

## GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS


<b>Version Number</b>	2
<b>Date of Issue</b>	February 2017
<b>Reference Number</b>	GCSCUVC-02-2017-ETML-V2
<b>Review Interval</b>	3 yearly
<b>Approved By</b> Name: Fionnuala O'Neill Title: Nurse Practice Coordinator	Signature: <i>Fionnuala O'Neill</i> Date: October 2016
<b>Authorised By</b> Name: Rachel Kenna Title: Director of Nursing	Signature: <i>Rachel Kenna</i> Date: October 2016 Rachel Kenna Director of Nursing
<b>Author/s</b>	Name: Eileen Tiernan Title: Coordinator Graduate Diploma Critical Care Nursing (Children), PICUs  Name: Marie Lavelle Title: Clinical Nurse Facilitator, Children's Heart Centre
<b>Location of Copies</b>	On Hospital Intranet and locally in department

### Document Review History

<b>Review Date</b>	<b>Reviewed By</b>	<b>Signature</b>
2020		

### Document Change History

<b>Change to Document</b>	<b>Reason for Change</b>

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 2 of 20	


## INTRODUCTION

Central Venous Access Devices (CVAD), is a broad term used to include many catheter types which are inserted into a peripheral/central vein in the body to deliver medications or other therapies to children.

A catheter has one end positioned outside the body while a port is surgically placed under the skin and requires a special needle to access it.

### **The most common CVADs include:**

- Peripherally Inserted Central Catheter inserted into one of the peripheral veins in the upper arm.
- Central Venous Catheter
- Implanted ports inserted into the subclavian or vein or jugular and attached to a fluid reservoir placed in a surgically created subcutaneous pocket in the upper chest or into an arm vein.
- Hickman/Broviac catheter
- Tenckhoff Catheter
- Umbilical Venous Catheter


Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 3 of 20	

## CONTENTS

		Page No
1.0	Introduction to Central Venous Devices	2
2.0	Commonly used References Tables	4
	<i>Table 1: Skin Asepsis prior to peripheral or central line insertion</i>	4
	<i>Table 2: Guide to CVAD choice and the duration of usage</i>	5
	<i>Table 3: Flush Volumes for CVADs</i>	6
3.0	Description	7
4.0	Indications	9
5.0	Complications	9
6.0	Contraindications	10
7.0	Nursing Management of Umbilical Venous Catheters	10
8.0	Removal of an Umbilical Venous Catheter (UVC)	13
9.0	Complications of UVC Removal	17
10.0	References	18

*The authors and Nurse Practice Committee acknowledge review of this document by:*

*Eileen Morrin and Regina Keogh, Clinical Nurse Specialists Neonatology; Professor Eleanor Molloy and Dr. Pamela O'Connor, Consultant Neonatologists and PICU Nursing Education Team.*

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 4 of 20	

**Table 1. Skin Asepsis prior to peripheral and central line insertion by clinical staff in OLCHC**

S.A.R.I. Guideline 2009- for prevention of infection associated with CVC or peripheral line insertion recommends chlorhexidine gluconate 2% in 70% isopropyl alcohol (in a single patient use application) in adults & **children ≥ 2 months**.

INDICATION	PRODUCT	COMPOSITION
Skin cleansing prior to <b>peripheral</b> canula insertion	Sanicloth®	↑ 2% chlorhexidine gluconate in 70% isopropyl alcohol ↓
Skin cleansing prior to <b>CVC</b> insertion	OR	
Device cleaning (e.g. hubs)	Chlorhexidine 2% Alcohol (Ecolab) 200ml bottle	

For infants < **2 months old** the recommendation is 0.5% Chlorhexidine in aqueous solution

INDICATION	PRODUCT	COMPOSITION
Skin cleansing prior to peripheral and central line insertion in infants < 2 months old (Corrected age)	Sterexidine 200® 150ml bottle	contains 0.5% Chlorhexidine Gluconate w/v in aqueous solution


**NB: Use in premature babies:**

In immature neonates (e.g.: below 30 weeks gestation), gently dab the product onto the skin for 10 seconds & allow the skin to dry in air. Avoid 'up & down, back & forth' movement as gentle friction can damage immature stratum corneum of neonates. After the procedure, the skin should be cleaned with sterile water and dried thoroughly.

**NOTE:**

Povidone Iodine 10% (*Videne®* or *Betadine®*) may be used in patients with a history of chlorhexidine sensitivity.


Povidone Iodine 10% (*Videne®* or *Betadine®*) should no longer be used prior to performing lumbar puncture. Use appropriate chlorhexidine product listed above instead.

