Statement of Competence

Competence is the attainment of knowledge, intellectual capacities, practical skills, integrity and professional and ethical values required for safe, accountable and effective practice as a registered nurse or registered midwife (NMBI 2015)

Michelle O’Gorman, Clinical Nurse Facilitator
Nicola Moss, Clinical Nurse Facilitator
Complied by Deborah O’ Grady, NPDU

Issue Date: October 2018
Review Date: October 2021
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</tr>
</tbody>
</table>

## OUR LADY’S WARD

| Signature of Preceptor:                                               |         |
| Signature of Nurse:                                                   |         |
| Date:                                                                 |         |
Our Lady’s Ward is predominantly a 10 bedded surgical unit, which provides care for children requiring general gastro-intestinal and genito-urinary surgery.

**PATIENT PROFILE – 1-16 year old, male and female**

- Appendectomy
- Nephrectomy / hemi nephrectomy
- Bowel resection
- Bowel obstruction
- Bladder augmentation/ urinary diversion
- Stoma formation (colostomy, ileostomy)
- Newly diagnosed oncology patients for Broviac insertion, biopsy)
- Post treatment oncology patients for resection of tumour
- Peg / jejunostomy tube insertion
- Cerebral palsy
- Patients requiring isolation
- Medical patients with complex needs/BIPAP /AIRVO

  This list is endless

**WARD STAFF**

<table>
<thead>
<tr>
<th>Clinical Nurse Manager (CNM 2)</th>
<th>Clinical Nurse Manager (CNM 1)</th>
<th>Clinical Nurse Facilitator (CNF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciara McGee</td>
<td>Alphonsa Rajan</td>
<td>Michelle O’Gorman</td>
</tr>
<tr>
<td>Joanna Connolly</td>
<td>Danielle Thorpe</td>
<td>Nicola Moss</td>
</tr>
<tr>
<td></td>
<td>Locardia Nyamorowa</td>
<td></td>
</tr>
</tbody>
</table>

**NURSES MAY BE IDENTIFIED BY THE UNIFORMS THEY WEAR**

<table>
<thead>
<tr>
<th>Green</th>
<th>CNM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navy with red trim</td>
<td>CNF</td>
</tr>
<tr>
<td>Blue</td>
<td>Staff Nurse</td>
</tr>
<tr>
<td>White (UCD &amp; OLCHC logo)</td>
<td>Post Graduate Nurse</td>
</tr>
<tr>
<td>White (OLCHC + TCD or UCD logo)</td>
<td>Undergraduate nurse</td>
</tr>
<tr>
<td>Pink</td>
<td>CNS</td>
</tr>
<tr>
<td>Red</td>
<td>Dietician</td>
</tr>
<tr>
<td>Navy Scrub</td>
<td>ICU Nurses</td>
</tr>
<tr>
<td>Green or Burgundy Scrub</td>
<td>Theatre</td>
</tr>
<tr>
<td>Purple (with cartoon trim)</td>
<td>HealthCare assistants</td>
</tr>
<tr>
<td>Yellow polo shirt</td>
<td>Play Specialists</td>
</tr>
<tr>
<td>Light Green</td>
<td>Household staff</td>
</tr>
</tbody>
</table>

**USUAL DAILY ROUTINE**

**Morning**
Our Lady’s Children’s Hospital, Crumlin, Dublin

where children’s health comes first

- Handover from night staff
- Safety pause
- Patient allocation & overview of patient care for the day

Allocated Nurse will do……..

- Safety checks
- Patient assessment/ pre op check/ IV site check
- Medications
- Pain assessment
- PEWS + fluid balance
- Hygiene
- Bloods to be taken before midday
- IV fluids and drugs charted
- Weight check (MUST BE DOUBLED CHECKED)

As per Operating Check List
- ✔ fasting since what time
- ✔ blood sugar
- ✔ blood results (if abnormal, consult team)
- ✔ pre-med (are theatre aware patient is due one)
- ✔ is patient clean
- ✔ due time in OT
- ✔ x-ray (teams should organise same)
- ✔ old charts (ring filing room, or ward clerk)
- ✔ Anaesthetic review?

Correct site surgery identified and marked

- Bed making
- Rooms tidied
- Follow up on Doctors rounds
- Any new tests or procedures ordered
- Review and document fluid balance hourly
- Update care plans
- Feedback to preceptor / CNM
- Lunches served by HCA
- Staff go to lunch too – ensure patient care is handed over to relevant staff

AFTERNOON

- Pews assessment + Fluid balance +medications
- Pain assessment
- Update care plans
Receive post op patients
Booked admissions arrive
Feedback to preceptor
Patient’s tea

**EVENING**

- Evening meds
- Pews assessment
- + Fluid balance + medications
- Care plans completed
- Feedback to preceptor
- Supper served
- Handover to night staff

**STAFF BREAK TIMES**

<table>
<thead>
<tr>
<th>Break</th>
<th>Duration</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>15 minutes</td>
<td>09.00 &amp; 10.30 hrs</td>
</tr>
<tr>
<td>Lunch</td>
<td>40 minutes</td>
<td>12.30 &amp; 14.00 hrs</td>
</tr>
<tr>
<td>Coffee</td>
<td>15 minutes</td>
<td>15.00 &amp; 16.00 hrs</td>
</tr>
<tr>
<td>Tea Break</td>
<td>30 minutes</td>
<td>17.00 &amp; 18.00 hrs</td>
</tr>
</tbody>
</table>

**POST-OPERATIVE PLAN**

**OBSERVATIONS**

- ¼ hourly for 2 hours (this should be started in recovery so finished 2 hrs from time patient comes into recovery)
- ½ hourly for 2 hours
- 1 hourly for 2 hours
- 4 hourly when stable

This is a **guideline only**, do observations as condition indicates.

Place on oxygen **saturations monitor** if respiratory compromised +/- on morphine infusion

Please **do not read heart rate from monitor**, please **feel or listen** to same

**Document** observations clearly and when you do them, don’t write them in later.

**PEWS assessment and interpretation**

**PAIN MANAGEMENT**

- Morphine Sulphate
- Epidural
Our Lady’s Children’s Hospital, Crumlin, Dublin  
..........................where children's health comes first

- IV paracetamol / IV tramadol / IV Difene

### CALCULATING MEDICATIONS

<table>
<thead>
<tr>
<th>What you want</th>
<th>X</th>
<th>Volume in which it is in</th>
</tr>
</thead>
<tbody>
<tr>
<td>What you have</td>
<td></td>
<td></td>
</tr>
<tr>
<td>You have</td>
<td></td>
<td>For Example: 60mg x 5mls = 2.5mls</td>
</tr>
<tr>
<td></td>
<td></td>
<td>120mg</td>
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</table>

### FLUID BALANCE

- Intravenous fluid intake for a child is prescribed according to the child's weight. To calculate the fluid requirements for a child for 24 hours:

<table>
<thead>
<tr>
<th>First 10 kgs of body weight</th>
<th>100mls/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next 10 kgs of body weight</td>
<td>50mls/kg</td>
</tr>
<tr>
<td>Every kg thereafter</td>
<td>20mls/kg</td>
</tr>
</tbody>
</table>

- Expected urinary output for a child: 1ml/kg/hour
- Expected urinary output for a teenager: 0.5ml/kg/hour
- Document fluid balance every hour and check iv site

### FASTING

- After consultation with the team, generally when the patient is alert and orientated post anaesthetic they may start with clear fluids and progress as tolerated to light diet. **CHECK POST-OP NOTES.**
- However, if the bowel was handled, the patient must remain fasting until bowel sounds are heard and the team is consulted.
- Ensure oral hygiene is maintained.

### WOUND CARE

- Mark any ooze on the dressing if noted. Check the wound, e.g., when doing the observations.
- Types of wound dressing include mepore, aquacel surgical, glue
- **All surgeons use different dressings so consult with senior staff for guidance**

### CHILDREN’S SAFETY

Children’s safety is an important aspect of children’s nursing. Children may not have the experience and knowledge to understand the risks associated with everyday things. Therefore as nurses, we need to look at things from a child’s perspective and avoid hazards which may injure a child.
Our Lady’s Children’s Hospital, Crumlin, Dublin

where children’s health comes first

- Always ensure that children have an ID band in situ displaying the Name/ Number/ Date of birth/ Ward.
- To avoid scalds when preparing a bath, always use cold tap first and ensure water is at correct temperature.
- Supervise young children during a bath or a shower.
- To prevent scalds, hot drinks are not permitted on the ward, and parents or children may not go into the ward kitchen.
- There is a parents room available
- Sterile bottles should be used for children under 1 year.
- To prevent falls, slippers or shoes should be worn when walking in the ward.
- If a child / baby is in a cot, ensure cot sides are raised and secured in position. If a child is at risk of falling out of bed, attach side-rails to the bed.
- To prevent tripping/falling, remove objects/obstructions from the floor.
- Children love to explore, so always ensure that doors to side rooms are closed.
- You must always know who is visiting your patients if you do not know please ask who everyone is. 2 visitors should only visit at any time. Remind visitors to wash your hands.

LEARNING RESOURCES AVAILABLE ON OUR LADY’S WARD

- Children’s nursing and medical notes
- The children and their parents
- Nursing staff
- Members of the multi-disciplinary team
- Intranet for policy and guidelines
- Staff education board
- Intranet access

Initials to be used throughout the booklet

Please insert your usual signature, initials and print name.

<table>
<thead>
<tr>
<th>Initials</th>
<th>Signature</th>
<th>Block Capitals</th>
<th>Date</th>
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Our Lady’s Children’s Hospital, Crumlin, Dublin  
……………………….where children’s health comes first

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<td>Documentation</td>
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<td>Emergency Checks</td>
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<td>Emergency Procedures: including Fire, Cardiac Arrest and Security</td>
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<td>Hospital Tour</td>
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<td>Layout of the Unit</td>
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<td>Risk Management/ Incident Reporting</td>
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<td>Rose of the Multi-disciplinary Team</td>
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<td>Sick Leave Policy</td>
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<td>Unit Philosophy of Care</td>
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<td>Unit Routine – Day and Night Shifts</td>
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<td>REQUIRED READING</td>
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<td>Signature</td>
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<tr>
<td>ABA - code of professional conduct</td>
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<tr>
<td>ABA - guidance on medication management</td>
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<tr>
<td>ABA - guidance to nurses &amp; Midwives on the development of policies and procedures</td>
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<tr>
<td>ABA - Recording Clinical Practice</td>
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<tr>
<td>ABA - scope of practice</td>
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<td>Concerns regarding Child abuse/neglect</td>
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<td>European work time directive</td>
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<td>Guidelines for good practice</td>
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<td>Guidelines for hand hygiene in health care setting</td>
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<td>Hanly Report</td>
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<td>Intravenous (IV) policy</td>
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<tr>
<td>Medication Policy Folder</td>
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<td>Misuse of drugs Act</td>
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<td>Nurse Practice Folder – Intranet only</td>
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<tr>
<td>Obtaining consent</td>
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<td>Our children, their lives</td>
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<td>Prevention of Abuse of Children by a Staff Member</td>
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<td>Quality and fairness, a health system for you</td>
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<tr>
<td>Smoke free work place</td>
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<td>The PEWS – national Clinical Guidelines</td>
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<tr>
<td>Waste Policy</td>
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</table>
The following study days are a mandatory requirement for all staff working in Our Lady’s Children’s Hospital.

