Basilic Vein Transpositions are Always the Best Option in the Obese

There are no studies that directly compare outcomes of Basilic Vein Transposition to AV Grafts in Obese Patients.

Comparative Outcomes Literature
- AV Access in obese vs non-obese
- Basilic transposition vs AV Graft

The Challenge of the Obese Patient
Obese have a Lower Prevalence of Functioning AV Fistulas
- The challenge of the obese patient
- Literature review
  - AV Access in the obese
  - Comparing BVT to AVG
- Technical tips for BVT in obese patients

Disclosures: none
Obese have a Lower Prevalence of Functioning AV Fistulas …

**Why is that?**

♦ Fistula creation rates lower?
  » Variations in practice patterns

Obese have a Lower Prevalence of Functioning AV Fistulas …

**Why? …**

♦ Are fistula maturation rates lower?
♦ Are fistula 2º failure rates higher?

_Data inconsistent_
(Kats study and Chan study and HEMO study)

Challenges of AV Access Creation in the Obese Patient

♦ Some are real (vessels are deep)
♦ Some are perceived (outcomes data inconsistent)
♦ Often diabetic (increased atherosclerosis)
♦ Is there an increased risk of access failure?
  ➢ Cannulation complications (depth)

Challenges of AV Access Creation in the Obese Patient …

♦ Increased risk of neointima hyperplasia?
♦ Increased risk of infection?
  ➢ Incidence of infection much lower in BVT vs AVG (see Tan 2011 p 69, refers to Woo 2009)

♦ Incidence of obesity increasing

Obesity Paradox

♦ Lower cardiovascular morbidity
♦ Lower all-cause mortality

**Obesity Paradox in Patients on Maintenance Dialysis**
Kalantar-Zadeh, Kopple 2006

Obesity Paradox…

For every 1 unit increase in **BMI**
Risk of **Mortality** decreases by **10%**

**Influence of excess weight on mortality and hospital stay in 1345 hemodialysis patients**
Fleischmann E, et al KI, 1999
Obesity Paradox …

**This is a BIG problem**
- Will live longer
- May be excluded from transplantation*  
  - BMI > 35  
  *SongulCelebi-Onder, Seminar in Dialysis 2012
- Will need more years of reliable HD access
  - Need best possible access (AVF)
  - Need to maximize future access options (AVF)

Literature on AV Access In Obese Patients

**BMI**
**(Body Mass Index)**

<table>
<thead>
<tr>
<th>Obesity</th>
<th>≥ 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe obesity</td>
<td>≥ 35 or 40</td>
</tr>
<tr>
<td>Morbid obesity</td>
<td>≥ 40 – 44.9</td>
</tr>
<tr>
<td>Super obesity</td>
<td>≥ 45 or 50</td>
</tr>
</tbody>
</table>

Basilic Vein Transpositions are Always the Best Option in the Obese

There are no studies that directly compare outcomes of Basilic Vein Transposition to AV Grafts in Obese Patients

Basilic Vein Transpositions are Always the Best Option in the Obese …

Comparative Outcomes Literature
- AV Access in obese vs non-obese
- Basilic transposition vs AV Graft

Studies Demonstrating Obesity Does **Not** Adversely Effect Fistula Maturation

- Allon KI 2001
- Dixon AJKD 2002
- Feldman AJKD 2003
- Ernandez Neph Clin Prac 2005
- Kats KI 2007

*All used vein mapping
(flesh out type of study and size…see Kats for
2007: Kats et al, University of Alabama

*Impact of obesity on arteriovenous fistula outcomes in dialysis patients*

Kidney International

388 consecutive patients requiring initial hemodialysis access

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**Incidence of AVF Creation**

