

PROVINCIAL STANDARDS & GUIDELINES



Chronic Kidney Disease: Vein Preservation

Updated December 2020

Approved by the BC Renal Hemodialysis Committee



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IMPORTANT INFORMATION

This BC Renal guideline/resource was developed to support equitable, best practice care for patients with chronic kidney disease living in BC. The guideline/resource promotes standardized practices and is intended to assist renal programs in providing care that is reflected in quality patient outcome measurements. Based on the best information available at the time of publication, this guideline/resource relies on evidence and avoids opinion-based statements where possible; refer to www.bcrenalagency.ca for the most recent version.

For information about the use and referencing of BC Renal guidelines/resources, refer to <http://bit.ly/28SFr4n>.



BC Renal

Phone: 604-875-7340

Email: bcrenal@bcrenal.ca

Web: BCRenal.ca

 [Facebook.com/BCRenal](https://www.facebook.com/BCRenal)

 [@BCRenal](https://twitter.com/BCRenal)

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1.0 Scope

This guideline makes recommendations for the preservation of veins in patients with chronic kidney disease (CKD).

Related Guideline(s):

BC Renal Guidelines (found at www.bcrenalagency.ca):

- Provincial Recommendations for VA for Patients with Chronic HD as Primary Modality.
- Insertion and Removal of Tunneled Permanent HD Catheters.
- Selection of Permanent Hemodialysis Vascular Access

National & International Nephrology Guidelines:

- Canadian Society of Nephrology Guidelines. Chapter 4: Vascular Access, *Journal of American Society of Nephrology*, 17: S16–S23, 2006.
- Mendelssohn, D et al, Report of the Canadian Society of Nephrology Vascular Access Working Group. *Seminars in Dialysis*, vol 25, no 1 (Jan-Feb) 2012, p.p., 22-25.
- National Kidney Foundation. Lok CE, Huber TS, Lee T, et al; KDOQI Vascular Access Guideline Work Group. KDOQI clinical practice guideline for vascular access: 2019 update. *Am J Kidney Dis*. 2020;75(4)(suppl 2):S1-S164.
- Vascular Access Guideline Working Group (Canadian HD Access Coordinators (CHAC)), Clinical Renal Educators (CEN), Canadian Nephrology Nurse Practitioners Group (CNNP)). Nursing Recommendations for the Management of VA in Adult HD Patients, 2015 Update, *CANNT Journal*, vol 25, suppl 1.

2.0 Recommendations, Rationale, & Evidence

Recommendation 1:

Initiate vein preservation strategies in patients with known stage 4 or 5 (eGFR<30 <30 mL/min/1.73m²) chronic kidney disease, including patients currently on dialysis (hemo or peritoneal) or with a functional kidney transplant.

Table 1: Stages of Chronic Kidney Disease (CKD)

| Stage | Description | eGFR (mL/min/1.73 m ²) |
|----------|-----------------------------------|------------------------------------|
| 1 | “Normal” renal function | ≥90 |
| 2 | “Mild” renal dysfunction | 60-89 |
| 3 | “Moderate” renal dysfunction | 30-59 |
| 4 | “Severe” renal dysfunction | 15-29 |
| 5 | “End-Stage” renal disease | <15 |

Rationale:

The order of preference for HD access for adult patients requiring chronic hemodialysis is arterio-venous fistula (AVF), then arterio-venous graft (AVG), then catheter. AVFs have the lowest rate of thrombosis and require the fewest interventions, resulting in longer access survival rates. As well, the costs of implantation and access maintenance of AVFs are lower than for AV grafts (AVGs) or catheters. The thrombosis and infection rates are reported to be approximately one-sixth and one-tenth respectively for AVFs in comparison to AVGs and the difference is even more dramatic when compared to catheters. AVFs are associated with increased survival and fewer hospitalizations (BCPRA VA Guideline: Selection of Permanent HD VA)

The ability to establish an AVF is dependent on having a patent peripheral vein, of sufficient size and elasticity to allow for dilation and maturation after surgical construction. Further, the function of the AVF is dependent on a healthy venous circuit back to the heart. Frequent venipuncture and the indiscriminate

use of peripheral intravenous lines and peripherally inserted catheters can damage veins, impair venous circulation and jeopardize future AVF construction or function (Hoggard et al, Mar/Apr 2008). Preservation of arm and central veins is important to the success of an AVF.

