

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



Health
South Eastern Sydney
Local Health District

Ref T24/41287

NAME OF DOCUMENT	Umbilical Catheters
TYPE OF DOCUMENT	Clinical Business Rule
DOCUMENT NUMBER	RHW CLIN057
DATE OF PUBLICATION	21.6.24
RISK RATING	Medium
REVIEW DATE	2027
FORMER REFERENCE(S)	N/A
EXECUTIVE SPONSOR	S Bolisetty (Medical Co-Director Newborn Care Centre); S Wise (Nursing Co-Director Newborn Care Centre)
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SUMMARY	To provide information on securing, monitoring, management, accessing and removal of umbilical venous catheters and umbilical arterial catheters
KEY WORDS	Neonatal nursing, umbilical catheters, UVC, UAC, securing, blood sampling, removal, monitoring, assessment

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This document outlines the requirements for the safe management of umbilical catheters in Newborn Care Centre (NCC) at The Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this Clinical Business Rule. Using this document outside the Royal Hospital for Women or its reproduction in whole or part, is subject to acknowledgement that it is the property of NCC and is valid and applicable for use at the time of publication. NCC is not responsible for consequences that may develop from the use of this document outside NCC.

1 BACKGROUND

Umbilical catheters offer central intravascular access in the newborn. Umbilical venous catheters (UVC) are utilised for emergency or short term administration of fluids, blood products and medication. Umbilical arterial catheters (UAC) provide arterial access for blood sampling and continuous measurement of blood pressure.

2 RESPONSIBILITIES

2.1 Medical- to prescribe appropriate fluids and medications to be administered and infused by a UVC or UAC. To determine when a UVC/UAC is no longer required.

2.2 Nursing Staff- to secure, monitor, administer medication and fluids and remove UVC and UACs as per this CBR.

3 PROCEDURE

3.1 Securing UVC and UAC Equipment

- Surgical Hat and mask
- Adhesive Tape
- Comfeel
- No sting barrier wipe
- Scissors

NOTE:

- Umbilical catheters should be secured with a looped suture to the umbilical stump, and position confirmed on x-ray prior to securing lines with goal post taping.
- Lines must not be accessed for fluids until position has been confirmed on x-ray by medical staff

3.2 Securing UVC and UAC Clinical Practice

3.2.1 Preparation

1. Cut two rectangle pieces of comfeel for either side of neonate's umbilical stump (width determined by tape used). (Picture 1)
2. Cut two long pieces of adhesive tape (thick for term or thin for preterm) and secure to comfeel pieces to create goal post. (Picture 2)
3. Cut two long pieces of thin adhesive tape (one for UVC and one for UAC if both present) for securing catheters to goal posts.

3.2.2 Procedure

4. Apply barrier wipe to abdomen on either side of umbilicus.
5. Apply prepared goal post in line with umbilicus so that the base of goal post is directly in line with the stump. (Picture 3)

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Picture 1



Picture 2



Picture 3

6. Take first catheter and create 2 small (but not tight) loops. (Picture 4)
7. Attach end of thin adhesive tape to first goal post.
8. Place catheter loop onto long thin adhesive tape so that line is sitting comfortably and not tugging at insertion site. Continue so adhesive tape is attached to opposite goal post. (Picture 5)
9. Double back the tape on itself all the way to first goal post to ensure catheter loop is fixed on both sides. (Picture 6)
10. Continue until length of tape is used. Ensure curtesy tab created at end of tape.
11. Immediately label line as either arterial or venous.
12. Repeat same process with secondary catheter (if applicable). Do not tape loops directly on top of each other where possible to allow easier visualisation.