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 5 of 20	

The routine use of antimicrobial or antiseptic ointments around CVC insertion sites at the time of insertion or during dressing changes is not recommended

**Table 2. Guide to CVAD choice and the duration of usage**


TYPE OF LINE	TYPE OF ACCESS	LOCATION	LENGTH OF USAGE
<b>PERIPHERALLY INSERTED CENTRAL CATHETER PICC</b>	<ul style="list-style-type: none"> <li>Short-term venous access devices</li> <li>Inserted under local anaesthetic</li> </ul>	<ul style="list-style-type: none"> <li>Brachial, cephalic, median-cubital or scalp vein placement</li> <li>Single or multiple lumens</li> </ul>	0 days to 6 weeks
<b>MIDLINE</b>	<ul style="list-style-type: none"> <li>Short-term venous access devices</li> <li>Inserted under local anaesthetic</li> </ul>	<ul style="list-style-type: none"> <li>Brachial, cephalic, median-cubital or scalp vein placement</li> <li>Single or multiple lumens</li> </ul>	0 days to 6 weeks
<i>Midlines can be used for antibiotic therapy, and fluids, blood transfusions, although not for concentrated TPN intended to use for centrally located catheters. So midline catheters should not be used for any solution containing greater than 10 percent dextrose or 5 percent protein, or any vesicant or caustic solution.</i>			
<b>Central Venous Catheter</b>	<ul style="list-style-type: none"> <li>Short term central device inserted under general anaesthetic</li> </ul>	<ul style="list-style-type: none"> <li>Single or multiple lumens</li> <li>Right or left internal jugular usually preferred</li> <li>Sutured in place</li> </ul>	7-10 days
<b>TUNNELLED HICKMAN OR BROVIAC</b>	<ul style="list-style-type: none"> <li>Known to the children in OLCHC as "Freddy"</li> </ul>	<ul style="list-style-type: none"> <li>Infraclavicular placement</li> <li>Single or multiple lumens</li> <li>Dissolvable sutures are used.</li> <li>Dacron cuff. Can be felt under the skin.</li> <li>Inform medical staff if the Dacron cuff is visible, as this is an indication that the catheter has moved.</li> </ul>	indefinite
<b>IMPLANTED VENOUS ACCESS PORT (IMPLANTOFIX)</b>	<ul style="list-style-type: none"> <li>Totally implanted venous access device</li> <li>Inserted under general anaesthetic</li> <li>Accessed through the skin using a non-coring needle</li> </ul>	<ul style="list-style-type: none"> <li>Intradermal</li> <li>Dome-shaped</li> <li>Incision scar often seen across, above, or below the dome</li> <li>Palpable</li> </ul>	indefinite

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 6 of 20	

<b>Umbilical Venous Catheter</b>	<ul style="list-style-type: none"> <li>Used in neonatal units</li> </ul>	<ul style="list-style-type: none"> <li>Inserted via the umbilical vein in the umbilical cord, with the tip of the catheter positioned at the junction of the inferior vena cava (IVC) with the right atrium. It is above the diaphragm and beyond the liver at T9-T10</li> </ul>	3-7 days
<b>Non tunnelled Permcath/Vascath</b>	<ul style="list-style-type: none"> <li>Used predominately for Haemafiltration or plasmapheresis</li> </ul>	<ul style="list-style-type: none"> <li>Permcath are non-tunnelled long term lines used for haemodialysis or plasmapheresis.</li> <li>Vascaths are temporary non tunnelled lines used for maximum of three weeks for haemodialysis and haemofiltration or plasmapheresis</li> </ul>	Indefinite  Max 3 weeks

**Table 3. Flush volumes for CVADS**

Line Type	Age	Blood discard volume	Suggested Flush volume for pre and post line use	Heparin dose
<b>PICC/Midlines</b> It is not possible to withdraw blood from a 1-2fr PICC	< 1 year	1ml	0.5ml	10 units/ml
	1-3 years	2.5ml	0.6	10 units/ml
	> 3 years	3.5ml	0.8	10 units/ml
<b>Central Venous Catheters</b>	< 1 year	1 ml	0.5-1ml	10 units/ml
	1-3 years	2.5ml	1-2.5mls	10 units/ml
	> 3 years	3-5ml	3-5 mls	10 units/ml
<b>Hickman/Broviac</b>	< 1 year	1 ml	As per surgeons	10 units/ml
	1-3 years	2 ml	As per surgeons	10 units/ml
	> 3 years	3-5 ml	As per surgeons	10 units/ml
<b>Implantofix</b> In some cases it may be requested that blood is withdrawn from an Implantofix.	< 1 year	N/A	1ml -2.5 mls	10 units/ml
	1-3 years	N/A	1ml- 2.5mls	10 units/ml but Use 100units/ml when on discharge for patients with CF
	> 3 years	N/A	1ml-2.5mls	10 units/ml
<b>Umbilical Venous Catheters</b>	< 1 year	1ml	0.5-1ml	10 units/ml
	1-3 years	N/A	N/A	10 units/ml
	> 3 years	N/A	N/A	10 units/ml
<b>Permcath/Vascath</b>				

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 7 of 20	

### 3.0 Description

Umbilical venous catheterisation is a central intravascular infusion route for resuscitation and maintenance fluids, blood and blood products and parenteral nutrition. It can also be used as an alternative when peripheral venous access is not possible. The umbilical vein remains patent for appropriately the first week of life (CRTO 2008). Special precautions and guidelines should be followed to prevent rare but often fatal complications. Alternative IV access is ideally sought once the infant is stable between 3-5 days (Loisel *et al.* 1996).

***NB: Infants with umbilical arterial catheters are not to be cared for at ward level under any circumstances.***

#### Umbilical Vein

The umbilical vein is appropriately 2-3 cms in length and 4-5 mm in diameter. It is thin walled and larger than the two arteries when viewed on the cord and usually in 11am - 12md position (CRTO 2008, Rotunda Maternity Hospital 2013).

