1. Introduction and Who Guideline applies to

Ideally, haemodialysis should be performed by accessing the circulation via an arteriovenous fistula (AVF), which is the safest, most effective, and most reliable form of vascular access. However, in many cases, urgent access for dialysis is necessary (e.g., acute renal failure, new presentation of established renal failure, clotting of established AVF). This urgent access is achieved by inserting large-bore catheters into central veins.

Haemodialysis catheters (HD-CVCs) are inserted into central veins for vascular access during haemodialysis. Nephrology services commonly use both semi-permanent tunnelled cuffed catheters (Permcaths) and temporary untunnelled uncuffed catheters (Vascaths).

These guidelines cover the insertion, removal, and exchange of both types of haemodialysis catheters. They are designed to assist competent practitioners and practitioners in training under direct supervision by a competent practitioner. These guidelines provide general guidance and advice specific to the insertion and removal of haemodialysis catheters but are not a comprehensive guide to HD-CVCs insertion and removal.
Clinical guidelines are advisory in nature. The interpretation and application of clinical guidelines remain the responsibility of the individual practitioner. In cases of uncertainty, consult a senior colleague or an expert.

2. Guideline Standards and Procedures

2.1 General Rules and Definitions

2.1.1 Avoid the subclavian site unless no other large vein is available, as there is a high incidence (>50%) of subclavian vein stenosis after haemodialysis catheter insertion.

2.1.2 Whenever possible, insert or remove catheters in a semi-elective manner between 09:00 and 17:00, using the dedicated procedure room with appropriate staff support and monitoring. Non tunnelled catheter (“vascath”) removals can be undertaken on the ward.

2.1.3 For patients with infectious issues (e.g., infective diarrhoea, MRSA infection), HD-CVC insertion and permcath removal should still occur in the procedure room.These should ideally be scheduled at the end of the day, and with thorough cleaning of the room immediately afterward.

2.1.4 Catheter insertions and permcath removals should only take place at the bedside for emergencies, very unstable patients requiring invasive monitoring, or when there is a high risk of infection if the patient is moved out of their side room.

2.1.5 Outside the hours of 09:00-17:00, Vascaths should only be inserted for genuine emergencies (e.g., severe hyperkalemia, severe acidosis, pulmonary oedema).

2.1.6 For all insertions and removals, it is very important that the patient is positioned appropriately, to reduce the risk of air embolism. Therefore, for a neck line (subclavian or jugular), lie the patient flat in the Trendelenberg position by tipping the bed (i.e. head slightly lower than feet). For femoral lines, patient should be positioned slightly head up.

2.1.7 Monitor the patient throughout the catheter insertion procedure using ECG and BP monitoring, as well as pulse oximetry. Ensure easy access to resuscitation equipment.

2.1.8 Review the following investigations before the procedure: Full blood count, clotting screen, and renal profile.

2.1.9 Review patient notes and drug charts for the risk of excessive bleeding or recent anticoagulation treatment. If the patient has undergone haemodialysis in the previous 12 hours, check APTT. Ideally, INR/APTT should be <1.6, and the platelet count should be >50.

2.1.10 Follow the principles outlined in the 4th edition of "Saving Lives: High Impact Intervention (Nov 2017) - Prevention of infections associated with central venous access devices" for line insertion/removal.

2.1.11 Clean the skin with single-use 2% chlorhexidine in 70% alcohol, as evidence suggests this reduces the risk of catheter colonization compared to iodine-based solutions.

2.1.12 Immediately before insertion, check if the patient has been screened for MRSA/MSSA carriage in the previous 7 days and whether treatment with Mupirocin/Stellisept has been commenced. If not, take swabs before catheter insertion and apply Mupirocin to both nostrils immediately.

2.1.13 Under rare circumstances, patients may require sedation for HD-CVC insertion/removal. Follow the UHL Sedation Policy: B10/2005.

2.1.14 Patients on therapeutic anticoagulation may require bridging or holding anticoagulant treatment for a specific duration to avoid bleeding risk. Refer to UHL Anticoagulation Bridging Therapy for Elective Surgery and Procedures UHL Guideline, using the procedure risk classification below.

2.1.15 For patients on a single antiplatelet agent, urgent procedures can be performed without interrupting the antiplatelet agent. For elective procedures, it is preferable to stop antiplatelet agents for 7 days before the procedure.

2.1.16 For patients on double antiplatelets, elective procedures should be postponed until the patient is on a single agent, unless clinically inappropriate. For urgent procedures, assess the risks and benefits in consultation with the clinical team and responsible consultant, prioritizing the less risky approach.

2.2 Consenting

2.2.1 Catheter insertion/removal requires written consent following the UHL policy (Policy for Consent to Examination or Treatment Ref A16/2002, updated March 2022).

2.2.2 Verbal consent can suffice for Vascath removal.

2.2.3 Seek written consent even if HD-CVCs is being 'rail-roaded.'

2.2.4 Use Consent Form 4 for adults who cannot consent to investigation or treatment, and document this in medical notes. Information leaflets and pre-printed labels with risks for consent forms are available for patients.