Picture 4



Picture 5



Picture 6

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3.3 Zeroing Arterial Line

3.3.1 Procedure

1. Ensure transducer of arterial line correctly lined up at the level of the heart of the infant.
2. Turn white dial off to patient end of giving set and on to orange cap port. (Picture 7)
3. Remove orange cap "off to patient, open to air" (Picture 8).
4. Tap on arterial line on main monitor screen and select >ZERO<.
5. Wait for systolic, diastolic and MAP values to read '0' on the screen.
6. Replace and tighten/close off orange cap (off to air).
7. Turn white dial back off to orange cap (air port) and on to patient giving set. (Picture 9)



Picture 7



Picture 8



Picture 9

3.4 Maintaining Patency of Second Lumen in Double Lumen UVC

NOTE: When using double lumen UVC, all compatible maintenance fluids and infusions should be run via primary lumen so secondary lumen can remain spare for inotrope or medication administration

3.4.1 Equipment

- Surgical hat and mask
- Sterile gloves and sterile paper towel
- Sterile plastic drape
- 5% Dextrose solution
- 50 mL syringe
- Extension line
- Double bifurcated microbore extension ("chooks foot")
- 0.5% Chlorhexidine and 70% alcohol swabs x 4

3.4.2 Procedure

1. Don hat and mask.
2. Clean surface down as per current unit cleaning.

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3. Open sterile drape onto work surface ensuring sterility maintained.
4. Open syringe, extension line, drawing up vial access needle (grey) and microbore double extension packs away from sterile field (to prevent contamination) and drop onto sterile field maintaining sterility.
5. Open sterile glove and sterile paper towel, leaving in backing of packs to maintain sterility.
6. Perform 2-minute aseptic handwash with green chlorhexidine solution.
7. Dry hands with sterile paper towel, starting from fingers and working down arms.
8. Don sterile gloves.
9. Assistant and proceduralist to perform fluid check against order, including expiry date.
10. Attach vial access needle (grey) to 50 mL syringe.
11. Assistant to open 5% dextrose fluid bag and proceduralist to draw up 50 mL of 5% dextrose solution.
12. Remove needle and attach extension line to 50ml syringe.
13. Prime extension and attach bifurcated microbore double extension.
14. Prime both lumens of bifurcated microbore double extension with 5% dextrose solution.
15. Clamp second lumen of extension not in use.
16. Assistant to perform primary clean or second lumen with chlorhexidine and alcohol swabs, then proceduralist to take line with swab in hand to prevent contamination of glove.
17. Proceduralist to perform two further cleans with swabs and allow 30 seconds drying time.
18. Attach 5% Dextrose solution to second lumen and run at 0.5ml/hr via syringe pump TKVO.
19. Remove gloves, discard of all equipment and perform hand hygiene.
20. Document commencement of fluid in eRIC and ensure syringe labelled.

3.5 Monitoring and observations of UVC and UAC

3.5.1 Clinical Practice

1. Infant should be:
 - Nursed supine for 1 hour post line insertion.
 - From there after, infant positioned supine or lateral, and **MUST NOT** be nursed prone to allow visualisation of lines at all times
 - Unwrapped to allow constant visualisation of umbilical site//limbs can be obtained. Crib or overhead radiant heater should be used to maintain normothermia
 - Nappy must be open to not obscure umbilical stump, to enable line visualisation and to assess buttocks circulation
2. Hourly observations should include:
 - Assessment of umbilical catheter insertion site and umbilical stump for bleeding, ooze, line placement/securement and potential line dislodgement
 - Inspection and assessment of infants buttocks, limbs and toes for perfusion and venous return. Ensure assessments includes colour, capillary refill and temperature (to touch)
 - Documentation of VIP scores and pump pressures for all infusions
 - Continual observation for limb colour, perfusion and blanching should be attended during blood sampling from arterial line
3. Line Management should include:
 - UAC being zeroed at commencement of each shift, after any fluid/line change, and after any change to infant or transducer positioning to ensure accurate blood pressure monitoring
 - UAC and UVC clearly labelled for identification of venous and arterial catheter
 - Arterial line transducer attached to crib/open bed (not separate pole) so that changes to crib/bed height do not change height of transducer in relation to infants heart

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3.6 Accessing UVC for Medication

NOTE:

- Single or double lumen UVCs are available.
- Where possible, peripheral vascular access is the preferred point for administering intravenous medication.
- If necessary to provide medication through UVC, additional considerations should be taken if only single lumen UVC available as this will result in increased risk of incompatibility, as well as bolusing of infusions already running through lumen.

