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

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Ventricular Peritoneal Shunt Insertion or Revision
<table>
<thead>
<tr>
<th>PRE-ADMISSION</th>
<th>ADMISSION/PRE-OP</th>
<th>INTRA-OPERATIVE</th>
<th>POST-OP</th>
<th>DISCHARGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• History &amp; physical assessment (including fontanelle assessment and head circumference if less than 10 months)</td>
<td>• Neurological Vital Signs Q 1-4h; assess if the patient requires close/constant observation and notify if unit required</td>
<td>• See Short Infusion Protocol Checklist to be completed in OR (see nursing unit staff only)</td>
<td>• Neurological Vital Signs Q 3-4h; Vital Signs Q 3-4h</td>
<td>• Vital signs and Neurological Vital Signs pre-discharge</td>
</tr>
<tr>
<td>• CT scan or MRI (new diagnosis should have a full MRI, otherwise could just be FAST MRI or MRi to assess ventricular size or Head US if infant and clinically appropriate)</td>
<td>• CT scan / MRI; if appropriate</td>
<td>• OR inf, IV, intra-op if needed</td>
<td>• Head circumference recorded</td>
<td>• Vital signs and Neurological Vital Signs post-discharge</td>
</tr>
<tr>
<td>• Short stature if CT/MRI or US is equivocal, abnormal or short components out of place. Could be targeted/junctional shunt series looking at specific area if recent revision)</td>
<td>• Monitor for signs &amp; symptoms of increased ICP</td>
<td>• Limit to signs on door</td>
<td>• Signs and symptoms of increased ICP</td>
<td>• Signs and symptoms of increased ICP</td>
</tr>
<tr>
<td>• Abdominal ultrasound (recent shunt insertion, abdominal function)</td>
<td>• Neurosurgeon to review mockup results (consult appropriate services if any abnormalities)</td>
<td>• Number of people touched/knowning not limited</td>
<td>• Child and family education: pain &amp; nausea well-controlled prior to discharge</td>
<td>• Child and family education: pain &amp; nausea well-controlled prior to discharge</td>
</tr>
<tr>
<td>• Pregnancy screening as per policy: Endocrinology, Obstetrics/Prenatal</td>
<td>• Pre-op bathing as per policy pre-op bathing policy</td>
<td>• Patient position feet closer to door than head</td>
<td>• Ensure patient has had a bowel movement</td>
<td>• Ensure patient has had a bowel movement</td>
</tr>
<tr>
<td>• Routine lab including CBC, Erythrocytes, PTT/BRI and Type/Screen</td>
<td>• Cardiograms immediately if the symptoms are noted or rapidly progressive</td>
<td>• Monitor signs &amp; symptoms of increased ICP</td>
<td>• Instillation is assessed</td>
<td>• Instillation is assessed</td>
</tr>
<tr>
<td>• If suspected scan medical team to consider initiating the surgical protocol</td>
<td>• Pre-op bathing as per policy</td>
<td>• Use of post-op shunt is not required — will only be order when specifically indicated</td>
<td>• CT scan; Fast MRI or head ultrasound depending on child’s age</td>
<td>• CT scan; Fast MRI or head ultrasound depending on child’s age</td>
</tr>
</tbody>
</table>

**Consults:**

- Neurosurgery consult if indicated
- Neurology to complete pre-operative orders in electronic system
- IV therapy for hydration and antibiotics if indicated
- Neurosurgeon to obtain consent from parents/ward
- Child Life consult
- Social Work
- Physical therapy

**Intravenous fluid:**

- One Lactated Ringers (LR) or Saline
- One pre-op dosage
- One post-op dosage 12-16 hrs after to be ordered with post-op orders
- LR 2000 mL IV (1 mg 100 mg)

**Skin preparation:**

- Shave and prep above clavicle
- Use of antibiotic

**Post-op care:**

- Early ambulation
- Early feeding
- Early bowel function

**Discharge:**

- Vital signs and Neurological Vital Signs pre-discharge
- Head circumference recorded
- Signs and symptoms of increased ICP
- Child and family education: pain & nausea well-controlled prior to discharge
- Ensure patient has had a bowel movement
- Instillation is assessed
## Activity
- Activity As Tolerated

### Nutrition & Diet
- NPO or Diet As Tolerated [Support/Lung ventilation guidelines](#)

### Activity
- Activity As Tolerated

### Nutrition & Diet
- NPO or Diet As Tolerated [Support/Lung ventilation guidelines](#)

### Activity
- Elevate head of bed as per medical order.
- Activity as tolerated or bed rest as per medical team.
- Encourage deep breathing and coughing exercises.