2.2.5 The doctor performing the procedure is responsible for ensuring the patient understands the risks, obtaining written informed consent if necessary with the aid of an interpreter, completing the standard consent form, and filing it in the case sheet.

2.2.6 Patients and their families should receive education on the purpose of the catheter, potential risks and complications, and care instructions for the catheter exit site.

2.2.7 The consent process should include a discussion of alternative vascular access options and their associated risks and benefits.

2.3 Risk classification

2.3.1 There is potential for significant patient harm, including complications such as pneumothorax, haemothorax, bleeding, sepsis, and arrhythmias, which on rare occasions could lead to death.

2.3.2 Due to the rate of complications observed in previous local audits, Permcath to Permcath exchange is considered a high-risk procedure.

2.3.3 Permcaths insertion and Vascath to Permcath exchange are considered intermediate-risk procedures. Consider the use of anti-platelets or anticoagulants carefully based on this risk assessment.

2.3.4 Vascaths insertion in the jugular vein is considered intermediate risk, while Vascaths insertion in femoral veins is considered a low-risk procedure.

2.3.5 HD-CVCs removal is considered a low-risk procedure. However, it's essential to note that even after removal of HD-CVCs, serious, and even fatal bleeding can occur. This has been highlighted by reports from the National Patient Safety Agency and has led to guidance being issued by the Renal Association/British Renal Society/Intensive Care Society in 2018.

2.4 Indications for and uses of haemodialysis central venous catheters

2.4.1 Temporary HD-CVCs are primarily used for treating patients with acute kidney injury. Ideally, they should not be used for patients with end-stage kidney disease, but this may be necessary due to problems with other access options.

2.4.2 These catheters are for dialysis only and should only be used for parenteral nutrition, vasoactives, blood sampling, etc., if no other route is available. In such cases, consider using a 'Tricath' catheter with a third lumen if possible. Using HD-CVCs for other purposes increases the risk of bacteremia and catheter dysfunction.

2.4.3 When it is anticipated that the catheter will remain in place for more than 3 weeks, consider inserting a Permcath either medically or surgically. Permcaths are more comfortable and may be associated with a lower risk of bacteremia and vein damage. However, they are more challenging to insert and require the use of a large-bore sheath or surgical exposure of the relevant vein.

2.5 Insertion of Vascaths

2.5.1 Only competent practitioners should independently insert catheters. New medical staff with previous central catheter insertion experience should be supervised by consultants or specialist nurse practitioners for vascular access insertion. Competence for a specific route should be established before unsupervised insertion.

2.5.2 Avoid the subclavian site due to a higher likelihood of central stenosis, particularly if significant respiratory disease is present, which increases the risk of pneumothorax.

2.5.3 Internal medicine trainees (CMT) must have direct supervision and should only insert lines if it aligns with their intended specialty (e.g., not GP trainees). Regular Direct Observation of Procedural Skills (DOPS) evaluation should be conducted. Foundation year doctors are not permitted to insert jugular or femoral catheters following a clinical incident in 2009.

2.5.4 Review patient notes and drug charts for the risk of excessive bleeding or anticoagulation treatment. Check clotting and platelets if recent heparin infusions or flushes were administered. Verify APTT before inserting HD-CVCs if there was a failed attempt to dialyze through a Vascath or Permcath, as heparin may be in the system, which can lead to excessive bleeding.

2.5.5 Strictly adhere to aseptic technique during the insertion procedure, including wearing a headcover, gown, gloves, and a mask. Create a sterile field. Perform procedures in most cases in a dedicated treatment room with the assistance of a renal care assistant.

2.5.6 Utilize ultrasound to identify veins immediately before the procedure. The standard of care in the department is to puncture the vein using real-time ultrasound guidance.

2.5.7 Confirm that the vein has been punctured to prevent cannulation of an artery. This can be confirmed by identifying the guidewire in the vein using ultrasound scan, identifying the guidewire under fluoroscopy, or by measuring the pressure in the vessel.

2.5.8 To measure pressure in the blood vessel, use an introducer needle with a plastic cannula. Aspirate blood and hold the tube vertically. Detach the syringe and allow the column of blood to fall. It should fall and oscillate with respiration. Seek senior help or stop the procedure if the level does not fall below 20cm despite these measures.

2.5.9 Recommended catheter lengths (adjust length for smaller patients) include:

- RIJ Vein: use a pre-curved 12.5 - 15cm line.
- RSC Vein: use a straight 15-16cm line.
- LIJ Vein: use a pre-curved 15-20cm line.
- LSC Vein: use a straight 15-20cm line.
- Femoral Vein: use a straight 20-25cm line.

2.5.10 Suture both wings with 1/0 or 2/0 nylon suture with a curved needle, ensuring a secure "bite" in the stitch. Dress with a transparent dressing. Suture and tape all femoral lines to the thigh to prevent catheter displacement; make this notation on the prescription.

2.5.11 Once the catheter is in place, verify good flow from both lumens. If not, check for kinks in the catheter or pull back 0.5-1.0cm. After confirmation of satisfactory flow, slowly flush each lumen with 10ml of saline immediately after insertion (use a 10ml syringe).