<table>
<thead>
<tr>
<th>Date</th>
<th>Nurses’ Signature</th>
<th>Facilitator / Preceptors Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood tracking</td>
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<tr>
<td>Child Protection and Awareness Training</td>
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<tr>
<td>Children’s First – HSE LAND</td>
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<td></td>
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<tr>
<td>Colorectal Study Day</td>
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<td></td>
</tr>
<tr>
<td>Enteral feeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epidural Workbook &amp; study day</td>
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<td></td>
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<tr>
<td>Fire Lecture (Bi-annual)</td>
<td></td>
<td></td>
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<tr>
<td>Haemovigilance and Infection Control Study day (Bi-annual)</td>
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<tr>
<td>Hand Hygiene (Annually)</td>
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</tr>
<tr>
<td>Intravenous Study Day</td>
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<tr>
<td>Management of the Acutely ill child (must be on the unit &gt;6months)</td>
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<tr>
<td>Manual Handling / Patient Moving Study Day (Bi-annual)</td>
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<tr>
<td>Medication Management (to be completed prior to IV day)</td>
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<td></td>
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<tr>
<td>PAEDAIM (Newly Qualified)</td>
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<tr>
<td>Pain Management</td>
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<tr>
<td>PEWS</td>
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<td></td>
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<tr>
<td>Preceptorship (must be on the unit &gt;6months)</td>
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</tr>
<tr>
<td>Paediatric Immediate Life Support (Yearly)</td>
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</table>
Please indicate your level of experience overall.  Tick appropriate box

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Theory, no practice</td>
</tr>
<tr>
<td>B</td>
<td>Intermittent experience</td>
</tr>
<tr>
<td>C</td>
<td>1 – 2 years’ experience</td>
</tr>
<tr>
<td>D</td>
<td>plus years’ experience</td>
</tr>
</tbody>
</table>

**Age Specific Practice Criteria**

Please check the boxes below for each age group for which you have expertise in providing age-appropriate nursing care. (Tick relevant box)

**AGE SPECIFIC PRACTICE CRITERIA**

*Please check the boxes below for each age group for which you have expertise in providing age-appropriate nursing care. (Tick relevant box)*

<table>
<thead>
<tr>
<th>Age Group</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn /Neonate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth – 1yr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toddler 1 –3 yrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-school 3 – 5 yrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School age children 5 yrs – 12 yrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adolescents 12 – 18 yrs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PLEASE INDICATE YOUR SKILL LEVEL 1-4 OF EXPERIENCE IN EACH CATEGORY BELOW**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No Experience</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Some experience</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Can perform independently</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Proficient /Can supervise and teach.</td>
<td></td>
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</table>

**MEDICATION ADMINISTRATION / IV’S**

<table>
<thead>
<tr>
<th>Self-Assessment</th>
<th>Education Completed</th>
<th>Performs Safely accurately &amp; efficiently</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug Calculation for paediatrics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate assessment of IVC, Flushing Connection and disconnection of Medication and IVF lines</td>
<td></td>
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</tr>
<tr>
<td>Addition of additives to IVF solutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administer IV bolus meds</td>
<td></td>
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<tr>
<td>Administer IV infusion meds</td>
<td></td>
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<tr>
<td>TPN: Read &amp; Understand Policy</td>
<td></td>
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<tr>
<td>Knowledge of specific patient care required for a child on TPN (Ordering, bloods, observations, trouble shooting)</td>
<td></td>
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</tr>
<tr>
<td>Observed TPN Preparation &amp; Connection</td>
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<tr>
<td>Assisted TPN Prep &amp; Connection</td>
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<tr>
<td>Preformed Independently with 2nd nurse Prep &amp; Connection</td>
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</tbody>
</table>
### MEDICATION ADMINISTRATION / IV’S

<table>
<thead>
<tr>
<th>Central Venous Access Devices</th>
<th>Self-Assessment</th>
<th>Education Completed</th>
<th>Preforms Safely accurately &amp; efficiently</th>
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</thead>
<tbody>
<tr>
<td>Read and understand policy</td>
<td></td>
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<tr>
<td>Knowledge of each CVAD in OLCHC and specific care to each one:</td>
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<tr>
<td>CVC: Care Bundle</td>
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<tr>
<td>Blood sampling</td>
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<tr>
<td>Dressing &amp; Bionector change</td>
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<tr>
<td>PICC: Care Bundle</td>
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<tr>
<td>Blood Sampling</td>
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<tr>
<td>Dressing &amp; Bionector Change</td>
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<tr>
<td>BROVIAC: Care Bundle</td>
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<tr>
<td>Blood Sampling</td>
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<tr>
<td>Dressing and Needle free change</td>
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<tr>
<td>IMPLATOFIX: Care bundle</td>
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<td>Blood sampling</td>
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<tr>
<td>Dressing &amp; Bionector change</td>
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<tr>
<td>Blood Products</td>
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<tr>
<td>Read &amp; understand policies</td>
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<td>Received Haemovigilance education</td>
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<td>Specific Patient care required</td>
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<tr>
<td>Blood collection &amp; administration with supervision</td>
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<tr>
<td>Blood collection independently &amp; 1st checker</td>
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<tr>
<td>Discarding of blood products</td>
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<tr>
<td>Documentation completed</td>
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</table>

**Administer nebuliser treatments**

- Read & understood Nebuliser therapy SOP
- Aware of different nebs, administration & equipment required
- Aware of uses and effects of each neb
- Patient Assessment

**Safety checks**

- PEWS: read and understood Guidelines
- Supervised Pews chart completion
- Completion of Pews chart and interpretation of results competently
- Assessing and recognising a patient in shock
- Oral and Nasal Suctioning
- Oxygen administration
<table>
<thead>
<tr>
<th>MEDICATION ADMINISTRATION / IV’S</th>
<th>Self-Assessment</th>
<th>Education Completed</th>
<th>Preforms Safely accurately &amp; efficiently</th>
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</thead>
<tbody>
<tr>
<td><strong>Resus Trolley</strong></td>
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<tr>
<td>Read and understand Resuscitation guidelines</td>
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<tr>
<td>Competently check Resus trolley</td>
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<tr>
<td>Aware of equipment and medication stored on resus trolley and its uses</td>
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<tr>
<td><strong>Gastrointestinal</strong></td>
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<tr>
<td><strong>Enteral Feeding Tubes</strong></td>
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<td></td>
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</tr>
<tr>
<td>Read &amp; understood guideline</td>
<td></td>
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<tr>
<td>Observe NG tube insertion &amp; care</td>
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<tr>
<td>Insert and care for tube under supervision</td>
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<tr>
<td>Competently insert NG tube and care for same independently</td>
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<tr>
<td>Administer tube feeding: gravity /pump bolus &amp; continuous</td>
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<tr>
<td>Read and understood Enteral Feeding Tube Medication Guideline</td>
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<tr>
<td>Administer medication via NGT competently</td>
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<tr>
<td>Care of a child with a Naso-jejunal tube</td>
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<tr>
<td><strong>Care of child with a PEG tube</strong></td>
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<tr>
<td>Read &amp; understood guideline</td>
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<tr>
<td>Aware of different Peg tubes available and their care</td>
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<tr>
<td>Pre op care required: dietician, peg CNS, information leaflets</td>
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<tr>
<td>Post op care: safe patient collection, adequate pain relief, specific post op instructions, Flush peg and administer medication</td>
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<tr>
<td>Administer feeds</td>
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<tr>
<td>Care of peg site – dressing</td>
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<td>Parental education</td>
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<tr>
<td><strong>Care of a child with a gastro-jejunal tube</strong></td>
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<tr>
<td><strong>Replogyle tubes</strong></td>
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<tr>
<td>Knowledge of use and care of replogyle tubes</td>
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<tr>
<td>Observe Insertion and use of replogyle tube including set up of Low pressure suction</td>
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<tr>
<td>Supervised insertion and use of replogyle tube including LPS</td>
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<tr>
<td>Competently insert and care for a replogyle tube including LPS</td>
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<tr>
<td>Understanding of GI losses and correct replacements of same</td>
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</tbody>
</table>
### MEDICATION ADMINISTRATION / IV’S

<table>
<thead>
<tr>
<th>Self-Assessment</th>
<th>Education Completed</th>
<th>Performs Safely accurately &amp; efficiently</th>
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</thead>
<tbody>
<tr>
<td>Care of a patient with a stoma</td>
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<tr>
<td>Aware of stoma type</td>
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<tr>
<td>Assess stoma</td>
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<tr>
<td>Preform stoma care and bag change</td>
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<tr>
<td>Care of a patient with Crohn’s disease or Ulcerative colitis</td>
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<tr>
<td>Care of a patient with severe dehydration</td>
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<tr>
<td>Care of the child with an acute abdomen</td>
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</table>

### Surgery

<table>
<thead>
<tr>
<th>Pre-operative care</th>
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</thead>
<tbody>
<tr>
<td>Fasting time (see appendix)</td>
<td></td>
<td></td>
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<tr>
<td>Aware of pre-op bloods required for specific surgeries</td>
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<td></td>
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<tr>
<td>Safe surgery Policy – Read and understood</td>
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<td></td>
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<tr>
<td>Consent see - HSE national consent policy</td>
<td></td>
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<tr>
<td>Pre op investigations e.g. MSU, CxR, U/S.</td>
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</tbody>
</table>

### Post Op care

| Pressure area care – assessing same, use of air mattress when required | | |

### Wound Care

| Wound Care Plan | | |
| Awareness of different dressing types and their usage (see appendix) | | |
| Assess wound site, Dressings and care of individual wounds, signs of infection | | |
| Preform dressings using aseptic techniques, wound drains: | | |
| Aware of types available and rationale for using same, Care of drains: emptying, recording output, dressing | | |
| Observe drain removal | | |
| Remove drain under supervision | | |
| Competently remove drain independently | | |
| Care of a VAC | | |

### Care of a Chest drain

| Care of a Chest drain | | |
| Read and understood chest drain guideline and care plan specific safety checks | | |
| Know equipment required when minding a chest drain | | |
| Care of chest drain site | | |
| Low pressure suction | | |
| Measure and record output | | |
| Observe for oscillating and bubbling and reasons for same | | |
Pain management

| Pain assessment – Baker Wong FACES & FLACC scale – | See appendix |

Knowledge of pain medication commonly used post operatively

- Paracetamol
- Ibuprofen
- Difene
- Clonidine
- Tramadol
- Oramorph
- Oxycodone

Morphine / oxycodone infusion:

| Read and understood morphine guidelines |
| Observe morphine pump set up and connection |
| Set up pump and connect under supervision |
| Competently set up, connect and manage morphine pump |
| Preform and interpret observations as per opioids infusion guideline |

