Appropriate Dialysis Access - Timing & Preparation for Dialysis Initiation

KDIGO Controversies Conference on Dialysis Initiation, Modality Choice and Prescription, Madrid, Spain, Jan 2018

Kevan Polkinghorne
Monash Medical Centre, Melbourne, Australia
Talk Summary

• Dialysis Access Practice Patterns

• Dialysis Access Types
  – Advantages/Disadvantages
  – Patency/Complications

• Determining the Timing of Dialysis Access Placement
  – Individual Patient Factors - Morbidity
  – Physician Based Factors
  – “Patient Factors” – Traits/Cultural Factors
Current Dialysis Access Access Practice
Dialysis Access Types

• Advantage and Disadvantages
Arteriovenous fistula

• Advantages
  – Lower risk of Mortality (?)
  – Lowest infection risk
  – Lower risk of hospitalisation
  – Longer patency once established
  – Cheaper especially if no primary failure
  – Adequate Blood Flow once mature

• Disadvantages
  – High rate primary failure
  – Prolonged maturation time
  – Ischaemic Steal
  – Not suitable in all patients
    • Elderly ?
    • Sign morbidity ?
  – ?Expensive
Arteriovenous graft

**Advantages**
- No prolonged maturation period
- Patency comparable to AVF if include primary failure
- Lower infection risk compared to CVC
- ? Good Choice in Elderly
- Reduce line exposure time

**Disadvantages**
- Higher Infection risk compared to AVF
- Need for (multiple) interventions to maintain patency
- Vascular Steal
- Cost
CVC

- **Advantages**
  - No maturation period
  - Suitable in Co-morbid Patients
  - Patient Factors eg Needle Phobia

- **Disadvantages**
  - Increased Mortality (?)
  - Infection
  - Dysfunction common
  - Central Venous Stenosis
  - Higher costs
  - Patient Factors (dressings etc)
Peritoneal Dialysis

• Advantages
  – Survival Advantage in first year?
  – No prolonged maturation period
  – Home based therapy (Predominantly)
  – QOL?

• Disadvantages
  – Home based therapy
  – Infection
  – Patency/Technique Failure
  – Not suitable for a large number of patients
Dialysis Access Types

• Patency
• Other Complications
• Mortality
Vascular Access Patency

• Patency definitions vary enormously in the literature

• Need to consider effects of changes in nature of dialysis population from 1980’s – 1990’s to 2000’s

• Majority Non-randomized comparisons
Patency Rates of the Arteriovenous Fistula for Hemodialysis: A Systematic Review and Meta-analysis

Ahmed A. Al-Jaishi, MSc, Matthew J. Oliver, MD, Sonia M. Thomas, MSc(c), Charmaine E. Lok, MD, MSc, Joyce C. Zhang, MD(c), Amit X. Garg, MD, PhD, Sarah D. Kosa, MSc(c), Robert R. Quinn, MD, and Louise M. Moist, MD, MSc

Primary Failure Rate 23% (18-28%)

Al-Jaishi et al, AJKD 2014
Arteriovenous Fistulae for Haemodialysis: A Systematic Review and Meta-analysis of Efficacy and Safety Outcomes


1 Epilepsy Institute, Ann Arbor, MI, USA
2 Humacyte Incorporated, Morrisville, NC, USA
3 Department of Surgery, Duke University, Durham, NC, USA

Table 1. Meta-analyses of primary unassisted patency in arteriovenous fistulae.

