State of the Union: Vascular Access in North America

SESSION: ISSUES IN RENAL FAILURE: PERSPECTIVE OF NEPHROLOGY

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Objectives:

- To Discuss about Hemodialysis Vascular Access:
  - What's happening
  - What's really good
  - What we've learned
  - What needs to be changed
  - What's in the future

Vascular Access at Hemodialysis Initiation

USRDS 2015

Vascular access use\textsuperscript{a} – incident patients
DOPPS 5 (2012-2014)

\textsuperscript{a} \text{USRDS 2015}

\textsuperscript{a} Ploni et al. Am J Kidney Dis. 2015;65(6):905-915
Timing of 1st nephrology care before HD*
DOPPS 5 (2012-2014)

Access use at first outpatient HD, by pre-ESRD nephrology care

Patients with “Urgent Starts” to dialysis

Little or no planning

>10 Ways Catheters Cost

Badness and Death
Conversion of Vascular Access in First Year of HD

<table>
<thead>
<tr>
<th>Change to access</th>
<th>Adjusted HR (95% CI)</th>
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<tbody>
<tr>
<td>Catheter to AV fistula</td>
<td>0.64 (0.47-0.87)</td>
</tr>
<tr>
<td>Catheter to AV graft</td>
<td>0.71 (0.55-0.92)</td>
</tr>
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\text{Catheter to AV graft: } 0.71 \quad (0.55-0.92)
\]

Bradbury. AJKD, 2009

Fistulas not suitable for dialysis – more common than we thought?

- **Occurrence**
  - 20-60%

AJKD

Original Investigation

<table>
<thead>
<tr>
<th>Patency Rates of the Arteriovenous Fistula for Hemodialysis:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year</td>
</tr>
<tr>
<td>Before 2000</td>
</tr>
<tr>
<td>After 2000</td>
</tr>
</tbody>
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DOPPS (1996-2004)

Catheters Last

"Fistula First"

Fistulas not suitable for dialysis – more common than we thought?

• Systematic review and meta-analysis; >7000 citations screened
  • ≈ ¼ - 1/3 never used for dialysis
  • Mean AVF primary failure=23%

• Within the last decade, further significant
  • in primary patency in more recent AVF created

Non-maturing fistulas – potentially serious consequences

• Consequence = Catheter Use
  • ↑ infection and sepsis risk
  • ↑ malfunction rate and inadequate dialysis
  • ↓ quality of life

Catheters = ↑ Mortality


Timelines of Vascular Access Use

USRDS 2015
Trends in Vascular Access Use

USRDS 2015

Are Patients Getting What They Want?

- 9/10 countries
- 50-95% of patients who were using a catheter, preferred a catheter

N=3815 HD patients, from 224 facilities

Fissell, R., et. al, J Vasc Access, 2011

Vascular access in use, by country*

DOPPS 5 (2012-2014)

Why the high Catheter Prevalence?

AVOID or like the “White stick of death”?

Are More Canadian Hemodialysis Patients Dying from Catheter Use?

What's Important?

Cannulation complications with fistulas and grafts - more concerning to patients than infections in catheters

Evidence Pyramid

Its Time for An Update!

CLINICAL PRACTICE GUIDELINES FOR VASCULAR ACCESS, UPDATE 2006

Evidence Pyramid

Confounding

RCT

Bias

- Randomized Controlled Studies
- Case Control Studies
- Case Series
- Case Studies
- Ideas, Editorials, Opinions
- Animal Research
- In Vitro Research

Evidence Pyramid

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Association

Stenosis Leads to Thrombosis to Loss of Patency

Severe Stenosis

Stenosis with Thrombus

Courtesy of A. Besarab

Observational Studies: Surveillance is GOOD

Courtesy of M. Allon
RCTs: Surveillance is unhelpful

Controversy and Confusion
- When guidelines become mandates based on lower level evidence
  - Prohibits efforts to find “the truth” via RCTs

Yes, VA Guidelines are Being Updated

A lot of Progress in AV access
Engineered grafts, conduits and vessels


Engineered grafts, conduits and vessels


Keeping an Open Mind for the Future: Vascular Access Options

Catheter

Fistula

Vascular Access

Graft

Humacryte Graft

Humacryte Graft

Keeping an Open Mind for the Future: Vascular Access Options

Many Key Changes to Our Approach

- Multidisciplinary

Progress To Date

- KDOQI Teams chosen:
  - Chair - Nephrology: Dr. Charmaine Lok
  - Vice-Chair- Surgery: Dr. Suren Shenoy
  - Vice-Chair- Interventional: Dr. Alex Yevzlin

- Evidence Review Team:
  - Lead by Dr. Timothy Wilt
  - Evidence-based Synthesis Program (ESP) Center, Minneapolis VA Medical Center, Minneapolis, MN
My Ideal Goal…

RIGHT ACCESS
RIGHT PATIENT
RIGHT TIME
RIGHT REASONS

Incorporate a process pathway to create an ESKD dialysis access Life-Plan for patients that involves multiple dialysis accesses rather than a singular approach.

Questions?

Summary

- What’s really good: Steady increase in fistula prevalence
- What we’ve learned: Persistent incident catheter use
  - Large contribution from urgent start patients (20-40%)
  - High percentage of fistulas created that are not suitable for dialysis
- What needs to be changed: Single focus on fistula creation
  - Consider “catheter last” and acceptable AV-graft options
  - Consider implications of interventions (e.g., cost and patient burden of fistula facilitation and maintenance)
  - Consider patient satisfaction as a quality & performance measure (policy makers & insurers)
- What’s in the future: A much needed update of KDOQI VA Guidelines is on the way!
  - A truly multi-disciplinary approach and a balanced focus on the patient vascular access pathway and ESKD Life-Plan

AV access placement (%) before HD\textsuperscript{a,b}

\textbf{DOPPS 5 (2012-2014)}

<table>
<thead>
<tr>
<th>% of Patients</th>
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<tbody>
<tr>
<td>100</td>
</tr>
<tr>
<td>UK</td>
</tr>
<tr>
<td>81</td>
</tr>
<tr>
<td>75</td>
</tr>
<tr>
<td>106</td>
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\textsuperscript{a} On dialysis ≥ 60 days at DOPPS enrollment
\textsuperscript{b} Provided ≥4 months of pre-dialysis nephrology care