

PURPOSE

To provide guidelines for clinical practice related to increasing the placement of native fistulae, detecting access dysfunction before access thrombosis and implementing quality improvement programs.

GOALS

- Early identification of patients with progressive kidney disease
- Identification and protection of potential fistula construction sites
- Early access dysfunction detection
- Implementation of procedures to maximize access longevity

CENTERS FOR MEDICARE AND MEDICAID SERVICES (CMS)

CMS Phase III ESRD Clinical Performance Measures for vascular access list 5 measures for vascular access which can be distilled into 3 key points: avoid central catheterization, maintain existing access by detecting impending failure, and maximize creation of functional autogenous AV fistulae (AVF). The CMS nationwide stretch goal of increasing the percentage of hemodialysis patients using AVF is 66% by 2009.

EARLY IDENTIFICATION OF PATIENTS WITH PROGRESSIVE KIDNEY DISEASE

Patients with a glomerular filtration rate (GFR) less than 30mL/min/1.73 m² (CKD stage 4) should be educated on all modalities of kidney replacement therapy options, including transplantation, so that timely referral can be made for the appropriate modality and placement of a permanent dialysis access, if necessary. Patients should have a functional permanent access at the initiation of dialysis therapy.

Recommended timeframes for access placement prior to initiation of dialysis:

- Fistula: At least 6 months prior, prefer wrist (radiocephalic) or elbow (brachiocephalic) primary fistula
- Graft: In most cases, at least 3 to 6 weeks prior, prefer forearm loop graft, to a straight configuration
- Peritoneal dialysis (PD) catheter should be placed at least 2 weeks prior
- Avoid long term central venous catheters

IDENTIFICATION AND PROTECTION OF POTENTIAL FISTULA CONSTRUCTION SITES

Recommended evaluations:

- History and physical examination
- Duplex ultrasound of the upper-extremity arteries and veins
- Central vein evaluation (if history of a previous catheter or pacemaker)

CKD stage 4 or 5, forearm and upper-arm veins suitable for placement of vascular access should not be used for:

- Venipuncture
- Placement of intravenous (IV) catheters
- Subclavian catheters
- Peripherally inserted central catheter lines (PICCs)

EARLY ACCESS DYSFUNCTION DETECTION

Prospective surveillance of fistulae and grafts for hemodynamically significant stenosis, when combined with correction of the anatomic stenosis, may improve patency rates and may decrease the incidence of thrombosis. NKF KDOQI guidelines recommend an organized monitoring/surveillance approach with regular assessment of clinical parameters of the AV access and hemodialysis (HD) adequacy. Data from the clinical assessment and HD adequacy measurements should be collected and maintained for each patient's access and made available to all staff. The data should be tabulated and tracked within each HD center as part of a Quality Assurance (QA)/CQI program.

Summary of monitoring and surveillance tools:

Physical examination (monitoring)

- Inspection: Assess for bleeding/swelling/clotting/cannulation problems
- Palpation
- Auscultation

Surveillance of grafts

Preferred:

- Intra-access flow using sequential measurements with trend analysis
- Directly measured or derived static venous dialysis pressure
- Duplex ultrasound

Surveillance of fistula

Preferred:

- Direct flow measurements
- Duplex ultrasound

Acceptable:

- Recirculation using a non-urea-based dilutional method
- Static pressures, direct or derived

IMPLEMENTATION OF PROCEDURES TO MAXIMIZE ACCESS LONGEVITY

The use of aseptic technique, appropriate cannulation methods, the timing of fistula and graft cannulation, and early evaluation of immature fistulae are all factors that may prevent morbidity and may prolong the survival of permanent dialysis accesses.

- Use aseptic technique for all cannulation and catheter access procedures
- Implement cannulation protocols
 - Cannulation training tools are available through www.fistulafirst.org
- Use the Rule of 6s as a guideline for determining fistula function:
 - Flow greater than 600 mL/min
 - Diameter at least 0.6 cm
 - Discernible margins
 - No more than 0.6 cm deep
- Grafts generally should not be cannulated for at least 2 weeks after placement (composite PU graft should not be cannulated for at least 24 hours after placement) and not until swelling has subsided
- A program should be in place to detect delays in fistula maturation. Evaluate access no later than 6 weeks after placement
- Potential complications such as persistent swelling, inadequate flow, stenosis, aneurysm, ischemia and infection must be resolved through appropriate intervention
- Indications for preemptive percutaneous transluminal angioplasty (PTA):

A fistula with a greater than 50% stenosis in either the venous outflow or arterial inflow, in conjunction with clinical or physiological abnormalities, should be treated with PTA or surgical revision
- Patients with extremity edema that persists beyond 2 weeks after graft placement should undergo an imaging study (including dilute iodinated contrast) to evaluate patency of the central veins. The preferred treatment for central vein stenosis is PTA.
- Stenoses that are associated with AVGs should be treated with angioplasty or surgical revision if the lesion causes a greater than 50% decrease in the luminal diameter and is associated with clinical/physiological abnormalities
- Treatment of thrombosis and associated stenosis:
 - Each institution should determine which procedure, percutaneous thrombectomy with angioplasty or surgical thrombectomy with AVG revision, is preferable based upon expediency and physician expertise at that center

- Catheters and ports should be evaluated when they fail to attain and maintain an extracorporeal blood flow of 300 mL/min or greater at a prepump arterial pressure more negative than -250 mm Hg
- Treatment of an infected HD catheter or port should be based on the type and extent of infection

CONTINUOUS QUALITY IMPROVEMENT (CQI)

- Each center should establish a database and CQI process to track the types of accesses created, complication rates for these accesses and outcomes
 - Implement periodic monitoring of accesses to detect hemodynamically significant stenoses before thrombosis
 - Evaluate incidence of catheter related infections and type of organism responsible for infections in order to improve catheter care
- Create a vascular access team to initiate and support improvements in the staff's skill set
- Increase the percentage of patients with native or primary AVFs by implementing the 11 Change Concepts of Fistula First

APPLICATION OF GUIDELINES

The above summary of guidelines pertains to adult hemodialysis patients. Pediatric indicators may differ from these guidelines. NKF KDOQI disclaimer states, "These Clinical Practice Guidelines (CPGs) and Clinical Practice Recommendations (CPRs) are based upon the best information available at the time of publication. They are designed to provide information and assist decision-making. They are not intended to define a standard of care, and should not be construed as one. Neither should they be interpreted as prescribing an exclusive course of management. Variations in practice will inevitably and appropriately occur when clinicians take into account the needs of individual patients, available resources, and limitations unique to an institution or type of practice. Every health-care professional making use of these CPGs and CPRs is responsible for evaluating the appropriateness of applying them in the setting of any particular clinical situation."

REFERENCE

1. National Kidney Foundation. KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for 2006 Updates: Hemodialysis Adequacy, Peritoneal Dialysis Adequacy and Vascular Access. *Am J Kidney Dis* 48 (suppl 1). S1-S322, 2006