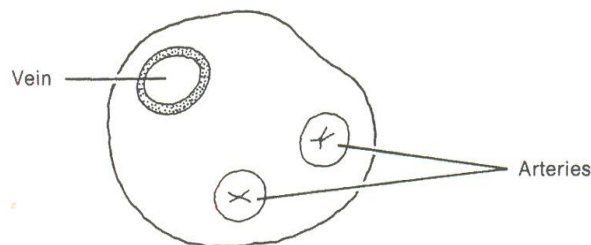



Figure 1: Cross Section of Umbilical Cord (APLS 2009)

#### UVC Catheter Tip Position

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 8 of 20	

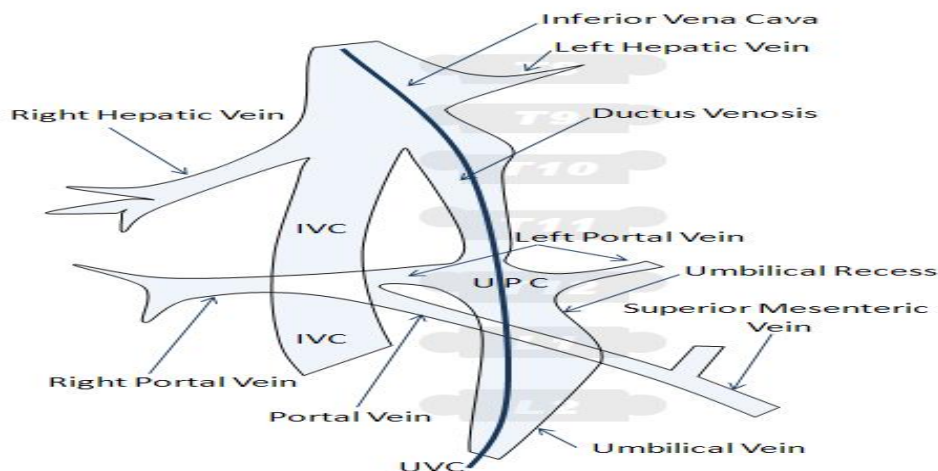


Figure 2: Correct Position of UVC

An umbilical venous catheter (UVC) is inserted via the umbilical vein in the umbilical cord, through the ductus venosus with the tip of the catheter positioned at the junction of the inferior vena cava (IVC) with the right atrium on chest x-ray. It is above the diaphragm and beyond the liver at T9-T10 (Hoellering *et al.* 2014). Catheter should not be in portal system or ductus venosus (CWIUH 2015). A lateral chest X-ray may be considered in addition to anteroposterior (AP) view (Rotunda Maternity Hospital 2013, Butler *et al.* 2014). Correct position is important to prevent portal venous system from receiving inappropriate hypertonic fluid resulting in hepatic necrosis and too deep a placement in the right atrium.

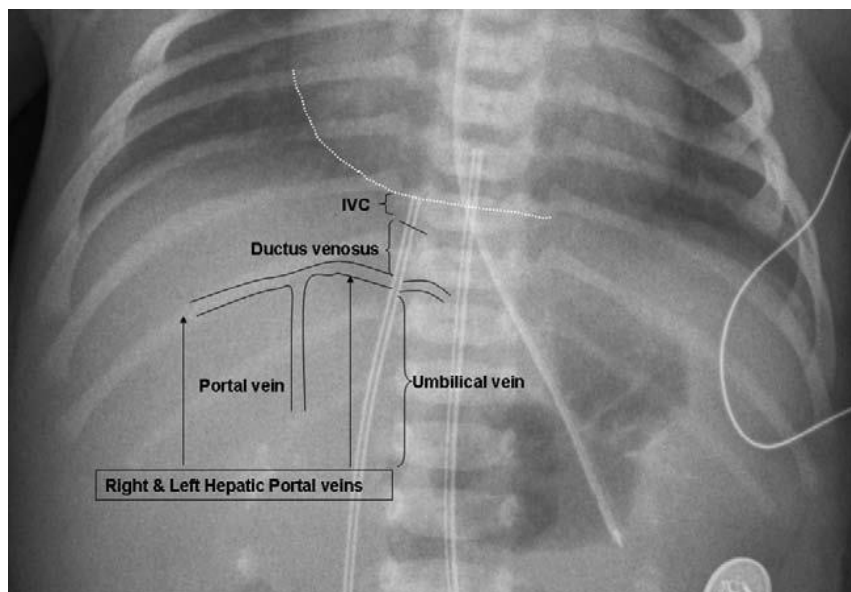



Figure 3: UVC positioned at intersection IVC and right atrial border (Hoellering *et al.* 2014).



Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 9 of 20	

*NB: In the AP Chest X-ray view the right atrium sits on the diaphragm. When the UVC protrudes above the diaphragm it is in the right atrium. There is a high incidence of incorrectly placed UVCs, therefore correct position of UVC on x-ray must always be verified by the medical staff prior to use. (Boxwell 2010, Rotunda Maternity Hospital 2013, Butler et al. 2014).*

### **Lifespan of UVC**

Usually inserted at birth in maternity hospital or within first 2 days. Maximum 10 -14 days. UVC is usually removed within first few days / as soon as possible (ASAP), once alternative IV access has been established.