Epidural

| Read and understood epidural guideline |
| Completion of epidural workbook |
| Attend epidural training session |
| Observe epidural set up, connection and patient care |
| Specific epidural observation – motor block, sensory block – preforming and interpreting the same |
| Set up epidural, connect and provide patient care under supervision |
| Competent in epidural care |

Renal / Genitourinary

Catheters

| Read and understand guidelines |
| Observe insertion of Foley catheter on females |
| Insert Foley catheter on females only under supervision |
| Competently insert Foley catheter independently |
| Care and removal of Foley catheters on male and females |

Care of a dripping stent

| Understand dripping stent care plan |
| Understand rationale for dripping stent |
| Care of dripping stent |
| Use of double nappy system |
| Care of a patient pre / post op Mitrofanoff |

Collection of a urine sample
Urinalysis results
Complex fluid balance
Interpretation of lab results
Blood glucose monitoring

<table>
<thead>
<tr>
<th>COMPLEX FLUID BALANCE: Respondents</th>
<th>Self-Assessment</th>
<th>Education given</th>
<th>Preforms accurately</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correctly calculate fluid requirements based on weight</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Aware of commonly used IVF and their actions:</td>
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<tr>
<td>0.9% NACL</td>
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<tr>
<td>Hartmans Solutions</td>
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<tr>
<td>0.9% NACL &amp; 5% dextrose</td>
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<td></td>
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<tr>
<td>10% Dextrose</td>
<td></td>
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<tr>
<td>Calculation of urinary output dependent of weight</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Correctly calculate requirements for fluid restricted patients</td>
<td></td>
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<tr>
<td>Complete fluid balance sheet correctly and interpret same</td>
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</tbody>
</table>

**Bowel Washouts**

- Aware of patient conditions which require bowel washouts
- Observe bowel washouts
- Preform bowel washouts under supervision
- Competently preform bowel washouts
- Aware of the different washouts used:
  - Olive oil enemas
  - Phosphate enemas
  - Willis Washouts
  - Saline washouts

**AIRVO**

- Read and understands HHFNC oxygen therapy guideline
- Observe set up of AIRVO and care of patient
- Set up and care for a patient on AIRVO under supervision
- Competently set up and care for a child on AIRVO
- Preform observations and interpret same appropriately

**Bladder reconstruction**

- Bladder reconstruction surgery
- Aware of the types of bladder surgery:
  - Augmentation / cystoplasty
  - Mitrofanoff
  - Bladder neck surgery
- Aware of pre op prep required:
Our Lady’s Children’s Hospital, Crumlin, Dublin

……………… where children’s health comes first

COMPLEX FLUID BALANCE: Respondents

<table>
<thead>
<tr>
<th></th>
<th>Self-Assessment</th>
<th>Education given</th>
<th>Preforms accurately</th>
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</thead>
<tbody>
<tr>
<td>Post op care</td>
<td></td>
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<tr>
<td></td>
<td>Strict hourly fluid balance recording</td>
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<tr>
<td>Bladder Flushes:</td>
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<tr>
<td></td>
<td>Observe mittroff flushes</td>
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<td></td>
<td>Preform mittroff flushes under supervision</td>
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<td></td>
<td>Competently preform mittroff flushes</td>
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<td>Anchor tape changes</td>
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<td>Trouble shoot</td>
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PRE-OPERATIVE FASTING GUIDELINES FOR CHILDREN UNDERGOING ANAESTHESIA

- All children who are to undergo anaesthesia should be fasted prior to the anaesthetic, to prevent the risk of regurgitation and pulmonary aspiration during the perioperative period.

- Regular oral medication should be continued unless contraindicated.

- For elective surgery, children should be fully fasted at the time of commencement of the surgical list i.e. 8.30 am for morning lists and 1.30 pm for afternoon lists. Exceptions to this require the prior agreement of the consultant surgeon or anaesthetist on that list.

- In certain emergency situations it may not be possible to have children fully fasted. There are also certain surgical conditions where despite fasting, the child is assumed to be at risk of regurgitation. In these situations the anaesthetic technique will be modified to minimize the risk of regurgitation and aspiration.

The fasting guidelines for children are:

- Food, formula and most fluids – 6 hours.
- The child may be given clear fluids up to 2 hours before surgery.
- Clear fluids are defined as non-particulate liquids e.g. water, glucose 5% or Flat 7 Up*
  *Please add some water to reduce fizz in 7Up

The fasting guidelines for infants are

- Breast Milk - 4 hours preoperatively
- Formula, Solids - 6 hours preoperatively
- The child may be given clear fluids up to 2 hours before surgery.
- Clear fluids are defined as non-particulate liquids e.g. water, glucose 5% or Flat 7 Up*
  *Please add some water to reduce fizz in 7Up
Our Lady's Children’s Hospital, Crumlin, Dublin

………………where children’s health comes first

---

**Wong-Baker FACES™ Pain Rating Scale Instructions For Usage**

Explain to the person that each face is for a person who has no pain (hurt) or some, or a lot of pain.

Face 0 doesn’t hurt at all. Face 2 hurts just a little bit. Face 4 hurts a little bit more. Face 6 hurts even more. Face 8 hurts a whole lot. Face 10 hurts as much as you can imagine, although you don’t have to be crying to have this worst pain.

Ask the person to choose the face that best describes how much pain he has.

---

**Daily 24 hour Fluid Balance**

To complete at 6am daily

<table>
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<tr>
<th>Date</th>
<th>Total IV Fluid TPN/Meds</th>
<th>Total Oral Intake</th>
<th>Total IV &amp; Oral Intake</th>
<th>Urine Output</th>
<th>Stoma Drain Stool</th>
<th>+V of Vo Balance</th>
<th>Repogyle Losses</th>
<th>Repogyle Replacements</th>
<th>Sign</th>
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Full Name: __________________________
Address: ____________________________
HCR: ________________________________
REMEMBER TO CARE FULLY FOR YOUR IV FLOW.

IV FLUID CHART

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<thead>
<tr>
<th>Time</th>
<th>0-10</th>
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REMINDER:
- Solution 1: TPN ELECTROLYTES 90 mL/h
- Solution 2: TPN LIPIDS & SMEAR
- Solution 3: IV MEDICATION + FLUSHES

ENSURE FLUIDS ARE Filled IN AND SOLUTIONS UPDATED.

ORDER:
- Total fluid/day
- Total fluid/hourly
- Specific orders:
- Total balance: 2600 mg

OUR LADY’S CHILDREN’S HOSPITAL, CRUMLIN, DUBLIN
…where children’s health comes first
Our Lady’s Children’s Hospital, Crumlin, Dublin

………..where children's health comes first

### IV Fluid Chart

<table>
<thead>
<tr>
<th>Time</th>
<th>O2</th>
<th>Total Oral Intake</th>
<th>Urine Output</th>
<th>Stoma Drain Stool</th>
<th>Vol-ve Balance</th>
<th>Repagylite Losses</th>
<th>Repagylite Replacements</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

**Weight:** 44 lbs

**Date:** 2.14.2018

**Name:**

**HTR No.:**

**Input & Output:**

- **Intake:**
  - Oral: 1790 mL
  - IV: 0 mL
  - Other: 0 mL
  - Total: 1790 mL

- **Output:**
  - Urine: 1140 mL
  - Stoma Drain: 0 mL
  - Other: 0 mL
  - Total: 1140 mL

**Supplements:**

- **Fluids:** 0 mL
- **Nutrition:** 0 kcal

**Other:**

- **Other Input:** 0 mL
- **Other Output:** 0 mL

**Notes:**

- **Orders:**
  - Total Body Fluids (TBW) Goal: 1790 mL
  - Oral Intake Goal: 1790 mL
  - Oral Intake: 1790 mL
  - Oral Intake Indicator: NPO
  - IV Fluids: 0 mL
  - IV Fluids Indicator: NPO

- **Medications:**
  - IV: 0 mL
  - Oral: 0 mL
  - Other: 0 mL

- **Other:**
  - Other: 0 mL

**Total Fluids:**

- **Total Intake:** 1790 mL
- **Total Output:** 1140 mL
- **Net Fluid Balance:** 650 mL

**Other:**

- **Weight:** 44 lbs
- **Date:** 2.14.2018

**Daily 24 hour Fluid Balance**

To complete at 6am daily

**Notes:**

- **This should be recorded in your handover**

**To be completed for all complex fluid balance patient**
CALCULATING FLUID REQUIREMENTS IN CHILDREN

100MLS/KG FOR 1ST 10KG
50MLS/KG FOR 2ND 10KG
20MLS/KG FOR EVERY KG AFTER THAT

E.G CHILD 37KG
100MLS × 10 = 1000
50MLSX10=500
20MLSX17=340
TOTAL = 1840 IN 24HOURS
IF ON IV’S THEY WOULD BE RUNNING AT A RATE OF 76.6MLS/HR
THIS CAN BE ROUNDED OFF TO 76MLS OR 77MLS/HR

URINARY OUTPUT:
Child – equal to or greater than 1ml/kg/hr
Adolescent – equal to or greater than 0.5/kg/hr

LOW pressure suction set up for Replogyle tubes
Nursing Care
Reconstructive Bladder Surgery

Liz Boyce
Urology CNS
OLCHC
Types of Reconstruction

- Augmentation Cystoplasty
- Mitrofanoff
- Bladder Neck Surgery
- ACE
- All of or a combination of the above

Aims of reconstructive surgery

- Provide adequate functional bladder capacity with low filling pressure.
- To preserve upper tract from high pressure damage by VUR.
- A safe continent urinary system.
- Improved QOL and independence.
Augmentation Cystoplasty

- Enlarge a high pressure small capacity bladder using a GI segment (ileum commonly used)

- Bladder substitution-replacement of the native bladder with GI segment.

Augmentation Cystoplasty
Augmentation Cystoplasty

Mitrofanoff

- Dr Paul Mitrofanoff (1980)
- The appendix, a portion of ileum or ureter is used and channelled from the bladder through the abdominal wall.
- Sited left or right iliac fossa or through the umbilicus forming a continent catheterisable channel to give access for intermittent bladder drainage.
Mitrofanoff

Appendix used to make the Mitrofanoff

Ileum segment (Monti Mitrofanoff)

Mitrofanoff

Continent channel which is catheterised to empty urine

Kidney
Ureter
Bladder or Neobladder

Catheter
Bladder Neck procedure

- BN closure ➔ NO URETHRAL OUTLET
- Potentially unsafe situation
- BN repair ➔ Will have some urethral outlet if under pressure
- Catheter patency essential to prevent bladder filling

Increasing Bladder Outlet Resistance

- Fascial Sling
  Suspension of the BN with a fascial strip. Coaptation of the BN due to traction, and/or elevation of the urethra to an intraabdominal position, which increases tension on the BN with abdominal straining.