Preservation of veins in patients with advanced kidney disease not currently on dialysis is important as these veins will be needed if the patient requires hemodialysis (HD). Similarly, preservation of veins in patients currently on PD or with a functioning kidney transplant is important as failure of either modality may result in the need for HD. Finally, preservation of veins in patients currently on HD is important in the event a new access is required.

Recommendation 2:

Preferred locations for venous access are:

Phlebotomy &/or peripheral venous access:



1st choice:

- Dorsal veins of the hand (either hand)



2nd choice:

Forearm veins:

- If access in place, forearm veins of the non-access arm
- If no access in place, forearm veins of the dominant arm

Last resort:

Forearm veins:

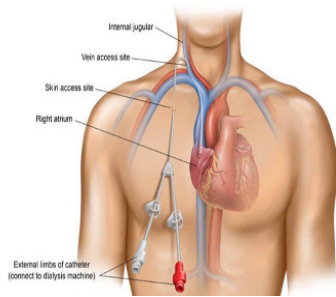
- If access in place, forearm veins of the access arm
- If no access in place, forearm veins of the non-dominant arm

DO NOT USE THE CEPHALIC VEINS.

Important points:

1. Use as small a needle as possible (general rule: 22 gauge or smaller)
2. Rotate venipuncture sites.
3. Draw labs at time of hemodialysis, when possible.
4. Never use tourniquets on or above the access during blood draws.
5. For blood pressure readings, use the non-access limb.
6. For diagnostic studies or treatments, use the non-access limb.
7. The use of clotting devices (e.g., tourniquets or straps) to assist clotting are not recommended.

Central venous access (small bore, tunneled CVC or port):



NOTE: This excludes catheters which are placed for the purposes of providing hemodialysis.

1st choice: Internal jugular veins (right IJ preferred)

2nd choice: External jugular veins

Other options:

- Subclavian veins (only when jugular options are not available)
- Femoral veins
- Translumbar or transhepatic access to the inferior vena cava

Recommendation 3:

If long-term access is required, use a small (<8 French) tunneled internal jugular line. DO NOT use a peripherally inserted central catheter (PICC) unless it is known for certain that the patient is NOT a candidate for a fistula/graft (e.g., limited life expectancy or no suitable veins for fistula/graft).

References re issues with PICC lines and midline catheters in patients with chronic kidney disease:

- A prospective study by Grove and Pevac (2000; <http://www.jvir.org/article/S1051-0443%2807%2961797-7/abstract>) and a retrospective study by Allen et al (2000; <http://www.jvir.org/article/S1051-0443%2807%2961307-4/abstract>) both assessed venous thrombosis associated with PICC placement.
- Turcotte, Dube and Beauchamp (2006; <http://cat.inist.fr/?aModele=afficheN&cpsidt=18032154>)

provide a comprehensive review of the topic, including a breakdown and results from nine prospective trials.

- Commentary by Drew and Weiner (2016; [www.ajkd.org/article/S0272-6386\(16\)00082-2/fulltext](http://www.ajkd.org/article/S0272-6386(16)00082-2/fulltext)) on the risks of use of PICC lines and midline catheters in patients with CKD.
- Additionally, in anecdotal reports, contrast injection and duplex vessel mapping studies documented complete destruction of the involved veins within weeks to months following PICC line placement, ruining vessels that could otherwise have been used to create HD accesses.
- Rationale and references were extracted from the Fistula First Recommendations for the Minimal Use of PICC Lines. www.esrdncc.org/globalassets/ffcl/ffbi-recommendations-for-the-minimal-use-of-picc-lines.pdf.

