When to Refer Patients for Hemodialysis Access & Who Should Monitor the Maturation Process?

Theodore F. Saad, M.D.
Chief, Section of Renal & Hypertensive Diseases
Christiana Care Health System
Nephrology Associates, P.A.
Newark, Delaware

Disclosures: None relevant

NKF-KDOQI 2006
1.3 Patients should have a functional permanent access at the initiation of dialysis therapy.

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

1.2 In patients with CKD stage 4 or 5, forearm and upper arm veins suitable for placement of vascular access should not be used for venipuncture or for the placement of intravenous (IV) catheters, subclavian catheters, or peripherally inserted central catheter lines (PICCs). (B)

NKF-KDOQI 2006
1.3 Patients should have a functional permanent access at the initiation of dialysis therapy.

• 1.3.1 A fistula should be placed at least 6 months before the anticipated start of HD treatments. This timing allows for access evaluation and additional time for revision to ensure a working fistula is available at initiation of dialysis therapy. (B)

• 1.3.2 A graft should, in most cases, be placed at least 3 to 6 weeks before the anticipated start of HD therapy. Some newer graft materials may be cannulated immediately after placement. (B)
A predictive model for progression of chronic kidney disease to kidney failure.

CONTEXT: Chronic kidney disease (CKD) is common. Kidney disease severity can be classified by estimated glomerular filtration rate (eGFR) and albuminuria, but more accurate information regarding risk for progression to kidney failure is required for clinical decisions about testing, treatment, and referral.

OBJECTIVE: To develop and validate prediction models for progression of CKD.

DESIGN, SETTING, AND PARTICIPANTS: Development and validation of prediction models using demographic, clinical, and laboratory data from 2 independent Canadian cohorts of patients with CKD stages 3 to 5 (estimated GFR, 10-59 mL/min/1.73 m²) who were referred to nephrologists between April 1, 2001, and December 31, 2008. Models were developed using univariate and multivariable regression methods and evaluated using c-statistics and integrated discrimination improvement for discrimination, calibration plots and Akaike Information Criterion for goodness of fit, and net reclassification improvement (NRI) at 1, 3, and 5 years.

MAIN OUTCOME MEASURES: Kidney failure, defined as need for dialysis or preemptive kidney transplantation.

RESULTS: The development and validation cohorts included 3449 patients (386 with kidney failure [11%]) and 4942 patients (1177 with kidney failure [24%]), respectively. The most accurate model included age, sex, estimated GFR, albuminuria, serum calcium, serum phosphate, serum bicarbonate, and serum albumin (c statistic, 0.917; 95% confidence interval [CI], 0.901-0.933 in the development cohort and 0.841; 95% CI, 0.825-0.857 in the validation cohort). In the validation cohort, this model was more accurate than a simpler model that included age, sex, estimated GFR, and albuminuria (integrated discrimination improvement, 3.2%; 95% CI, 2.4%-4.2%; calibration [Nam and D'Agostino χ² statistic, 19 vs 32]; and reclassification for CKD stage 3 [NRI, 8.0%; 95% CI, 2.1%-13.9%] and for CKD stage 4 [NRI, 4.1%; 95% CI, -0.5% to 8.8%]).

CONCLUSION: A model using routinely obtained laboratory tests can accurately predict progression to kidney failure in patients with CKD stages 3 - 5.

PMID: 21482743

Renal Failure (ESRD)
Risk Estimation

- http://kidneyfailurerisk.com/
- App: Qx Calculate

Case #1: Pre-ESRD AV Access
- 75 year-old female
- CKD Stage-4
- Creatinine 2.7 mg/dL
- eGFR 18 ml/min
- Urine Pr/Cr = 1200 mg/gm
- Referred to vascular surgeon for AV access
- No suitable veins for LUE AVF

Case #2: Pre-ESRD AV Access
- 64 year-old male
- CKD Stage-4
- Creatinine 3.97 mg/dL
- eGFR 15 ml/min
- Urine Pr/Cr = 800 mg/gm
- Referred to vascular surgeon for AV access
- NO previous central lines, AICD
- April 2017
- LFA radial-cephalic fistula
October 2018

Trajectory of CKD-4

2017 AVF 2018 ?

eGFR ml/min
Creatinine mg/dL

Case #2: Pre-ESRD AV Access

- 66 year-old male
- CKD Stage-4
- Creatinine 4.14 mg/dL
- eGFR 15 ml/min
- Urine Pr/Cr = 103 mg/gm
- Referred to vascular surgeon for fistula ligation

Weighing factors in timing AV Access Surgery

Too Early
- Burden of fistula failure
- Interventions to mature or maintain
- Costs
- Morbidity
- Complications, steal, neuropathy

Too Late
- Disadvantages of initiating HD without functional permanent AV access

Vascular Access Blasphemy

- Risks of initiating hemodialysis with a catheter may be (vastly?) overstated
  - Patient selection
  - Antiquated catheter data
  - CMS Dialysis “Quality Incentive Program” (QIP)
    - 90 day “grace” period for venous catheter starts
  - Established surgeon & access plan

Who Monitors Access Maturation?
Somebody who knows what he/she is doing

- Vascular Surgeon
- Nephrologist
- Interventional Nephrologist
- Interventional Radiologist
- Vascular Access Coordinator
  - Dialysis RN or Tech
When to Refer for Hemodialysis Access?

Summary

- Predict timing of ESRD
- Renal risk failure equation
- Trajectory of eGFR decline
- Referral for “fistula only”
  - Predictors of fistula success
- “Need” for initiation of dialysis
  - Early vs. delayed start
  - Non-dialytic management of CKD
- Early-access grafts
- Percutaneous fistula
- Catheter with a plan