Should We Be More Aggressive in the Treatment of Acute DVT?

UCSF Vascular Surgery Symposium
April 6, 2017

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DISCLOSURES

• Consultant – Penumbra, Inc.

17 yo male, DVT 8 months ago, complete iliac v. occlusion. 3-block LLE venous claudication. Symptoms completely resolved x3.5 years
16 yo previously healthy with acute iliocavofemoral DVT

Should We Be More Aggressive in the Treatment of Acute DVT?

Patient Selection

ACUTE DVT

HEALTHY

AGGRESSIVE THERAPY
SELECT CASES

ACUTE DVT

-0.5%

-40%

POST THROMBOTIC SYNDROME

PTS: Incidence after Symptomatic DVT

- Multicenter prospective study of PTS occurring over 2 years following acute symptomatic DVT in adults (n=387)
- 43% incidence of PTS (modified Villalta scoring)
  • 30% mild (Villalta 5-9)
  • 10% moderate (10-14)
  • 3% severe (> 14 or ulcer)
- Proximal DVT increases likelihood of PTS
  • 2.23 increase in MV score vs. distal, p < 0.001
- Proximal DVT increases risk of recurrent ipsilateral DVT
  • HR 2.4, p = 0.036
Can We Prevent PTS?

CaVenT (2012)

RCT of catheter-directed thrombolysis versus conventional therapy alone for acute DVT (<21 d) above mid-thigh (n = 209)
- Patients followed for 2 years
- 54% femoral vein DVT only

Catheter-Directed Therapy
- No pharmacomechanical thrombolysis (tPA infusion only)
- Lysis success:
  - 48% complete lysis, 41% partial lysis, 10% unsuccessful
- Adjunctive therapy:
  - 23% percutaneous transluminal angioplasty
  - 15% patients stented

Enden T et al J Lancet 2012

Post Thrombotic Syndrome (Villalta)
- ARR of 14.4% (41.1% CDT versus 55.6% control)
  - in CDT group, iliofemoral patency at 6 months decreased risk of PTS at 24 months: 37% versus 61% (p = 0.001)

Risks
- No death, ICH, or PE
- 3 major complications
  - 1 abdominal wall hematoma necessitating transfusion
  - 1 calf compartment syndrome necessitating surgery
  - 1 inguinal puncture site hematoma

Enden T et al J Lancet 2012
Do People with PTS have worse QOL?

CaVenT (2013) – Secondary Outcomes

<table>
<thead>
<tr>
<th>PTS (n=92)</th>
<th>No PTS (n=97)</th>
<th>Mean difference</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generic QOL</td>
<td>EQ-5D 0.77 (0.730 to 0.810)</td>
<td>0.86 (0.823 to 0.903)</td>
<td>0.09 (0.03 to 0.15)</td>
</tr>
<tr>
<td>Disease-specific QOL</td>
<td>VENUS-QOL 45.8 (43.4 to 47.9)</td>
<td>54.2 (52.8 to 55.8)</td>
<td>8.8 (5.9 to 11.3)</td>
</tr>
<tr>
<td></td>
<td>VENUS-Sym 45.0 (42.7 to 47.2)</td>
<td>54.8 (53.5 to 56.0)</td>
<td>9.8 (7.3 to 12.3)</td>
</tr>
<tr>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generic QOL</td>
<td>EQ-5D 0.80 (0.770 to 0.837)</td>
<td>0.82 (0.786 to 0.869)</td>
<td>0.02 (0.040 to 0.09)</td>
</tr>
<tr>
<td>Disease-specific QOL</td>
<td>VENUS-QOL 45.8 (44.6 to 46.8)</td>
<td>53.0 (51.3 to 54.7)</td>
<td>6.2 (3.4 to 9.0)</td>
</tr>
<tr>
<td></td>
<td>VENUS-Sym 45.9 (44.6 to 46.8)</td>
<td>53.0 (51.4 to 54.8)</td>
<td>6.1 (3.4 to 8.9)</td>
</tr>
</tbody>
</table>

Can We Prevent PTS?

Attract (2017)

- NIH-sponsored multicenter open-label, assessor-blinded two-arm RCT (n = 692)
- Compared pharmacomechanical catheter-directed thrombolysis + standard therapy versus standard therapy

Primary Outcome = Development of PTS at 2 years

Secondary outcomes = safety, QOL, cost-effectiveness, relief of early pain and swelling

Can We Prevent PTS?

