

Royal Hospital for Women (RHW)
NEONATAL BUSINESS RULE
COVER SHEET



Health
South Eastern Sydney
Local Health District

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SUMMARY	Umbilical vessel/s catheterisation is performed on neonates requiring invasive blood pressure monitoring and blood sampling as well as ongoing delivery if intravenous (IV) fluids and medications. This guideline outlines the process for the insertion of umbilical catheters in a neonate.
Key Words	Umbilical catheterisation, UVC, UAC, Neonate

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- Blue Inco Pad
- 3x Chlorhexidine 0.5% antiseptic swabstick
- Comfeel
- Adhesive tapes
- Neutral detergent

3.2 Clinical Practice

3.2.1 Set up

1. Explain procedure to parent/s and gain consent (if present).
2. Perform a "Time-out" on the newborn (see Educational Notes).
3. Perform hand hygiene.
4. Collect equipment.
5. Calculate/measure (see below) the insertion distance for the catheter/s. Confirm measurement with a Medical Fellow/Consultant.

Insertion length⁸:

Umbilical Arterial Catheter (UAC) = 3 x weight + 9cm + stump or diagonally umbilicus to shoulder length + 1cm + stump

Umbilical Venous Catheter (UVC) = 1.5 x weight + 5cm + stump or UAC length / 2 + 1cm + stump

Emergency UVC access 5cm plus cord stump length

6. Insert a blue inco-pad under infant.
7. Position neonate in a comfortable posture and ensure the nappy is sitting below lower abdomen.
8. Provide appropriate pain management prior to the procedure as needed.
9. Clean work-surface with neutral detergent solution.
10. Request assistance for the procedure.
11. Put surgical hat and mask on. Open packet of sterile gown on a work-bench and add sterile gloves to the sterile field.
12. Perform a surgical scrub from hands to elbows for 2 minutes.
13. Dry hands with the sterile paper towel without cross contamination and gown up.
14. Put sterile gloves on using "closed-glove" technique.
15. Assistant provides sterile plastic sheet for proceduralist to put on work-surface (Picture 2).



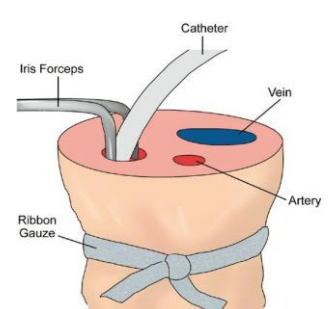
Picture 2



Picture 3



Picture 4

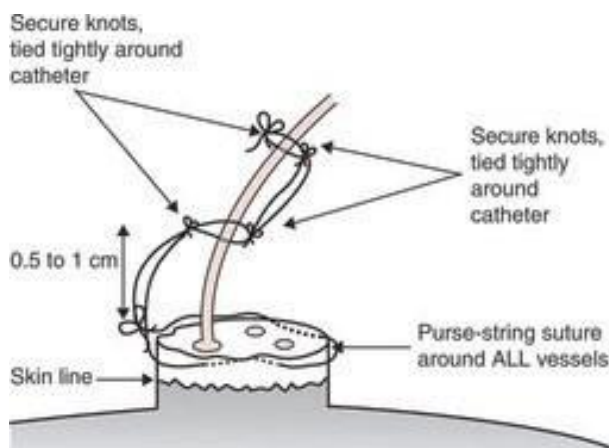


Picture 5

16. Assistant opens all equipment packs for proceduralist to prepare (Picture 3) the following:
 - Fill syringes with normal saline solution
 - Prime umbilical catheter/s with normal saline and leave syringes connected to catheter/s
 - Place primed umbilical catheter/s and all required instruments in the sterile green towel. Fold towel over instruments to maintain sterility
17. Assistant washes hands and dries hands with sterile paper towel from Umbilical Placement Pack before putting on sterile gloves.
18. Proceduralist attaches a sterile towel clip/forcep to the umbilical cord clamp.
19. Assistant holds the towel clip to lift cord clamp off infant's abdomen for cleaning.
20. Proceduralist cleans the abdominal skin around the umbilicus, the umbilicus stump including the cord clamp with chlorhexidine swabsticks. Repeat cleaning.
21. Insert towel clip through the fenestrated sterile drape as the drape is applied onto the neonates abdomen.

3.2.2 Insertion

22. Assistant suspends the umbilicus as proceduralist ties sterile cotton tape firmly at the base of umbilicus (Picture 4) whilst avoiding the skin around the umbilicus..
23. Produralist cuts below the cord clamp (Picture 4) with a scapel blade.
24. Identify the required umbilical vessel (Picture 5).
25. Insert and advance the primed umbilical catheter with slight pressure to the pre-measured length (Picture 5).
26. Gently withdraw syringe plunger for visible blood return in the catheter and flush catheter after this check.
27. Check umbilical catheter position with x- ray followed by an ultrasound when possible (See Education notes). Verify catheter position with the Medical Fellow/Consultant.
28. Secure umbilical catheter with sutures (Picture 6).



