Thrombus removal in acute VTE: What is new and what works best?

Michael Piorkowski
Cardioangiologische Centrum Bethanien (CCB)
Disclosure

Speaker name:

.................................................................................................................................

I have the following potential conflicts of interest to report:

☑ Consulting Inari Medical, Boston Scientific, W.L.Gore, Veryan Medical, Abbott
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☐ Other(s)

☐ I do not have any potential conflict of interest
Case 1

- 61 yo female patient with cervix carcinoma
- injury of the IVC during surgical treatment, resuscitation necessary
- bilateral ileofemoral DVT and IVC thrombosis up to the renal veins
Case 2

- 46 yo female patient swelling and claudication of her left (!) leg
- D-Dimer was slightly elevated, and DVT CFV and below was excluded
- oral anticoagulation was started
Case 3

- 18 yo female patient swelling and claudication of her left leg
- IF-DVT was diagnosed 3 weeks ago
- Compression stockings or oral anticoagulation did not change anything
- very tall sportive, trains for triathlons
- May-Thurner-Syndrom
What do we expect from treating those patients?

• Case 1: Symptom relief, fast dismissal, non-invasive procedure, single procedure, no lytics

• Case 2: Thrombus removal before IVC occlusion, clarify the cause, prevent additional VTE

• Case 3: fast recovery, harmless procedure, no risk for bleeding or long-term impact on her life
What can we offer those patients

- Mechancial thrombectomy (Rotational devices, large bore aspiration, scratching out veins)
- Pharmacomechanical thrombectomy (pulse-spray techniques, hydrojet devices, Ultrasound assisted CDT)
- Pharmacotherapy (CDT)

Most of the case this ends with Lysis, ICU and long stenting
# Clot age and symptoms

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Patients (N)</th>
<th>Treatment</th>
<th>% with RVO</th>
<th>Time for Assessment</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2006</td>
<td>316</td>
<td>AC</td>
<td>55%</td>
<td>60 mo.</td>
<td>n/s</td>
</tr>
<tr>
<td>Yoo&lt;sup&gt;2&lt;/sup&gt;</td>
<td>2018</td>
<td>156</td>
<td>AC</td>
<td>61%</td>
<td>8 mo.</td>
<td>&gt; 40%</td>
</tr>
<tr>
<td>Aziz&lt;sup&gt;3&lt;/sup&gt;</td>
<td>2012</td>
<td>75</td>
<td>CDT</td>
<td>11%</td>
<td>36 mo.</td>
<td>&gt; 50%</td>
</tr>
<tr>
<td>Prandoni&lt;sup&gt;4&lt;/sup&gt;</td>
<td>2002</td>
<td>313</td>
<td>AC</td>
<td>13%</td>
<td>72 mo.</td>
<td>n/s</td>
</tr>
<tr>
<td>Dronkers&lt;sup&gt;5&lt;/sup&gt;</td>
<td>2018</td>
<td>2,684</td>
<td>AC</td>
<td>36%</td>
<td>6 – 72 mo.</td>
<td>n/s</td>
</tr>
<tr>
<td>Avgerinos&lt;sup&gt;6&lt;/sup&gt;</td>
<td>2019</td>
<td>142</td>
<td>CDT, PMT + Stenting</td>
<td>67%</td>
<td>Index</td>
<td>&gt; 50%</td>
</tr>
</tbody>
</table>

---


---

Up to 50% of DVT patients have residual vascular obstruction (RVO) after AC or tPA<sup>1-6</sup>
Clot formation

>70% of clot removed at time of treatment is resistant to lytics (non-fibrin).¹


Clot age and symptoms

Clot Chronicity (by symptoms vs visualization)*1

- Chronic 8%
  - Subacute 21%
- More chronic
- Chronic 32%
  - Subacute 35%
- Acute 71%
  - Acute 33%

~50% of thrombus was more chronic than suggested by symptom duration.1

* Defined as acute = < 2 weeks; soft, dark red; subacute = 2-6 weeks; light red; chronic = > 6 weeks; firm, white
ClotTriever® is Effective on Clot of all Ages

% of limbs with complete or near complete (≥75%) thrombus removal
(as assessed by Marder Score)¹

- Acute: 91%
- Subacute: 82%
- Chronic: 84%

¹ Thrombus Chronicity Sub-analysis of Mechanical Thrombectomy for Deep Vein Thrombosis in Real-world Patients: Six-Month Outcomes from the CLOUT Registry (n=250) presented at AVF February 2022 by Dr. David Dexter
Case 1
Case 2
CLOUT vs. ATTRACT Propensity matched Analysis

**Marder score reduction**

<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
<th>Reduction</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLOUT</td>
<td>1.0</td>
<td>10.5</td>
<td>9.5</td>
<td>90.6%</td>
</tr>
<tr>
<td>ATTRACT</td>
<td>2.8</td>
<td>10.6</td>
<td>7.8</td>
<td>68.3%</td>
</tr>
</tbody>
</table>

*Sample size 158-166*  

**Thrombus clearance**

<table>
<thead>
<tr>
<th></th>
<th>CLOUT n=166</th>
<th>ATTRACT n=158</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥75% clearance</td>
<td>88.0%</td>
<td>65.8%</td>
<td>P&lt;0.0001</td>
</tr>
<tr>
<td>≥90% clearance</td>
<td>65.1%</td>
<td>41.8%</td>
<td>P&lt;0.0001</td>
</tr>
<tr>
<td>100% clearance</td>
<td>57.8%</td>
<td>30.4%</td>
<td>P&lt;0.0001</td>
</tr>
</tbody>
</table>
**CLOUT vs. ATTRACT Propensity matched Analysis**

<table>
<thead>
<tr>
<th>Villalta score reduction</th>
<th>Villalta disease severity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CLOUT</strong></td>
<td><strong>ATTRACT</strong></td>
</tr>
<tr>
<td><strong>Baseline</strong></td>
<td><strong>Day 30</strong></td>
</tr>
<tr>
<td>3.7</td>
<td>10.5</td>
</tr>
<tr>
<td>4.7</td>
<td>10.3</td>
</tr>
<tr>
<td><strong>54.7%</strong></td>
<td><strong>47.7%</strong></td>
</tr>
</tbody>
</table>

**Villalta ≥5**
- **CLOUT**: 27.1% (n=133)
- **ATTRACT**: 39.7% (n=151)
- **P-value**: P<0.05

**Villalta ≥10**
- **CLOUT**: 9% (n=12)
- **ATTRACT**: 14.6% (n=22)
- **P-value**: NS

*Sample size 130–166*
Case 3
Summary

- Pure mechanical thrombectomy offers an effective and thrombus removal across all ages / stages of chronicity
- Single sessions treatment
- No lytics
- No ICU
- RCTs comparing to conservative treatment is enrolling
Thrombus removal in acute VTE: What is new and what works best?

Michael Piorkowski
Cardioangiologische Centrum Bethanien (CCB)