Attract (2017) – PCDT Technique

- Poor Popliteal Inflow
- Good Popliteal Inflow
- Infusion-First Thrombolysis
- AngioJet Thrombolysis
- Trellis Thrombolysis
- Additional infusion thrombolysis, adjunctive techniques for thrombus removal, and venoplasty/stenting
Can We Prevent PTS?

**ATTRACT (2017) – Initial Data Presented at SIR**

<table>
<thead>
<tr>
<th>Outcome (24 mo)</th>
<th>PCDT (n = 336)</th>
<th>No-PCDT (n = 355)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any PTS</td>
<td>46.7%</td>
<td>48.2%</td>
<td>0.56</td>
</tr>
<tr>
<td>Moderate or Severe PTS</td>
<td>17.9%</td>
<td>23.7%</td>
<td>0.035</td>
</tr>
<tr>
<td>Moderate or Severe PTS w/IFDVT</td>
<td>18.4%</td>
<td>28.2%</td>
<td></td>
</tr>
<tr>
<td>Moderate or Severe PTS w/FPDVT</td>
<td>17.1%</td>
<td>18.1%</td>
<td></td>
</tr>
<tr>
<td>Recurrent VTE</td>
<td>12.5%</td>
<td>8.5%</td>
<td>0.09</td>
</tr>
<tr>
<td>Generic QOL (SF-36 PCS)</td>
<td>11.8</td>
<td>10.1</td>
<td>0.37</td>
</tr>
<tr>
<td>Venous QOL (VEINES)</td>
<td>27.7</td>
<td>23.5</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Should We Be More Aggressive in the Treatment of Acute DVT?

**Patient Selection**

*NO!*

- We suggest a strategy of early thrombus removal in selected patients meeting the following criteria: (a) a first episode of acute iliofemoral deep venous thrombosis, (b) symptoms <14 days in duration, (c) a low risk of bleeding, and (d) ambulatory with good functional capacity and an acceptable life expectancy.

*Meissner MH et al J Vasc Surg 2012*
How Much Thrombus Removal is Enough?


OPEN VEIN HYPOTHESIS
How Much Thrombus Removal is Enough?

*CaVenT CDT Group Analysis (2013)*

Inverse correlation between post-lysis thrombus score and venous patency at 24 months ($p = 0.04$)

Presence of iliofemoral patency at 6 and 24 months correlated with reduced frequency of PTS ($p < 0.001$)

No correlation between post-lysis thrombus score and PTS ($p = 0.473$) or Villalta score ($p = 0.723$)

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**Better Tools?**

*ATTRACT (2017) – PCDT Technique*

- **Poor Popliteal Inflow**
  - Infusion-First Thrombolysis
  - AngioJet Thrombolysis
  - Additional infusion thrombolysis, adjunctive techniques for thrombus removal, and venoplasty/stenting

- **Good Popliteal Inflow**

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**Should We Be More Aggressive in the Treatment of Acute DVT?**

**Patient Selection**

**Technique** → **YES!**
Ultrasound-Accelerated Thrombolysis

BERNUTIFUL (2015)
- RCT comparing USAT (n = 24) to standard CDT (n = 24) in patients with symptomatic acute iliofemoral DVT

No difference in % thrombus reduction or 3-month patency or Villalta score

Better Tools?

ATTRACT (2017) – PCDT Technique

Poor Popliteal Inflow

Good Popliteal Inflow

Infusion-First Thrombolysis

AngioJet Thrombolysis

Additional infusion thrombolysis, adjunctive techniques for thrombus removal, and venoplasty/stenting

Improved Rheolytic Thrombectomy?
Aspiration/Mechanical Thrombectomy Devices

34 yo with active UC flare (bloody stools)
Better Tools?

**ATTRACT (2017) – PCDT Technique**

- **Poor Popliteal Inflow**
- **Good Popliteal Inflow**

- **Infusion-First Thrombolysis**
- **AngioJet Thrombolysis**

- Additional infusion thrombolysis, adjunctive techniques for thrombus removal, and venoplasty/stenting

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**Venous Stents**

- **Boston Scientific WALLSTENT**
  Late 1980s-1990s

- **Laser Cut Nitinol Tube**
  Self-Expanding Stents 1990s-early 2000s

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**Venous Stents in U.S. Trials**

- **Cook Zilver Vena**

- **Veniti VICI**

- **Bard VENOVO**
Should We Be More Aggressive in the Treatment of Acute DVT?

Patient Selection → NO!

Technique → YES!

THANK YOU!