<table>
<thead>
<tr>
<th>Analysis</th>
<th>1 year rate</th>
<th>Rate (95% CI)</th>
<th>$i^2$, p-Het</th>
<th>Mean in months</th>
<th>Mean (95% CI)</th>
<th>$i^2$, p-Het</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>59</td>
<td>11,433</td>
<td>0.64 (0.59–0.68)</td>
<td>94.6%</td>
<td>&lt;.001</td>
<td>52</td>
</tr>
<tr>
<td>Overall restricted</td>
<td>43</td>
<td>7919</td>
<td>0.63 (0.58–0.67)</td>
<td>93.1%</td>
<td>&lt;.001</td>
<td>37</td>
</tr>
<tr>
<td>USA</td>
<td>18</td>
<td>3379</td>
<td>0.57 (0.49–0.64)</td>
<td>93.7%</td>
<td>&lt;.001</td>
<td>18</td>
</tr>
<tr>
<td>Other countries</td>
<td>41</td>
<td>8054</td>
<td>0.66 (0.61–0.71)</td>
<td>94.8%</td>
<td>&lt;.001</td>
<td>34</td>
</tr>
<tr>
<td>&lt;65 years old</td>
<td>7</td>
<td>1373</td>
<td>0.63 (0.51–0.72)</td>
<td>93.4%</td>
<td>&lt;.001</td>
<td>3</td>
</tr>
<tr>
<td>65+ years old</td>
<td>10</td>
<td>1194</td>
<td>0.60 (0.52–0.68)</td>
<td>85.5%</td>
<td>&lt;.001</td>
<td>6</td>
</tr>
<tr>
<td>Diabetic</td>
<td>7</td>
<td>377</td>
<td>0.67 (0.60–0.73)</td>
<td>25.4%</td>
<td>&lt;.001</td>
<td>4</td>
</tr>
<tr>
<td>Non-diabetic</td>
<td>6</td>
<td>848</td>
<td>0.72 (0.61–0.80)</td>
<td>88.3%</td>
<td>&lt;.001</td>
<td>3</td>
</tr>
<tr>
<td>Incident access</td>
<td>14</td>
<td>3688</td>
<td>0.89 (0.77–0.95)</td>
<td>99.8%</td>
<td>&lt;.001</td>
<td>6</td>
</tr>
<tr>
<td>Prevalent access</td>
<td>4</td>
<td>183</td>
<td>0.57 (0.42–0.70)</td>
<td>58.1%</td>
<td>&lt;.001</td>
<td>4</td>
</tr>
<tr>
<td>Access created post-initiation</td>
<td>3</td>
<td>199</td>
<td>0.54 (0.46–0.61)</td>
<td>0.0%</td>
<td>.373</td>
<td>3</td>
</tr>
</tbody>
</table>

Overall 1 year Primary Unassisted Patency 64%
Mean of 20 months

Bylsma, et al Eur J Vasc Endovasc Surg 2017
Arteriovenous Fistulae for Haemodialysis: A Systematic Review and Meta-analysis of Efficacy and Safety Outcomes


1 EpelTrust Institute, Ann Arbor, MI, USA
2 Humacyte Incorporated, Morrisville, NC, USA
3 Department of Surgery, Duke University, Durham, NC, USA

<table>
<thead>
<tr>
<th>Analysis</th>
<th>1 year rate</th>
<th>Mean in months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n&lt;sup&gt;a&lt;/sup&gt;</td>
<td>n&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Studies conducted pre-2005</td>
<td>19</td>
<td>3375</td>
</tr>
<tr>
<td>Mixed years (pre- and post-2005)</td>
<td>18</td>
<td>4785</td>
</tr>
<tr>
<td>Studies conducted post-2005</td>
<td>17</td>
<td>2603</td>
</tr>
</tbody>
</table>

Bylsma, et al Eur J Vasc Endovasc Surg 2017
# Arteriovenous Fistulae for Haemodialysis: A Systematic Review and Meta-analysis of Efficacy and Safety Outcomes


* Epileptict Institute, Ann Arbor, MI, USA
** Humacyte Incorporated, Morrisville, NC, USA
*** Department of Surgery, Duke University, Durham, NC, USA

## Overall 1 year Secondary Patency 79%  Mean of 28 months

<table>
<thead>
<tr>
<th>Analysis</th>
<th>1 year rate</th>
<th>Mean in months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n^a</td>
<td>n^b</td>
</tr>
<tr>
<td>Studies conducted pre-2005</td>
<td>21</td>
<td>3171</td>
</tr>
<tr>
<td>Mixed years (pre- and post-2005)</td>
<td>22</td>
<td>6975</td>
</tr>
<tr>
<td>Studies conducted post-2005</td>
<td>18</td>
<td>2813</td>
</tr>
</tbody>
</table>

Bylsma, et al Eur J Vasc Endovasc Surg 2017

Charmaine E. Lok,† Jessica M. Sontrop,‡ George Tomlinson,§ Dheeraaj Rajan,‡ Mark Cattral,§ George Oreopoulos,§ Jeremy Harris,* and Louise Moist†

Primary Failure Included

Primary Failure Excluded

2x angioplasties in AVG, more thrombosis

Lok, C. E., et al cJASN 2013
CVC Patency

• No Large contemporary studies of CVC complications.