### **Catheter Sizes**


Catheter sizes vary between approximately 4Fg – 8Fg (Rotunda Maternity Hospital 2013, CWIUH 2015).

## **4.0 Indications for Use**

- Rapid vascular access required for emergency fluid, medications, infusions and blood sampling resuscitation
- Difficulty establishing peripheral IV access, within a reasonable time or attempts
- Central venous access for the administration of fluids and /or drugs i.e. 12.5% dextrose / Total I Nutrition.
- CVP monitoring
- Blood and colloid administration (except platelets)
- Exchange transfusion (Bradshaw and Furdon 2006, Royal Prince Alfred Hospital 2011, Karlse Rotunda Maternity Hospital 2013, Kenner and Wright Lott 2016).

## **5.0 Complications**

- Sepsis (most common), especially with TPN
- Air embolism
- Pulmonary / systemic emboli
- Thrombosis i.e. intracardiac
- Catheter malposition / migration: leading to pericardial effusion/ tamponade
  - Arrhythmias (i.e. catheter moves into right atrium)
  - Intracardiac thrombus formation
  - Myocardial perforation, crossing foramen ovale to left atrium
  - Pericardial effusion / tamponade
  - Pulmonary and systemic emboli
  - Pulmonary infarction
  - Pulmonary haemorrhage
  - Hydrothorax (catheter perforated or lodged in a pulmonary vein)

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 10 of 20	

- Hepatic Necrosis
- Portal Vein Thrombosis
- Obstruction of pulmonary venous return (infants with TAPVD).
- Necrotising enterocolitis (especially if in situ > 24 hours)
- Thrombotic endocarditis
- Vascular damage
- Accidental dislodgement  
(Schlesinger *et al.* 2002, Royal Prince Alfred Hospital 2011, Karlsen 2013, Rotunda Maternity Hospital 2013).

***Strict adherence to aseptic technique and handwashing are essential when inserting, moving or accessing a UVC.***

## 6.0 Contraindications

### Relative

- Local infection
- Intestinal hypo perfusion
- Evidence of vascular compromise to the lower limbs or buttocks
- Bleeding or thrombotic tendencies
- Vascular abnormalities (Furdon *et al.* 2006, CRTO 2008).

### Absolute


- Exomphalus
- Exomphalitis
- Necrotising Enterocolitis (NEC)
- Peritonitis
- Gastroschesis

(Royal Prince Alfred Hospital 2011, Rotunda Maternity Hospital 2013, Kenner and Wright Lott 2016, Royal Children's Hospital Melbourne 2016).

## 7.0 Nursing Management of Umbilical Venous Catheters


On admission of infant with UVC insitu ensure the following has been documented / handed over:


- Date and time of catheter insertion
- Insertion depth of umbilical catheter
- Radiologic confirmation of catheter tip position
- Further catheter manipulations, as well as the infant's tolerance of the procedure, blood loss or other

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 11 of 20	

complications

- Centimeter marking on the catheter at the umbilical stump at time of insertion
- This information is then used to assess for catheter migration in conjunction with clinical assessment.
- Must be checked a minimum of twice shift to ensure no change has occurred to catheter insertion depth (Bradshaw and Furdon 2006).

ACTION	RATIONALE EVIDENCE and REFERENCE
<p><b>Securing the UVC</b></p> <p>Skin protected with Duoderm® strips lengthwise on infants abdomen. Position and secure the UVC using 'H-Tapes'. Ensure tapes are secure and catheter is looped.</p>  <p>Figure 4: Securing of UVC using 'H' Tapes.</p> <p>Check UVC site frequently for loose 'H-Tapes'. Place the tubing and catheter away from the infant's limbs. Position the nappy well below the insertion site.</p> <p><i>NB: Male infants, position nappy with aim to divert the urinary stream downwards.</i></p> <p><b>Safety</b> Confirmation of satisfactory placement by chest / abdominal x-ray should be confirmed prior to use. <i>NB: Once inserted the UVC should <b>NEVER BE ADVANCED</b>, only pulled back (medical responsibility).</i> A repeat x-ray should be undertaken to confirm</p>	<p>As umbilical stump sloughs and separates the anchoring suture will no longer secure catheter, therefore 'H-Tapes' must secure catheter against movement or accidental dislodgement which can result in loss of vascular access and significant blood loss (Rotunda Maternity Hospital 2013).</p> <p>Tapes can loosen due to humid environment in incubator (Rotunda Maternity Hospital 2013). To prevent accidental tension on the catheter which could result in catheter displacement (Royal Prince Alfred Hospital, 2011). To avoid contamination with urine / faeces. This would represent an infection risk (Boxwell 2010).</p> <p>To ensure correct placement / safety and to prevent and reduce the risk of infection (OLCHC 2005, 2007; OLCHC 2010a, CWIUH 2015)</p>

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 12 of 20	

correct placement before use.

Blood return from UVC should be obtained prior to administering fluids / medications through the catheter.

