Evidence for endovascular therapy of iliofemoral DVT: CAVENT, ATTRACT, CAVA and more to come

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Or rephrased...

“To lyse or not to lyse: that is the question: Whether tis nobler in the mind to suffer The raving pain or ulcer of post thrombotic syndrome
Or to take arms against the clot and by lysing end them? To lyse: To Live! “

with thanks for inspiration to Peter Neglen (and of course Shakespeare)
Long-term outcome after additional catheter-directed thrombolysis versus standard treatment for acute iliofemoral deep vein thrombosis (the CaVenT study): a randomised controlled trial

Tone Enden, Ylva Haag, Nils-Einar Kleve, Carl-Erik Slagsvold, Leiv Sandvik, Waldemar Chantima, Göran Heijboer, Pål Andre Holme, Lars Olaf Holmen, Anne Mette Njaasdal, Gunnar Sandvik, Per Morten Sandset, on behalf of the CaVenT Study Group
## CAVENT

### 2 year follow up
- AC PTS 56%
- CDT PTS 41%
- Absolute Risk Reduction 15%
- Number Need to Treat = 7

### 5 year follow up
- AC PTS 71%
- CDT PTS 43%
- Absolute Risk Reduction 28%
- Number Need to Treat = 4

The results show a widening gap between CDT and AC in favour of CDT. 20 bleeding complications related to CDT included three major and five clinically relevant bleeds.
<table>
<thead>
<tr>
<th></th>
<th>Additional catheter-directed thrombolysis (n=90)</th>
<th>Standard treatment only (n=99)</th>
<th>p value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>% (95% CI)</td>
<td>n</td>
</tr>
<tr>
<td>Post-thrombotic syndrome at 24 months†</td>
<td>37</td>
<td>41.1% (31.5-51.4)</td>
<td>55</td>
</tr>
<tr>
<td>Iliofemoral patency at 6 months††‡</td>
<td>58</td>
<td>65.9% (55.5-75.0)</td>
<td>45</td>
</tr>
<tr>
<td>Post-thrombotic syndrome at 6 months§</td>
<td>27</td>
<td>30.3% (21.8-40.5)</td>
<td>32</td>
</tr>
</tbody>
</table>

Post-thrombotic syndrome defined as Villalta score of 5 points or higher. *χ² test. †Co-primary outcomes. ‡Five patients had inconclusive patency assessments and one was lost to follow-up at 6 months. §Secondary outcome.

Table 2: Short-term and long-term outcomes

Enden T  J Thromb Haemost 2009; 7 (8) 1268-1275
ATTRACT key data

- 692 patients enrolled (337 PCDT; 355 no-PCDT)
- 56 clinics
- 62% men; 38% women
- Median age: 53 years
- Mean thrombus removal: 74 %
ATTRACTION
SHORT-TERM OUTCOMES
PCDT vs no-PCDT, within 10 days:

- Major bleeding: 1.7% vs 0.3%; P = .049
- Any bleeding: 4.5% vs 1.7%; P = .034
- Leg pain: -1.62 vs -1.29; P = .019
  - At 30 days: -2.17 vs -1.83; P = .026
- Leg swelling: -0.26 vs +0.27; P = .024
  - At 30 days: -0.74 vs -0.28; P = 0.51
- No fatal or intracranial bleeds in either arm
ATTRACTION
LONG-TERM OUTCOMES PCDT vs no-PCDT

- Post-thrombotic syndrome: 46.7% vs 48.2%; P = .56
- Iliofem 52% vs 48% p = ns (on villalta)
- Recurrent venous thromboembolism: 12.5% vs 8.5%; P = .09
ATTRACT- major criticisms

• Inclusion of Fem popliteal DVT patients
• Stent rate 30% (only 60% in IFDVT group) implies many lesions potentially missed (no IVUS)
• Selection bias- recruitment only 1/52 patients screened
• Mean 6 patients per centre
• PTS at 2 years an incredibly high 47%
• No imaging follow up- unacceptable
ATTRACT did demonstrate:

**Positives**
- No benefit in treating
  - older patients
  - those with lesser symptoms
  - Femoro-popliteal disease should not be treated
- However
  - IF has a benefit if VCSS the outcome (Circ paper)
  - Symptom improvement across the board on continuous data

**Negatives**
- Flawed recruitment
- Depowered IF DVT arm
- Heterogeneous treatment
- No IVUS
- No imaging follow up
- ENTIRE PREMISE-the OPEN VEIN hypothesis was not tested
Randomized trial of parachutes

Parachute use to prevent death and major trauma when jumping from aircraft: randomized controlled trial

BMJ 2018;363 doi: https://doi.org/10.1136/bmj.k5094 (Published 13 December 2018)

Conclusions

Parachute use did not reduce death or major traumatic injury when jumping from aircraft in the first randomized evaluation of this intervention. However, the trial was only able to enroll participants on small stationary aircraft on the ground, suggesting cautious extrapolation to high altitude jumps. When beliefs regarding the effectiveness of an intervention exist in the community, randomized trials might selectively enroll individuals with a lower perceived likelihood of benefit, thus diminishing the applicability of the results to clinical practice.
Modern Practice

Any PTS 18%
Mod – Severe < 5%

6 months  p = 0.61
1 year  p = 0.75
CDT vs Angiojet

Bern, Copenhagen and others
CAVA

• Netherlands
• RCT of EKOS vs BMT
• 180 patients – 90 in each arm
• Completed Recruitment
• Results awaited
Clear-DVT

- Trial of Modern Practice
- Cohort followed by RCT
- Core Lab Adjudicated
- IVUS
- Duplex follow up
All truth passes through three stages. First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as being self-evident.

— Arthur Schopenhauer
Conclusion

• Trial data still suggests Iliofer benefit
• Modern practice has evolved
• We need to evolve with data
• Await further studies as we have done with Coronary and Stroke
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