• CVC Patency estimates range between 34 to 78% over 1 year

• Up to 87% of catheters develop dysfunction during the course of their use and 30% develop dysfunction monthly

• <10% of CVC survive 1 year without need for intervention
CVC and Central Vein Stenosis

- Central Vein Stenosis can be as high as 40% in haemodialysis population

- Risk factors include previous CVC placement, number of CVC’s and duration of CVC placement.

- Again not well studied
Other Dialysis Access Complications
Vascular Access Complications: DOPPS

Figure 3. | Distribution of access complications by initial permanent access type. Access complications include noninfectious complications only (n=2044) and any infectious complications (n=542). In this plot, people who experienced both complications (n=325) were included in the infectious complication group only.
Vascular Access Complication: DOPPS

Comparisons by outcome (type of complication)

- **Non-infectious (<90 days)**
  - Graft vs. Fistula: HR = 1.22 [1.05; 1.41]
  - Catheter vs. Fistula: HR = 0.62 [0.55; 0.69]

- **Non-infectious (90-180 days)**
  - Graft vs. Fistula: HR = 1.39 [1.13; 1.71]
  - Catheter vs. Fistula: HR = 1.51 [1.29; 1.76]

- **Infectious (local)**
  - Graft vs. Fistula: HR = 1.31 [0.92; 1.87]
  - Catheter vs. Fistula: HR = 1.37 [1.06; 1.78]

- **Infectious (systemic)**
  - Graft vs. Fistula: HR = 1.36 [0.81; 2.29]
  - Catheter vs. Fistula: HR = 2.47 [1.72; 3.54]

Ravani P cJASN 2017.
Other Dialysis Access Complications

### Associations between Hemodialysis Access Type and Clinical Outcomes: A Systematic Review

<table>
<thead>
<tr>
<th>Reference Annual Event Risk&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Vascular Access Comparison</th>
<th>Meta-Analytical RR (95% CI)</th>
<th>Heterogeneity (I²; P Value)</th>
<th>Number of Additional Events per 1000 Patients Exposed per Year (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major cardiovascular events</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.10 for fistula users</td>
<td>Catheter versus fistula</td>
<td>1.38 (1.24–1.54)</td>
<td>0%; 0.47</td>
<td>38 (24–54) excess with catheter</td>
</tr>
<tr>
<td>0.11 for graft users</td>
<td>Catheter versus graft</td>
<td>1.26 (1.11–1.43)</td>
<td>0%; 0.57</td>
<td>28 (12–46) excess with catheter</td>
</tr>
<tr>
<td>0.10 for fistula users</td>
<td>Graft versus fistula</td>
<td>1.07 (0.95–1.21)</td>
<td>0%; 0.52</td>
<td>7 (–5–21)&lt;sup&gt;b&lt;/sup&gt; excess with graft</td>
</tr>
<tr>
<td>Fatal infections</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.03 for fistula users</td>
<td>Catheter versus fistula</td>
<td>2.12 (1.79–2.52)</td>
<td>0%; 0.82</td>
<td>28 (20–38) excess with catheter</td>
</tr>
<tr>
<td>0.04 for graft users</td>
<td>Catheter versus graft</td>
<td>1.49 (1.15–1.93)</td>
<td>0%; 0.23</td>
<td>17 (5–32) excess with catheter</td>
</tr>
<tr>
<td>0.03 for fistula users</td>
<td>Graft versus fistula</td>
<td>1.36 (1.17–1.58)</td>
<td>0%; 0.78</td>
<td>9 (4–15) excess with graft</td>
</tr>
</tbody>
</table>

Also No Differences Age<65 versus Age≥65 years

Ravani, P., et al JASN 2013
Dialysis Access and Mortality
### Associations between Hemodialysis Access Type and Clinical Outcomes: A Systematic Review