Picture 6

Ref. Suturing an umbilical catheter, Procedures, Obgyn Key, Chapter 3

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NOTE:

- NO inotropes or any infusion should start until the umbilical catheter position is confirmed by x-ray.
- Give pulsatile flushes via the 10mL syringe to the umbilical catheter while waiting for x-ray result.
- All Umbilical catheter tips and position must be confirmed by ultrasound within 24 hours post-insertion
- The infant **MUST NOT** be left unattended whilst waiting for x-ray result.
- Catheter tip position must be checked by a neonatal medical Fellow/Consultant

29. Aseptically connect umbilical catheter/s to primed infusion sets. Attach needle-free intravenous bungs to all lumens.

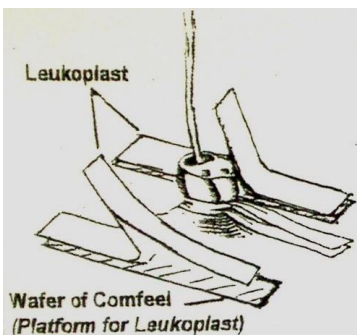
30. At completion of procedure:

- Remove instruments and drape from infant's bed
- Discard disposable equipment
- Put any non-disposable equipment in CSD bin for sterilising
- Complete CSD record list

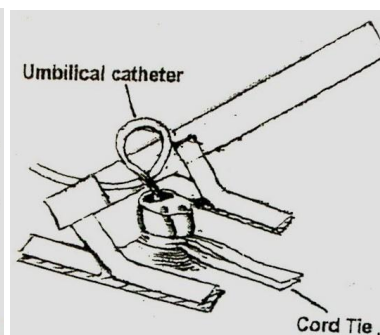
3.2.3 Securement

31. Secure the umbilical catheter/s

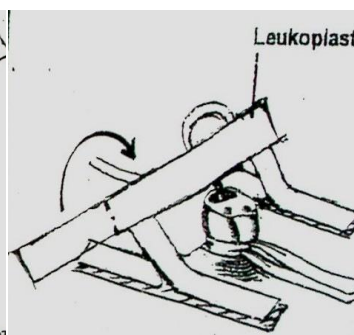
- Cut two strips of comfeel to the desired length
- Apply a strip of comfeel to the abdomen on both sides of the umbilicus (Picture 7)
- Secure the umbilical catheter/s and silk threads with adhesive tape using the 'goalpost' method (Picture 8).
- Coil the catheter within the tape (Picture 7). Ensure the coil is small (Picture 9 & 10)
- See NCC Nursing CBR – [Umbilical Catheters](#) for more detail on securement



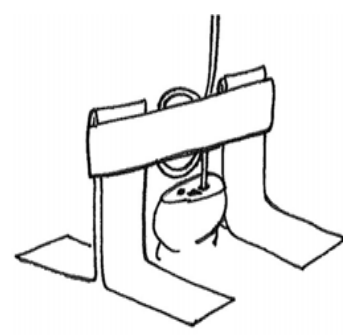
Picture 7



Picture 8



Picture 9



Picture 10

3.3 Documentation

- eRIC

3.4 Education Notes

- Two clinicians are required to perform a "time-out" before starting the procedure to confirm the:

- The correct procedure for the infant
- For the correct infant
- On the correct site
- **Umbilical Venous Catheters**
 - The ideal catheter tip position is at the junction of the ductus venosus and inferior vena cava.
 - On x-ray, the catheter can be identified going straight up with the catheter tip at the level of the diaphragm (Picture 11-12).
 - Picture 13 shows UVC in correct position on ultrasound
- **Malpositioned Catheters**
 - If catheter tip is in the chambers of the heart:
 - Measure the distance for an ideal position
 - Withdraw to the new measurement
 - Repeat x-ray or ultrasound to confirm the new position



Picture 11



Picture 12



Picture 13

(with permission from RPAH, Dr.N. Evans)

- **Umbilical Arterial Catheters**
 - High positioning of a UAC (T8 – T10) with the catheter tip in the descending aorta, above the level of the diaphragm and below the left subclavian artery causes fewer complications. It is preferred and recommended with less adverse sequelae.
 - Low placement of a UAC (L3 – L4) with the catheter tip sitting above the aortic bifurcation and below the renal arteries may be used with caution (Barrington, 1999).