- Artificial Urinary Sphincter
  Ideal patients for AUS are post pubertal males/females who can void volitionally and empty their bladder.
Antegrade Continence Enema

The appendix or portion of ileum is tunnelled out through the abdominal wall, usually right iliac fossa to form a continent catheterisable channel.

When flushed with enema irrigates the colon.

Faeces passes via the rectum.

Antegrade Continence Enema (ACE)
Who?

**Congenital malformations** (Bladder Extrophy)

Most common candidates are those with **neuropathic bladder** (Spina Bifida)

**Pre renal transplant** (Renal disease/PUV/Obstructive uropathy) **SAFE** bladder required prior to transplant

**Conservative Management**

- Not everybody is **suitable** for surgery
- Not everybody **wants** surgery
- Anticholinergics / Botox + Clean Intermittent catheterisation
- Minimally invasive
Pre Op Assessment

- Imaging (RUS, DMSA, MAG 3)
- Baseline renal function
- Bladder function assessment and Uroflow
- Cystometry
- Physical suitability (body habitus, weight, dexterity)
- Psychological suitability (motivation, expectations, readiness)
- All assist in the planning of patient specific surgery.

Cystometry

*(pressure flow study)*

- Performed when results will affect management (pre reconstruction / Renal transplant)
- Urotherapy has failed.
- Screening tests are abnormal.
- Unknown diagnosis, not sure exactly what is going on.
- Pressure recording of both the bladder and the abdomen.
- Comprehensive assessment of the filling and storage phase, detrusor function, bladder sensation, bladder capacity and volume, compliance and urethral function.
Love and Marriage......
Lower Urinary tract dysfunction can cause upper tract impairment

Pre Op Prep

• **Comprehensive** prep with CNS after discussion in OPD with Consultant.

• **Readiness** is paramount to ensure compliance post op.

• **Meeting** with other parents/child who have undergone reconstructive surgery to get a more subjective approach is important.
Pre Op

- **Admit** by Team - 24-72hrs pre op, depending on bowel prep required.

- **Urine C+S URGENT** to lab. May need AB’s pre op.

- **IVC / Fluids / Routine bloods.**

- **Anaesthetic review (Epidural)**

Bowel Prep

- **TOTAL BOWEL EVACUATION** Full reconstruction involving small bowel.

- **ACE/MITROFANOFF** may require lower gut prep. Dulcolax for 3 days prior to admission. W/O the evening before OT if established.

- **BN SURGERY** generally no specific prep

- All in conjunction with low/no residue diet.

- **Patient specific**
Bowel Prep

- Picolax
- 1 BD (8am/2pm) 1 OD on day 2 (8am)
- Good fluid intake
- Aim for yellow soft stools/clear
- In conjunction with low/no residue diet
- IVC/IVF to maintain hydration
Post Op Management

- Routine post op cares
- Specific catheter care/safety
- Catheter flushing
- Intake/output
- Pain management/spasm
- Wound care
- Mobilising
- Bowel Management

Plumbing

- Catheters post op depend on patient condition, anatomy and specific surgery performed.

- Mitrofanoff/SPC/Urethral.

- PURPOSE is to keep the bladder on CONTINUOUS DRAINAGE.

- Safety
Plumbing

- If you have a good knowledge of the child’s anatomy and condition you can manage the plumbing

- Read the operative note to get a very clear picture.

Catheters

**Mitrofanoff**
- Size 10Fr
- Indwelling 4-6 weeks
- Remove and start CIC

**Supra Pubic**
- **ALWAYS insitu post augmentation**
- Large bore (facilitate mucus drainage)
- Safety valve
- Insitu until CIC established
Catheters

- ALL catheters on free drainage initially.
- Secured to abdomen at 2 points with elastoplast.
- Free of kinks, below the bladder, at end of bed for better syphonage.
- 24hr drainage bags when on bed rest.
- Leg bags when mobilising.
- Night drainage bags ALWAYS connected overnight. (2lt capacity)

Post op Mitrofanoff

- Size 10 NGT sutured at skin level
- Note CM level of tube
- 2 anchor tapes (elastoplast)
- Insitu 4-6 weeks
- Remove dressing 24-48 hrs post op and leave exposed unless excessive ooze

Anchor Tapes

- Anchor tapes secure the tube to the skin.
- 2 stress points.
- Always change 1 at a time while sitting or lying down.
- Change when wet or loose.
Free Drainage

- Hourly urine output monitoring for first 48hrs, then extend monitoring by 1 hour if output is ok.
- Free drainage via leg bag when output is satisfactory and mobilising.
- Overnight bag MUST be connected at night.
- Strict and accurate Intake/Output.

6 weeks Post Op

- Commence Clean Intermittent Catheterisation
- 3 hourly drainage +/- Overnight drainage
Flushing

• **Mucus from anastomotic bowel segment** can create post op and ongoing complications such as catheter blockage, stone formation and infection.

• Flushing instructions will be documented in the post op note and needs to be charted in the kardex.

• Volume/frequency at Consultant/CNS discretion.

• ** Usually 4-6 hourly 20-50mLs 0.9% NaCl.**
Flushing

- Clean technique
- Change equipment every 24hrs (Tray/60ml syringe/gallipots/Nacl/Alcowipes)
- As prescribed and PRN.
- Provided what goes in comes out you can flush as required

Aspiration

- Aspirate with care
- Exert pressure in the bladder
- Risk of mucosal damage / Pain
- Mucus is heavier than urine and will sink to the bottom of the bladder
- Flush with speed to disturb the mucus and aspirate
- If the plunger does not freely release DON’T put your back into it!
- Parents / Child are taught this method
- DO NOT USE THIS METHOD IN IMMEDIATE POST OP PERIOD
Flush Technique
(Post augmentation when both catheters are draining freely)

- Always flush via mitrof to return via SPC.
- Use an alco wipe to disconnect the catheter and instil slow steady flush.
- Observe for return via SPC.
- Monitor patient response to the flush.
- ALWAYS empty both drainage bags prior to flushing.
- Never aspirate the mitrof, risk of blocking with mucus.

STOP FLUSH IF........

- Sensation of fullness or desire to pass urine
- Resistance when flushing
- Patient reports pain
- Leaking at mitrofanoff site
Urine drainage is sluggish or decreased by half the previous hours drainage

- **Check fluid intake.** Previous 24hrs I/O to assess hydration status.
- Concentrated urine?
- Acceptable output for age/weight.
- Check position of catheters.
- Obstruction—milk the SPC by gently twisting and stretching the catheter between thumb and forefinger.
- Remove anchor tapes if necessary to milk length of the tube.
- **Gently** aspirate the SPC using a 50ml catheter tip syringe.
- **Gently** instil 5mls NaCl into the SPC.
- If SPC is patent, flush the mitrofanoff.
- When in doubt contact Team/CNS.

Urethral Leaking

- **Aim to avoid it.** Evident bladder filling.

- **BN repair/closure should not leak.**

- Post op bed rest and free drainage.

- Quite often one catheter will do majority of draining and one may be clamped.
Troubleshoot

• Find source of obstruction.
• Open any clamped catheter.
• Aspirate the SPC/check position of catheters.
• Do not get the pt to strain.
• Inform the team.
• Estimate volume of leak and document.

Intake and Output

• Appropriate output for age/weight.
• Renal pts may be on a higher fluid challenge.
• IV maintenance initially.
• Oral intake 1,200-1,500mls per day in regular divided volumes.
• ROUTINE is important for bladder cycling.
• Routine drinking/CIC.
• Can be the most difficult part of recovery for many.
Intake and output

• HOURLY urine output monitoring.
• ACCURATE timely intake. Please don’t guestimate.

Pain Management

Epidural
• Anaesthetic review pre op suitability
• Remove day 3-5 post op
• Bed rest
• Pain CNS

Morphine
• If epidural not suitable
• Side effects
• Gut motility
Spasm

• Result of trigonal irritation from indwelling catheters
• Manifests as pain in perineum/tip of willy

Treatment
• Anticholinergics
• Oxybutynin/Tolterodine
• Side effects must be considered before prescribing

Wound care

• Remove dressings 24-48 hours post op
• Expose to air
• Mucus production from mitrofanoff is normal, protect clothes with gauze
• Clean with saline
• Shower as normal
Mobilising

- ASAP post op depending on restrictions.
- (BN work/epidural)
- NB to promote gut motility and prevent respiratory complications.
- Stand tall! Avoid stooping.
- Physiotherapy involvement.

Bowel Management

- If established on washouts (willis/Peristeen) return to regime post op once eating/drinking.

- ACE formation → Activated on day 5 post op. Catheter left insitu x 6 wks

- Treat with laxatives earlier rather than later. Movicol/lactulose

- Splint the abdomen while pooing.

- Fluids and diet
Constipation

Potential Complications of Augmentation

**COMMON**
- Difficulty catheterising (stenosis/false passage) ACE stopper
- Bladder stones Flushing with saline reduced risk from 43% to 7%. Rate of recurrence up to 44%
- UTI
- Reoperation 34%
- Metabolic complications Absorptive properties of bowel

**UNCOMMON**
- Bladder perforation/Rupture uncommon but most serious and life threatening complication
- Bowel obstruction 2-5%
- Neoplasia 1.2% TCC following augmentation in population of 250.
- Screening yearly 10 years after augmentation.
Difficulty catheterising

- Time if they have a pop off valve
- Over distension/rupture risk if BN closed
- Trauma from repeated attempts/swelling/bleeding/pain/false passage
- Always given a smaller catheter on discharge
- Get one in, leave it in and contact OLCHC

UTI’s

No CSU...No Point
- Chronic Bacteruria as bowel now present in the bladder
- CSU essential with careful interpretation
- Treat if symptomatic
Antibiotic Resistance

Discharge

- Length of stay 10-14 days
- Child/parents instructed in all aspects of management.
- Prescription for supplies/meds.
- Faxed to pharmacy.
- Supplies given on discharge.
- Readmit 4-6 wks post op for CIC training.
- R/O SPC once established on CIC.
- OPD 3 months.
This workbook on epidural pain management was developed to help familiarize nursing staff with the nursing care for patients receiving epidural analgesia. The training program for epidural analgesia includes 2 components including the completion of:
LEARNER OBJECTIVES

After the completion of this self-directed learning module, the nurse will be able to:

1. Identify the benefits, indications and contraindications for epidural analgesia
2. Describe the key anatomical structures and their functions related to epidural analgesia.
3. Identify the mechanism of action for the following classes of drugs:
   - Neuroaxial opioids
   - Local anaesthetics
   - Adjuvant drugs
4. Identify the most common potential complications of epidural analgesia and the specific actions to be taken if a complication occurs.
5. Describe the nursing core assessment & monitoring for patients receiving epidural analgesia
6. Demonstrate, in a simulated setting and then in the clinical setting, the following:
   - Set up of the continuous epidural infusion (pump and tubing)
   - Assessment of the patient with an epidural infusion
7. Describe necessary documentation for epidural analgesia

REPONSIBILITY OF CARE
Role of Nursing Staff
Under An Bord Altranais Scope of Professional Practice (2000), nurses should maintain and improve their professional knowledge and experience in caring for patients. To meet this requirement nurses who are asked to care for children with epidural infusions should attend a theoretical teaching programme and be prepared to ensure that they are competent to care for children receiving epidural infusions. The registered nurse must be aware of and demonstrate their accountability, including their own abilities and limitations when caring for a patient who is receiving continuous epidural analgesia.