2.6 Insertion of Permcaths

2.6.1 Permcaths placed in the internal jugular vein are increasingly used for semi-permanent access in chronic dialysis patients. In rare cases, they may be inserted in the femoral or iliac vein, which should be decided in consultation with a relevant consultant nephrologist.

2.6.2 These may be inserted either percutaneously by appropriately trained senior staff (generally consultants, SpRs, or operators with specific training) or through an open surgical approach.

2.6.3 The right internal jugular approach can be employed under ultrasound guidance without fluoroscopy. However, all left-sided catheters (or when the subclavian vein is used as a last resort) must be inserted under fluoroscopy.

2.6.4 Patients with a history of multiple previous catheters at the chosen site or known central venous stenosis should undergo radiological screening or an open approach, as determined by clinical assessment.

2.6.5 The insertion procedure should be regarded as a minor operation, demanding strict adherence to sterile techniques and proper consent. It is recommended to perform the insertion in a dedicated procedure room, preferably during scheduled procedures sessions.

2.6.6 To minimize infection risk, it is advisable to avoid exchanging a catheter over a guidewire from a Vascath to a Permcath. Ideally, the Vascath should be removed at least 24 hours prior, and a new puncture site should be chosen. Exceptions to this rule may be considered in cases where re-puncture of the vein is anticipated to be very difficult.

2.6.7 Permcath insertion packs containing all necessary equipment for the procedure are available from sterile supplies. The preparation and initial puncture of the internal jugular vein should follow similar protocols as for temporary catheters.

2.6.8 To prevent catheter kinking, the initial puncture of the internal jugular vein should be positioned "low" to avoid a tight kink where the catheter turns in the root of the neck. Kinking of the catheter is a common cause of immediate catheter malfunction.

2.6.9 The catheter exit site should be selected so that the tip of the catheter is positioned approximately at the 4th intercostal space, corresponding to the junction of the superior vena cava and right atrium. The choice of catheter length (typically 24-28cm for the right side and 32cm for the left side) should be tailored to the patient's size but may vary based on individual factors. For femoral permcaths , 36cm -40cm catheters are typically used.

2.6.10 Infiltrate the proposed catheter track with 2% lignocaine with adrenaline to minimize bleeding.

2.6.11 Carefully check that dilators and split sheaths ride freely over the guidewire during the insertion process. When inserting the dilator or split sheath, apply

gentle force to advance it into the vein while ensuring that the vein is entered without damaging it.

2.6.12 When removing the dilator from the split sheath, be aware of the risk of air embolism. Patients should be positioned head down, if possible, and asked to hold their breath during expiration. The sheath may be pinched between the thumb and forefinger to minimize this risk.

2.6.13 Confirm that there is good flow from both lumens of the catheter. Vigorously pull back on a 10ml syringe to ensure immediate filling of the barrel. If this does not occur, try pulling back 0.5-1.0cm or use blunt forceps to smooth out any kinking of the tube in the root of the neck.

2.6.14 Secure the catheter to the skin, and keep these sutures in place for three weeks to allow the cuff to become fixed in the subcutaneous tunnel.

2.7 Post HD-CVCs Insertion Care

2.7.1 HD-CVCs should be locked using TauroLock™-Hep500. Employ a 2.5-5ml syringe and draw up 0.1ml more than the void volume per lumen. (Note: The standard procedure in the Intensive Care Unit (ITU) typically employs heparin 1000IU/ml as a catheter lock.) Lock the catheter using a volume corresponding to the dead space volume of the catheter lumen, as indicated on the catheter itself. Ensure the catheter is clamped under positive pressure when the plunger reaches 0.1ml. This requires careful coordination.

2.7.2 Following the procedure, a chest X-ray is mandatory for all patients with internal jugular and subclavian catheters, even if the insertion was unsuccessful. The interpretation of the chest X-ray findings must be documented in the patient's medical notes before proceeding with dialysis. The catheter tip should ideally be positioned at the lower end of the superior vena cava (SVC) or the right atrium.

2.7.3 Complete the catheter insertion checklist and ensure that this checklist is filed in the patient's medical records.

2.7.4 Prescribe TauroLock™-Hep500 locks for use during dialysis.

2.7.5 Record the insertion procedure on the access timeline in PROTON and in the patient's medical notes, using the Safer Surgery checklist for CVC insertion. This record should encompass comprehensive details of the procedure, including indications, approach, complications, and outcomes. Include information regarding the vessel puncture site, guidewire insertion, catheter advancement, line tip positioning, and securing techniques.

2.7.6 Ensure that the patient is prescribed Mupirocin and Stellisept per the protocol to reduce the risk of Staphylococcus aureus (staph aureus) and Methicillin-resistant Staphylococcus aureus (MRSA) carriage. (Refer to the separate protocol for detailed guidance.)

2.7.7 If a Permcath is inserted in a pre-dialysis patient who is still awaiting a dialysis slot, the operator should take responsibility for arranging ongoing catheter care. This includes tasks such as weekly flushing and dressing changes until the patient is handed over to a dialysis unit.

2.8 Advice on Misplaced HD-CVCs

2.8.1 In the event of concerns following a jugular HD-CVCs insertion, indicating that the HD-CVCs may be positioned outside the vein lumen, it is imperative to leave the HD-CVCs in place and promptly seek advice from senior medical staff.