<table>
<thead>
<tr>
<th>Reference Annual Event Risk</th>
<th>Vascular Access Comparison</th>
<th>Meta-Analytical RR (95% CI)</th>
<th>Heterogeneity (I²; P Value)</th>
<th>Number of Additional Events per 1000 Patients Exposed per Year (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-cause mortality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.20 for fistula users</td>
<td>Catheter versus fistula</td>
<td>1.53 (1.40–1.67)</td>
<td>83.9%; &lt;0.01</td>
<td>106 (80–134) excess with catheter</td>
</tr>
<tr>
<td>0.24 for graft users</td>
<td>Catheter versus graft</td>
<td>1.38 (1.25–1.52)</td>
<td>86.2%; &lt;0.01</td>
<td>91 (60–125) excess with catheter</td>
</tr>
<tr>
<td>0.20 for fistula users</td>
<td>Graft versus fistula</td>
<td>1.18 (1.09–1.27)</td>
<td>82.1%; &lt;0.01</td>
<td>36 (18–54) excess with graft</td>
</tr>
</tbody>
</table>

**Also No Differences Age<65 versus Age≥65 years**

**Selection Bias, Residual Confounding**

Ravani, P., et al JASN 2013
Determining the Timing of Dialysis Access Placement
Determining the Timing of Dialysis Access Placement

- What do the guidelines say?
Timing of PD Catheter Placement

- **ISPD Guidelines 2010**
  - We suggest that, whenever possible, catheter insertion should be performed at least 2 weeks before starting PD.

- **UK Renal Association 2017**
  - We recommend that, where possible, timing of PD catheter insertion should be planned to accommodate patient convenience, commencement of training between 10 days and 6 weeks and before RRT is essential to enable correction of early catheter-related problems without the need for temporary haemodialysis.

- **KDOQI 2006**
  - A peritoneal dialysis (PD) catheter ideally should be placed at least 2 weeks before the anticipated start of dialysis treatments.
  - A backup HD access does not need to be placed in most patients. A PD catheter may be used as a bridge for a fistula in “appropriate” patients.
Timing of AVF/AVG Creation ??

• KHA/CARI Guidelines 2013
  – All patients, especially those with co-morbid conditions, should be referred to a vascular access
    surgeon well in advance of the anticipated need for haemodialysis. The exact timing depends on
    patient-related factors and local facilities.
  – Several procedures may be required to establish a useable native AVF. Maturation of AVF may be
    prolonged (3 months or more) in some patients.

• KDOQI 2006
  – 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.
  – 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.
Timing of AVF/AVG Creation??

- Canadian Society of Nephrology
  - Set specific targets for tasks during CKD Stages 3, 4, and 5 management according to the rate of decline of eGFR:
    - (a) Assuming a usual rate of decline of 2–5 ml/min/yr, modality education should usually begin at eGFR=30 ml/min, modality decisions should usually be finalized by eGFR=20 ml/min, and that those who choose HD (and who are expected to survive long enough and are suitable), should usually be referred to a vascular surgeon for consideration/evaluation of AVF when eGFR=15–20 ml/min (as per 2006 CSN guideline).
    - (b) In patients whose rate of decline of eGFR over time is greater than 5 ml/minute/year, these tasks should be undertaken earlier than proposed before. . . Assuming that local resources are available, we recommend that if and when patients reach eGFR=15 ml/minute and are unable or unwilling to make a modality decision, consideration should be given to refer suitable patients to the VA surgical team for assessment concerning possible dialysis access options. . . Note that this recommendation is about when to consider referral to the surgeon for evaluation, and does not contemplate when vascular surgery is to be scheduled.
Determining the Timing of Dialysis Access Placement

• 1. Individual Patient Factors - Morbidity

• 2. Physician Based Factors

• 3. “Patient Factors” – Traits/Cultural Factors
Determining the Timing of Dialysis Access Placement

1. Individual Patient Factors

A number of individual patient factors are associated with primary failure/catheter use e.g. Age, gender, DM, vascular disease

Are largely un-modifiable factors
Determining the Timing of Dialysis Access Placement

• 2. “Physician” Based Factors
  – Level of kidney function
  – Trajectory of decline
Trajectories of Kidney Function Decline in the 2 Years Before Initiation of Long-term Dialysis

% of Cohort

- 3%
- 9%
- 25%
- 63%

O’Hare et al. AJKD, 2012
Trajectories of Kidney Function Decline in the 2 Years Before Initiation of Long-term Dialysis

O’Hare et al. AJKD, 2012
Longitudinal Progression Trajectory of GFR Among Patients With CKD

African American Study of Kidney Disease and Hypertension

Li L et al AJKD 2012
Determining the Timing of Dialysis Access Placement

• 2. “Physician” Based Factors
  – Level of kidney function
  – Trajectory of decline
  – Likelihood of Starting Dialysis if AVF created
When to refer patients with chronic kidney disease for vascular access surgery: Should age be a consideration?

