UMBILICAL CATHETER INSERTION (UAC/UVC)

Insertion of umbilical catheters is a surgical aseptic technique. See Infection Control Manual - Framework for Aseptic Technique

Consider the following infants for umbilical catheter insertion:

- Preterm
- Increasing oxygen requirements +/- ventilation
- Requiring blood pressure or central venous pressure monitoring
- Requiring repeated blood gas monitoring.
- Fluid and nutritional support
- Administration of multiple medications and/or infusions
- Exchange transfusion
- When peripheral access can not be obtained.

KEY POINTS

- High positioning of the UAC (T8 – 10) is associated with a lower incidence of blanching of the peripheries and vasospasm of the extremities. Infant’s with umbilical lines in situ should not be wrapped or have booties on, the feet should be visible at all times to check for adequate circulation.
- Following insertion and securing of umbilical catheter(s) commence the following infusions prior to placement confirmation by an X-ray:

<table>
<thead>
<tr>
<th></th>
<th>Infusion Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>UAC ≤27 weeks</td>
<td>sodium chloride 0.9% + 0.5 u/ml heparin</td>
</tr>
<tr>
<td>≤27 weeks</td>
<td>sodium chloride 0.45% + 0.5 u/ml heparin</td>
</tr>
<tr>
<td>UVC ≤ 27 weeks</td>
<td>Starter Pack 5% glucose or glucose 5% + 0.5 u/ml heparin</td>
</tr>
<tr>
<td>≤ 30 weeks</td>
<td>Starter Packs 7.5% glucose</td>
</tr>
<tr>
<td>&gt;30 to ≤34 weeks</td>
<td>glucose 7.5% + sodium chloride 0.22% +0.5 u/ml heparin</td>
</tr>
<tr>
<td>&gt;34 weeks</td>
<td>glucose 10% + 0.5 u/ml heparin</td>
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</tbody>
</table>

- Penicillin, amoxycillin and gentamycin may be given prior to X-ray confirmation.
- Inotropes, blood products and other infusions/medications may commence only following medical review of catheter(s) position confirmation. Adjustment to be done if required and
In the event of emergency situations fluids and medications may be given via the UVC following a "flush back and prior to X-ray confirmation at the discretion of the attending senior medical officer.

**X-RAY CONFIRMATION LANDMARKS**

| T12 – diaphragm, celiac artery | For UAC the catheter tip should be placed: |
| L1 – superior mesenteric artery, renal artery | • T8 for infants > 1000 grams |
| L3 – inferior mesenteric artery | • T9 for infants 700 – 1000 grams |
| L4 – aortic bifurcation | • T10 for infants < 700 grams |
| For UVC the tip should be placed: | between the diaphragm and the left atrium. |

**EQUIPMENT**

- Umbilical catheter insertion tray
- Sterile gloves / pack / gown and hand towels
- Chlorhexidine swabsticks 1.0% or Povidone-iodine solution
- Silk suture 3.0
- Umbilical artery catheters/Umbilical venous catheters (single or double lumen)
- 2ml syringe x 2
- 1ml arterial blood gas syringe
- Normal saline / sterile water
- Drawing up needles
- 3 way taps
- Smartsite valves for spare ports and multilumen extension for UVC if applicable.
- Leucoplast tape
- Transducer set and cables. Infusion pump
- Tape measure
- Giving set

**PROCEDURE**

Measure from the shoulder to the umbilicus perpendicular to determine the insertion length.

<table>
<thead>
<tr>
<th>UVC Insertion distance</th>
<th>UAC Insertion Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder – Umbilicus Distance (cm)</td>
<td>UVC insertion length</td>
</tr>
<tr>
<td>9</td>
<td>5.7</td>
</tr>
<tr>
<td>10</td>
<td>6.5</td>
</tr>
<tr>
<td>11</td>
<td>7.2</td>
</tr>
<tr>
<td>12</td>
<td>8.0</td>
</tr>
<tr>
<td>13</td>
<td>8.5</td>
</tr>
<tr>
<td>14</td>
<td>9.5</td>
</tr>
<tr>
<td>15</td>
<td>9.3</td>
</tr>
<tr>
<td>16</td>
<td>10.0</td>
</tr>
<tr>
<td>17</td>
<td>12.0</td>
</tr>
</tbody>
</table>
1. Prepare the umbilical tray.
2. Attach three way taps to UAC and UVC catheter. For UVC (single or dual) - attach smartsite valve onto the spare insertion/withdrawal port(s).
3. Prime catheters with normal saline.
4. Prepare skin as per NCCU policy.
5. Cut off the excess cord leaving at least a 1cm stump. The cord stump should be stabilised with artery forceps.
6. Once the catheter is in position, aspirate to verify blood return and flush line.
7. Secure the catheter with purse string suture around the cord stump (Wharton’s jelly) and secured at least once through the umbilical skin, and then tied around the umbilical catheter. Remove excess chlorhexidine with sterile water.
8. Apply a 2.5cm piece of brown tape around catheter and suture material as close as possible to umbilical stump/catheter.
9. UAC - Connect primed transducer and line. Calibrate line and commence infusion at 0.5-1.0mL/hr. The transducer should always be positioned at the level of the right atrium and recalibrated as follows:
   - when fluids are changed
   - if the trace becomes ‘dampened’

Note: if concurrent non-invasive cuff BPs are taken there can be a +/- 10mm Hg discrepancy. If the arterial trace is good and the transducer is at the optimal position then the invasive readings should be considered more accurate.

10. UVC - commence infusion at 1mL/hr until position confirmed by xray.

DOCUMENTATION

The “Insertion and Removal of Central Venous Lines” stamp is to be completed by the medical officer in the progress notes. Document on the observation chart the catheter size, position and date of insertion. Observe for adequate patency of artery/vein, pink, warm, well-perfused digits and/or limbs distal to cannulation. An estimation of blood loss should be documented.

COMPLICATIONS ASSOCIATED WITH UMBILICAL LINES.

Are mainly due to vascular accidents – thromboembolic incidents involving the kidney, bowel, legs and rarely the spinal cord. May manifest as haematuria, hypertension, signs of NEC, or blanching/cyanosis of the skin of the buttocks and lower extremities. Other complications seen are infection, DIC, and vessel perforation. All these complications are indications for catheter removal.

REFERENCES