See [Appendix 1](#) for a proposed algorithm of decision-making for venous access.

Rationale for avoiding PICC lines: Peripherally inserted central catheters (PICC lines¹) and can damage veins that may be needed in the future for a fistula or graft in patients with chronic kidney disease.

Patients have only four superficial upper arm veins that have the potential for creating AVFs or AVGs – the cephalic and basilic veins in each arm. It is important that these veins be preserved.

In addition, several studies have shown that PICC lines are associated with both a high risk of vein stenosis and thrombosis, in addition to damaging the peripheral veins. These studies showed that it may take only a short time to render a vein useless for hemodialysis access.

¹PICC lines: Inserted via the cephalic, basilic, brachial or median cubital veins in the upper arm and threaded so the catheter tip is located in the lower segment of the superior vena cava (central line).

Recommendation 4:

Utilize a standardized approach to “flag” patients that meet the criteria for “vein preservation:”

- **Educate patients and families about veins to preserve and ways to communicate to health care providers.**
- **Provide patients with a wallet card and purple wristband (samples in Appendix 2).**
- **Inpatients: Put poster at the patient’s bedside (sample in Appendix 3)**
- **Ask care providers to stamp lab requisitions “RENAL PATIENT: Try to use hand veins for venipuncture.”**
- **If computer system allows, flag patients in the hospital/office/laboratory computer system (ideally, the system would automatically print an alert on relevant laboratory and radiology requisitions).**

Rationale:

Implementation of a standardized approach to “flag” patients that require “vein preservation” will improve the chances of compliance to vein preservation strategies.

Purple wrist bracelets and wallet cards not only help with the “flagging” and education of high-risk CKD patients but can also empower the patients in the protection of their own veins. Electronic medical records have the potential to automatically identify a stage 4 or 5 CKD patient on hospital admission and facilitate individual bed, door or room signs to help prevent indiscriminate phlebotomy or intravenous access placement (Hoggard et al, 2008).

Recommendation 5:

Establish processes for vascular access teams (i.e., IV/PICC) in hospitals to screen & seek expert advice re referrals for PICC lines in patients with reduced kidney function. Refer to algorithm in Appendix 1.

3.0 References

1. Allen, A.W., Megargell, J.L., Brown, D.B., Lynch, F.C., Singh, H., Singh, Y., et al. (2000). Venous thrombosis associated with the placement of peripherally inserted central catheters. *J Vasc Interv Radiol*; Nov-Dec; 11(10): 1309-1314.
2. Drew, D. and Weiner, D.E. (2016). Peripherally Inserted Central Catheters (PICCs) in CKD: PICC’ing the Best Access for Kidney Disease Patients. *AJKD*; Ma6; 67(5): 724 - 727.
3. *Fistula First*, Vein Preservation and Hemodialysis Fistula Protection & Recommendations for the Minimal Use of PICC Line (www.fistulafirst.org)
4. Grove, J.R., & Pevec, W.C. (2000). Venous thrombosis related to peripherally inserted central catheters. *J Vasc Interv Radiol*; 11 (7): 837-840.
5. Hoggard, Jeffrey et al, Guidelines for Venous Access in Patients with Chronic Kidney Disease, A Position Statement from the American Society of Diagnostic and Interventional Nephrology Clinical Practice Committee & the Association for Vascular Access, *Seminars in Dialysis*, 21(2): 186-191, March/April 2008.
6. Selection of Permanent HD VA, BC Renal www.bcrenalagency.ca/resource-gallery/Documents/Selection%20of%20Permanent%20Hemodialysis%20Vascular%20Access%20Guidelines.pdf
7. Turcotte, S., Dube, S., & Beauchamp, G. (2006). Peripherally inserted central venous catheters are not superior to central venous catheters in the acute care of surgical patients on the ward. *World J Surg*; 30: 1605-1619.

4.0 Sponsors

Developed by:

- BC Renal Vascular Access Educators Group (VAEG)

Reviewed by:

- BC Renal Educators Group (REG) – (Oct 2, 2019)

Approved by:

- BC Renal Hemodialysis Committee (Jan 15, 2020)

5.0 Effective Date

- Effective date: March 9, 2011; Last revised date to Dec 23, 2020.