AM O’Hare\textsuperscript{1,2}, D Bertenthal\textsuperscript{2}, LC Walter\textsuperscript{1,2}, AX Garg\textsuperscript{3}, K Covinsky\textsuperscript{1,2}, JS Kaufman\textsuperscript{4}, RA Rodriguez\textsuperscript{5} and M Allon\textsuperscript{6}

eGFR <25 ml/min, 1 yr F/U

O’Hare et al Kidney Int 2007: 71; 555–561
When to refer patients with chronic kidney disease for vascular access surgery: Should age be a consideration?

AM O’Hare, D Bertenthal, LC Walter, AX Garg, KA Covinsky, JS Kaufman, RA Rodriguez, and M Allon

Fig. Ratio of unnecessary to necessary permanent access surgeries at different theoretical referral eGFR thresholds by age and length of follow-up. (A) Referral threshold eGFR of 25 ml/minute/1.73 m². (B) Referral threshold eGFR of 20 ml/minute/1.73 m². (C) Referral threshold eGFR of 15 ml/minute/1.73 m².

O’Hare et al Kidney Int 2007: 71; 555–561
Likelihood of Starting Dialysis after Incident Fistula Creation


Oliver et al. cJASN, 2012
Increased age associated with lower “hazard” of commencing dialysis
Determining the Timing of Dialysis Access Placement

- **1. Individual Patient Factors - Morbidity**
- **2. Physician Based Factors**
- **3. “Patient Factors” – Traits/Cultural Factors**
  - Patient Education
Patient Dialysis Knowledge Is Associated with Permanent Arteriovenous Access Use in Chronic Hemodialysis

Kerri L. Cavanaugh,* Rebecca L. Wingard,† Raymond M. Hakim,*‡ Tom A. Elasy,‡ and T. Alp Ikizler*

• Assessed 490 incident haemodialysis patients with the Chronic Hemodialysis Knowledge Survey
  – The Chronic Hemodialysis Knowledge Survey (CHeKS) evaluates patient knowledge about important issues in CHD care including dialysis adequacy, nutrition, anemia, access care, medications, and safety.
  – The scale included 23 multiple-choice items with only one correct response

### Table 3. Adjusted Logistic Regression Analyses: Association between baseline CHeKS score and use of an arteriovenous fistula or graft at baseline and three- and six-months after dialysis initiation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>OR [95% CI]</th>
<th>OR [95% CI]</th>
<th>OR [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>3-Months</td>
<td>6-Months</td>
</tr>
<tr>
<td></td>
<td>n = 426</td>
<td>n = 395</td>
<td>n = 367</td>
</tr>
<tr>
<td>Dialysis Care Knowledge</td>
<td>1.34 [1.02, 1.76]</td>
<td>1.49 [1.16, 1.93]</td>
<td>1.33 [1.03, 1.72]</td>
</tr>
<tr>
<td>CHeKS Score (20% points)</td>
<td>0.03</td>
<td>0.002</td>
<td>0.03</td>
</tr>
<tr>
<td>Age (per year)</td>
<td>1.00 [0.99, 1.02]</td>
<td>1.00 [0.99, 1.02]</td>
<td>1.00 [0.98, 1.01]</td>
</tr>
<tr>
<td>Sex (Female versus Male)</td>
<td>1.22 [0.78, 1.90]</td>
<td>1.18 [0.78, 1.78]</td>
<td>1.10 [0.72, 1.68]</td>
</tr>
<tr>
<td>Race (Non-white versus White)</td>
<td>1.07 [0.66, 1.73]</td>
<td>1.04 [0.67, 1.63]</td>
<td>0.95 [0.61, 1.50]</td>
</tr>
<tr>
<td>Education (HS or greater versus less than HS)</td>
<td>0.88 [0.52, 1.50]</td>
<td>0.91 [0.56, 1.48]</td>
<td>0.88 [0.54, 1.45]</td>
</tr>
<tr>
<td>Diabetes (Yes versus no)</td>
<td>1.08 [0.69, 1.69]</td>
<td>1.25 [0.82, 1.90]</td>
<td>1.24 [0.81, 1.90]</td>
</tr>
<tr>
<td></td>
<td>0.74</td>
<td>0.30</td>
<td>0.33</td>
</tr>
</tbody>
</table>

*OR, odds ratio; CI, confidence interval; HS, high school.