- Obese: 47.4%
- Non-obese (BMI <30): 47.1%

---

**Fistula location**

Upper arm = Forearm

**Vessel Size** (Artery and Vein diameter)

Obese = Nonobese

---

**AVF 1st Failure Rate** (Maturation)

- Obese: 46%
- Non-obese (BMI <30): 41%

*P* = .45

---

**Studies Demonstrating Obesity Does Not Adversely Effect 1st or 2nd Access Patency in AVF or AVG**

- Cull: JVS 2004
- Wolford: JVS 2005
- Chan: SID 2008 Observational (largest)
- Weyde: NDT 2007 (prospective)

(flesh out type of study and size...see Chan for references)

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2008: Chan et al, University of Wisconsin

*Obesity as a Predictor of Vascular Access Outcomes: Analysis of the USRDS DMMS Wave II Study*

Seminars in Dialysis

Retrospective analysis of 1,486 hemodialysis patients
Fistula Maturation Failure

Logistic regression model

Non-obese = Obese (BMI > 30)
Odds Ratio = 1.52
p=0.33 (NS)

Obesity NOT associated with increased AVF or AVG revision or failure rates

2008: Chan et al, University of Wisconsin…
(1,486 Hemodialysis Patients)

Obesity NOT associated with increased AVF or AVG revision or failure rates

2008: Weyde et al, Wroclaw, Poland

Obesity is not an obstacle for successful autogenous arteriovenous fistula creation in haemodialysis
Nephrology Dialysis Transplantation
Prospective study of 71 obese patients (BMI 34.6 +/- 8)

71 Obese Patients

♦ 2-Stage Radial-cephalic fistula
♦ BMI 34.6 +/- 8, (29.1 - 53.73)
♦ Diabetes 59%

Outcomes
♦ Successful access creation 92%
♦ Functional patency 85%
♦ 1st patency
  » 6 month 65%
  » 1 year 59%

Outcomes
♦ 2nd patency
  » 6 month 83%
  » 12 months 83%
  » 2 years 80%

* Patencies comparable to non-obese
Conclusions:
♦ Obesity does not preclude successful AVF creation (85% success)
♦ Obesity protects vessels from iatrogenic trauma
♦ Transposition led to Improved Cannulation and Improved Outcomes

Literature BVT vs AVG

Numerous Studies Demonstrate Superior Outcomes with BVT versus AVG
♦ Better long term patency
♦ Fewer complications
♦ Lower risk of infection

2008: Weyde et al, Wroclaw, Poland...

2011: Tan & Farber, Boston University
Brachial-Basilic Autogenous Access
Seminars in Vascular Surgery
11 Studies Comparing BVT to AVG
➢ 10 retrospective
➢ 1 randomised multi-center trial (Keuter)

1994: Coburn & Carney, Brown University
Comparison of Basilic Vein and Polytetrafluoroethylene for Brachial Arteriovenous Fistulae
Journal of Vascular Surgery
Retrospective review
♦ 1988 - 1993
♦ 106 fistulas/grafts
♦ 81 patients

1994: Coburn & Carney, Brown University ...

Complications (%)

<table>
<thead>
<tr>
<th>Complication</th>
<th>Basilic</th>
<th>PTFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection</td>
<td>3.4</td>
<td>16.1</td>
</tr>
<tr>
<td>Steal</td>
<td>3.4</td>
<td>8.1</td>
</tr>
<tr>
<td>Aneurysm</td>
<td>3.4</td>
<td>6.5</td>
</tr>
<tr>
<td>Bleeding</td>
<td>6.8</td>
<td>1.6</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>43</td>
</tr>
</tbody>
</table>

p < 0.04
1994: Coburn & Carney, Brown University...