2.8.2 If there is any suspicion that the HD-CVCs is located within the carotid artery, **it is crucial to refrain from removal and instead leave the HD-CVCs in situ**. Immediately contact the on-call vascular surgeon for expert evaluation.

2.8.3 In cases where there is suspicion that the HD-CVCs is located within the mediastinum, and the patient remains hemodynamically stable, it is essential to arrange for an urgent CT scan. However, if the patient's hemodynamic status is unstable, promptly contact thoracic surgeons for immediate evaluation. **Do not attempt to remove prior to the aforementioned interventions.**

2.9 Prophylactic Antibiotics

2.9.1 Prophylactic antibiotics are typically not administered during insertion or removal procedures due to their sterile nature. However, when inserting a Permcath, consider administering Teicoplanin 400mg intravenously 30 minutes before the procedure in the presence of evidence such as skin sepsis, inflammation, ulceration, or when exchanging a catheter over a guidewire from a Vascath (avoid this if possible) or from a non-functioning Permcath.

2.10 Permcath/Vascath removal

2.10.1 HD-CVCs may be removed for various reasons, including catheter-related infection, dysfunction, when temporary access is no longer required (e.g., mature AVF), or in cases of renal function recovery.

2.10.2 It is imperative to emphasize that HD-CVCs must not be removed without prior consultation and agreement between the medical and nursing teams. Additionally, the decision to remove the catheter must be accurately recorded in the patient's medical notes.

2.10.3 The removal of HD-CVCs is typically considered an elective procedure. However, in cases where there is clinical evidence of infection, the procedure can be deemed urgent based on clinical assessment.

2.10.4 For detailed steps please refer to Haemodialysis Central Venous Catheter - Removal UHL Renal LocSSIP

2.11 Permcath exchange

2.11.1 The exchange of a Permcath is considered a complex procedure, as it involves both removal and insertion of an HD-CVC. Consequently, this procedure carries elevated risks and should generally be avoided, unless there are limited alternative options for vascular access.

2.11.2 Exchange from a Vascath to a Permcath can be conducted within a procedure room, following the same logistical arrangements as those for Permcath insertion.

2.11.3 Exchange of a Permcath for malfunctioning catheters should ideally take place in an interventional radiology setting under fluoroscopic guidance, ensuring the utmost precision and safety.

2.11.4 Prior to attempting a Permcath to Permcath exchange, it is imperative to conduct comprehensive pre-procedure imaging to investigate the cause of malfunction and assess venous anatomy. This typically involves obtaining a linogram and/or CT venogram.

3. Education and Training

- Medical and nursing staff must be appropriately trained and competent to perform catheter insertions and removals.
- Competency should be assessed and maintained through regular direct observation of procedural skills (DOPS) and ongoing professional development.
- New staff or those not experienced in catheter insertion should receive supervised training and demonstrate competency before performing procedures independently.
- Staff involved in catheter insertions and removals should receive regular updates on relevant policies and guidelines.
- Ongoing training and competency assessment should be part of the department's continuous quality improvement program.

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
The safety and effectiveness of HD-CVC procedures.	Regular audits and quality improvement initiatives			
Catheter-related complications,	Data to be collected on infection rates, thrombosis, and catheter dysfunction			

Feedback from audits and quality improvement efforts should inform updates to policies and procedures.

5. Supporting References (maximum of 3)

UHL Policy for Consent to Examination or Treatment: A16/2002
UHL Delegated Consent Policy: B10/2013
Anticoagulation management ("bridging") at the time of elective surgery and invasive procedures (adult)
The UHL Sedation Policy: B10/2005
Haemodialysis Central Venous Catheter - Removal UHL Renal LocSSIP

6. Key Words

HD-CVC, Haemodialysis, catheter, insertion, removal.

CONTACT AND REVIEW DETAILS	
Guideline Lead (Name and Title) Yahya Makkeyah	**Executive Lead**
Details of Changes made during review: Combined insertion and removal advice in same document	

Approved by:		**Date Approved:**

REVIEW RECORD			
Date	**Issue Number**	**Reviewed By**	**Description Of Changes (If Any)**
23 Jul 2007	2	G Warwick	Reference to HII IIC, nurse practitioner role in training, consent labels, surgical insertion for L sided catheters, Taurolock
27Oct 2008	3	G Warwick /Nick Brylka Mee	Inclusion of all HII renal HD catheter care bundle criteria; minor other changes
Jun 2009	4	G Warwick	Exclusion of FY staff; importance of consent for railroading and of post CXR if failure emphasised; importance of insertion in normal working hours
Apr 2011	5	G Warwick /Nick Brylka Mee/ R Westacott	Introduce checklist for all lines; avoid railroading vascaths to permcaths unless venous access very difficult; using treatment room even if infective; use Mupirocin pre-insertion; advice on misplaced lines
Sept 2012	6	G Warwick	Prophylactic antibiotics to be given for catheter exchange or skin sepsis(section 6)
Feb 2013	7	G Warwick	Addition of Biopatch dressing (section 7)
Mar 2016	8	G Warwick	Inclusion of advice on checking for venous puncture; Updated to new UHL template
Oct 2016	9	Os Iyasere	Section 3.7 added to cover discharge with temporary catheter
April 2017	10	G Warwick	Expanded section 3.3.4 on risk of death; checklist changed to UHL central venous line insertion checklist
8Nov 2017	11	G Warwick	Line lock changed from heparin 5000IU/ml to Taurolock-Hep500
Nov 2019	12	R Bell	Inclusion of catheter insertion LocSSIP
March 2024	13	Yahya Makkeyah/Os Iyasere/Helen Skeete	Inclusion of catheter removal guidance & LocSSIP

