Clinical Pathway: Ventricular Septal Defect (VSD) Repair

Notes: (1) This pathway is a general guideline and variations can occur based on professional judgment to meet individual patient needs. (2) This is a quality improvement document and should not be a part of the patient’s medical record.

Pathway Process

Instructions for Providers

- All patients should have a paper copy of this pathway in their chart from preoperative clinic thru OR to PICU transition of care.
- Please obtain most recent version of pathway packet here: [https://www.med.unc.edu/ticker](https://www.med.unc.edu/ticker)
- Please fill out Y/N and comments for each step of the pathway.
- After transition of care to the PICU, a PICU team member should put the pathway in the box outside of the patient room for collection by the pathway team.
- Contact information for questions:
  - Meg Kihlstrom: margaret_kihlstrom@med.unc.edu
  - Nicole Conrad: niconrad@aims.unc.edu
  - Karla Brown: karla_brown@med.unc.edu
# Clinical Pathway: Ventricular Septal Defect (VSD) Repair

## Suggested Guidelines

### PREOPERATIVE

<table>
<thead>
<tr>
<th>Labs</th>
<th>Y - check; comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type and Screen</td>
<td>□</td>
</tr>
<tr>
<td>Abo/Rh</td>
<td>□</td>
</tr>
<tr>
<td>CBC</td>
<td>□</td>
</tr>
<tr>
<td>Patient specific considerations: CMP, UA, thyroid, albumin/total protein, RVP</td>
<td>□</td>
</tr>
</tbody>
</table>

### Imaging

<table>
<thead>
<tr>
<th>Imaging</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>ECHO within 1 month of case</td>
<td>□</td>
</tr>
<tr>
<td>CXR</td>
<td>□</td>
</tr>
<tr>
<td>ECG</td>
<td>□</td>
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</tbody>
</table>

### Orders

<table>
<thead>
<tr>
<th>Orders</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>CARDIAC SURGERY TEAM</td>
<td>□</td>
</tr>
<tr>
<td>Prepare pRBC: &lt; 10kg: 1 full unit; 2 split packs; &gt; 10kg: 2 units</td>
<td>□</td>
</tr>
<tr>
<td>Prepare FFP: 1 full unit</td>
<td>□</td>
</tr>
<tr>
<td>ANESTHESIA TEAM</td>
<td>□</td>
</tr>
<tr>
<td>Antibiotics: Cefuroxine 50mg/kg x2 doses; alternate - Vancomycin</td>
<td>□</td>
</tr>
<tr>
<td>Vasoactive: Epinephrine, Vasopressin, Calcium (&lt; 6mo); Patient specific (Milrinone - no loading dose, start infusion at 0.5mcg/kg/min)</td>
<td>□</td>
</tr>
</tbody>
</table>

### Instructions

<table>
<thead>
<tr>
<th>Instructions</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Medications</td>
<td>□</td>
</tr>
<tr>
<td>Respiratory: continue</td>
<td>□</td>
</tr>
<tr>
<td>Cardiac: Lasix - continue; ACE/ARB - discontinue</td>
<td>□</td>
</tr>
<tr>
<td>Neuro: continue</td>
<td>□</td>
</tr>
<tr>
<td>NPO guidelines</td>
<td>□</td>
</tr>
<tr>
<td>Chlorhexidine wash</td>
<td>□</td>
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</tbody>
</table>

### Day of Surgery

<table>
<thead>
<tr>
<th>Day of Surgery</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>ANESTHESIA TEAM</td>
<td>□</td>
</tr>
<tr>
<td>ECHO order</td>
<td>□</td>
</tr>
<tr>
<td>Blood verification (call blood bank and anesthesia tech to bring blood to room)</td>
<td>□</td>
</tr>
<tr>
<td>Premedication +/-</td>
<td>□</td>
</tr>
<tr>
<td>PICU TEAM: pre-admission orders (CXR/labs)</td>
<td>□</td>
</tr>
</tbody>
</table>

### Intraoperative

<table>
<thead>
<tr>
<th>Intraoperative</th>
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</thead>
<tbody>
<tr>
<td>Intubation: &lt; 10kg: nasal; &gt;10kg: oral</td>
<td>□</td>
</tr>
<tr>
<td>Lines</td>
<td>□</td>
</tr>
<tr>
<td>2 PIVs</td>
<td>□</td>
</tr>
<tr>
<td>Central line: first attempt RIJ (&lt;5kg: 5F 5cm; &gt;5kg: 5F 8cm; &gt;100cm: 5F 12cm)</td>
<td>□</td>
</tr>
<tr>
<td>Arterial line</td>
<td>□</td>
</tr>
<tr>
<td>ECHO</td>
<td>□</td>
</tr>
<tr>
<td>Probe size (&lt; 3kg: micro; 3-29kg: pediatric; &gt;29kg: adult)</td>
<td>□</td>
</tr>
<tr>
<td>Report in EPIC as a procedure note (pre/post bypass; written by anesthesia with assistance of cardiology)</td>
<td>□</td>
</tr>
</tbody>
</table>
- **Infusions**
  - Aminocaproic acid
    - Neonate: 50mg/kg load, 40mg/kg/hr infusion
    - Child: 75mg/kg load, 75mg/kg/hr infusion
  - Vasopactive (listed above in preoperative section)
- **Neuraxial anesthesia:** immediately after intubation (lengthen time till heparinization)
  - <5yo: caudal (morphine 50mcg/kg; clonidine 1-2 mcg/kg)
  - >5yo: spinal (morphine 5mcg/kg; clonidine 1-2 mcg/kg)
- **Monitors**
  - NIRS - cerebral and somatic (neonatal < 45 weeks gestation)
- **Labs**
  - ABG - q30min
- **Blood**
  - If more pRBC is needed; anesthesia to order split packs if <10kg
  - If more FFP is needed; anesthesia to order full unit
- **PERFUSION**
  - Prime
    - Neonate circuit: 150mL pRBC, 100mL FFP
    - Pediatric circuit: blood prime if Hgb <10
    - Adult circuit: blood prime if Hgb <10
  - Aminocaproic acid:
    - Neonate circuit: 10mg/100mL prime
    - Child circuit: 25mg/100mL prime
  - MUF: neonate circuit; available with pediatric circuit
  - Cell saver >20kg
- **CBP**
  - MAP goals
    - Neonate 35-45
    - Infant 40-50
    - Toddler 45-55
    - Older child/teenager 20% of baseline
  - PaO2: Not greater than 150
  - PaCO2: 35-45
- **Other medications**
  - Optional (Magnesium, furosemide)
- **Extubation:** Plan to extubate unless patient specific considerations