IV tubing and fluids should be accessed and changed using Aseptic Non Touch Technique (ANTT) level 3.(Needlefree devices in situ).

UVC and Needlefree devices should always be visible.

Ensure airtight system and connections secure.

**NB: Never leave an UVC open to air.**

Attach to standard transducer system (PICU / HDU only) using standard fluid (0.9% Normal Saline + 2 I.U. heparin per ml) i.e.500mls Normal Saline 0.9% + 1000 i.u. heparin, as prescribed.

Replace all infusions administer via UVC every 24 hours.

### Monitoring

Observe umbilicus and catheter site closely i.e hourly for:

- Bleeding
  
- Signs of infection i.e. pyrexia, tachycardia, abnormal full blood count (FBC) i.e. high white cells, low platelets, positive blood cultures. Non-specific signs i.e. poor handling, desaturation bradycardia or apnoea may also be due to sepsis.

To ensure catheter / system integrity and observe for signs of dislodgement / migration (King Edward Memorial Hospital 2012).

(O'Grady *et al.* 2011, OLCHC 2013, Loveday 2014, NICE 2014).

To ensure timely intervention. Loose needle free devices / connections promote backflow of blood contributing to blood loss and possible catheter occlusion by clot formation (Bradshaw and Furdon 2006; Rotunda Maternity Hospital 2013).

The abdominal venous system is under negative pressure.

Air can enter the catheter on inspiration and result in air embolism (Boxwell 2010, University of Iowa Children's Hospital 2016).


To maintain line patency, reduce catheter occlusion and allow CVP monitoring (Bradshaw and Furdon 2006).

Minimise infection risk (Rotunda Maternity Hospital 2013, OLCHC 2010b).

Early detection of infection and/or dislodgement and timely intervention (Karlsen 2006).

If inadvertent dislodgement of UVC occurs, firmly pinch the abdomen directly above the umbilical stump, along the pathway of the umbilical vein to promote haemostasis (Bradshaw and Furdon 2006).

These are potential signs of infection.


Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 13 of 20	

<ul style="list-style-type: none"> <li>• An UVC should be removed as soon as possible should positive blood cultures be obtained, in conjunction and following medical review and advice.</li> <li>• Check that 'H-Tape' /strapping have not loosened and for accidental catheter migration. <i>NB: cm marking at the skin on UVC and then hourly until removed as clinically indicated. Reinforce if necessary.</i></li> <li>• Observe the feet, legs and buttocks and groins for signs of vascular compromise i.e. cool peripheral temperature or compromised peripheral pulses.</li> <li>• Observe for blanching, blueness or mottling of buttocks or lower limbs.</li> <li>• Observe the infant for progressive abdominal distension, hypotension, and poor perfusion.</li> <li>• When an infant shows signs of acute deterioration, this may indicate dislodgement of the UVC into heart</li> </ul> <p>Document all observations in the nursing notes.</p>	<p>To remove source of infection and treat promptly.</p> <p>To ensure security of catheter position.</p> <p>These are signs of dislodgement/ migration/ obstruction.</p> <p>May indicate vascular compromise and need for possible UVC removal (King Edward Memorial Hospital 2012, Rounda Maternity Hospital 2013, University of Iowa Children's Hospital 2016).</p> <p>Must be urgently considered with signs of hypotension, tachycardia, respiratory distress, oxygen desaturation, muffled or distant heart sounds. These can be life threatening and need to be treated rapidly to ensure patient survival (Bradshaw and Furdon 2006).</p> <p>Continuity of care and to maintain accountability through accurate recording of nursing care (Dougherty and Lister 2011, NMBI 2015a).</p>
---	---

## 8.0 Removal of an Umbilical Venous Catheter


### Indications

- Alternative IV access has been established
- UVC is no longer required for IV access
- Evidence of extravasation or leaking catheter
- Proven Candida sepsis or Gram Negative Septicaemia


Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 14 of 20	

- Gram positive septicaemia unresponsive to antibiotic therapy in 24-48hours
- Equipment
- Clean dressing trolley
- Sterile dressing pack and sterile prep towel
- Sterile linen cord tie
- Solution for skin preparation as per local policy
- Sterile container to collect tip of UVC
- Sterile scissors
- Stitch cutter
- Sucrose 24%
- Medication Chart
- Opsite™ dressing
- Sharps bin
- Protective goggles

ACTION	RATIONALE, EVIDENCE and REFERENCE
<p><b>Procedure</b></p> <p><b><i>Responsibility for Removal of UVC</i></b>  Appropriately trained medical / nursing staff may carry out removal following verifying medical instructions.  Registered nurses should only remove an umbilical catheter if they have received the necessary theoretical and practical instruction to practice competently, within their scope of practice.</p> <p><b><i>Position</i></b>  Position infant supine</p> <p>Wrap a small blanket / nappy around both legs.</p> <p><b><i>Pain Relief</i></b>  Ensure the infant is receiving some pain relief measures i.e. facilitated tucking, 24% sucrose and non-nutritive sucking as prescribed.</p>	<p>To ensure patient safety (NMBI 2015b).</p> <p>To ensure adequate visibility of the UVC.</p> <p>To immobilise the infants' legs.</p> <p>To ensure comfort and prevent / minimise pain and distress (Trigg and Mohammed 2010).  Sucrose via the intra-oral route has been demonstrated to have evidence based analgesic actions for minor invasive procedures in neonates.  The sweetness of sucrose appears to elevate pain thresholds via endogenous opioid pathways and</p>


Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 15 of 20	

<p>Position infant with soother and swaddling both legs as condition allows.</p> <p><b>Monitoring</b> Ensure the infant is stable and nursed in incubator / radiant warmer on servo control.</p> <p>Monitor vital signs i.e. heart rate and oxygen saturation.</p> <p><b>Procedure</b> Ensure all necessary equipment is available.</p> <p>Decontaminate hands, using an aseptic non-touch technique (ANNT) level 3.</p> <p>Clean an appropriate work surface with 70% isopropyl alcohol swab and allow to air dry (30 seconds). Lay dressing trolley.</p> <p>Wash hands with antiseptic solution (ANNT) level 2. Apply non-sterile gloves.</p> <p>When an infusion is in progress, clean the Needlefree device with an appropriate cleanser.</p> <p>Disconnect infusion from the Needlefree device and clamp it.</p> <p>It may be necessary to apply soaked saline gauze to the stump for 10 – 15minutes.</p> <p>Carefully open 'H-Tapes' and lift UVC catheter from tape</p>	<p>result in decreased crying in the infant. Sucrose last approximately 3 – 5minutes with a peak action at 2 minutes. (Noerr 2001, Mitchell and Waltman 2003, Hockenberry and Wilson 2015, Stevens et al. 2016).</p> <p>Effects of sucrose are intensified with sucking Maintaining containment during the procedure reduced stress (Folk 2007).</p> <p>To maintain infants neural thermo temperature whilst ensuring close observation of patient and easy access to UVC insertion site.</p> <p>To have a baseline set of observations and allow monitoring throughout the procedure.</p> <p>To ensure the procedure is completed smoothly (Dougherty and Lister 2011).</p> <p>To prevent cross infection (Infection Control Association 2002, OLCHC 2010a, O'Grady <i>et al.</i> 2011, OLCHC 2013, Loveday 2014, NICE 2014)</p> <p>This creates a clean field for dressing pack (O'Grady et al. 2011, Loveday 2014)</p> <p>To prevent cross infection (OLCHC 2010a, O'Grady et al. 2011, LOCHC 2011, Loveday 2014, NICE 2014).</p> <p>(O'Grady et al. 2011, OLCHC 2011, Loveday 2014, NICE 2014)</p> <p>To soften the stump (Royal Children's Hospital Melbourne 2016) .</p>
--	--

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 16 of 20	

<p>Assess the insertion site for evidence of infection - redness, ooze or inflammation. Obtain a wound swab for culture and sensitivity (Culture and Sensitivity), ensuring no contamination occurs, as clinically indicated.</p> <p>Wash hands with antiseptic solution (ANTT) level 2. Apply sterile gloves</p> <p>Clean umbilical venous catheter insertion site with antiseptic solution as per local policy.</p> <p>Using sterile stitch cutter remove anchor suture(s) securing the catheter.</p> <p>When the umbilical stump (cord) still exist, tie the umbilical tape around it as umbilical catheter is gently removed. This is usually left in situ from the maternity hospital.</p> <p>Alternatively an artery forceps can be used to clamp the vessel once the UVC is removed, until any bleeding has ceased.</p> <p>Remove the catheter slowly to the 2 cm mark, the last 2cms are removed very slowly over 2 minutes. The vessel is clamped with an artery forceps or tied with umbilical tie once UVC is removed.</p> <p>When the umbilical stump has already fallen off and clamping of the vessel is difficult, pressure can be applied with sterile gauze.</p> <p>Clamp the vessel or maintain pressure on the swabs for about 5minutes after the catheter has been removed or until the site is no longer bleeding.</p>	<p>Careful assessment allows early identification of colonisation or infection of the insertion site. (Dougherty and Lister 2011).</p> <p>To prevent cross infection (OLCHC 2010a, O'Grady et al. 2011, OLCHC 2011, Loveday 2014, NICE 2014).</p> <p>Cleaning the site helps to prevent contamination of the catheter on removal. (Dougherty and Lister 2015).</p> <p>To facilitate removal. (Dougherty and Lister 2015).</p> <p>To minimise and prevent bleeding.</p> <p>Clamping and pressure is applied to prevent haemorrhage and to encourage resealing of the vein wall. It also prevents the entry of air into the vein. (Woodrow 2002).</p> <p>To ensure hemostasis occurs (Infusion Nurse's Society 2011)</p>
---	--




Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 17 of 20	

<p>Apply Kaltostat in the event of persistent bleeding in consultation with the medical team.</p> <p>Apply a sterile occlusive dressing i.e. Opsite™ to the venous access site for a minimum of 24 hours.</p> <p>Ensure UVC including tip is complete.</p> <p>Send 5 cm of UVC tip for culture and sensitivity if clinically indicated, i.e. infant unwell and shows signs and symptoms of infection.</p> <p>The Infant should remain supine for 4-6 hours and site monitored for minimum 12 hours and thereafter daily as clinically indicated.</p> <p>Dispose of all equipment appropriately.</p> <p>Wash hands with antiseptic solution.</p> <p>Document procedure in child's medical notes and nursing care plan.</p>	<p>Kaltostat is an external wound dressing designed to absorb exudates and promote haemostasis (CWIUH 2015).</p> <p>To protect against entry of pathogens and air. Residual catheter tract remains an air entry port until completely sealed.</p> <p>To prevent air emboli (Woodrow 2002).</p> <p>To detect any infection related to the catheter, and thus provide necessary treatment. (Dougherty and Lister 2011).</p> <p>To observe umbilical stump for excessive oozing / haemorrhage following removal and /or other complications and early / timely treatment (Infusion Nurse's Society 2011, Royal Prince Alfred Hospital 2011).</p> <p>To promote safety and prevent cross infection (Department of Health and Children 2002, OLHSC 2008).</p> <p>To prevent cross infection (OLHSC 2013,).</p> <p>Maintains accountability through accurate recording of medical and nursing intervention (NMBI 2015a).</p>
---	--


## 9.0 Complications of UVC Removal

- Infection
- Thrombosis
- Catheter malposition
- Air embolism
- Haemorrhage

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 18 of 20	

## 10.0 References

- Advanced Paediatric Life Support Group (2009) *Advanced Paediatric Life Support: The Practical Approach*, 5<sup>th</sup> Edition. Blackwell Publishing, Oxford.
- Boxwell, G. (ed) (2010) *Neonatal Intensive Care Nursing, 2<sup>nd</sup> Edition*. Routledge: Abington, Oxon..
- Bradshaw, W.T. and Furdon, S.A. (2006) A nurses guide to early detection of umbilical venous catheter complications in infants. *Advances in Neonatal Care*. **6**(3): 127-138.
- Butler, G. Al-Assaf, N. Tarrant, A. Ryan, S. and El-Khuffash, A. (2014) Using lateral radiographs to determine umbilical venous catheter position in neonates. *Irish Medical Journal*, **107**(8): 256-258.
- CRTO (2008) *Central Access: Umbilical Artery and Vein Cannulation. Clinical Best Practice Guideline*. College of Respiratory Therapist of Ontario (CRTO): Ontario. Available online: [www.crto.on.ca](http://www.crto.on.ca) (Accessed February 22<sup>nd</sup> 2016).
- CWUIH (2015) *Umbilical Catheter, PICC, Central catheter, Broivac Catheter and Hub Management*. Coombe Woman's and Infant's University Hospital: Dublin.
- Department of Health and Children (2002) *Segregation Packaging and Storage Guidelines for Healthcare Risk Waste (Working Draft)*. Department of Health and Children, Dublin.
- Dougherty, L. and Lister, S.E. (2011) (eds) *The Royal Marsden Hospital, Manual of Clinical Nursing Procedures*, 8<sup>th</sup> Edition. Wiley Blackwell: London.
- Folk, L.A. (2007) Guide to capillary heelstick blood sampling in infants. *Advances in Neonatal Care* **7**(4), 171-178.
- Furdon, S.A. Horgan, M.J. Bradshaw, W.T. and Clark, D.A. (2006) Nurses' guide to early detection of umbilical arterial catheter complications in infants. *Advances in Neonatal Care*, **6**(5): 242-256.
- Hockenberry, M.J. and Wilson, D. (eds) (2015) *Wong's Nursing Care of Infants and Children*, 10<sup>th</sup> Edition. Mosby: St Louis.
- Hoellering, A.B. Koorts, P.J. Cartwright, D.W. and Davies, M.W. (2013) Determination of umbilical venous catheter tip position with radiograph. *Pediatric Critical Care Medicine*, **14**(1): 56-61.
- Infection Control Nurses Association (2002) *Hand Contamination Guidelines*, 2<sup>nd</sup> Ed. ICNA: Fitwise Bathgate.
- Infusion Nurse's Society (2011) Access devices. *Journal of Infusion Nursing*, **34**(1S): S50-S54.
- Loisel, D. Smith, M. MacDonald, M. and Martin, G. (1996) Intravenous access in newborn infants; impact of extended umbilical venous catheter use on requirement for peripheral venous lines. *Journal of Perinatology* **16**:461-

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 19 of 20	

466.

Loveday, H.P. Wilson, J.A. Pratt, R.J. Golsorkhi, M. Ingle, A. Bak, J. Browne, J. Prieto, J. Wilcox, M. (2014) Epic3: National evidence-based guidelines for preventing healthcare-associated infections in NHS hospital in England. *Journal of Hospital Medicine*, **851**: s1 – s70.

Karlsen, K. (2013) *The S.T.A.B.L.E. Program, Learner / Provider manual: Post Resuscitation / Pre-transport Stabilisation Care of Sick Infants. Guidelines for Healthcare Providers*, 6<sup>th</sup> Edition. S.T.A.B.L.E. Inc. Salt Lake City.

Kenner, C. and Wright Lott, J. (2016) *Neonatal Nursing Handbook: an Evidenced-based Approach to Conditions and Procedures*, 2<sup>nd</sup> Edition. Springer; New York.

