as per usual practice
- Biodegradable implanted catheters
- If Backhead not available
- Regular seat catheter with Antibiotic injection – Intrathecal
  - Vancomycin/10mg in 1ml of normal saline
  - Gentamycin (1mg in 2ml of normal saline)
- Skin closure per standard practice
- Neurosurgeon to document in electronic patient chart nature of surgery, type of shunt device (including name of valve system, setting of programmable device if worst), any complications and surgical incision closure
- Outlined surgical field to also be overseen by Neurosurgeon including nature of surgery, how of shunt device (including name of valve system, setting of programmable device if worst, any complications and surgical incision closure
- Neurosurgeon to notify unit after patient needs any heightened monitoring/pump setting dressing applied to all wounds. Leave in place overnight
- Dressing applied to all wounds. Leave in place overnight

### Post-op
- Neurological Valsalva Q2-4h
- Vital Signs Q 3-4 h
- Bowel sounds Q shift
- 9-12 months of age check and recheck ventricular Q 2-4h and head circumference daily
- Monitor for signs & symptoms of increased ICP
- Sayids
- 

### Discharge
- Vital signs and Neurological Vital Signs pre discharge
- Head circumference recorded
- Signs and symptoms of increased ICP
- Child and family verbalization pain & nausea wello controlled prior to discharge
- Ensure patient has had a bowel movement
- Instem is assessed

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### Ventricular Peritoneal Shunt Insertion or Revision

#### Activity
- Activity As Tolerated
- Nutrition & Diet
- NPO or Diet As Tolerated

#### Nursing Activity
- Complete falls assessment, document in care plan and on patient record (falls and CSE protocol)
- Activity As Tolerated
- Nutrition & Diet
- NPO or Diet As Tolerated (Anesthesia NPO guidelines)

#### Pain Assessment
- Age appropriate pain assessment using [pain assessment tool](#)
- Inhibit [Gardner-Fishbain](#) bundle
- Pain assessment tools (please select appropriate):
  - VAS
  - PLACQ
  - Words
  - Numeric
  - Faces
  - NCCPC-P
  - NCCPC-PV

#### Activity
- Elevate head of bed as per medical order
- Activity as tolerated or bedrest as per medical team
- Encourage deep breathing and coughing exercises
- Nutrition & Diet
- Diet As Tolerated

#### Dressing & Wound Care
- Neurosurgeon to verify type of closure (staples/staples)
- Incision to remain covered for 24-48 hours post-op
- Notify MD if dressing wet or oozing from incision noted
- Increase allow daily and per

#### Fluid Management
- Discontinue IV when ambulation completed, tolerating full fluids and no nausea and no further investigations pending (CT, MRI)

#### Activity
- Activity As Tolerated
- Nutrition & Diet
- Diet As Tolerated

#### Dressing & Wound Care
- Nutrition & Diet
- Diet As Tolerated
- Patient to be eating moderate amounts with no nausea and maintaining hydration prior to discharge

#### Activity
- Activity As Tolerated
- Nutrition & Diet
- Diet As Tolerated

#### Dressing & Wound Care
- Ensure patient dressing prior to discharge, ensure new Pressure if required (N/less than 44 hours)
- Review wound care instructions
- MNP to view incision prior to discharge
- If discharge sooner; instruct family that sutures will dissolve over time (~3-4 weeks)
- If sutures; instructions for family to remove 10th day post-op
- If staples; give staple remover to family with instructions for family MD to remove 10th day post-op
- Information worker to book follow-up appointment in Neurosurgery Clinic in 6-8 weeks
- Neurosurgeon to indicate if further

#### Activity
- Continue pain management [pain assessment tool](#)
- Pain assessment
- Age appropriate pain assessment as per previous selection [pain assessment tool]

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<td>Ensure child &amp; family's understanding the plan of care</td>
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**Meds before OR:**
- Morphine
- Fentanyl
- Nasopharyngeal airway
- Anti-nausea

**Post-operative teaching:**
- Wash to remain dry for 48 hours
- Follow-up appointment in imaging required
- Ensure child and family's understanding of plan of care post-discharge

**If child has a programmable valve:**
- Make sure family is aware of the valve set and understand the need for follow-up appointments and teaching.

- Provide family with a Patient Care plan.

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**Discharge med resuscitation:**
- Pediatric resuscitation
- Anticipate need for intubation
- Ensure family is aware of the valve set and understand the need for follow-up appointments and teaching.
4.0 Guideline Group and Reviewers

Guideline Group Membership:
1. Patricia Rowe, RN (EC), MN, NP Paeds Nurse Practitioner Neurosurgery
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5.0 References


Attachments:

Shunt protocol.pdf

ventricular shunt_CPG_September 2021.pdf