3.6.1 Equipment

- Surgical Hat and mask
- Sterile glove and paper towels
- Plastic sterile drape
- Medication vial and necessary fluids/syringes/needles for dilution process (as per ANMF policy)
- Valid and correct medication prescription in eRIC
- Three way tap
- 10 mL syringe (for flush)
- Drawing up Needle
- Sodium Chloride 0.9% (for flush)
- 0.5% Chlorhexidine and 70% Alcohol Swabs x 4

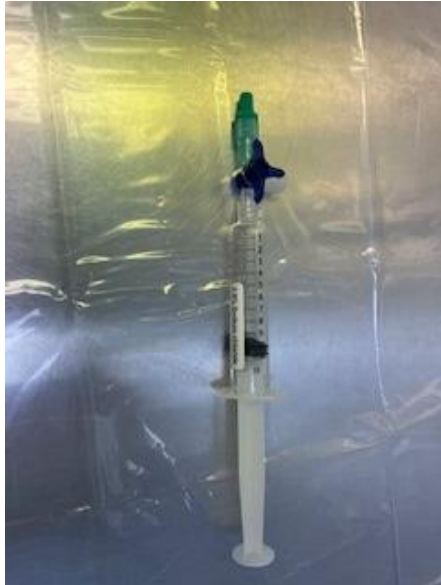
3.6.2 Procedure

1. Confirm medication order on eRIC and perform all necessary medication checks with second RN.
2. Follow steps 21-28 of above procedure to set up sterile field and gloves.
3. Draw up and dilute medication as per ANMF policy with assistance to hold/open all vials and fluid bags to prevent contamination. Ensure all tops of vials are swabbed when opened and allow 30 seconds drying time before accessing.
4. Draw up 10 mL of sodium chloride 0.9% using 10 mL syringe and drawing up needle.
5. Attach normal saline syringe to end port of three way tap, open to all ports. (Picture 10)
6. Prime all ports of the three way tap with sodium chloride 0.9%. Ensure minimum 2 mL of sodium chloride 0.9% remain in syringe to flush following medication administration.
7. Perform final medication safety check including dose in syringe.
8. Attach medication syringe (with or without extension depending on medication given) to side port of three way tap and ensure tap is turned off to flush and on to patient. (Picture 11)
9. Perform cleaning process from step 36 and 37 above to second bifurcated microbore extension lumen (attached to second lumen of UVC).
10. Attach three way tap to extension lumen and administer medication via bolus or pump as per ANMF guidelines.
11. Post medication administration, perform hand hygiene.
12. Turn three way tap off to medication and on to flush, and slowly and gently push 1 mL of sodium chloride 0.9% to flush medication through extension.
13. Clamp second microbore lumen and remove three way tap.
14. Document and validate medication on eRIC.

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Picture 10



Picture 11

NOTE:

- 5% dextrose TKVO fluid can be left running for duration of medication administration providing medication compatible with 5% dextrose.
- Refer to compatibility and incompatibility section of the ANMF policy of the medication being given.

3.7 Blood Sampling from UAC

3.7.1 Equipment

- Gloves
- Arterial syringe or luer intravenous syringe
- 0.5% Chlorhexidine and 70% Alcohol Swab
- Required blood tubes and request form

NOTE:

- When collecting coagulation profile from arterial line, a minimum volume of 1 mL must be taken off prior to collecting coagulation to prevent heparin contamination.
- Perform all blood gas and additional blood work before collecting coagulation bloods, OR if other bloods are not required, remove 1 mL of blood, then take coagulation sample off and return the 1 mL of blood to the patient.
- Use standard intravenous syringe (without heparin) to collect coagulation profile.
- Document on the order form that the sample has been taken from an arterial line.