*p-value*
# Effects of a Nationwide Predialysis Educational Program on Modality Choice, Vascular Access, and Patient Outcomes

_Eduardo Lacson Jr, MD, MPH, Weiling Wang, MS, Cari DeVries, Keith Leste, MA, Raymond M. Hakim, MD, PhD, Michael Lazarus, MD, and Joseph Pulliam, MD_

**Table 2.** Odds Ratios Comparing Modality Choice and Vascular Access Type for Incident Patients

<table>
<thead>
<tr>
<th>Baseline Outcomes</th>
<th>All TOPs Patients</th>
<th>Matched TOPs Cohort&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peritoneal dialysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unadjusted</td>
<td>8.45 (7.63-9.37)</td>
<td>7.51 (6.10-9.24)</td>
</tr>
<tr>
<td>Case-mix adjusted</td>
<td>5.51 (3.85-7.88)</td>
<td>3.87 (3.54-19.78)</td>
</tr>
<tr>
<td>Case-mix + laboratory</td>
<td>5.13 (3.58-7.35)</td>
<td>7.73 (3.26-18.32)</td>
</tr>
<tr>
<td>adjusted</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Noncatheter access</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unadjusted</td>
<td>2.14 (1.96-2.33)</td>
<td>1.82 (1.61-2.06)</td>
</tr>
<tr>
<td>Case-mix adjusted</td>
<td>2.17 (1.99-2.37)</td>
<td>1.83 (1.61-2.07)</td>
</tr>
<tr>
<td>Case-mix + laboratory</td>
<td>2.06 (1.88-2.26)</td>
<td>1.73 (1.51-1.97)</td>
</tr>
<tr>
<td>adjusted</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CARI Project: Patient Education

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician factors</td>
<td></td>
</tr>
<tr>
<td>First nephrology review &lt;3 mo before dialysis start (vs &gt;3 mo)</td>
<td>32.77 (8.66-123.97)(^d)</td>
</tr>
<tr>
<td>First nephrology review &lt;12 mo before dialysis start (vs &gt;12 mo)</td>
<td>8.20 (5.92-11.36)(^d)</td>
</tr>
<tr>
<td>Predialysis education (vs no education)</td>
<td>0.44 (0.27-0.71)(^e)</td>
</tr>
<tr>
<td>eGFR at AVF/AVG creation (/5-mL/min/1.73 m(^2) increase)</td>
<td>0.22 (0.10-0.50)(^d)</td>
</tr>
</tbody>
</table>

Adjusted for patient age, sex, late referral, cause of ESKD, cigarette smoking, peripheral vascular disease, presentation type and pre-dialysis education.

Lopez-Vargas et al AJKD 2011
Determining the Timing of Dialysis Access Placement

- **1. Individual Patient Factors - Morbidity**
- **2. Physician Based Factors**
- **3. “Patient Factors” – Traits/Cultural Factors**
  - Patient Education
  - Patients Views
• Older patients with fistulas:
  – more likely to be at least moderately bothered by bleeding and bruising

• Younger patients with catheters:
  – were more likely to be bothered by having to protect their access, having the access interfere with leisure and social activities, and worrying about the longevity of their access

## The Vascular Access Questionnaire: assessing patient-reported views of vascular access

| Table III - Responses to measures of overall patient satisfaction with vascular access |
|----------------------------------------|----------------|
| Fistula (n=118)                       | Catheter (n=104) |
| Somewhat or very satisfied, %         | 55             | 63            |
| Probably or definitely recommend, %   | 62             | 77\(^{a}\)   |
| Somewhat or very easy to use, %       | 86             | 97\(^{b}\)   |
| Would change type of access if possible, % | 11             | 32\(^{b}\)   |

\(^{a}\) \(p = 0.01\); \(^{b}\) \(p < 0.01\)

What’s Important to Patients? SONG-HD

Absolute importance score with 95% CI
Ordered by patients/caregivers’ priority

Unpublished Survey
Conclusions: Appropriate Dialysis Access - Timing & Preparation for Dialysis Initiation
Is It Rocket Science?

It’s time to face reality, my friends. We’re not exactly rocket scientists.
Conclusion: Appropriate Dialysis Access

Woo & Lok. cJASN 2016