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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<table>
<thead>
<tr>
<th>PRE-ADMISSION</th>
<th>ADMISSION/PRD</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 required</td>
<td>- See Short Infusion Protocol Checklist to be completed in OR (covering room off)</td>
<td>- Neurological Vital Signs Q3-4h</td>
<td>- Vital signs and Neurological Vital Signs post discharge</td>
</tr>
<tr>
<td>- CT scan or MRI (new diagnostic should be a 4D MRI, otherwise could just be FAST MRI) to assess ventricular size or Head US (if infant and clinically appropriate)</td>
<td>- 8-10 months of age, check and record fontanelle Q 3-4h and head circumference daily</td>
<td>- OR triage: Limited by signs on door</td>
<td>- EVD line to be removed</td>
<td>- Head circumference recorded</td>
</tr>
<tr>
<td>- Shunt series if CT/MRI or US is equivocal, abnormal or shunt components out of place (could be targeted by ventricular series looking at specific area of recent revision)</td>
<td>- Monitor for signs &amp; symptoms of increased ICP</td>
<td>- Number of people obscured/observing not limited</td>
<td>- NPO 9-12 months of age (on head shunt and re-credentialed)</td>
<td>- Signs and symptoms of increased ICP</td>
</tr>
<tr>
<td>- Abdominal ultrasound (recent shunt insertion, abdominal examination)</td>
<td>- Neurosurgeon to review window results (consult appropriate services if any abnormalities)</td>
<td>- Patient position feel closer to door than head</td>
<td>- Monitor for signs &amp; symptoms of</td>
<td>- Child and family education/pain &amp; nausea well controlled prior to discharge</td>
</tr>
<tr>
<td>- Pregnancy screening as per policy: Expectancy, Pregnancy Risk</td>
<td>- Peri-operative baseline as per policy: peri-operative policy</td>
<td>- Bed AlFen 5% (30 mg/kg IV, max 3g)</td>
<td>- Increased ICP</td>
<td>- Ensures patient has had a bowel movement</td>
</tr>
<tr>
<td>- Routine lab including CBC, ESR, PT/INR, PTT, and Triage</td>
<td>- One pre-injection dose</td>
<td>- One pre-op dose before OR (on i/f)</td>
<td>- Serius</td>
<td>- Incision is assessed</td>
</tr>
<tr>
<td>- If selected specialty medical team to consider initiating the ICP monitor</td>
<td>- One pre-op dose before OR (on i/f)</td>
<td>- One pre-op dose before OR (on i/f)</td>
<td>- CT scan, FAST MRI or head ultrasound</td>
<td>-</td>
</tr>
</tbody>
</table>
### Ventricular Peritoneal Shunt Insertion or Revision

<table>
<thead>
<tr>
<th>Activity</th>
<th>Activity</th>
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<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity As Tolerated</td>
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<td>Activity As Tolerated</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>Nitrogen</td>
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</tr>
<tr>
<td>NPO or Diet As Tolerated</td>
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<td>NPO or Diet As Tolerated</td>
</tr>
</tbody>
</table>

### Pain Assessment

- Age-appropriate pain assessment using pain assessment tools
- Infants: Edmonton Infant Pain Scale
- Toddlers: FLACC
- Preschoolers: Numeric
- School-aged: Faces
- Adolescents: NCPQ-R
- Adults: NCPQ-PV

### Pain Management

- Continue pain management as per previous assessment
- Pain assessment: daily

### Nutrition & Diet

- Diet As Tolerated
- Activity As Tolerated

### Dressing & Wound Care

- Neutropenia: refer to chert
- Change in dressing once daily
- Notify MD if dressing well and avoid from infection
- Change will be made daily and per MD

### Fixed Management

- Conduction IV when anticoagulation is completed
- Early feeding and no nasogastric
- Further investigations pending (CT, MRI)

### Activity

- Activity As Tolerated
- Activity As Tolerated
- Activity As Tolerated
- Activity As Tolerated

### Ventricular Peritoneal Shunt Insertion or Revision

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<th>Pre-operative teaching</th>
<th>Post-operative teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review child &amp; family's knowledge base</td>
<td>Review with family wound care</td>
</tr>
<tr>
<td>Provide hydrocephalus AboutKidsHealth information</td>
<td>Review/Provide short section/AboutKidsHealth information</td>
</tr>
<tr>
<td>Provide short instructions AboutKidsHealth</td>
<td>Review/Provide hydrocephalus AboutKidsHealth information</td>
</tr>
<tr>
<td>Correlation to Ward and Routines (both family and child)</td>
<td>Medications, Class numbers, office number, contact number</td>
</tr>
<tr>
<td>Discharge Preparation</td>
<td>Follow-up appointment (x imaging required)</td>
</tr>
<tr>
<td>Review child &amp; family's understanding</td>
<td>CHILDREN's understanding</td>
</tr>
<tr>
<td>Children's understanding of plan of care</td>
<td>CHILDREN's understanding of plan of care post-discharge</td>
</tr>
<tr>
<td>Airway</td>
<td>If child has a programmable valve, MORP to document setting, and ensure family is aware of programmable valve, current setting and MPV (Min) MPV (Max) teaching. Provide family with Patient Data card</td>
</tr>
</tbody>
</table>

**Ventricular Peritoneal Shunt Insertion or Revision**

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4.0 Guideline Group and Reviewers

Guideline Group Membership:
1. Patricia Rowe, RN (EC), MN, NP Paeds Nurse Practitioner Neurosurgery
2. Maria Lamberti-Pascuill, RN, Neurosurgery Research Nurse
3. Sara Breitbart, RN, MN, NP Paeds Nurse Practitioner Neurosurgery
4. Dr. Abhaya Kulkarni: Staff Neurosurgeon
5. Dr. D.D. Cochrane: Staff Neurosurgeon

Internal Reviewers:
1. Dr. James Drake, Chief of Neurosurgery
2. Dr. James Rutka: Staff Neurosurgeon
3. Dr. Peter Dirks: Staff Neurosurgeon
4. Dr. Michael Taylor: Staff Neurosurgeon
5. Arbelle Manicat-Emo, RN (EC), MN, NP Paeds Nurse Practitioner Neurosurgery
6. Herta Yu, RN (EC), MN, NP Paeds Nurse Practitioner Neurosurgery
7. Dr. Dennis Scolnik Staff Physician, Emergency
8. Dr. Jamie Hutchison Staff Physician, CCU
9. Sabrina Boodhan, Pharmacist

External Reviewers:
1. Dr Jan Riva-Cambrin MD FRCS: Assistant Professor of Neurosurgery, University of Utah
2. Dr. Mandep Tamber MD, PhD, FRCS: Assistant Professor, Pediatric Neurosurgery University of Pittsburgh School of Medicine
Children’s Hospital of Pittsburgh

5.0 References

5. 242-247.
7. 407-277.

Attachments:

Shunt protocol.pdf
ventricular shunt_CPG_September 2021.pdf