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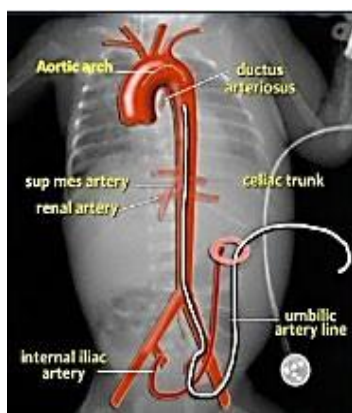
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Duration of umbilical catheter use:	
UVC	UAC
<ul style="list-style-type: none"> Length of time a UVC can continue to be used is determined by the infant's clinical condition An alternative central line (eg. PICC) should be considered no later than Day 7 post- insertion if UVC is in a good position (inferior vena cava) [see examples in educational notes] UVC should be removed within 48 hours if position is sub-optimal (low-lying) provided infant is clinically stable [see examples in educational notes] 	<ul style="list-style-type: none"> Length of time a UAC can continue to be used is determined by the infant's clinical condition Risk of infection or vascular compromise increases with time and removal needs to be weighed against clinical need

Positioning

- Picture 14 demonstrates relevant x-ray landmarks when positioning a UAC (Schuppen 2013).
- Picture 15 shows an example of an ideally positioned UAC (T7 – T8; in the descending aorta, above the coeliac trunk).
- Picture 16 shows an example of a UAC that is positioned too low (T9; below the coeliac trunk).
- Picture 17 shows an example of a UAC that is positioned too high (T3; near the aortic arch).



Picture 14



Picture 15



Picture 16



Picture 17

3.5 Abbreviations

IV	Intravenous	UAC	Umbilical arterial catheter
UVC	Umbilical Venous Catheter	PICC	Peripherally Inserted Central Catheter

3.6 CBR Implementation Plan

The revised CBR will be distributed to all medical, nursing and midwifery staff via @health email. The CBR will be discussed at ward meetings, education and patient quality and safety meetings. Education will occur through in-services, open forum and local ward implementation strategies to

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address changes to practice. The staff are asked to respond to an email or sign an audit sheet in their clinical area to acknowledge they have read and understood the revised CBR. The CBR will be uploaded to the CBR tab on the intranet and staff are informed how to access

3.7 Related Policies/procedures

- RHW NCC LOP – Golden Hours Protocol – Management of Preterm Infants
- RHW NCC Nursing CBR- Umbilical Catheters

3.8 References

1. Barrington KJ. Umbilical artery catheters in the newborn: effects of position of the catheter tip. Cochrane Database of Systematic Reviews 1999;1: CD000505.
2. Fleming SE, Kim JH. Ultrasound-guided umbilical catheter insertion in neonates. Journal of Perinatology 2011;31:344-9.
3. P P Kumar, C D Kumar, M Nayak, F A R Shaikh, S Dusa & A Venkatalakshmi. Umbilical arterial catheter insertion length: in quest of a universal formula. Journal of Perinatology 2012; 32:604–607.
4. Royal Prince Alfred Hospital – Umbilical Venous Catheterisation Guideline, January 2011.
5. RCH Clinical Practice Guidelines – Central Venous Access Device Clinical Guidelines – Insertion and Management, June 2016.
6. Schuppen vJ,, Onland W & Rijn vR. Lines and tubes in Neonates. Paediatric Radiology and Neonatology of the Emma's Children Hospital, Amsterdam, November 2013. www.radiologyassistant.nl/en/p526bd2e468b8c/lines-and-tubes-in-neonates.html
7. Shukla H, Ferrara A. Rapid estimation of insertional length of umbilical catheters in newborns. AJDC 1986;140:78710
8. Rapid Estimation of Insertional Length of Umbilical Catheters in Newborns. Harikrishna Shukla, MD, D Ped; Angelo Ferrara, MD, PhD. Am J Dis Child. 1986;140(8):786-788. doi:10.1001/archpedi.1986.02140220068034

4 ABORIGINAL HEALTH IMPACT STATEMENT DOCUMENTATION

- Considerations for culturally safe and appropriate care provision have been made in the development of this Business Rule and will be accounted for in its implementation.
- When clinical risks are identified for an Aboriginal and/or Torres Strait Islander woman or family, they may require additional supports. This may include Aboriginal health professionals such as Aboriginal liaison officers, health workers or other culturally specific services

5 CULTURAL SUPPORT

- For a Culturally and Linguistically Diverse CALD woman, notify the nominated cross-cultural health worker during Monday to Friday business hours

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- If the woman is from a non-English speaking background, call the interpreter service: [NSW Ministry of Health Policy Directive PD2017_044-Interpreters Standard Procedures for Working with Health Care Interpreters.](#)

6 NATIONAL STANDARDS

- Standard 1 Clinical Governance
- Standard 3 Preventing and Controlling Infections
- Standard 5 Comprehensive Care

7 REVISION AND APPROVAL HISTORY

Date	Revision No.	Author and Approval
1999	Primary	KB Lindrea (CNC)
2004	Revision 2	KB Lindrea (CNC)
2014	Revision 3	KB Lindrea (CNC)
August 2018	Revision 4	KB Lindrea (CNC)
25 th July 2024	Revision 5	KB Lindrea (CNC). Endorsed by NCC CBR Committee
29 July 2024	5	RHW BRGC