3.8.2 Procedure

1. Pause Heparinised saline solution running through UAC.
2. Wash hands and don non-sterile gloves.
3. Clean red sample bung close to patient end of sample line with swab and allow to dry.

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4. Turn red stop cock off to the syringe driver (down) and on to draw back syringe attached to set (Picture 13).
5. Pull back on draw back syringe slowly until 3 mL mark. (Picture 14)
 - Ensure you observe perfusion of abdomen and limbs as you draw back.
 - You will see blood slowly start to fill the sample line and the heparinised solution that was sitting in the arterial line fill the draw back syringe
6. Attach arterial syringe or luer syringe to sample port at patient end and draw back correct volume of blood to fulfill required blood tests. (Picture 15)

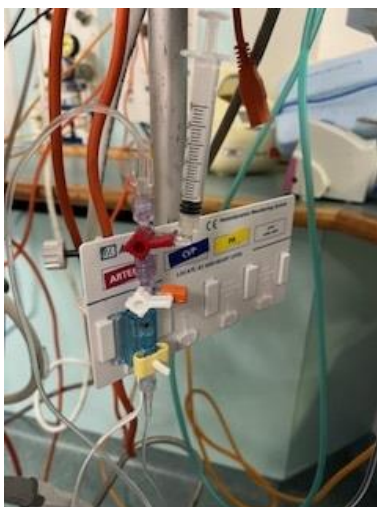


Picture 13



Picture 14

7. Transfer blood from collection syringe to required blood tubes or gas machine.
8. Remove gloves and perform hand hygiene.
9. Slowly push the 3 mL volume in draw back syringe back to patient and set to begin to clear the blood from the set.
10. Turn red stop cock back off to draw back syringe and on to syringe driver and arterial set. (Picture 16)
11. Purge 1 mL of heparinised saline from syringe driver to set, pulsing/ squeezing yellow gauge at transducer (Picture 17). You will see the blood in the arterial set become diluted and begin to clear. It is not necessary to clear all blood from arterial set.



Picture 16



Picture 17

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12. Recommence heparinised saline solution at 0.5 mL/hr via syringe driver.
13. Ensure all blood tubes are correctly labelled with patient label (or hand written label for group and hold/blood group).
14. Sign pathology request form and send blood tubes and request form in pathology bag in shute.

3.9 Removal of UVC and UAC

3.9.1 Equipment

- Surgical hat and mask
- Sterile gloves & sterile paper towels
- Plastic sterile drape
- Large dressing pack
- 0.5% chlorhexidine swab sticks
- Suture cutter
- Adhesive remover wipes
- Sterile water
- Sterile gauze

3.9.2 For tip culture (Not routinely sent. Only if requested)

- Sterile Specimen container
- Sterile scissors

3.9.3 Preparation

1. Confirm removal of lines with medical staff and ensure you are aware if you are removing UVC/UAC or both
 - Identify depth of insertion and verify against recorded depth of insertion. This information can be found in 'Skin/wound' tab of eRIC.
2. Identify infant, check with another nurse and explain the procedure to parent/s (if present).
3. Ensure infant is stable and continuous vital monitoring is on.
4. Drape the lower abdomen with blue inco-pad.
5. Position infant supine & flat and provide oral sucrose or EBM for pain relief (if required).
6. Don surgical hat and mask.
7. Clean trolley and gather required equipment.

3.9.4 Procedure

8. Apply moist gauze (use warmed sterile water) to umbilical stump/line insertion point to loosen sutures/encrusted blood.
9. Perform hand hygiene: 2 minute procedural hand wash using 4% Chlorhexidine solution.
10. Dry hands with sterile paper towels and don sterile gloves.
11. Open sterile drape onto clean trolley.
12. Request for assistance to maintain asepsis. Ask assistant to open packs of equipment onto sterile field.
13. Organise field by maintaining aseptic technique to prevent contamination of key parts.
14. Soak goal-post adhesive tape with medical adhesive remover.
15. Gently remove taping in preparation for line removal (if only removing one line, do not soak goal post and only remove taping from the line to be removed).
16. Clean umbilicus and surrounding skin with chlorhexidine 0.5% swab sticks for 20 seconds. Use circular motion from centre out. Repeat x3 times.
17. Allow area to dry.
18. Infusions need to remain at a minimum of 1 mL/hr during removal.

