

## **PRESERVATION OF PERIPHERAL VEINS IN PATIENTS WITH CHRONIC KIDNEY DISEASE**

**A Joint Position Statement from the  
Association for Vascular Access (AVA)  
American Society of Diagnostic and Interventional Nephrology (ASDIN)**

### **INTRODUCTION**

Venipuncture or insertion of any venous access device can damage a peripheral vein. Although such injuries often resolve without complication some patients will incur permanent damage, such as stenosis or thrombosis, which renders the vein unusable for future hemodialysis vascular access construction (1, 2).

Preservation of the upper extremity peripheral veins is of critical importance to patients with chronic kidney disease who are receiving hemodialysis treatment and to those patients who may require hemodialysis treatment in the future (3, 4). Preservation of veins is also important to patients who are receiving other forms of renal replacement therapy, including peritoneal dialysis or kidney transplant who remains candidates for future hemodialysis. Creation of an autogenous arteriovenous fistula, the optimal vascular access for hemodialysis, is dependent upon the availability of good quality peripheral veins. Patients with chronic kidney disease often have limited peripheral veins and it is imperative that these veins be preserved for future use as a vascular access conduit for hemodialysis.

The Association for Vascular Access (AVA) and the American Society of Diagnostic and Interventional Nephrology (ASDIN) recognize the importance of vein preservation in patients with chronic kidney disease and support the following collaborative position statement.

### **POSITION STATEMENT**

The ASDIN/AVA Joint Clinical Practice Committee recommends that ***patients with an estimated glomerular filtration rate (eGFR) of less than 60 mL/min/1.73 m<sup>2</sup>, or if an eGFR is not available then a serum creatinine level of greater than 2.0 mg/dl, should undergo an expert vascular access assessment prior to placement of any vascular access device.***

The purpose of this recommendation is to provide a simple criterion for the early identification of patients with chronic kidney disease who are likely to need a hemodialysis fistula or graft in the future. For patients who meet this criterion a comprehensive vascular access plan should be discussed with the patient's nephrologist and other members of the health care team prior to venipuncture or insertion of a venous access device. These patients should receive education about the importance of vein preservation and specific instructions regarding their role in protection of their peripheral veins. Medical alert bracelets that identify the patient as having chronic kidney disease and warn against indiscriminant venipuncture should be considered.

It is recognized that venipuncture and peripheral venous catheters are common procedures which are necessary and beneficial for many patients. A policy which restricts the use of peripheral veins in all patients with chronic

kidney disease would be untenable in many health care environments. This position statement is not intended to prohibit the use of peripheral veins in all patients with chronic kidney disease. It is intended to provide nurses and other health care professionals with a simple criterion to identify patients who should undergo a comprehensive vascular access assessment to determine the optimal strategy prior to venipuncture or insertion of a venous access device.

## **COLLABORATIVE PATIENT MANAGEMENT**

Optimal management of venous access in patients with chronic kidney disease necessitates involvement of the patient's entire health care team including; 1) the nurses directly caring for the patient, 2) the physician requesting venous access, 3) the nurses and physicians responsible for placement of peripheral venous access devices, 4) the nephrologist managing the patient's kidney disease, and 5) the surgeon responsible for creating arteriovenous access. The nursing staff plays a pivotal role in the identification of patients who need specialized venous access care. It is imperative that nurses receive education and guidance to fulfill this role and to ensure their ability to refer appropriate patients to a vascular access specialist. Furthermore, each health care system should implement policies and procedures to encourage collaboration between these key providers and offer timely services for placement of the appropriate venous access device.

