Should AV Fistulas Be Ligated or Preserved Following Renal Transplantation?

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Disclosures:
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to Ligate
OR NOT
to Ligate?
That is the question!

Why are we asking this question?
♦ Frequent topic of discussion s/p txp
♦ Limited literature
♦ No established guidelines

“Poll the Audience”
Do you routinely ligate the AV Fistula following successful renal transplantation?

Do you NOT routinely ligate the Fistula?

Key Questions
Will the transplanted patient need the access in the future?
Let’s look at some data

Should AV Fistulas Be Ligated?

Kidney Transplant 10 year Graft Survival Rates*

- Cadaver donor: 43%
- Living donor: 61%

* Organ Procurement & Transplantation Network & Scientific Registry of Transplant Recipients (OPTN/SRTR): 2010 Annual Data Report

Can the patient be re-transplanted?

Availability of Donor Kidneys *

- Waiting list for donor kidney: 92,000
- Kidney transplants (2011): 17,000
  - Demand 5 x > Supply

* OPTN 2012: http://optn.transplant.hrsa.gov/data/

Potential Benefits of Ligation?

- Improved cosmesis/deformity
  - “It’s ugly!”

Potential Benefits of Ligation …

- Prevent inflow artery aneurysmal degeneration & peripheral embolization?
- Increase transplant survival?
- Improve cardiac morphology and function?
- Increase patient survival? “Fistula toxicity”

Potential Benefits of Ligation …

- Prevent brachial artery aneurysm formation?

Brachial artery aneurysm with distal embolisation
2003: Eugster, Switzerland

Brachial artery dilatation after arteriovenous fistulae in patients after renal transplantation: A 10-year follow-up with ultrasound scan

Measured Brachial Artery Diameter
- Renal transplant with AVF 29
- AVF (control) 9

Observations
- Patent AVF > Occluded
- Increased despite occlusion of the AVF

** No information regarding mural thrombus or embolization

Conclusion:
Access ligation does not prevent brachial artery dilation in transplant patients

Left Ventricular Hypertrophy
“LVH” (Some facts)
- Most common cardiac pathology in ESRD patients
- LVH is linked to Mortality
  - Heart failure
  - Arrythmias
  - Sudden death

Should AV Fistulas Be Ligated?
- LVH ...
- Etiology of LVH in ESRD (multifactorial)
  - Hypertension
  - Anemia
  - Uremia
  - AV Access

Should AV Fistulas Be Ligated?
- Effect of Transplantation on LVH?
  - May improve
  - Complete regression is rare
  - ? if patent AVF interferes with LVH regression?
Literature Review
Effect of Access Closure on LVH

10 Studies
- Possible benefit 4
- No benefit 6

Endpoints/Outcomes
- Echocardiographic (LVMI): Most
- Access Flow: Some
- Patient Survival/Transplant Survival: None
- Cardiac morbidity/mortality: None

“Pro-Ligation” Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>F/U</th>
<th>Results**</th>
<th>Access Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movilli, 2010*</td>
<td>Pro, n=25</td>
<td>6 mos</td>
<td>Reduced LVMI, etc.</td>
<td>-</td>
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<tr>
<td>Cridlig, 2008</td>
<td>Matched-pair, n=38</td>
<td>na</td>
<td>Reduced LVMI, etc.</td>
<td>1,040 ml/min</td>
</tr>
<tr>
<td>Unger, 2002</td>
<td>Pro, n=17</td>
<td>3-10 wks</td>
<td>Reduced LVMI, etc.</td>
<td>-</td>
</tr>
<tr>
<td>van Duinhoven, 2001</td>
<td>Pro, n=20</td>
<td>4-5 months</td>
<td>Reduced LVMI, etc.</td>
<td>1,780 ml/min</td>
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</tbody>
</table>

**No Cardiac Morbidity/Mortality or Survival Data

“Don’t-Ligate” Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>F/U</th>
<th>Results of Ligation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soleimani, 2012</td>
<td>Retro, n=23*</td>
<td>6-18mos</td>
<td>No benefit (Echo findings)</td>
</tr>
<tr>
<td>Sheashaa, 2004</td>
<td>Retro, n=34*</td>
<td>10 yrs</td>
<td>No benefit (Echo findings) (Patient &amp; txp survival)</td>
</tr>
<tr>
<td>Patard, 2002</td>
<td>Retro, n=160</td>
<td>89 mos</td>
<td>Natural History Study (Patent AVF = not morbid)</td>
</tr>
</tbody>
</table>

* Spontaneous thromboses

Summary
- Likelihood of Access Ligation improving cardiac morphology and function
  - At best is uncertain
- Transplant survival
  - Not significantly improved
- Patient survival
  - Not significantly improved
- Many patients will return to dialysis

The Future?
- Need for a randomized prospective study
- Evidence-based criteria for closure
  - Dilated LV and high-flow fistulas?
- Identify predictability of LVH reversibility
- Effect of LVH reversibility on Cardiac Morbidity and Mortality
CONCLUSION
When should a fistula be ligated s/p renal transplant?
Almost Never!!

DOH n’t Ligate !!!

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