RPA Newborn Care Guidelines
Royal Prince Alfred Hospital

Nursing Guidelines for PCVCs

Equipment for PCVC insertion

<table>
<thead>
<tr>
<th>Clean</th>
<th>Sterile</th>
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<tbody>
<tr>
<td>Clean dressing trolley with alcohol solution, leave one minute &amp; wipe dry</td>
<td>Vygon PCVC catheter 24 G (2Fg) - Premicaths are available for very small infants on request of consultant/fellow only</td>
</tr>
<tr>
<td>masks x2</td>
<td>gown and gloves</td>
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<tr>
<td>4 ampoules heparinised saline (50u/s / 5ml)</td>
<td>sterile green drapes (incl fenestrated)</td>
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<tr>
<td>unopened solutions for skin preparation</td>
<td>dressing pack</td>
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<tr>
<td>aqueous chlorhexidine 0.015%</td>
<td>umbilical drip insertion set</td>
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<tr>
<td>IV infusion pump (neomate)</td>
<td>gauze swabs</td>
</tr>
<tr>
<td>1 ampoule optiray 300</td>
<td>assorted needles / syringes</td>
</tr>
<tr>
<td>Syringe driver</td>
<td>100 ml burette / IV giving set</td>
</tr>
<tr>
<td>Alfoil – lipid syringe</td>
<td>3 way taps x 2 &amp; bungs</td>
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<tr>
<td></td>
<td>steri strips</td>
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<tr>
<td></td>
<td>occlusive dressing (Tegaderm)</td>
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<tr>
<td></td>
<td>For TPN: lipid, Primene, Filters (both lipid &amp; Primene), extension set.</td>
</tr>
</tbody>
</table>

Nursing Care for PCVC

- The infant should be left clean and dry, check temperature
- Position of catheter tip should be verified by X-ray (usually before fluids are infused).
- Neonatal fellow / registrar to document date, type of catheter used, depth of insertion and radiological findings.
- Routine dressing changes are contra indicated due to risk of contamination and accidental catheter dislodgment.1 Dressings should be changed only when:
  - the dressing lifts
  - the catheter is inadequately secured or kinked
  - the site requires closer observation due to inflammation, oedema or leaking of infusion
Change of dressing requires two registered nurses with suitable instruction in the technique. It is a sterile procedure and the area is to be cleaned with aqueous chlorhexidine 0.015% prior to reapplication of dressing. Document management.

- Limb does not require immobilization with an arm board
- Insertion site to be observed 1 hrly for:
  - signs of superior vena cava obstruction (neck / arm swelling)
  - extravasation
  - bleeding
  - signs of infection
  - leaking of infusate
  - security of catheter and occlusive dressing – hub must be adequately secured
- Prophylactic heparin in central venous catheters reduces the incidence of catheter occlusion\(^2\) thus increasing usable life span of the catheter\(^3\). Optimal concentration may be as low as 0.5 units/ml for intravenous infusion of TPN\(^4\) and results in less elevation of free fatty acids with lipid infusions.\(^5\)
- PCVCs may not be heparin locked – continuous infusion of at least .5ml/hour needed to maintain patency.
- Blood or blood products should not be routinely infused through these small lumens.
- The Premicaths should not have blood, blood products or lipid infusions.
- The catheter hub (the external female end of the catheter to which infusion tubing connects) plays a major role as a source for catheter related sepsis especially in long term catheter use.\(^6\)
- Rupture of catheters under high pressure is a potential serious problem.\(^6\) The Vygon corporation states their neonatal catheter:
  - has a continuous working pressure limit of 14.5 psi (750 mmHg)
  - has a bolus pressure limit of 17.4 psi (900 mmHg)
  - may rupture between 58 – 72 psi (3000-3700 mmHg)

but:

- 1ml tuberculin syringes will generate 150 psi (7800 mmHg)
- 3ml syringe will generate 120 psi (6200mmHg)
- 5ml syringe will generate 90 psi (4608 mmHg)

therefore:

- 1 ml and 3ml syringes should be used with great caution
- retrograde infusions are preferable when administering medications

*The goal of nursing care is to minimise the number of connections and line violations:*\

- Plan line changes and administration of medications to reduce the number of line violations.
- Prepare IV solutions using sterile technique – sterile drape & gloves and the assistance of a second nurse.
- Prior to breaking the line swab the connection with alcohol chlorhexidine 0.5% and leave until dry.\(^8\)
- Replace all infusions given through PCVC every 24 hours, except Primene (48 hours).
- Administer statim medications via the proximal connection to assure accurate dose. Do not use 1 ml or 3 ml syringe. Preferably use peripheral lines in infants > 27 weeks gestation.
- Commence on prophylactic oral Nilstat 0.5 mls QID for infants < 27 weeks for duration of intravenous access.\(^9\)
Procedure for removal PCVC

Observe all preliminary procedure standards appropriate to this procedure as detailed in the preface of this nursing manual

- **Catheter should be removed as soon as its use is no longer clinically indicated.**
  
  Other indications for catheter removal include:
  
  - bacteremia and/or clinical symptoms persisting beyond 48-72 hrs despite appropriate IV antibiotic therapy through the catheter
  - progressive insertion site infection especially pseudomonas
  - sepsicaemia due to fungaemia
  - clinically unstable condition of infant and/or development of hypotension due to sepsis
  - evidence of septic emboli or endocarditis

- **PCVC may be removed by a clinical nurse specialist using an aseptic technique:**
  
  - the infusion should be ceased
  - occlusive dressing and steri strips should be removed, taking care not to damage the skin. Olive oil may be used.
  - the catheter should be removed slowly using slow controlled traction. If tethered stop and seek medical assistance.
  - ensure the catheter is complete note markings
  - PCVCs are not routinely sent for culture, if doubt discuss with fellow/registrar
  - control bleeding by applying pressure if necessary
  - applied small dressing to site and remove within 24 hrs
  - observe the site for bleeding, trauma and signs of infection
  - document procedure

Observe all post procedure standards appropriate to this procedure as detailed in this manual.

Conclusion

Central venous access facilitates stabilization and ongoing provision of adequate nutrition for preterm neonates and reduces the number of attempts at venous access.

Central venous access is an invasive procedure with risks to the infant. These risks can be minimised by strict attention to infection control principles, ongoing education and quality improvement programmes.
References


Revised: April 2008