DISTRIBUTION RECORD:			
Date	**Name**	**Dept**	**Received**

APPROVERS	POSITION	NAME
Person Responsible for Procedure:	Nurse Practitioner (former) Consultant Nephrologist/ITU (former) Nurse Practitioner (current) Consultant Nephrologist (current)	Nicky Brylka-Mee Ricky Bell Anil Permessur Yahya Makkeyah
SOP Owner:	Head of Service Nephrology (former) Head of Service Nephrology (current)	Richard Baines Jorge Jesus-Silva
Sub-group Lead:	Consultant Nephrologist	Osasuyi Iyasere

Appendices in this document:

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Appendix 2 : Patient Information Leaflet for *Procedure* Available at:
Kidney_Care_UK_Removing_your_temporary_haemodialysis_catheter_patient_information.pdf (cdn.ngo)

Introduction and Background:

This LocSSIP covers removal of short term non-tunnelled and long term tunnelled haemodialysis central venous catheters (HD-CVCs) in the nephrology service at University Hospitals of Leicester NHS Trust. It was developed in line with the Safety Standards for Invasive Procedures UHL Policy.

Haemodialysis catheters (HD-CVC) are inserted into central veins for vascular access for haemodialysis. Both tunnelled cuffed catheters ('Permcaths') and untunnelled, uncuffed catheters ('Vascaths') are used commonly within the nephrology services.

They may be removed for the following reasons :-

- Catheter infection
- Dysfunction of catheter
- Temporary access no longer needed (e.g. AVF mature)
- Renal function has recovered

Although removal of haemodialysis catheter is considered a low risk procedure serious, even fatal, bleeding can occur after removal of a haemodialysis catheter. This has been highlighted by reports from the National Patient Safety Agency and has led to guidance being issued by the Renal Association/British Renal Society/Intensive Care Society in 2018.

The aim of this LocSIPP is to ensure the safe removal of haemodialysis central venous catheters in particular to: -

- Ensure haemostasis is achieved
- Minimise risk of infection
- Minimise risk of air embolism

This LocSIPP is not intended to cover the process of tunnelled haemodialysis central venous catheter exchange.

Never Events:

Death immediately after removal of haemodialysis catheter and this information should be collected via Datix form.

List management and scheduling:

HD-CVCSs must only be removed after discussion with the medical and nursing teams. The decision to remove should be documented in the medical notes.

Tunnelled lines ('permcaths') will be removed in a procedure room. The referrer should complete a procedure request form in advance on ICE and discuss with the specialist vascular access nurse. The specialist vascular access team will prepare the procedure list.

For inpatients, the specialist vascular access team will inform the ward medical and nursing staff advising them of the date and time of the procedure.

For outpatients, the referrer should also complete a procedure request form on ICE. The day case staff will liaise with the vascular access team and the patient to arrange an appointment. For elective outpatients that do not attend, a second procedure date will be offered. Patients who do not attend the second time will have a letter sent to the referring consultant to notify them.

Non-tunnelled lines ('vascaths') will generally be removed in ward areas and do not require completion of request form.

Timing:

- The majority of HD-CVC removal should occur within normal working hours (09:00-17:00).
- HD-CVCs should only be removed for genuine emergencies during out of hours (17:00-09:00).

Patient preparation:

Consent

- The procedure should be explained carefully to the patient.
- Verbal consent is acceptable for removal of non-tunnelled lines ('vascaths').
- Written consent should be recorded for removal of a permcath warning patients in particular of the risks of bleeding, infection and air embolism.
- This procedure requires written consent in line with the UHL Policy for Consent to Examination or Treatment: A16/2002.
- Consent Form 4 should be used for adults who are unable to consent to investigation or treatment, in line with the UHL Delegated Consent Policy: B10/2013. This should be documented in the medical notes.
- It is the responsibility of the practitioner performing the procedure to ensure that the patient understands the risks of the procedure, completes the consent form and ensures it is filed in the medical notes.

Pre-procedure investigations

- Required investigations include full blood count, clotting screen and renal profile. Results will be

reviewed by the practitioner performing the procedure.

- Notes and drug charts should be reviewed to determine if there is any risk of excessive bleeding or recent anticoagulation treatment.
  - Check INR and FBC.
  - If haemodialysis in previous 12hours, check APTT.
  - INR/APTT should ideally be <1.6 and platelet count >50.