### Access Failures

<table>
<thead>
<tr>
<th></th>
<th>Patency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTFE</td>
<td>27/47 57.4%</td>
</tr>
<tr>
<td>Basilic vein</td>
<td>9/59 15.3%</td>
</tr>
</tbody>
</table>

1994: Coburn & Carney, Brown University

### Patency (%)

<table>
<thead>
<tr>
<th></th>
<th>Basilic</th>
<th>PTFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Patency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-year</td>
<td>90</td>
<td>70</td>
</tr>
<tr>
<td>2-year</td>
<td>86</td>
<td>49</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Patency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-year</td>
<td>90</td>
<td>87</td>
</tr>
<tr>
<td>2-year</td>
<td>86</td>
<td>64</td>
</tr>
</tbody>
</table>

1998: Matsuura, Rosenthal et al, Georgia Baptist

**Transposed Basilic Vein Versus Polytetrafluoroethylene for Brachial-Axillary Arteriovenous Fistulas**

*American Journal of Surgery*

### Concurrent Series

- 1994 - 1996
- 98 - Brachial artery ➔ Axillary vein grafts/fistulas

1998: Matsuura, et al, Georgia Baptist...

### Life-table Analysis of 2 Year Patency (%)

<table>
<thead>
<tr>
<th></th>
<th>Basilic Veins</th>
<th>PTFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Patency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( P )</td>
<td>70</td>
<td>46</td>
</tr>
<tr>
<td>0.023</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Patency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( P )</td>
<td>70</td>
<td>51</td>
</tr>
<tr>
<td>0.015</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1998: Matsuura, Rosenthal et al, Georgia Baptist...

### Cumulative Secondary Patency

2008: Keuter, et al., Maastricht

*A randomized multicenter study of the outcome of brachial-basilic arteriovenous fistula and prosthetic brachial-antecubital forearm loop as vascular access for hemodialysis.*

*Journal of Vascular Surgery*

- BVT \( n=50 \)
- 4arm Loop AVG \( n=51 \)
2008: Keuter, Brachial-basilic vs. Prosthetic brachial-antecubital forearm loop...

- BVT higher 1⁰ patency: 46 vs 22%, P=.005
- 2⁰ patency (equivalent): 89 vs 85%, NS

More interventions required for AVG
- BVT: 1.7 interventions/patient-year
- AVG: 2.7 interventions/patient-year

Complications
- BVT: 1.6/patient-year
- AVG: 2.7/patient-year

Infection
- BVT: 1/50
- AVG: 6/51, P=.031

Thrombosis
- BVT: 6/50
- AVG: 33/51, P<.001

BVT In Obese Patients

Technical Considerations

- Length of vein too short for transposition(retunncelling)
- Wound healing
- Hematomas
Technical Challenges of BVT in the Obese Patient …

- Basilic veins usually good size/quality .protected from iatrogenic puncture .But…limited length of adequate caliber vein precludes sc tunneling

Technical Tips for Obese Patient

- Use a 2-stage approach
  - The vein will elongate !!!
  - Make the 1st stage anastomosis distal to the ac crease
    - Proximal radial or ulnar artery
  - Decreased venous htn and wound hematoma with 2 –stage (Kakkos, Weaver EJVS 2010)

Advantages of 2-Stage Transpositions …

- If thromboses, better chance of salvage …

Technical Tips for Obese Patient…

- Close dead space

- Use interrupted 3-0 nylon vertical mattress sutures (axilla) to decrease risk of skin breakdown

Technical Tips for Obese Patient…

- Closed suction drain overnite

- Wound breakdown/hematoma in a fistula is a manageable problem (lois robinson and other dude)
74 yo Male BMI 35.3 (5’9”, 239#) “Severely Obese”

68yo Female
BMI 42.5 (5’3”, 240#) “Morbidly Obese”

2-Stage Basilic Transposition

worst case scenario
- If length of vein too short for transposition(retunelling)
- Make new anastomosis more proximally (brachial artery)
- Add segment of ptfe to end “graft extension”
  - Tabbara The American Surgeon 2013
  - Georgiatis, JVS, 2005
  - non cannulation zone
BVT is Superior to AVG

Conclusions
- High maturation rate
- Superior long term patency
- Lower reintervention rates (cheaper)
- Lower risk of infectious complications
- Maximizes future access options

*BVT is the access procedure of choice for the obese patient*