

UMBILICAL CATHETERISATION

This Local Operating Procedure is developed to guide safe clinical practice in Newborn Care Centre (NCC) at The Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this Local Operating Procedure.

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INTRODUCTION

Umbilical vessel catheterisation (UVC) is most successful in the first few hours of life. The umbilical venous access provides a portal for delivery of fluids during emergency, nutrition, drug administration and reduces the need for multiple peripheral intravenous accesses. Umbilical arterial catheterisation (UAC) provides an access for blood sampling, blood gas monitoring and when connected to the blood pressure transducer enables continuous blood pressure monitoring.

1. AIM

- To guide safe aseptic insertion of umbilical catheterisation for UAC or UVC

2. PATIENT

- Newborns

3. STAFF

- Medical and nursing staff

4. EQUIPMENT

- Sterile disposable gown
- Hat & Mask for proceduralist and assistant
- Sterile gloves x 2 for proceduralist and assistant
- PICC Pack
- Mosquito forcep x 1 (not disposable)
- Lacrimal probe (if required)
- Umbilical catheter/s (appropriate size: Single, double or triple lumen – 3.5 Fg or 5.0 Fg)
- 10 mL syringes (extra if more than one umbilical catheter access port)
- Sterile cotton tape
- Safeshield scalpel
- 2.0 silk (dependent on number of catheter/s inserted)
- Extra packets of gauze
- Red bung (for each access port)
- 5 mL Sodium Chloride 0.9% ampoules x 4
- Sterile solution labels for syringes
- Sterile plastic sheet (large)
- Sterile green cloth
- Blue Inco Pad
- Central venous line insertion Record
- Chlorhexidine 0.05% antiseptic solution
- Measuring tape
- Comfeel
- Leucoplast tapes
- Neutral detergent

UMBILICAL CATHETERISATION cont'd

5. CLINICAL PRACTICE

Procedure:

1. Explain procedure to parent/s (if present).
2. Perform a "Time-out" on the newborn.
3. Perform hand hygiene.
4. Collect equipment.
5. Calculate/measure the insertion distance for the catheter/s. Confirm measurement with a fellow or consultant.

NOTE: Insertion length

UAC = 3 x weight + 9cm + stump or diagonally umbilicus to shoulder length + 1cm + stump

UVC = 1.5 x weight + 5cm + stump or UAC length / 2 + 1cm + stump

Emergency UVC access 5cm plus cord length

6. Insert the blue inco-pad under the newborn. Position the newborn in a comfortable posture.
7. Provide pain management prior to the procedure e.g. oral sucrose or morphine if on morphine infusion.
8. Clean work-surface with neutral detergent solution.
9. Request for assistance with the procedure and to observe and document the central venous line insertion record.
10. Put hat then mask on. Open packet of sterile gown and add sterile gloves to the sterile gown field.
11. Perform a surgical scrub and gown up. Put sterile gloves on using "closed-glove" technique.
12. Assistant to open packet of sterile plastic sheet for proceduralist to put on work-surface (Picture 1).
13. Assistant to open all packets of equipment for proceduralist to prepare (Picture 2).
 - Fill syringes with normal saline solution and attach labels to syringes
 - Prime umbilical catheter/s
 - Place primed umbilical catheter/s and all required instruments in the sterile green towel
 - Fold towel over
 - Pour antiseptic solution (assistant) in the plastic gallipots with 2 cotton ball swabs each
14. Assistant to perform hand hygiene and put on sterile gloves.
15. Medical officer to attach a sterile towel clip/forcep to the umbilical cord clamp for assistant to suspend the cord clamp.
16. Clean the abdominal skin surrounding the umbilicus, the umbilicus stump including the umbilical cord clamp. Repeat cleaning with cotton ball swab.
17. Insert towel clip/forcep on the umbilical cord clamp through the fenestrated sterile drape.
18. Suspend the umbilicus. Tie cotton tape firmly at the base of the umbilicus (Picture 3).
19. Cut below the cord clamp (Picture 3).
20. Identify the required umbilical vessel and dilate it using a fine toothed forceps or a lacrimal probe.
21. Insert and advance the umbilical catheter with slight pressure to the pre-measured length (Picture 4).



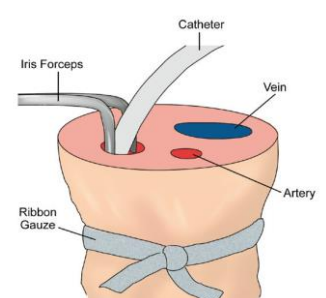
Picture 1



Picture 2



Picture 3



Picture 4

UMBILICAL CATHETERISATION cont'd

NOTE:

Always use sterile forceps to handle umbilical catheter.