Patients on anticoagulation

- Please refer to trust policy on Anticoagulation Bridging Therapy for Elective Surgery and Procedures UHL Guideline.
- HD-CVCs removal is considered a low bleeding risk procedure.
- If warfarin has been continued deliberately, ensure INR <2.0
- If over anti-coagulated and this cannot be reversed arrange for removal in theatre where availability of diathermy permits easier haemostasis
- Patients should have warfarin stopped 4-5 days pre-removal if safe to do so (e.g. to maintain permcath patency).
- Where warfarin needs to continue (e.g. metal valve, recurrent pulmonary embolism) dose should be adjusted to titrate INR down to 1.5-2.0
- If anticoagulation must be maintained at higher INR, follow UHL anticoagulation bridging policy.
- If in doubt, discuss with responsible consultant nephrologist

Sedation

- Under rare circumstances, patients may require sedation for removal of a HD-CVC. The UHL Sedation Policy: B10/2005 should be followed.

Workforce – staffing requirements:

HD-CVC must only be removed by Authorised Professionals or under the direct supervision of an Authorised Professional (competency to be developed for Renal Nurse Development Programme) i.e.

- Registered Nurse assessed as competent to remove HD-CVC
- Medical practitioner assessed as competent to remove HD-CVC
- A trained assistant should be present throughout the entire procedure.

Ward checklist, and ward to procedure room handover:

The patient will be collected by a member of the procedure room staff and the procedure confirmed with the patient and ward staff. Patient details from the request form will be cross-checked with the patient identifier band, and confirmed with the patient.

Procedural Verification of Site Marking:

The site will be confirmed from the request form immediately before the procedure, therefore site marking is not required.

Team Safety Briefing:

For permcath removal, the team safety briefing will be performed by the vascular access team (practitioner and assistant) before the start of each procedure session, in the procedure room.

For vascath removal, the team safety briefing will be performed by at least two members of the ward team.The second staff member may be experienced HCA able to summon assistance if needed, line

removal should be planned but not delayed by waiting for 2 RNs to be present.

Sign In:

Before the procedure, the first part of the invasive procedure checklist "Before the procedure" should be completed. This should be completed by both the person performing the procedure and the assistant. Any omissions, discrepancies or uncertainties must be resolved before starting the procedure.

Time Out:

Verbal confirmation between team members should be performed immediately before the start of the procedure, according to the second part of the Invasive procedure checklist "Time Out". This should be led by the assistant who will complete the checklist contemporaneously. All team members must be present and engaged as this is happening. If a separate or sequential procedure is happening on the same patient, a separate time out checklist should be completed. Any omissions, discrepancies or uncertainties must be resolved before starting the procedure.

Performing the procedure:

The procedures for removing Vascaths and Permcaths are considered separately although there are many similarities

1. Procedure for removal of Vascath

1.1. Pre-procedure

It is very important that the patient is positioned appropriately, to reduce the risk of air embolism. This is highest when the heart in a higher position compared to the site of removal. Therefore:

1.1.1. For a neck line (subclavian or jugular), lie the patient flat in the Trendelenberg position by tipping the bed (i.e. head slightly lower than feet).

1.1.2. For femoral lines, patient should be positioned slightly head up.

1.2. Practical steps in line removal

1.2.1. Remove sutures from line and dispose of stitch cutter in sharps bin

1.2.2. Place several pads of sterile dry gauze over exit site, ask the patient to perform the Valsalva manoeuvre by taking breath in and out then holding breath in expiration with forced expiratory effort ("strain") against closed airway – patient may be advised to pretend they are trying to blow into a trumpet.

1.2.3. Hold the catheter with one hand near the point of insertion and pull outwards. As the catheter begins to move, press firmly down on the insertion site with the sterile gauze pads.

1.2.4. Maintain pressure on the puncture site with the swabs for 15 minutes after the catheter has been removed then carefully lift the pressure swab to check that there is no bleeding or swelling at puncture site.

1.2.5. Care must be taken to ensure full haemostasis is achieved with no evidence of bleeding before leaving the puncture site pressure free. Serious complications including fatalities from bleeding from a femoral catheter site have been reported to the National Patient Safety Agency.

1.2.6. Place line in sharps bin unless removing for infection when tip needs to be removed with sterile scissors and sent for Microscopy, Culture and Sensitivity.

1.2.7. Digital pressure should be applied until haemostasis is achieved. Pressure dressings provide inadequate compression and can increase patient discomfort and delay the detection of bleeding.

1.2.8. When bleeding has stopped apply sterile, transparent occlusive dressing to site leave

dressing in situ for 72hours unless signs of leakage or infection

2. Procedure for removal of Permcath

2.1. Pre-procedure

It is very important that the patient is positioned appropriately, to reduce the risk of air embolism. This is highest when the heart in a higher position compared to the site of removal. Therefore:

2.1.1. For a neck line (subclavian or jugular), lie the patient flat in the Trendelenberg position by tipping the bed (i.e. head slightly lower than feet).

2.1.2. For femoral lines, patient should be positioned slightly head up.

2.1.3. Remove any dressings from exit site. Inspect site.

2.2. Practical steps

2.2.1. Identify subcutaneous cuff – take care to do this as cuff may be difficult to feel but is located in most catheters 5cms from junction of catheter shaft and hub (except surgical inserted catheters where it is 7.5cm). If cuff lies very close to vein puncture, stop and seek surgical advice.

