Pre-Dialysis Arteriovenous Fistula Placement in ESRD Patients: OVERRATED

General Surgery Grand Rounds
Miral R. Sadaria, MD
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End Stage Renal Disease

- 3 options for renal replacement therapies
  - Hemodialysis vs. hemofiltration
  - Kidney transplant
  - Peritoneal dialysis

- Waste product and water removal from blood when kidneys fail
History of Hemodialysis & Access

- 1913—Abel, Rountree, and Turner developed the first artificial kidney
- 1924—George Haas (German) first human hemodialysis

History of Hemodialysis & Access

- 1943—Willem Kolff constructed first working dialyzer
  - 1945—First successfully treated patient
- 1946—Nils Alwall
  - Dialyze and remove excess fluid
  - First AV shunt made of glass

History of Hemodialysis & Access

- 1960—Belding Scribner and Wayne Quinton
  - Teflon shunts
  - Quinton-Scribner shunt
- 1966—Cimino and Brescia
  - First AV fistula

Statistics

- U.S. Renal Data Systems—335,000 pts. on dialysis in 2004
- >$3 billion to place and maintain vascular access
- Vascular access dysfunction ➔ leading cause of hospitalization for ESRD pt.

Fistula First Breakthrough Initiative

- 2000 National Kidney Foundation-Kidney Disease Outcomes Quality Initiative

- “To the greatest extent possible, these guidelines are based on evidence in the published literature. Where evidence is not available, the guidelines are based on the opinion of the Work Group. For each guideline, there is a clear indication of whether the guideline is based on evidence, opinion, or both.”

Fistula First Breakthrough Initiative

- Guideline 8: Timing of Access Placement
  - A. Primary AVF when CrCl <25mL/min, serum Cr >4mg/dl, or within 1 year of need for dialysis (OPINION)
  - B. New primary fistula should mature for 1 month (preferably 3-4 months) (OPINION)
  - C. Dialysis AV graft placed 3-6 weeks before HD if not AVF candidate (OPINION)
  - D. HD catheters not to be inserted until HD necessary (EVIDENCE/OPINION)

Downfalls of “FISTULA FIRST”

- No clearly documented proven public health benefits beyond individual
- Not a potentially life-saving procedure
- Uncertainty
- Can always have AVF placed after pt. needs dialysis

O’Hare AM. Semin Dial 2010;23:452-5.
Downfalls of “FISTULA FIRST”

- Recommendations for AVF fall into 1 of 2 categories:
  - Referral within a prespecified period of time before initiation of dialysis
  - Varying rates of decline in renal function
  - A threshold level of estimated glomerular filtration rate (eGFR) at which time pt. should be referred

O’Hare AM. Semin Dial 2010;23:452-5.
Limitations of Using eGFR Threshold

- Older pts.
  - Slower loss of eGFR
  - Lower incidence of ESRD
  - Higher mortality rate

O’Hare AM. Semin Dial 2010;23:452-5.
Limitations of Using eGFR Threshold

- Retrospective cohort study in VA
- 11,290 non-dialysis pt
  - eGFR <25mL/min (sustained 3 months)
  - Excluded kidney txp and PD pts.

O’Hare AM. Semin Dial 2010;23:452-5.
Limitations of Using eGFR Threshold

- Older pts.
- Higher ratio of unnecessary to necessary AV fistula in older pts. compared to younger

O’Hare AM. Semin Dial 2010;23:452-5.
Mortality in Elderly on Dialysis

- U.S. Renal Data System (UCSF)
- 1996 to 2003
- Octogenarians and Nonagenarians
  - Dialysis initiation increased by 57%
  - One-year mortality 46%
  - Higher eGFR and less ESRD morbidity
  - 1-year survival unchanged

Quality of Life

- Observational study, single-center in UK
- 202 elderly (>70 yo)
- Maximum Conservative Management vs. Renal Replacement Therapy
- Median survival 37.8 months RRT and 13.9 months MCM (p<0.01),
- MCM hospital-free days ≈ RRT

O’Hare AM. Semin Dial 2010;23:452-5.
- U.S. Renal Data System linked with the Minimum Data Set
- Nursing home residents started on dialysis → June 1998 to Oct. 2000

O’Hare AM. Semin Dial 2010;23:452-5.
Functional Status after Starting HD

- Functional status
  - Measured as ability to perform 7 ADL
    - Prior to HD
    - 3, 6, 12 months after HD initiation
  - Scored from 0-28 ➔ higher score = more extensive functional impairment

O’Hare AM. Semin Dial 2010;23:452-5.
Functional Status after Starting HD

- 3 mon → fxn status maintained in 39%
- 12 mon → 58% died, fxn maintained in 13%

O’Hare AM. Semin Dial 2010;23:452-5.
Among nursing home residents with ESRD, the initiation of dialysis is associated with a substantial and sustained decline in functional status.
Conclusions

- Arteriovenous fistula FIRST based on OPINIONS
- Uncertainty and AVF after HD initiated
- AVF First to...
  - Younger pts. with rapidly declining eGFR
  - ~6 months from needing HD
- Age of pt., quality of life, functional status, and other medical comorbidities all play a role