6.0 Appendices

Appendix 1:

Algorithm for Selection of Venous Access Sites

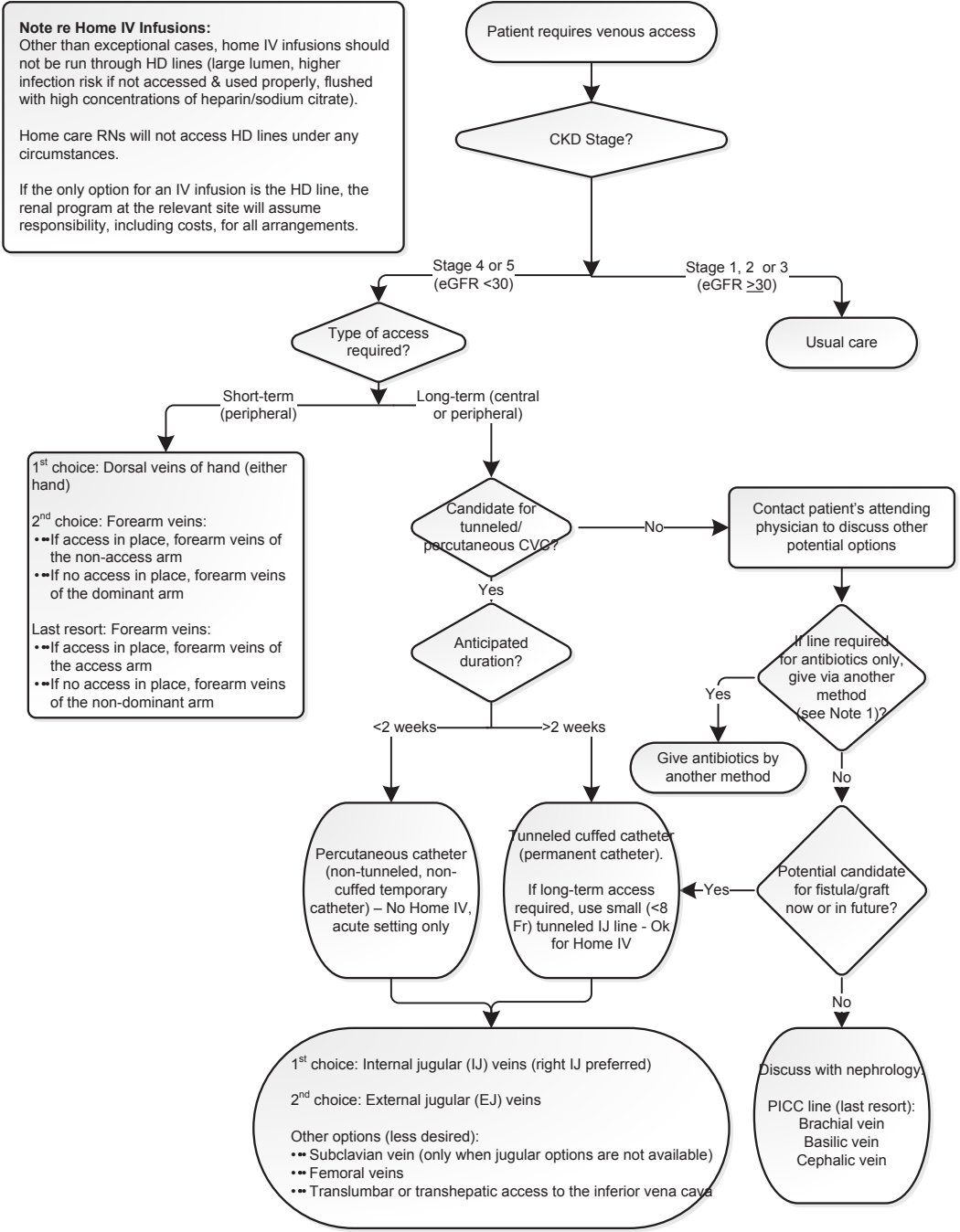
Appendix 2:

Sample Wallet Card & Purple Wrist Band

Appendix 3:

Inpatients: Poster to Alert Health Care Providers of the Need for Vein Preservation.