**OR to PICU TRANSITION**

- **Transport/transition**
  - See anesthesia transfer notes and handoff form attached
  - Infusions: all that are not in use should be dismantled from pumps, capped and transported to PICU
  - Airway adjuvant: small nasal cannula with CO2 (PICU to send nasal cannula with bed and monitor AND anesthesia will stock in OR)
  - Monitor (NIRS cable sent with monitor)
  - Blood
    - MUF blood labeled with patient sticker and expiration (<4 hours post opening)
    - Any opened blood products labeled with patient sticker and expiration (<4 hours post opening)
    - Unopened blood products transported to PICU in cooler
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Pediatric Cardiac Transfer Note

Patient Name:______________________________ Weight:______kg Home Meds:_____
Age:_____________ Notable PMHx & PSHx:________________________
Allergies:______________________________ Pre-op cath/TTE:____________________
Procedure:_________________________

Type of Anesthesia: General Induction: Mask Intravenous
Mask ventilation: Easy Two-hand Oral airway used --- size:_____________
ETT: Size:___________ Nasal Oral Blade & # of attempts:_______ Depth:_______
Accept:
PIV:___________ PIV:___________ CVC:___________ A-line:___________
Caudal: Yes No Morphine PF:___________mcg Clonidine:___________mcg

Medications:
Fentanyl:___________mcg
Antibiotic:___________mg @ _______ CPB start time:___________
Neuromuscular blockade: Yes No Reversed: Yes No
Acetaminophen:___________mg @ ___________
Other meds:_________________________

CPB: Pump Time__________minutes Cross clamp Time:__________minutes
Circulatory arrest:__________minutes Low Flow Time:__________minutes

Fluids:
Crystallloid:_______________ PRBC’s:_______________
Colloid:_______________ FFP:_______________
Cell Saver:_______________ Platelets:_______________
Cryoprecipitate:_______________ Urine Output:_______________
Pacer Capture:
A-wires:_______________ V-wires:_______________

Echocardiogram: (EPIC report)
Pre-CPB TEE:______________________________ Post-CPB TEE:______________________________
# Clinical Pathway: Ventricular Septal Defect (VSD) Repair

## OR to PICU Handoff

<table>
<thead>
<tr>
<th>Team Member</th>
<th>Activity</th>
<th>Template(s) or Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. OR Circulating Nurse</td>
<td>1st call to PICU is placed 30 min to 1 hour prior to ICU</td>
<td>Estimated time to ICU Patient Weight Ventilator? Lines and expected infusions</td>
</tr>
<tr>
<td>2. OR Circulating Nurse</td>
<td>Rolling call to alert PICU of immediate transport status.</td>
<td></td>
</tr>
</tbody>
</table>
| 3. PICU Nurses/Respiratory Therapist | Transitioning to PICU monitors and respiratory support                   | Charge RN:  
  - Transfer to PICU monitors, including CVL and arterial line  
  Helper RN:  
  - Check and scan infusions and blood products  
  - Connect CT and position foley  
  - Draw labs  
  Bedside RN:  
  - Rapid patient assessment  
  RT:  
  - Hook up ventilator or oxygen source |
| 4. Anesthesia Provider             | Anesthesia Provider Report                                               | - Patient name, age, weight, diagnosis  
  - Relevant medical history  
  - Airway management  
  - Access  
  - Neuaxial  
  - Medications administered  
  - ECHO report  
  - Bypass report/pacer  
  - Intra-operative issues  
  - Fluids, blood products, urine  
  - Post operative concerns (pain management, labs, airway)  
  - Current infusions: all medication infusions should be reviewed for accuracy by the anesthesia provider and receiving RN (signoff in EPIC)  
  - Any Questions? |
| 5. Surgical Team Member            | Surgical Report                                                          | - Surgical procedure  
  - Drains and catheters  
  - Additional issues or concerns |
| 6. All team members                | Questions and concerns                                                   |                                                                                                  |

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Anesthesia provider maintains patient responsibility until handoff is complete (including analgesia, pacer, resuscitation, airway, etc) and the PICU team accepts responsibility of the patient.