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19. Support the insertion site with non- dominant hand, then use your dominant hand to gently pull on the catheter at the insertion point by 1cm.
20. Remove suture/s only when unable to dislodge catheter. Position suture cutter facing away from catheter and proceed to carefully cut suture/s.
21. Gradually remove catheter by 1-2cm allotments, pausing between each draw back to allow vessel to constrict and to check infant stability.
22. When catheter nearly removed, place sterile guaze around umbilical stump to apply firm pressure to absorb any ooze once final section of catheter removed.
23. Maintain pressure with gauze on umbilical stump for 5 minutes.
24. Check and verify catheter tip after removal with another nurse.

NOTE:

- If tip culture is requested, place tip of catheter on sterile field.
- Using sterile scissors, cut 2cm of the distal end, place in sterile specimen jar and send to microbiology for sensitivity and culture.
- Ensure jar is labelled with correct patient label and request form is included.

3.9.5 Following removal

25. If bleeding continues, firmly grasp the abdomen below the umbilical stump (for UAC) or above umbilical stump (for UVC) with sterile gauze. Apply pressure for 5 minutes. Call for medical assistance if required.
26. Allow site to dry.
27. Leave infant supine with the umbilical area exposed for minimum 1 hour.
28. Monitor for vascular compromise of lower limbs, buttocks and abdomen. Identify signs of poor perfusion, weak pulses, swelling or discolouration of lower limbs.

3.10 Documentation

- Record date and time of umbilical catheter removal:
 - Document in eRIC by selecting 'skin/wounds' tab
 - Left click of UVC/UAC and select 'Removal record'
 - Complete given form
 - Once form complete, left click UVC/UAC and select 'stop' to end timeline
 - Further document removal of umbilical catheter in progress notes

3.11 Abbreviations

UVC	Umbilical venous catheter	VIP	Visual Infusion Phlebitis
UAC	Umbilical arterial catheter	ANMF	Australasian Neonatal Medicines Formulary
MAP	Mean Arterial Pressure	eRIC	Electronic Records for Intensive care
TKVO	To keep vein open	EBM	Expressed Breast Milk

3.12 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 address changes to practice. The staff are asked to respond to an email or sign an audit sheet in their clinical area to

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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

3.13 Related Policies/ Procedures

- RHW NCC Medical Clinical Business Rule- Umbilical Catheterisation
- RHW NCC Nursing Clinical Business Rule- Arterial Line Peripheral and Umbilical (UAC) intra-arterial line set up

3.14 References

1. Kandil ESA, Bahgat RS, Sadik BRA et al. Effect of Nursing Interventions of Nurses' Performance regarding Care Provided to Neonates Undergoing Umbilical Venous Catheterisation. JNSBU. 2022;22:667-681. Accessed 24/11/2023
2. Sydney Children's Hospital Network Policy, Procedure and Guidelines Committee. Umbilical Catheters: Care and Management in CICU. 2019: 1-17. Accessed 15/09/2023
3. Newborn Care Centre Local Operating Procedures Committee. Umbilical Catheterisation. 2019: 1-6. Accessed 15/09/2023

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
- 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 4 Medication Safety
- Standard 5 Comprehensive Care
- Standard 7 Blood Management
- Standard 8 Recognising and Responding to Acute Deterioration

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7 REVISION AND APPROVAL HISTORY

Date	Revision No.	Author and Approval
10/03/2024	1	C Walter (CNE); R Dunkerly (RN), Endorsed by NCC CBR Committee
30.5.24 3.6.24	1	Reviewed by L Byun (Pharmacist) and approved for use Endorsed BRGC