2.2.2. Infiltrate with lignocaine over the cuff extending proximally for 3-4cm

2.2.3. Once anaesthetised, use knife to incise carefully skin and fascia over cuff

2.2.4. Using blunt dissection, gradually dissect down to cuff and to catheter just proximal to cuff

2.2.5. Artery forceps can be used to grasp and elevate cuff which aids dissection and minimises bleeding

2.2.6. Extreme care must be taken not to cut through the catheter.

2.2.7. The proximal catheter will be encased within a thin sheath, which is in continuity with the cuff. The catheter should be grasped with artery forceps proximal to cuff

2.2.8. The sheath can then be carefully dissected from the circumference of the catheter between the cuff and the artery forceps taking care not to cut the catheter.

2.2.9. Once the proximal catheter has been fully freed and exposed, it can be eased out using artery forceps. Ask the patient to perform the Valsalva manoeuvre by holding his/her breath on expiration with forced expiratory effort ("strain") against closed airway – patient may be advised to pretend they are trying to blow into a trumpet. Pressure should be applied at root of neck to occlude the venotomy as catheter is pulled back to prevent any bleeding or ingress of air

2.2.10. When the catheter is clear of vein, it can be cut proximal to the cuff

2.2.11. If excessive bleeding occurs back through the catheter track and this does not respond to pressure alone, a purse string suture should be put round the catheter track and drawn tightly. This is only rarely required.

2.2.12. The cuff can then be easily dissected and the remaining part of the catheter removed

2.2.13. Maintain pressure on the site with the swabs for 15 minutes after the catheter has been removed to ensure good haemostasis. Then close skin defect with vicryl sutures and apply a sterile transparent dressing.

Monitoring:

The following observations should be performed at baseline and every 15 minutes – oxygen saturations, respiratory rate, blood pressure, heart rate. If patient has diabetes mellitus, capillary blood glucose levels will also be monitored.

If bleeding occurs repeat steps above and seek medical advice as appropriate.

Prosthesis verification:

Not Applicable.

Prevention of retained Foreign Objects:

For permcath (tunnelled dialysis catheter) removals, the permcath insertion/removal pack will contain a list of contents which will be checked by 2 members of staff at the start and end of the procedure, utilising the whiteboard in the procedure room.
No swabs are used internally but these will also be checked in a similar manner.
All equipment is checked each time it is used.

Radiography:

N/A

Sign Out:

At completion of the procedure, the third part of the Invasive procedure checklist "Sign out" should be completed by the practitioner and the assistant.

This should include:

- Confirmation of procedure
- Confirmation that counts (instruments, sharps and swabs) are complete
- Discussion of post-procedural care and any concerns
- Record the removal on Proton

Handover:

After completion of the procedure, the patient will be monitored in the ward area. Details of the procedure, frequency of observations, and any complications will be handed over to the ward staff. Specific instructions will be documented on the Invasive procedure checklist.

Team Debrief:

A team debrief should occur at the end of all procedure sessions, in the Ward 10 procedure room. All members of the procedural team should be present. The content of the debrief should include:

- Things that went well
- Any problems with equipment or other issues
- Areas for improvement
- A named person for escalating issues (Consultant for procedure on that week).

Post-procedural aftercare:

Following HD-CVC removal, the patient will have a full set of observations taken (temperature, blood pressure, heart rate, oxygen saturations, respiratory rate, capillary blood glucose if diabetic).

- Patient should be kept on bed rest for least 1 hour post procedure and observed for complications (bleeding) every 15mins
- Patient should be observed for minimum of 2hours if removal performed as day case
- If bleeding occurs, apply pressure to removal site and seek medical advice as appropriate
- Always remember to document clearly in medical notes including timing of catheter removal, consent process, coagulation results, length of pressure given, dressings used and observations performed post-procedure
- Complete catheter removal checklist.

Discharge:

For elective out-patients, if there has been no significant bleeding, or alteration in the observations after a minimum observation period of 2 hours, then the patient can undergo nurse-led discharge. If there are any concerns about the patient's condition, this should be escalated immediately to the ward registrar, renal registrar or consultant on call.

Governance and Audit:

All safety incidents will be reported on Datix, including incidents that lead to patient harm or 'near-misses'. These will be reviewed by the Head of Service, and discussed at the departmental M&M meeting, where details will be reviewed and learning points disseminated.

A review of Datix incidents related to HD-CVCs removal will be audited annually and the results of this will be presented at the department M&M meeting.

To submit monthly Safe Surgery Audit and WHOBARS assessment as per Safe Surgery Quality Assurance & Accreditation programme.

Training:

New medical staff should be trained or supervised by a consultant or specialist nurse practitioner, and deemed competent for a given route before removal of a permcath. No operator should attempt permcath removal unless they are considered competent.

All staff who remove 'vascaths' must:

a) Be taught by a registered health care professional who is experienced in the removal of these devices and has been assessed as competent themselves.

b) Successfully complete a final competency based assessment by an appropriately trained assessor

c) Maintain records of the competency assessment as to provide evidence if required.

d) Successfully completed mandatory Aseptic Non-touch Technique training on HELM.

e) Maintain knowledge and skills and provide evidence of this as agreed with line manager as part of the annual appraisal process.