Role of the Anaesthetist and the Acute Pain Nurse
It remains the responsibility of the anaesthetic staff to support staff on the wards caring for patients with Epidurals. Ward staff will be trained to undertake the day-to-day management of epidurals. The Acute Pain Nurse will be available on weekdays for advice and assessment of patients. Medical support is also provided on a daily basis by the anaesthetic team. Out of these hours the Anaesthetist on call will be available. The acute pain team will visit patients with epidurals at least daily until the epidural has been discontinued. If a patient comes to the ward via ICU/HDU, with an epidural infusion the CNS pain should be informed to initiate daily reviews.

Introduction
Epidural analgesia (EA) is regarded as the gold standard for managing acute pain after major surgery or trauma to the chest, abdomen, pelvis or lower limbs. Epidural analgesia is an effective method of providing pain relief to children. (Llewellyn & Moriarty, 2007). When combined with other pharmacological interventions, children can achieve better pain control, decreased suffering and anxiety and improved physiological outcomes and reduced hospital stay. (Llewellyn & Moriarty, 2007). However, epidural analgesia can cause serious, even life-threatening complications and its safe and effective management requires a coordinated multidisciplinary approach. This self-directed learning module is essential information for the nurse who cares for children receiving epidural analgesia.

Definition
Epidural analgesia is achieved by infusing preservative free morphine or fentanyl or local anaesthetic or a mixture of both) through a catheter placed into the epidural space surrounding the spinal cord. An epidural catheter is usually placed to enable repeated doses or an infusion of the drug to be given. The infusion may be continuous, intermittent (Bolus) or patient controlled.

Why use epidural analgesia?
There is considerably less systemic exposure to opioids when the epidural (rather than intravenous) route is chosen.

- The drug is diffused through the dura, enters the spinal fluid where it begins to spread rostrally (toward the head) and is absorbed into the arteries supplying the dorsal horn of the spinal cord.
- The drug is able to act directly at the opioid receptors in the dorsal horn of the spinal cord
- Lower impact on GI tract
- Less constipation
- Less nausea and vomiting
- Faster return to normal GI motility (normal eating and defecation).
- The use of combination solutions (opioid + local anaesthetic) increases analgesia while decreasing the potential toxicity of higher doses of a single agent.
Epidural analgesia is often considered superior to intravenous patient controlled analgesia, especially for major abdominal or thoracic surgery.

- Decreased incidence of pulmonary complications (Mann et al 2000)
- Earlier ambulation
- Because all other administration routes have been found to be ineffective

**Physiology of pain**

Noxious (thermal, chemical or mechanical) stimuli initiate a series of chemical response that result in the transmission of the stimulus by way of nerve fibres and activation of the pain pathway. Neurotransmitters and neuromodulators are involved in the inhibition or facilitation and the modulation of the painful stimulus. The conscious perception of pain occur at different levels in the brain.

**Physiology of epidural analgesia**

Local anaesthetics and opiates spread as if in a column, like the rise of mercury in a thermometer with increasing temperature when injected into the epidural space. The site of needle insertion, catheter tip location and volume and concentration of local anaesthetic administered determines the extent and quality of sympathetic, sensory and motor blockade.

Local anaesthetics block or inhibit the production of nociceptive impulses. Opioid analgesics bind to opioid receptors found in the body altering the pain response and produce analgesia through inhibition of nociceptive impulses.

**Indications for epidural analgesia**

Post-operative pain management (Pasero 1998; Liu & Mulroy 1998) Epidural analgesia appears to be most beneficial for the high-risk surgical patient e.g. children with impaired pulmonary function e.g. children with asthma bronchopulmonary dysplasia, cystic fibrosis or for those recovering from extremely large or painful surgical procedures. Such procedures include thoracotomies, major upper abdominal, major abdominal vascular and orthopaedic surgeries. The epidural infusion provides a localized band of analgesia at the site of the incision.

- **Multiple trauma** (Pasero 1998) Epidural analgesia is especially beneficial for patients with chest trauma, i.e.: rib fractures. The localized analgesia helps the patient overcome the pain induced
splinting that contributes to the loss of pulmonary function, which in turn may lead to atelectasis and pneumonia.

- **Chronic pain** (Pasero & Mc Caffery 1999) Epidural analgesia can be used in the treatment of patients experiencing an acute exacerbation of Complex Regional Pain Syndrome (CRPS) by producing a sympathetic blockade using a local anaesthetic. This provides improved analgesia, and allows the patient to participate in physical therapy, which is vital in the control of their symptoms.

- **Cancer Pain** medical pain poorly responsive to conventional systemic opioids and adjunctive medications such as sickle cell pain cancer pain.

### CONTRAINDICATIONS TO EPIDURAL ANALGESIA

<table>
<thead>
<tr>
<th>Absolute Contraindications for use of Epidurals:</th>
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<tbody>
<tr>
<td><strong>Infection</strong></td>
</tr>
<tr>
<td>√ Infection at Puncture site</td>
</tr>
<tr>
<td>√ Meningitis</td>
</tr>
<tr>
<td>√ Systemic septicemia</td>
</tr>
<tr>
<td>Localized infection at the site of insertion may lead to an infection in the epidural space.</td>
</tr>
<tr>
<td>Systemic infection may lead to an infection in the epidural space.</td>
</tr>
<tr>
<td><strong>Allergy to local anaesthetics</strong></td>
</tr>
<tr>
<td><strong>Bleeding</strong></td>
</tr>
<tr>
<td>√ Coagulopathy : inherited or acquired</td>
</tr>
<tr>
<td>√ Thrombocytopenia</td>
</tr>
<tr>
<td>Increased risk for an epidural haematoma</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
</tr>
<tr>
<td>√ Patient/parent Refusal</td>
</tr>
<tr>
<td>√ Progressive degenerative CNS disease</td>
</tr>
<tr>
<td>√ Allergy to drugs used</td>
</tr>
<tr>
<td>An inadvertent dural puncture when trying to locate the epidural space in a patient with increased intracranial pressure increases the chance of cerebellar or tentorial herniation due to the loss of CSF.</td>
</tr>
<tr>
<td><strong>Uncorrected hypovolemia</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relative Contraindications:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spinal column deformities, laminectomy, or low back pain</strong></td>
</tr>
<tr>
<td>May make the insertion of an epidural catheter difficult or impossible.</td>
</tr>
<tr>
<td><strong>Severe backaches or headaches</strong></td>
</tr>
<tr>
<td><strong>Patient unable to co-operate</strong></td>
</tr>
<tr>
<td><strong>Stable neurologic disease.</strong></td>
</tr>
<tr>
<td><strong>Anticoagulation therapy</strong></td>
</tr>
<tr>
<td>Anticoagulation therapy and neuroaxial anaesthesia used together increase the risk of epidural haematoma, which may lead to serious adverse effects such as permanent paralysis. Anticoagulation therapy should not be initiated or changed without first advising the Acute Pain Service/Anaesthetist. Note: see summary ASRA consensus statement</td>
</tr>
<tr>
<td><strong>Lack of qualified nursing care to monitor patients for side effects and complications</strong></td>
</tr>
<tr>
<td>Epidural analgesia should only be used in hospital units where the staff has received adequate training. Staff should be knowledgeable concerning epidural catheter</td>
</tr>
</tbody>
</table>
placement, epidural medications, and the possible side
effects and complications from epidural analgesia

NOTE: low dose heparin is not a contraindication provided the INR is within normal range. The potential risk of epidural hematoma formation and resultant serious
neurological sequela (spinal cord compression, ischemia, and subsequent paralysis) may preclude these patients as candidates. If a patient is to be on subclinical
anticoagulant therapy check with the prescribing physician regarding administration.

The Vertebral Column
The vertebral column or spinal column, consists of 33 vertebrae, but since the 5 sacral vertebrae are fused and the 4 coccygeal vertebrae are fused, it consists of just 26 separate bones. The vertebrae are named according to the region of the back where they are located; in each region the vertebrae are numbered from top to bottom. (McCaffery & Pasero 1999)

7 cervical vertebrae: located in the neck.
12 thoracic vertebrae: located in the chest.
5 lumbar vertebrae: located in the lower back.
5 sacral vertebrae: fused to form the sacrum.
4 coccygeal vertebrae: fused to form the tailbone.

All nerves emerging from the spinal cord are called spinal nerves. They exit through holes (intervertebral foramina) formed by notches made by the vertebrae above and below each nerve. There are 31 pairs and all are mixed nerves, having both motor and sensory fibers.

At each vertebral body level, nerve roots exit from the spinal cord bilaterally. Specific skin surface areas are innervated by a single spinal nerve or group of spinal nerves. The skin areas are called dermatomes. (Mc Caffery & Pasero 1999)
DERMATOMES

Dermatomes are segmental areas of the skin that are supplied by the spinal nerves.

C2 - C8. The neck, upper aspect of the shoulders, and the outer aspects of the arms and the hands are predominantly supplied by the cervical nerves.

C2, 3, 4 and 5 supply the diaphragm.

T1 - T11. The inner aspects of the arms, and all the intercostal muscles of the thoracic cavity from the 1st rib down receive their nerve supply from the thoracic nerves.

T9 - T12. The abdominal muscles receive their nerve supply from extending as far down as the pubic region anteriorly and posteriorly to the lower back.

The lumbar and sacral nerves innervate the legs from the lower back posteriorly and from the pubic region anteriorly.

REVIEW OF ANATOMY

The spinal cord and the brain are covered by three meningeal membranes: The pia mater, which adheres to the cord and brain; the arachnoid and the dura mater which surrounds the spinal cord like a protective sac. Cerebrospinal fluid is contained in the intrathecal space (subarachnoid space) which is the area between the pia mater and the arachnoid mater. The epidural space is a potential space that lies between the dura mater and the vertebral canal, and extends from the cranium to the sacrum. It contains blood vessels, fat and connective tissue.

<table>
<thead>
<tr>
<th>LAYER</th>
<th>LOCATION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dura mater</td>
<td>outer layer next to bone</td>
<td>is a fibrous connective tissue containing many blood vessels</td>
</tr>
<tr>
<td>Arachnoid mater</td>
<td>Middle layer</td>
<td>is a delicate fibrous membrane</td>
</tr>
<tr>
<td>Pia mater</td>
<td>inner layer next to the brain</td>
<td>is a vascular membrane containing a plexus of blood vessels-forms the choroids plexus</td>
</tr>
</tbody>
</table>

Epidural analgesia can be administered by 3 methods:

- Single injection
- Intermittent bolus
- Continuous infusion

**EPIDURAL MEDICATIONS**

Medications used to treat pain include Morphine, Hydromorphone, Fentanyl and Sufentanil and local anaesthetics, Levobupivacaine (chirocaine), Bupivacaine (Marcaine).