22. Withdraw the syringe plunger to check for visible blood return in the catheter. Flush blood in catheter.
23. Secure the umbilical catheter with sutures (Picture 5).
24. Check umbilical catheter position with x-ray followed by an ultrasound when possible (see notes below). Verify catheter position a fellow or consultant.

NOTES:

- NO inotropes 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. Document in the CVL insertion record form with date, time and signature.
- Catheter length must be checked and recorded daily in observation chart.
- The newborn MUST NOT be left unattended whilst waiting for x-ray result.

25. Connect umbilical catheter/s to primed infusion sets. Ensure red bungs are attached to all lumens.

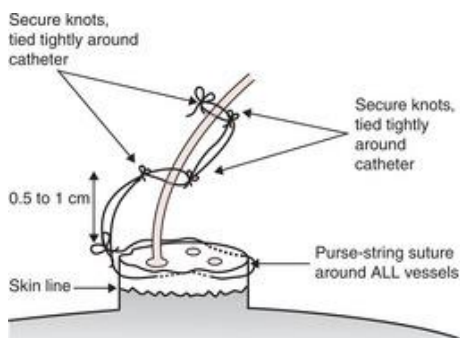
26. At completion of procedure:

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

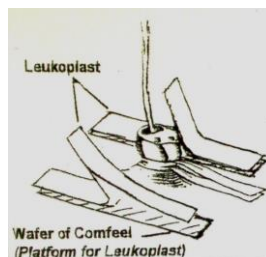
27. Medical officer and assistant to complete the central venous line insertion record.

28. Secure the umbilical catheter/s:

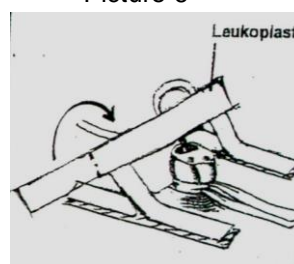
- Apply a strip of Comfeel to the abdomen on both sides of the umbilicus (Picture 6)
- Secure the umbilical catheter/s and silk threads with leucoplast tape using the goalpost method (Pictures 6-9)
- Coil the catheter within the tape (Picture 7)
- Ensure the coil is small (Pictures 8-9)



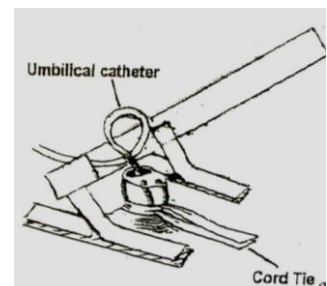
Picture 5



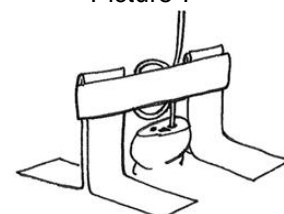
Picture 6



Picture 8



Picture 7



Picture 9

UMBILICAL CATHETERISATION cont'd

Duration of umbilical catheter use:

UVC	UAC
<ul style="list-style-type: none"> The 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"> The length of time a UAC can continue to be used is determined by the infant's clinical condition The risk of infection or vascular compromise increases with time and removal needs to be weighed against the clinical need

6. DOCUMENTATION

- eMR
- Daily Care Plan
- Neonatal Observation Chart
- Central Line Surveillance Form
- NICUS Database

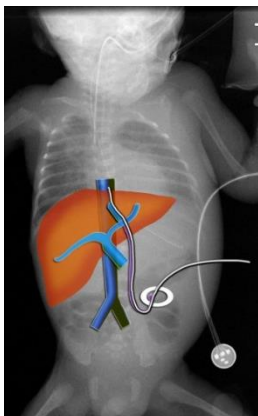
7. EDUCATIONAL NOTES

Umbilical Venous Catheters

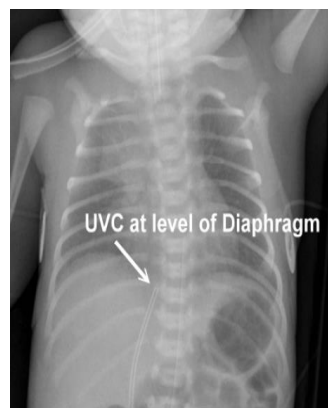
- The ideal catheter tip position is at the junction of the ductus venosus and inferior vena cava. On x-ray, the catheter can be identified going straight up with the catheter tip at the level of the diaphragm (Picture 1-2).