### Nutrition & Diet
- Sire to Diet As Tolerated

### Dressing & Wound Care
- Neurorsurgical to note in chart type of closure (sutures/tacks/graft)
- Incision to remain unopened for 24-48 hours post-op.
- Notify MD if dressing well or oozing from incision noted.
- Change allow area daily and per

### Fixed Management
- Continuous IV when antibiotics completed, tolerating full fluids and no naso and no further investigations pending (CT, MRI).

### Activity
- Activity As Tolerated

### Nutrition & Diet
- Diet As Tolerated

### Dressing & Wound Care
- Maintain original dressing prior to discharge, sutures with new Pressure if required (less than 68 hours)
- Review wound care instructions.
- MISTP to new incision prior to discharge.
- If discharge sutures: instruct family to suture will dissolve over time (8-10 days).
- If staples: instruct family to staple removal to family with instructions for family MD 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 policy](#)
- Pain assessment
- Activity As Tolerated

### Activity
- Age appropriate pain assessment [Pain assessment policy](#)
- Informed Consent/Injury bundle
- Pain assessment tools (please select appropriate):
  - VAS
  - FLACC
  - Wong
  - Numeric
  - Faces
  - NCCPC-P
  - NCCPC-Py

### Activity
- Age appropriate pain assessment as per previous section [Pain assessment policy](#)

### Activity
- Age appropriate pain assessment as per previous section [Pain assessment policy](#)
**Ventricular Peritoneal Shunt Insertion or Revision**

<table>
<thead>
<tr>
<th>Pre-operative teaching:</th>
<th>Post-operative teaching:</th>
</tr>
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<tbody>
<tr>
<td>- NPO instructions</td>
<td>- Wound to remain dry for 48 hours</td>
</tr>
<tr>
<td>- Cell time</td>
<td>- Pain management</td>
</tr>
<tr>
<td>- LV insertion if applicable</td>
<td>- Pain management/Plan management</td>
</tr>
<tr>
<td>- Prone bath</td>
<td>- Assess child &amp; family's understanding</td>
</tr>
<tr>
<td>- Transport to OR</td>
<td>- Child family understand awareness/understanding of plan of care</td>
</tr>
<tr>
<td>- Answer questions or offer resource for short related questions</td>
<td></td>
</tr>
<tr>
<td>- Recovery room</td>
<td>- Post-operative teaching:</td>
</tr>
<tr>
<td>- Post-op medications/Pain management</td>
<td>- Pain management/Plan management</td>
</tr>
<tr>
<td>- Assess child &amp; family's understanding</td>
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</tbody>
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**Medication Reconciliation:**
- Medications ordered based on pain assessment.
- Pain management
- Anticonvulsants
- Antibiotics
  - Cefuroxime 1.5 g IV (1/2) every 8 hrs or tailored antibiotic for sepsis
  - Post-operative day 5

**Discharge medication reconciliation:**
- Analgesics, based on pain assessment.

**Review with family wound care:**
- Review with family wound care
  - Provide short answer/Website AboutKidsHealth Information www.sickkids.ca
  - Medications
    - Class numbers, office number, contact number
  - Follow-up appointment (if imaging required)
  - Child family understand awareness and understanding of plan of care post-discharge
  - If child has a programmable valve: M/C/PR to document setting and ensure family is aware of programmable valve, current setting and M/C/PR to reinforce teaching.
  - Provide family with a Patient Data Card

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5.0 References


Attachments:

Shunt protocol.pdf

ventricular shunt CPG_September 2021.pdf