All epidurally administered medications must be preservative free.

**LOCAL ANAESTHETICS**

Local anaesthetic drugs act at the spinal nerve root and affect the nerve activity by preventing the influx of sodium into the cell resulting in inhibition of nerve impulse transition. They also antagonize the release of prostaglandins reducing the inflammatory response. Local anaesthetic blocks sympathetic impulses. The secondary effect is blocking of sensory impulses before they enter the dorsal horn of the spinal cord resulting in a change of sensation, pain, touch and temperature and finally motor block if doses are increased.

Commonly used local anaesthetic agents include bupivacaine (0.25%, 0.5%) and Levobupivacaine (Chirocaine, the L-isomer of bupivacaine) 0.25%, 0.5%). When given epidurally, these drugs gain access to the nerve roots and the spinal cord by crossing the dura and subarachnoid membranes (Macintyre & Ready 2001). They inhibit pain transmission by blocking sodium ion channels which are involved in the propagation of electrical impulses along the spinal nerves.

Low concentrations of Levobupivacaine (e.g. 0.1–0.125%) preferentially block nerve impulses in the smallest diameter nerve fibres, which include the pain and temperature sensory fibres. Sensory nerves are blocked before motor because they are smaller and have less myelin so drug diffuses more quickly into the nerve. As the larger diameter motor fibres are less likely to be blocked with concentrations of 0.1–0.125% Levobupivacaine, leg weakness is avoided and the patient is able to mobilize. The dose of a local anaesthetic agent will also determine which nerves are blocked.

Solutions are given as percentages. This equals the amount of drug (in grams) in 100ml.

1% solution = 1g in 100ml = 1000 mg in 100ml = 10 mg/ml

<table>
<thead>
<tr>
<th>Drug</th>
<th>Levobupivacaine</th>
<th>Bupivacaine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>10-15 mins</td>
<td>10-15 mins</td>
</tr>
<tr>
<td>Max dose (without adrenaline)</td>
<td>2.5 mg/kg</td>
<td>2.5 mg/kg</td>
</tr>
<tr>
<td>Duration (without adrenaline)</td>
<td>3-12 hours</td>
<td>3-12 hours</td>
</tr>
</tbody>
</table>

Lipid solubility
Epidural medications vary in drug solubility. This variability affects the onset of action - Lipophilic drugs (Fat Soluble) (i.e. Fentanyl and Levobupivicaine (Chirocaine)) cross the dura or fat layer readily and provide a more rapid onset. While hydrophilic drugs (water soluble) such as morphine and hydromorphone cross slowly thus have a slower onset of action. The poor lipid solubility may result in retention of the drug in the CNS and thus prolonged analgesia.

<table>
<thead>
<tr>
<th>DRUG</th>
<th>EPIMORPHINE</th>
<th>FENTANYL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOLUBILITY</td>
<td>Water soluble- slower onset</td>
<td>Lipid soluble- fast onset</td>
</tr>
<tr>
<td>ONSET</td>
<td>15-60 minutes -Peaks in 60 mins</td>
<td>5-10 minutes- Peaks in 20min</td>
</tr>
<tr>
<td>DURATION</td>
<td>Long- 4-24 hours</td>
<td>Short -3-4 hour</td>
</tr>
<tr>
<td>OTHER</td>
<td>More spread to brain</td>
<td>Less spread to brain</td>
</tr>
<tr>
<td></td>
<td>Delayed Respiratory depression can occur up 8-10 hrs and up to 24 hr but can occur as early as 30</td>
<td>Less delayed respiratory depression (3-4 hrs. post injection). Is most likely to be used in infusions.</td>
</tr>
<tr>
<td>ADVERSE REACTIONS</td>
<td>Increased sedation. Respiratory depression, hypotension, hallucinations, vomiting, constipation, urinary retention urticarial, rash, pruritus, allergic reaction.</td>
<td></td>
</tr>
</tbody>
</table>

The infusion rates will have variable ranges depending on: patient condition, age, infusion concentrations. However, the side effects are minimized with the use of infusion.

Whenever a patient is receiving epidural analgesia with an opioid agent **naloxone** should be readily available on the unit.

Whenever a patient is receiving, Epidural analgesia **with a local anaesthetic Adrenaline (Ephedrine)** should be readily available on the unit for the treatment of hypotension.

**COMMON EPIDURAL INFUSION**

<table>
<thead>
<tr>
<th>Common Opioid Concentrations</th>
<th>Common Local Anaesthetic Concentrations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine 50 microgram/ml</td>
<td>Levo-Bupivacaine (Chirocaine® 0.125%) 1 mg/ml</td>
</tr>
<tr>
<td>Fentanyl 2–5 microgram/ml</td>
<td>Levo-Bupivacaine (Chirocaine®) 0.05% Chirocaine® 0.125% 0.5mg/ml</td>
</tr>
</tbody>
</table>

**COMMON INFUSION RATES: 5-15cc/hr**

**Changing the Infusion Rate**
The rate of infusion is adjusted to alter the extent of the block. The rate is not to be changed except by the order of the acute pain service or an anaesthetist. The one exception is in the case of a life-threatening emergency, when the epidural infusion should be ceased immediately.
The Epidural Catheter
Epidural catheters include short term percutaneously inserted catheters and tunneled long term catheters.

Short Term Catheter
This polyethylene catheter is used for short term pain management and is inserted as described below. It exits the spinal column and is run up the back and is looped over the shoulder.

INSERTION OF CATHETER
Catheter
The 18G Portex epidural catheter has blue hub and has a single bold mark at 5 cm, then a mark every 1 cm up to the two bold lines indicating 10 cm. The 1 cm markings continue until three bold lines together, which indicate 15 cm. There are no further markings until four bold lines together, which indicate 20 cm. The catheter has a coloured closed tip and three lateral holes.

19G Portex epidural catheter has white hub and has a mark every cm from 2 cm with a bold mark indicating 5 cm. There are two bold lines together indicating 10 cm. Markings continue every 1 cm up to three bold lines together, which indicate 15 cm. The catheter has a single end hole with a coloured tip.

In children the catheter is inserted in Theatre whilst the child is under anaesthesia. During the insertion the child may be positioned on his/her side, lying in fetal position, with both knees drawn upward with head and shoulders flexed toward the chest. This extends the spine, widening the spaces between vertebrae, making insertion of the catheter easier.

A special needle (usually a Touhey needle) is inserted through the skin, fat and fascia between the spinous processes, penetrating the ligamentum flavum then advanced into the Epidural or Subarachnoid space.

During epidural catheterisation, the anaesthetist is able to recognise when the point of the needle penetrates the dense ligamentum flavum.
Entry into the epidural space exerts a negative pressure, which is recognised as loss of resistance in the syringe attached to the needle. (Mc Caffery & Pasero 1999)

Proper placement of the catheter is verified by the anaesthetist through aspiration of the catheter and a small test dose of a local anaesthetic. Once the needle has been determined to be in the appropriate position, the catheter is threaded through the needle. The needle is then removed. A connector is then attached to the catheter and a .22 micron filter is attached between the catheter and the infusion tubing which is taped with Tegaderm to prevent disconnection.

Once proper placement of the catheter is confirmed, a ‘window’ is made around the catheter exit site with an occlusive clear dressing (e.g. Tegaderm or Opsite) to allow viewing of the insertion site and catheter markings. Hypoallergenic and firmly adhering tape (e.g Hyperfix or Mefix) is used to further secure the catheter up the child's back and over one shoulder where it connects with the filter.

The tubing and site should be labelled as “EPIDURAL

Only changed by CNS acute pain/anaesthetist if dressing becomes wet or loose

**POSITION OF EPIDURAL CATHETER**

Local anaesthetic drugs block nerve fibres at spinal segments adjacent to their site of administration. To ensure the local anaesthetic agent spreads to the dermatomes or nerves supplying the area of pain (e.g. the surgical site), the tip of the epidural catheter should be placed within the mid-dermatomal distribution of the pain site. This achieves optimal analgesia using the least amount of drugs. If the catheter is placed below the dermatomes supplying the pain site then analgesia is likely to be inadequate.

Optimal catheter location for different surgical sites

**Surgical site Catheter location**

- Thoracic T6–T9
- Upper abdominal T7–T10
- Lower abdominal T9–L1
- Hip/knee L1–L4

**Equipment**
Continuous epidural analgesia must only be administered via a dedicated epidural pump with a dedicated yellow administration set.

- The epidural giving set will be changed every 72 hours.
- The portex filter can be used for up to 60 days.
- The giving set should be changed if there is known contamination.
- Infusion pumps are cleaned prior to being returned to recovery.

### Intravenous Access

- All children with an epidural infusion in progress must have intravenous access. Usually the IV will have a continuous infusion but in some situations (e.g. longer-term epidurals) intermittent flushing of an IV bung may be appropriate. Please discuss this with the pain service.
- After the epidural is ceased the IV must remain until the local anaesthetic/opioid has worn off (12 hours)

### Catheter Disconnection

If a catheter disconnection is discovered. The infusion is stopped and the catheter should be wrapped in a sterile 4x4 and anesthesia/CNS acute pain should be notified

If the catheter disconnection is unwitnessed

1. DO NOT RECONNECT
2. Cover both ends with sterile gauze
3. Contact anaesthetist immediately
   - All unwitnessed disconnections require the epidural to be removed at the earliest possible time to reduce the risk of infection.

### Leaking Epidurals

These are not uncommon in children. If the child is comfortable (suggesting the epidural is providing adequate analgesia), the dressing should be reinforced and the leakage observed. If the epidural dressing needs changing, the anaesthetist should be called.

If the child is in pain, the CNS acute pain/anaesthetist should be consulted.

### MONITORING

When caring for a patient receiving epidural analgesia, it is important to monitor the patient for the following:

- Signs of drug-related side-effects
- Pain intensity
- Signs of complications due to the epidural procedure
Motor Blockade
This will depend on the concentration and total dose of local anaesthetic agent used and the position of the epidural catheter. Motor blockade occurs when the local anaesthetic agent blocks the larger diameter motor nerves. Leg weakness will occur if the motor nerves supplying the legs are blocked.

Assess Monitor motor function every 4 hours when child is awake
as per the Bromage scale

0 = no block (0%) – Full flexion of knees and feet possible;
1 = Partial (33%) – Just able to flex knees, full flexion of feet;
2 = Almost complete (66%) – Unable to flex knees, still flexion in feet;
3 = complete (100%) – Unable to move legs or feet.