Malpositioned Catheters

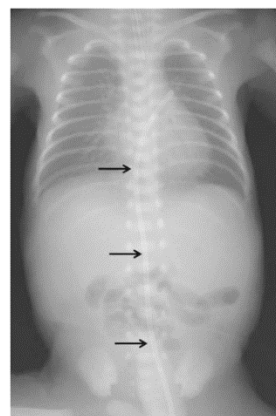
- If catheter tip is in the chambers of the heart (Picture 3-4):
 - Measure the distance for an ideal position
 - Withdraw to the new measurement
 - Repeat x-ray or ultrasound to confirm the new position



Picture 1



Picture 2



Picture 3



Picture 4

- If catheter tip is in hepatic or portal veins and in a lobe of the liver (Pictures 5-6):
 - Measure the distance for an ideal central position
 - Withdraw to the new measurement
 - Repeat x-ray or ultrasound to confirm the new position

UMBILICAL CATHETERISATION cont'd

- If catheter tip is in an intermediate or low position:
 - Monitor the line closely during use
 - Replace catheter early (by 48 hours) with a PICC line

To locate and confirm catheter tip position with ultrasound (Picture 7)

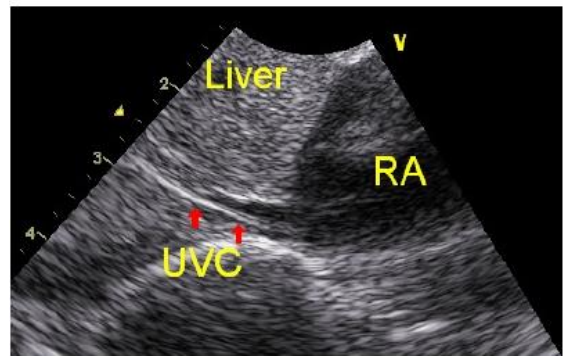
- It is easiest to visualise the UVC when it tracks up the ductus venosus and is visible in the subcostal true sagittal view. When the UVC cannot be sighted in the ductus venosus on ultrasound, the catheter may be malpositioned. A combination of x-ray and ultrasound should be used to confirm catheter position.



Picture 5



Picture 6



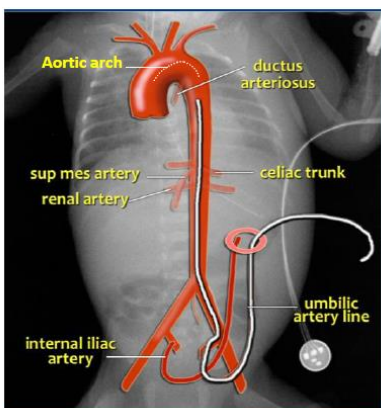
Picture 7 (with permission from RPAH)

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**).

Positioning

- Picture 8 demonstrates relevant x-ray landmarks when positioning a UAC (Schuppen 2013).
- Picture 9 shows an example of an ideally positioned UAC (T7 – T8; in the descending aorta, above the coeliac trunk).
- Picture 10 shows an example of a UAC that is positioned too low (T9; below the coeliac trunk).
- Picture 11 shows an example of a UAC that is positioned too high (T3; near the aortic arch).



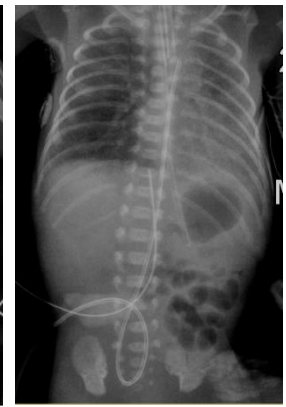
Picture 8



Picture 9



Picture 10



Picture 11

UMBILICAL CATHETERISATION cont'd

8. RELATED POLICIES/PROCEDURES/CLINICAL PRACTICE LOP

- Royal Hospital for Women NCC LOP – Golden Hours Protocol – Management of Preterm Infants <32 weeks in the first 2 hours of life

9. RISK RATING

- Low

10. NATIONAL STANDARD

- Standard 1 Governance for Safety and quality in Health Service Organisation
- Standard 3 Preventing and Controlling Healthcare Associated Infections
- Standard 5 Patient Identification and Procedure Matching

11. ABBREVIATIONS AND DEFINITIONS OF TERMS

NCC	Newborn Care Centre	PICC	Percutaneous Intravascular Central Catheter
UVC	Umbilical Venous Catheter	CVL	Central Venous Line
UAC	Umbilical Arterial Catheter	CSD	Central Sterilising Department

12. REFERENCES

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- Shukla H, Ferrara A. Rapid estimation of insertional length of umbilical catheters in newborns. AJDC 1986;140:78710.

13. AUTHOR

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REVISION & APPROVAL HISTORY

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1999 Primary

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