Currently there are no nationally recognized policies or guidelines which address the need for specialized venous access care in patients with chronic kidney disease. The ASDIN/AVA Joint Clinical Practice Committee proposes the following:

### **GUIDELINES FOR VENOUS ACCESS IN PATIENTS WITH CHRONIC KIDNEY DISEASE**

For patients with chronic kidney disease stage-3 or greater (eGFR of less than 60 mL/min/1.73 m<sup>2</sup>) or a serum creatinine level greater than 2.0 mg/dl:

1. When suitable anatomy is present, the dorsal veins of the dominant hand are the preferred location for venipuncture and for immediate short-term use and selected non-injurious infusion therapies.
2. The forearm veins, upper arm veins and subclavian veins are of critical importance for creation of a hemodialysis fistula and these veins should not be routinely used for venous access procedures, including peripherally inserted central catheters. These veins should be used only when preferred veins are not available or if requirement for future hemodialysis vascular access is determined to be unlikely.
3. Alternative long-term venous access solutions should be identified and implemented as soon as possible, avoiding prolonged reliance on limited peripheral veins.
4. The internal jugular vein is the preferred vessel for central venous access. Central venous catheters inserted via the internal jugular vein that are intended for long-term use (>1 week) should be placed using a subcutaneous tunnel.

When central venous access is needed a small diameter (< 8 Fr.) catheter should be inserted into the internal jugular vein (5). Placement of central venous catheters using a subcutaneous tunnel has been shown to reduce the incidence of catheter related bloodstream infection (6) and is recommended by Centers for Disease Control guidelines for prevention of catheter-related infections (7). Furthermore, tunneling from the neck to an exit site on the anterior

chest wall below the clavicle results in venous access that is more comfortable for the patient, physically secure, easier to cover and care for by nursing staff, and suitable for hospital discharge. The recommendation to avoid use of the subclavian vein is a relative one. If the patient's upper extremity veins have been thoroughly evaluated-using ultrasound or venography and found to be not suitable for a hemodialysis graft or fistula, then the ipsilateral subclavian vein may be utilized for central venous access procedures.

A peripherally inserted central catheter (PICC) should not be routinely used in patients with chronic kidney disease. The decision to insert a PICC in these patients should be guided by medical necessity rather than convenience. A preferable alternative is a small diameter catheter inserted via the internal jugular vein. However, a PICC may be an appropriate venous access device for a subgroup of these patients with chronic kidney disease including patients with a short life expectancy, previous failures of arteriovenous access, or severe peripheral arterial disease for whom there is no possibility of future fistula construction in that limb.

### REFERENCES

1. Grove JR, Pevac WC: Venous thrombosis related to peripherally inserted central catheters. *J Vasc Interv Radiol* 2000; 11:837-840.
2. Allen AW, Megargell JL, Brown DB, et al.: Venous thrombosis associated with the placement of peripherally inserted central catheters. *J Vasc Interv Radiol* 2000; 11:1309-1314.
3. Saad TF, Vesely TM: Venous access for patients with chronic kidney disease. *J Vasc Interv Radiol* 2004; 15:1041-1045.
4. McLennan G: Vein Preservation: An algorithmic approach to vascular access placement in patients with compromised renal function. *JAVA* 2007; 12: 89-91.
5. Sasadeusz KJ, Trerotola SO, Shah H, et al.: Tunneled jugular small-bore catheters as an alternative to peripherally inserted central catheters for intermediate-term venous access in patients with hemodialysis and chronic renal insufficiency. *Radiology* 1999; 213:303-306.
6. Maki DG, Kluger DM, Crnich CJ: The risk of bloodstream infection in adults with different intravascular devices: A systematic review of 200 published prospective studies. *Mayo Clin Proc* 2006;8:1159-1171
7. Centers for Disease Control and Prevention; Guidelines for the prevention of intravascular catheter-related infections. *Morbidity and Mortality Weekly Report* 2002; 51: 1-29.

**Contributors: Thomas M. Vesely, M.D. Theodore F. Saad, M.D. Jeffrey Hoggard, M.D. Timothy Royer, BSN, CRNI; Kelli Rosenthal, MS, RN,BC, CRNI, ANP, APRN,BC ; Kathy McHugh RN, BSN; Denise Macklin BSN, RNC**