Sensory Assessment
Assess the level of block on both sides to see if it is changing - refer
dermotome illustration

• Assess sensation at the start of each shift and thereafter every 4
  hours for numbness, tingling or normal sensation using cold
  sensation with ice.
• Start by explaining what you are going to do to the child. Rub your
  arm on an area that one would expect to have normal sensation.
• Run ice (wrapped in tissue or gauze) up from the toe and note where coldness is detected by the
  child/young person.
• In younger children or children with communication problems it may be possible to elicit sensation
  by noticing wriggling, pulling away from the cold sensation.
• Note", weakness is an expected finding - this finding should be correlated to the level of sensation.

Breakthrough pain
Possible causes:
- Insufficient dose
- Displaced epidural catheter
- Kinked or disconnected tubing or catheter
- Catheter placement below the site of pain
- Increase in patient activity
Managing Breakthrough pain

- Assess pain
- Note the site and quality of the patients pain (surgical sit, epidural catheter insertion site, back or neck)
- Check for leakage and for any obvious breaks or kinks in the tubing
- Increase the infusion within prescribed limits
- Notify the anaesthetist /CNS Acute pain
- Administer supplemental analgesics
### POTENTIAL ADVERSE EFFECTS AND COMPLICATIONS RELATED TO EPIDURAL ANALGESIA

<table>
<thead>
<tr>
<th>ADVERSE EFFECTS</th>
<th>ORIGINS</th>
<th>NURSING CONSIDERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPIOID RELATED</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **RESPIRATORY DEPRESSION** | Early phase respiratory depression: opioid absorption via epidural vasculature. Late phase respiratory depression: usually seen with morphine as drug levels accumulate in the CSF and spread to migrate to the brain. | - Clinically seen within 1 hour of administration.  
- Clinically seen 8-24 hours after administration.  
- Careful monitoring of respiratory rate, oxygen saturation, heart rate, sedation levels.  
- Manage as per opioid guidelines. |
| **NAUSEA AND VOMITING** | Rostral (towards the head) spread of opioid to the brain stimulating the chemoreceptor trigger zone. | - Administer anti-emetics.  
- Remove opioid from infusion.  
- Monitor for the sedative effects of anti-emetics. |
| **PRURITIS** | Histamine release associated with opioid use. | - Monitor for allergic reactions. Administer antihistamines and decrease the opioid infusion rate as ordered.  
- Ondansetron may be beneficial  
- Low dose naloxone may be effective in reducing pruritus. |
| **URINARY RETENTION** | As with epidural opioids, blockade of the nerves supplying the bladder sphincter can cause urinary retention. | - Assess frequently for bladder distension if no indwelling catheter.  
- Monitor input and output.  
- Low dose naloxone has been shown to be effective in treating urine retention.  
- Be prepared to catheterize the patient. |
| **CONSTIPATION** | Stimulation of intestinal mu receptors resulting in hypo motility. | - Administer stool softeners/laxatives. |
### LOCAL ANAESTHETIC RELATED

#### HYPOTENSION

*Firstly*, local anaesthetic agents can spread outside the epidural space, blocking the sympathetic nerves. This results in peripheral vasodilatation and hypotension. It is most likely to occur if a bolus dose of local anaesthetic agent (e.g. 10 ml of 0.125% Levobupivacaine) is given to improve pain control.

*Secondly*, if the local anaesthetic agent spreads above the T4 dermatome (nipple line) the cardio-accelerator nerves may become blocked, leading to bradycardia and hypotension (Macintyre & Ready 2001).

- Monitor blood pressure and administer fluids as needed.
- It may be necessary to reduce or stop the infusion.
- DO NOT PUT PATIENT HEAD LOW

#### MOTOR BLOCKADE

Blockade of large motor fibers

- Monitor for motor involvement (weakness- complete loss of function)
- Assist patient with positioning
- Assess for skin irritation/ breakdown.

#### TOXICITY

**CNS:** *Early:* tingling lips, ringing in the ears, light-headedness, confusion, nausea and vomiting.


**CVS:** *Early:* if adrenaline has been used with the local anaesthetic, tachycardia and hypertension may occur before cardiovascular collapse.

- *Later:* bradycardia, hypotension, cardiac arrest (ventricular fibrillation, which can be resistant to defibrillation especially with bupivacaine. Chirocaine is thought to be safer in this respect).

- Assess for signs and symptoms of allergic reaction, e.g. respiratory distress, itching and oedema
- Stop infusion
- Resuscitation (ABC) as per APLS guidelines
- Notify the medical team/ anaesthetist/ CNS pain

#### PRESSURE SORES

It is important that pressure area care is meticulous for all patients with an epidural infusion.

The patient receiving epidural analgesia must be turned 2-3 hourly, have extra pressure control devices (such as...
The decreased sensation produced by epidural analgesia removes the usual warning signs that prompt patients to move and significant motor block may limit patient movement, both factors potentially contributing to the development of pressure necrosis. Most commonly the heels, medial and lateral malleoli and sacrum are involved but ALL pressure points are at risk.

**CATHETER RELATED**

**POST DURAL PUNCTURE HEADACHE**

CSF leak as a result of accidental puncture of the dura during catheter placement. The pain is usually located in the occipital region and may be associated with neck stiffness. Headache is severe and made worse by sitting up or mobilizing. It may be associated with nausea and vomiting.

- Notify the anaesthetist.
- Provide analgesic medication.
- Maintain hydration – regular oral fluids or if the patient is unable to take oral fluids then the IV route should be used
- Avoidance of coughing and straining – stool softening agents or laxatives may be useful
- Bed rest is usually necessary as the headache is worse when the patient is sitting upright
- The anaesthetist responsible for the block should be informed. If despite these measures the headache persists, the anaesthetist may perform an “autologous blood patch” (administering a small amount of the patient’s own blood epidurally to seal over the leak in the dura. This technique is usually rapidly effective in 70 to 80 per cent of cases.

**EPIDURAL HAEMATOMA**

Bleeding into the epidural space from catheter placement or catheter erosion. Incidence is very rare.

- Assess for bleeding and haematoma formation at catheter insertion site:
- Changes in neurosensory status (numbness and tingling) in extremities.
- Severe localised back pain or tenderness

sheepskins and air mattresses), and their skin regularly checked for signs of pressure.
As the haematoma expands to compress the nerve roots or the spinal cord, this proceeds to sensory/motor weakness.

| Unilateral or bilateral weakness in the arms, legs or trunk or other sensory deficits |
| Incontinence or inability to control the bowel or bladder |
| If patient demonstrates signs of impaired motor function. Stop infusion and contact anaesthetist immediately. |
| Occasionally, haematomas resolve on their own. However, most need to be evacuated surgically. Surgery should take place within 12 hours of symptom onset for the best chance of neurological recovery. |
| Avoid anti-coagulants. Take care with timing of epidural catheter removal if patient is receiving anti-coagulants. |

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**EPIDURAL ABSCESS**

Infection within the epidural space from an exogenous source via contaminated equipment or drugs or from an endogenous source, leading to bacteraemia which seeds to the insertion site or catheter tip.

Alternatively the catheter can act as a wick through which the infection tracks down from the entry site on the skin to the epidural space.

| Assess epidural site for signs and symptoms of infection. |
| Assess motor strength and sensory levels frequently. |
| Symptoms include back pain and tenderness accompanied by redness with a purulent discharge from the catheter exit site. |
| If patient complains of severe pain and impaired motor function. Stop infusion and contact the anaesthetist immediately. |

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Alternatively the catheter can act as a wick through which the infection tracks down from the entry site on the skin to the epidural space.
REMOVAL OF EPIDURAL CATHETERS

Stopping Epidural Infusion
- The stopping of the epidural infusion therapy should **only** be done in consultation with the anaesthetist, CNS Acute Pain.
- When it is decided that epidural analgesia is no longer required, the infusion is ceased and alternative analgesia administered. There is no logic in "weaning" epidural infusions.
- It is important to educate the parents and, if appropriate, the child, about the possibility of the child experiencing some discomfort or being a little unsettled as the local anaesthetic wears off. Sensation returns in about two hours.
- If significant pain occurs despite alternative analgesia, the anaesthetist should be notified, with a view to re-establishing epidural blockade, or prescribing other analgesia.

Considerations before Removal of an Epidural Catheter
- Signs of infection have been reported to anaesthetist.

  The coagulation status of the child is within normal parameters
  - No Heparin has been given in the last 8 hours prior removal of catheter
  - No oral long acting anti-coagulant agent has been given 12 hours prior removal of catheter.
  - IV Heparin has been stopped and clotting has returned to normal.

- Pain is under control.
  - Oral/IV analgesic has been ordered, and given if appropriate, so that pain control is maintained when epidural analgesia is discontinued.

- The epidural has been stopped 2 hours before removal
- The procedure has been explained to the child/parent, including the analgesic regimen that will replace the epidural analgesia.

Removal of Epidural Catheter
- Wash hands. With bactericidal soap and water or bactericidal alcohol hand rub
- Clean Trolley & open dressing pack
- Position the child on his or her side of comfort.
- Remove tape and dressing from catheter insertion site, using adhesive removal spray/ wipes
- Wash hand again
- Clean around catheter site with 0.9% sodium chloride.
- Gently in one swift movement, remove catheter.
  - Although gentle traction is necessary to remove the catheter, it should come out easily and painlessly. If resistance is met or the child reports pain or unusual sensations (e.g., tingling or a "catch in the back"), stop the procedure and notify the anaesthetist.
  - Check that it is removed intact by observing marks along the catheter. The catheter tip is checked for presence of a black or blue mark.
  - Apply a Band-Aid and leave *in situ* for 24 hours.
- Epidural catheter removal is documented in the patient’s nursing notes and includes a description of the site.
SUMMARY: CARE OF THE CHILD RECEIVING EPIDURAL MEDICATIONS

Assess site of catheter placement

- Check for signs of infection
- Keep occlusive, transparent dressing intact - Reinforce prn
- Ensure catheter is secure
- Label site
- Observe the connector to ensure that it is secure

Assess pain status

- Use a pain rating tool to evaluate the child’s pain
- Document pain status on Epidural flow sheet
- Check system for mechanical errors or check site for leakage if pain relief ineffective
- Notify anaesthetist/CNS acute pain if pain relief ineffective

Assess sensory and motor function

- Ask patient if legs are numb
- Assess if motor function affected using Bromage score.
- Assess level of sensory blockade using dermatomes.
- Prior to ambulation - assess for postural hypotension
- Patient should be accompanied to ambulate and transfer
- Assess bladder and sphincter function - record I&O, BMs, bladder distention

Assess for side effects

- See previous pages - CONTACT & INFORM ANAESTHETIST of any signs of complications
- Have appropriate reversal agents available

Drugs and Pump

- Double check for correct drug and dosing
- Independently double check medication for epidural use before connecting to epidural catheter.
- Double check all catheter connections independently, ensure these are labeled “For EPIDURAL USE ONLY”
- Double check pumps settings and function with two nurses when changing rates
- Have reversal agents or adrenaline readily available on the ward/unit
REFERENCES


Bibby P (2001) Introducing ward-based epidural pain relief. Professional Nurse. 16 (6) 1178-1182


Epidural Analgesia A self-directed learning Module. 3rd Ed, Copyright, 2000, UW Hospital and Clinics Authority Board


Schechter NL, Berde CB, Yaster M (Eds.), Pain in infants, children, and adolescents. 2003; Lippincott/Williams & Wilkins; Philadelphia, PA, USA.