Documentation:

All HD-CVC removals should be completed using :-

Invasive Procedure Safety Checklist: HD-CVC removal

These should be completed and filed in the medical notes.

References to other standards, alerts and procedures:

- National Safety Standards for Invasive Procedures, NHS England 2015:
- https://www.england.nhs.uk/patientsafety/wp-content/uploads/sites/32/2015/09/natssips-safety-standards.pdf
- National Patient Safety Alert: response to reported death from blood loss following removal of a temporary femoral dialysis catheter (2018)
- Royal Marsden Hospital Manual of Clinical Nursing Procedures 5th Ed (2000)
- Royal College of Nursing (2003) Standards for infusion therapy.
- UHL Safer Surgery Policy: B40/2010

- UHL Vascular Access in Adults and Children Policy and Procedures: B13/2010
- UHL Prevention of haemodialysis catheter related blood stream infection: C10/2016
- UHL Sedation Policy: Safety and Sedation of Patients Undergoing Diagnostic and Therapeutic Procedures: B10/2005
- UHL Consent to Treatment or Examination Policy: A16/2002
- UHL Delegated Consent Policy B10/2013
- Shared decision making for doctors:Decision making and consent (gmc-uk.org
- COVID and PPE: UHL PPE for Transmission Based Precautions - A Visual Guide
- COVID and PPE: UHL PPE for Aerosol Generating Procedures (AGPs) - A Visual Guide
- Air Embolism Associated With Central Venous Haemodialysis Catheters UHL Renal Guideline: C228/2016

END

Error! Reference source not found.

Patient ID Label *or write name and number*
Hospital No.:
Name:
Address:
D.O.B.: Sex:
Telephone No. 1:
Telephone No. 2:

STOP THE LINE

Safer Surgery Checklist

Removal of Haemodialysis Central Venous Catheter (HD-CVC)

Nephrology Department

LocSSIPs

NHS
University Hospitals of Leicester
NHS Trust

Date:
Time:
Location:

TEAM BRIEF

Prior to list with all team members

All members of team have discussed care plan and addressed concerns	Yes ☐ No ☐

SIGN IN

On arrival of patient in procedure room, with all team members present

Team introduce themselves by name and role	Yes ☐ No ☐
Confirm patient's name, DOB, Hospital Number with patient and against wristband/consent/procedure list	Yes ☐ No ☐
Confirm valid written consent/ digital consent	Yes ☐ No ☐
Confirm valid verbal consent	Yes ☐ No ☐
Confirm procedure and site with patient	Yes ☐ No ☐
Known allergy:	Yes ☐ No ☐
Diabetes status confirmed	Yes ☐ No ☐
All equipment available?	Yes ☐ No ☐
Patient Information Leaflet Provided	Yes ☐ No ☐
Hand washed by assistant	Yes ☐ No ☐
Practitioner scrubbed, gowned and gloved in accordance with UHL NHS Trust's Policy	Yes ☐ No ☐
Consider any previous or current Anticoagulant medications & review of most recent Coagulopathy results	Yes ☐ No ☐
Coagulation and other relevant blood result status of patient safe to proceed	Yes ☐ No ☐

Read out by: (PRINT)

Signed: Date:

TIME OUT

Immediately before skin incision or commencement of procedure

Confirm identity checks completed	Yes ☐ No ☐
Confirm site and side of procedure including reason for procedure, such as alternative access or access no longer required	Yes ☐ No ☐
Confirm any significant cardiac disease, including presence of any stent, pacemaker, defribillator, metallic heart valve	Yes ☐ No ☐
Confirm any Diabetic History. If Yes, is the patient on treatment and latest CBG	Yes ☐ No ☐
Confirm any allergies	Yes ☐ No ☐

TIME OUT

During Procedure/Mid Procedure

All removed dilator, tunneller, guide wire and catheter integrity intact?	Yes ☐ No ☐

Read out by: (PRINT)

Signed: Date:

SIGN OUT

After counts Before patient or team members leave room

Procedure correctly performed and recorded	Yes ☐ No ☐
Swab, equipment and instrument count correct	Yes ☐ No ☐
Sharps disposed of safely	Yes ☐ No ☐
Any equipment issues?	Yes ☐ No ☐
Any specimen/sample to be sent?	Yes ☐ No ☐
Key concerns for recovery and post-operative management discussed	Yes ☐ No ☐
Post care information and/or relevant leaflet provided to patient	Yes ☐ No ☐
Procedure and post care handed over to relevant staff	Yes ☐ No ☐
Any follow up appointment?	Yes ☐ No ☐

TEAM DEBRIEF

Any concerns from Team Members throughout the procedure?	Yes ☐ No ☐
If Yes, please identify with follow up actions	Yes ☐ No ☐

Read out by: (PRINT)

Signed: Date:

(1123144 19/08)

Removal of Haemodialysis Central Venous Catheter (HD-CVC) Standard Operating Procedure UHL Nephrology (LocSSIPs)
Approved by CMG 2023

Appendix 2: Patient Information Leaflet for haemodialysis catheter removal

Available at

Kidney_Care_UK_Removing_your_temporary_haemodialysis_catheter_patient_information.pdf (cdn.ngo)