King Edward Memorial Hospital (2012) *Umbilical Catheter Insertion (VAC / UVC)*. Available online: [www.kemh.health.wa.gov.au/services/nccu/](http://www.kemh.health.wa.gov.au/services/nccu/) (Accessed February 17th 2016).

National Maternity Hospital (2002) *Nursing and Midwifery Policy and Practice Guideline: Umbilical Venous Catheters*. National Maternity Hospital, Dublin.

National Institute for Health and Clinical Excellence (NICE) (2014) *Epic 3: National Evidence-Based Guidelines for Preventing Health Care-Associated Infections in NHS Hospitals in England*.

Nursing and Midwifery Board of Ireland (NMBI) (2015a) *Recording Clinical Practice*, 2<sup>nd</sup> Edition. Nursing and Midwifery Board of Ireland: Dublin.

Nursing and Midwifery Board of Ireland (NMBI) (2015b) *Scope of Nursing and Midwifery Practice Framework*, 2<sup>nd</sup> Edition. NMBI: Dublin.


Mitchell, A. and Waltman, P.A. (2003) Oral sucrose and pain relief in preterm infants. *Pain Management Nursing* 4(2), 62-69.

Noerr, B. (2001) Sucrose for neonatal procedural pain. *Neonatal Network* **20**(7), 63-67.

O'Grady, N.P. Alexander, M. Burns, L.A. Dellinger, E.P. Garland, J. Heard, S.O. Lipsett, P.A. Masur, H. Mermel, L.A. Person, M/L/ Raad, I.I. Randolph, A. Rupp, M.E. Saint, S. and Healthcare Infection Control Practices and Advisory Committee (HICPAC) (2011) *Guidelines for Prevention of Intravascular Catheter-related Infection*. (CDC) / HICPAC. Available online: <https://www.cdc.gov/hicpac/pdf/guidelines/bsi-guidelines-2011.pdf> (Accessed February 15<sup>th</sup> 2017).

OLHSC (2008) *Infection Control / Waste Policy*. Our Lady's Hospital for Sick Children's: Dublin.

OLCHC (2010a) *Guidelines on Hand Hygiene*. Nurse Practice Development Folder. Our Lady's Children's Hospital Crumlin: Dublin.

Our Lady's Children's Hospital, Crumlin		
Document Name: GUIDELINES FOR CLINICAL STAFF ON THE CARE OF UMBILICAL VENOUS CATHETERS		
Reference Number: GCSCUVC-02-2017-ETML-V2	Version Number: V2	
Date of Issue: February 2017	Page 20 of 20	

OLCHC (2010b) *Medication Policy*. Our Lady's Children's Hospital Crumlin: Dublin.

OLCHC (2013) *Aseptic Non-touch Technique, OLCHC Reference Guide*. Our Lady's Children's Hospital, Crumlin: Dublin.

Rotunda Maternity Hospital (2013) *Insertion of Umbilical Arterial and Venous Catheters*. Rotunda Maternity Hospital: Dublin.

Royal Children's Hospital Melbourne (2016) *Umbilical Venous Catheterisation of the Newborn*. Available online: [http://www.rch.org.au/uploadedFiles/Main/Content/neonatal\\_rch/clinical\\_practice\\_guidelines/UVC%20Newborn\(2\).pdf](http://www.rch.org.au/uploadedFiles/Main/Content/neonatal_rch/clinical_practice_guidelines/UVC%20Newborn(2).pdf) (Accessed February 15<sup>th</sup> 2017).

Royal Prince Alfred Hospital (2011) *Umbilical Venous Catheters*. Available online: [www.slhd.nsw.gov.au/rpa/neonatal/](http://www.slhd.nsw.gov.au/rpa/neonatal/) (Accessed February 15<sup>th</sup> 2016).

Schlesinger, A.E. Braverman, R.M. Dipietro, M.A. (2002) Neonates and umbilical venous catheters; normal appearance, anomalous positions, complications and potential aid to diagnosis. *AJR*. 1147-1153.

Stevens, B. Yamada, J. Ohisson, A. Haliburton, S. and Shorkey, A. (2016) *Sucrose for Analgesia (pain relief) in Newborn Infants Undergoing painful Procedures*. Cochrane database of Systematic Reviews. Issue 7. Art No: CD 001069 DOI: 10.1002/14651858 CD001069.pub5. Available online: [www.cochranelibrary.com](http://www.cochranelibrary.com) (Accessed 10<sup>th</sup> August 2016).

Trigg, E. and Mohammed, T.A. (eds) (2010) *Practices in Children's Nursing: Guidelines for Hospital and Community*, 3<sup>rd</sup> Edition. Churchill Livingstone Elsevier, Edinburgh.

University of Iowa Children's Hospital (2016) *Insertion of Umbilical Vessel Catheters*. Available online: <https://uichildrens.org/health-library/insertion-umbilical-vessel-catheters> (Accessed February 15<sup>th</sup> 2017).

Woodrow, P. (2002) Central venous catheters and central venous pressure. *Nursing Standard* **16**(26) 45-52, 54.

©2017 OLCHC.

Disclaimer 2017, Our Lady's Children's Hospital Crumlin, Dublin 12. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means without the prior written permission of the copyright holder. Every effort has been made to ensure that the information provided is accurate and in accord with standards accepted at the time of printing.