QUESTIONNAIRE
## True or False (Please record your answers on the answer sheet provided)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exogenous opioids bind with opioid receptors to modulate the nociceptive transmission.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Fat in the epidural space functions as a 'depot' for the opioids and local anaesthetics.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Lipophilic opioids such as fentanyl, when administered epidurally, have a rapid onset and a long duration of action.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Morphine/ when administered epidurally, has a slower onset but a longer duration of action when compared to fentanyl.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>The dose of an opioid administered epidurally is about the same as an IV dose.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Common side effects of epidural opioids are nausea, pruritus, and urinary retention.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>If the epidural catheter dressing is leaking, the nurse should stop the infusions and the epidural catheter should be removed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>A sudden increase in a patient's sedation level may be due to the migration of the epidural catheter into the subarachnoid space.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>All medications administered epidurally must be preservative-free.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>The epidural catheter insertion site should be assessed daily for tenderness, swelling, erythema, or drainage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>When an opioid is injected into the epidural space, it disperses to three key areas. Identify the 3 areas.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12. Briefly explain how local anaesthetic injected into the epidural space acts to prevent the transmission of pain signals.

A)  

B)  

C)  

13. Your patient has had an upper abdominal operation. The anaesthetist has specified the epidural level as T8. When you test sensory loss you find that the child has no feeling down the inner arm. What level is the epidural at? What do you do?

14. Your patient is complaining of severe headache, what might be the cause of this headache?

What action will you take?

16. Write short notes on each of the side effects specified below. You might include information such as likelihood of occurrence, whether some patients are at increased risk of the side effect, treatment.
Hypotension

Respiratory depression

Nausea and vomiting

Urinary retention

17 When you check the epidural site, you notice it is leaking. What action will you take?
18 Which statement is true about medications given through the epidural catheter? | True | False
---|---|---
A) Most IV medications can be given safely via the epidural catheter |  | 
B) Antibiotics may be piggybacked into the epidural line |  | 
C) Medications must be preservative free. |  | 

19 Your patient complains of numbness in his arms and tingling of his lips.

A) What is the likely cause of his symptoms?

B) What action will you take?

20 Your patient complains of pain on movement. His epidural infusion is running at 3mls/hr. The prescription allows the infusion to run at 2-10mls/hr.

A) What action(s) will you take?

B) How can you ensure that this action is safely carried out?

20 Mary had surgery yesterday for resection of a large abdominal mass. She has an epidural catheter in situ infusing with Chirocaine 0.125% at 5mls/hr. She is comfortable. She is reviewed by the surgeons on rounds who advise stopping the epidural and removing the catheter.

A) What action will you take?
Care of the child with an Acute Abdomen

MICHELLE O GORMAN

Photos:
Mary Traynor Mary Kearney Michelle O Gorman (OLCHC)
What we will look at today

- What is Acute Abdomen
- Causes
- What is a bowel obstruction
- Different treatment
- Management of symptoms
- Case study
- Antibiotic therapy

“Acute abdomen”

- Sudden onset of abdominal pain that requires urgent evaluation, diagnosis & treatment.
- Medical cause: gastroenteritis (vomiting precedes pain).
- Surgical cause: appendicitis (pain precedes vomiting).
- Medical or Surgical intervention?

Investigations

- General appearance
- Vital signs
- Abdominal exam
- Urine
- Blood
- U/S, x-ray, CT

Anatomy
“Bowel obstruction”

- Mechanical
  occlusion of the bowel lumen
- Non-Mechanical
(pseudo-obstruction, paralytic ileus)
decreased gut motility

Mechanical Bowel Obstruction

**ACQUIRED**

- Tumours
- Hernia
- Foreign matter in the intestines (Trizobazore)
- Volvulus
- Adhesions
- Intussusception

**CONGENITAL**
- Hirschsprung's
- Malrotation
- Impacted faeces (neuropathic bowel, constipation)
- Intestinal atresia
- Imperforate anus

**Ano rectal anomalies**

![Image of ano rectal anomaly]

**Malrotation**

![Image of malrotation]
Non-Mechanical Bowel Obstructions Causes

- Abdominal surgery
- Injury or trauma
- Infections
- Severe generalized infections
- Drugs
- Electrolyte imbalance

Clinical Presentation

- Nausea/Vomiting usually bilious
- Altered bowel patterns /sounds
- Constipation
- Abdominal Distension
- Dehydration
- Pain
  - Increased heart rate
  - Agitated, irritable, rigid

Management
Conservative
Aim: rest the bowel hoping that obstruction resolves itself

Active
Aim: surgically repair / remove the cause of the obstruction

Conservative management
- NPO
- IV cannula x 2 (minimum)
- Check U&E daily
- IV fluids +/- KCL
- Correct electrolyte imbalance
- Gastric decompression - NGT on hourly aspiration and free drainage (50ml syringe) or Replogyle on low pressure suction replogyle is preferred option
- Replace gastric losses ml for ml (Or as prescribed) with 0.9% NaCl + 10mmols KCl per 500mls
- +/- antibiotics
- Analgesia

Conservative management
- Adequate fluid and electrolyte balance essential
- Fluid bolus usually hartmans/CSL 10 to 20mls/kg
- And repeat if necessary as prescribed
- Observe and record response
- Then iv fluid maintenance 100mls/kg first 10 kgs, 50mls for second 10kgs and 20mls for every kg thereafter

Conservative management
- Monitor blood sugars (6 hourly; PRN)
- Strict Intake and Output ensure patient is passing 1ml/kg hr
- Consider TPN if fasting for 3-5 days

Active management
If symptoms do not resolve with conservative management, child may require surgery.

- Usual pre-operative care
- Explanations to the child / parents
- FBC / U&E
- Group & Hold or Crossmatch as indicated

**POST-OPERATIVE CARE**

**Fluids and nutrition**

- Fast - 1-5 days depending on surgery
- IV fluids – Hartmans for 24 hours, then Dextrose/Saline +/- KCL
- Blood sugars as indicated/minimum once per shift

**Gastric decompression**

- Prevent accumulation of gastric/intestinal fluids
- CLPS using Replogle/sump tube or 1-2 hourly aspiration with a NG tube
- Replace losses with 0.9% Saline 500MLS + 10mmols KCl

**Restarting fluids and diet**

- Start with clear fluids and progress to light diet as tolerated.

**PAIN MANAGEMENT**

- Morphine infusion (PCA /NCA)
- Epidural
- IV Paracetamol / IV Difene (Max 2 days only)
- IV Clondine
- IV Tramadol (after consultation with pain team if on opioids) ensure antiemetic given
- Rectal analgesia can be administered, providing the child has not had surgery on the distal colon, ensure surgeons allow this prior to administration
- Pain assessment with observations regularly

Post-operative care, cont.

**Wound**

- Dry dressing and steri-strips

Remove dry dressing after 48 hours (HSE guidelines) or as per consultants instruction

- Child may have aqualcel surgical on which can stay on for up to 7 days at surgeons request if dry and intact
Some surgeons leave wound exposed
Glue may be used keep dry for 5/7 days
If wound is oozing swab and replace the dry dressing. Clean with water prior to same.
Remove steri-strips in 7/10 days.
May have a stoma (Liaise with stoma CNS)
IV antibiotics

Nursing responsibilities
- Assess hydration status and manage fluid balance
- Hartmans is given for correction of extracellular volume and electrolyte depletion for first 24/48hrs post op.
If KCL required max is 40mmol/l (=1mmol per 25mls). Max rate of infusion is 0.2mmol/kg/hr via peripheral route or without ECG monitoring.
- Gastric losses
  - (Replace ml /ml or as ordered)
  - Replacement fluid is 0.9NACL with 10mmols kcl per 500 mls
  - TPN if fasting for 3 to 5 days ensure full blood work up done prior to commencing TPN /central access preferable

Nursing responsibilities
- Urine Output (1ml/kg/hr)
- Monitor bowel sounds /motions.
- Assess for alteration in vital signs – e.g., pyrexia, tachycardia and increased pain may indicate perforation
- Positioning
- Monitor respiratory status
- Personal hygiene

Fluid management
- Post op surgical bowel obstruction can often have 3rd spacing of fluids
- Body fluids may collect in a 3rd body compartment that is not normally perfused with fluids.
- This makes the fluid unavailable to the circulatory system.

What is 3rd Spacing - A Quick Overview
Third spacing is an inflammatory response post op that makes all cells and tissues more permeable

- HR raised
- BP low
- Urine output marginal
- Weight is up
- Oedematous (Oedema tells you the patient is getting enough fluids but the vital signs and output are telling you the patient is hypovolaemic)

**Where the fluid is usually**

- 60% of weight is fluid
  - 40% Intracellular
  - 60% Extracellular _interstitial_ (between cells, in tissue)
    - intravascular

(where inside the blood vessels)

- Fluid loss: urine, sweat, stool, incidental losses from resp. effort

**Third Spacing**

**How fluids move**
Diffusion: fluids move from area of high concentration to low concentration

Osmosis: movement of fluid through a semi permeable membrane

Active transport: fluid moves from area of low concentration to high concentration

Types of fluids

- Isotonic: doesn’t affect cell size, stays where it is put, no osmosis
  - Examples: lactated ringers, 0.9% sodium chloride

Types of fluids

- Hypertonic: fluid shift into blood vessels
  - Examples: 5% dextrose in 0.45% sodium chloride, 5% dextrose in 0.9% sodium chloride
- Hypotonic: fluid shifts out of the blood vessels and into the cells and interstitial spaces
- Example: 0.45% sodium chloride

**What is a Replogyle Tube? - Note others may use Ryles tube or NGT**

- Used for gastric decompression
- Come in sizes 6Fr, 8Fr, 10Fr, 12Fr, 14Fr, 16Fr, 18Fr. Manufacturers guidelines say size 8Fr for infants <1500g and 10Fr > 1500g.
- Can be connected to Low Pressure Suction
- Vent – protects mucosa
  - keep clear (Make sure it is not kinked)
  - do not knot
- Only spigot air inlet if on free drainage

**RELOGYLE TUBE**

- Check the position of the replogyle tube with PH paper. Should be < 5.5 as per NGT aspirate.
- If the air inlet drains this means that the tube is blocked.
- Suction pressure may cause gastric irritation
- Ensure PPI prescribed (iv Nexium/ranitidine)

Replogyle Tube
Continuous low pressure suction (CLPS)

- What is it: continuous drainage of gastric contents
- Why: decompress the stomach & bowel
- How: use a Replogyle tube & low vacuum suction
- How much suction:
  - 50-75 mmHg
Post op complications

- Peritonitis
- Haemorrhage
- Hypovolemic shock
- Chest infection/pleural effusion
- Wound infection/wound breakdown
- Abscess formation
- Pressure sore

Wound breakdown