Appendix 1: Algorithm for Selection of Venous Access Sites (Guideline for kidney care teams & vascular access teams (IV/PICC) in hospitals)



Note 1: Alternative Methods for Antibiotic Administration

In patients with renal failure, delayed elimination of certain antibiotics can be advantageous. In particular, vancomycin, aminoglycosides, and most cephalosporins can be dosed to maintain effective levels when administered 3 times per week at each HD treatment.

Most quinolones can achieve systemic levels with oral administration just as well as with an IV route.

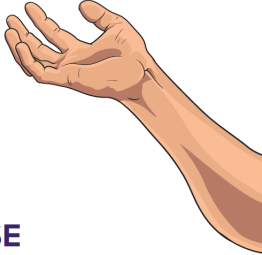
The selection of one of these options, when medically appropriate, can obviate the need for a separate venous access.

Appendix 2: Sample wallet card, arm band and patient information sheet

Vein preservation wallet card (front)

I AM A KIDNEY PATIENT.
Important info about my veins

- For IVs and blood draws, use:
 - Right side
 - Left side
- Hand veins best. Avoid ACF.
- For BPs, use non-fistula/graft arm.
- If long-term access is required, **USE** internal jugular line.



Vein preservation wallet card (back)


Provincial Health Services Authority

For further information, go to:
**BCRenal.ca ► Health Professionals ► Vascular
Access ► Vein Preservation (guideline)**



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Vein preservation wallet cards may be ordered at:

[BCRenal.ca](#) ► [Health Professionals](#) ► [Clinical Resources](#) ► [Print Materials Order Form](#)

Purple “Save the Veins” wristband



Vein preservation wrist bands may be ordered at:

[BCRenal.ca](#) ▶ [Health Professionals](#) ▶ [Clinical Resources](#) ▶ [Print Materials Order Form](#)

Patient Info Sheet “Save My Veins”

Patient Handout: Save My Veins



Why protect your veins?

Your arm veins provide the best access to your bloodstream if you need a fistula or graft for hemodialysis.

Placing an IV or having blood taken from your arm veins can damage the veins and make it difficult to create a fistula or graft in the future.

It is important that you save your fistula arm for dialysis and let others know this.



Tools to help remind you and your healthcare providers to save your veins:

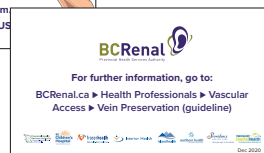
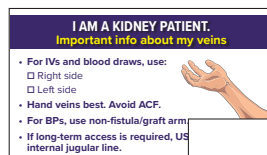
Purple wristband

- Your kidney care team will tell you which arm to wear this wristband. Keep it on this arm.
- Show this arm band to healthcare providers before they take blood or start an IV.
- It will be available to healthcare providers in an emergency.



Wallet card


- Carry this card in your wallet or purse.
- Show this card to healthcare providers before they take blood or start an IV.
- It will be available to healthcare providers in an emergency.



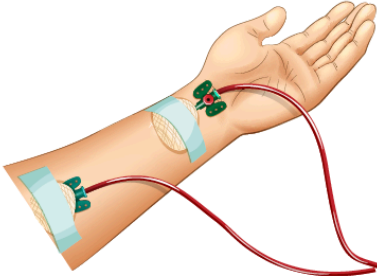
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Appendix 3: Inpatients: Poster to Alert Health Care Providers of the Need for Vein Preservation



Important Info About my Veins



- **For IVs and blood draws, use:**
 - Right side
 - Left side
- **Hand veins best. Avoid ACF.**
- **For BPs, use non-fistula/graft arm.**
- **If long-term access is required, USE internal jugular line.**

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