Dissections: Do they matter and how can they be managed

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- **Honoraria received from:** Abbott Vascular, Veryan, Biotronik, Boston Scientific Corp., Cook Medical, Gore & Associates, Medtronic, Philips-Spectranetics, TriReme, Veryan, Shockwave, Biotronik, B. Braun

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- **Common stock:** QT Medical
Lesions with dissections have a **TLR rate 3.5 times higher** than lesions without dissection\(^1\)

Current tools for dissection repair (stents) have limitations

\(^1\)Kokkinidis, *Intervent Cardiol Clin* 2017
High-Grade, Non-Flow-Limiting Dissections Do Not Negatively Impact Long-term Outcome After Paclitaxel-Coated Balloon Angioplasty: An Additional Analysis From the THUNDER Study

Gunnar Tepe, MD, PhD; Thomas Zeller, MD; Beatrix Schnorr, DVM; Claus D. Claussen, MD; Ulrich Beschorner, MD; Klaus Brechtel, MD; Bruno Scheller, MD; and Ulrich Speck, PhD

Figure 4: LLL by dissection grade

Difference in lumen area at 6 months [mm²]

Grade A/B
Grade C/D/E

Control group Pac balloon group

LLL: Late Lumen Loss

J Endovasc Ther. 2013; 20: 792-800
Do we Need Implants?

Bailout Stent Rates across DCB Trials

?Do we need a full metal jacket?

<table>
<thead>
<tr>
<th>Sample Size</th>
<th>220</th>
<th>131</th>
<th>157</th>
<th>126</th>
<th>1406</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesion Length [cm]</td>
<td>8,9</td>
<td>17,2</td>
<td>26,4</td>
<td>22,8</td>
<td>12,1</td>
</tr>
<tr>
<td>Total Occlusion</td>
<td>25,8%</td>
<td>34,0%</td>
<td>60,4%</td>
<td>100,0%</td>
<td>35,5%</td>
</tr>
<tr>
<td>Primary Patency (KM @ 360 days)</td>
<td>87,5%</td>
<td>88,7%</td>
<td>91,1%</td>
<td>85,3%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

DCB Limitations: High rate of Provisional Stent Bailout Rates across DCB Trials

1. Tepe G et al., Circulation 2015
2. Brodmann M et al., JACC Cardiovasc Inerv. 2017
Tack® Implants

- Multiple pre-loaded implants on a single catheter
- **Adaptive Sizing™** self-sizes to tapering ATK and BTK anatomy
  - ATK 2.5 – 6.0 mm
  - BTK 1.5 – 4.5 mm
- Nitinol with gold radiopaque markers
- 6 mm deployed length

Delivery System

- **ATK: 6F / 0.035”** – 6 implants preloaded on an OTW delivery system
- **BTK: 4F / 0.014”** – 4 implants preloaded on an OTW delivery system
- Accurate (≤ 1mm) deployment

The Tack Endovascular System (6F) is FDA approved for SFA and proximal popliteal (3.5-6.0mm RVD) treatment of post-PTA dissections.

Tack® Implants and Tack Endovascular System® are registered trademarks of Intact Vascular, Inc.
# TOBA: Dissection Repair Clinical Trials

<table>
<thead>
<tr>
<th>Trial</th>
<th>Description</th>
<th>Sites</th>
<th>Patency/Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First in Human</strong> (N=11)</td>
<td>ATK and BTK Safety, Feasibility</td>
<td>2 Paraguay sites</td>
<td>•</td>
</tr>
<tr>
<td><strong>TOBA</strong> (N=138)</td>
<td>Prospective, single arm</td>
<td>13 European sites</td>
<td>• 89.5% K-M freedom from CD-TLR</td>
</tr>
<tr>
<td><strong>TOBA II</strong> (N=213)</td>
<td>Prospective, single arm</td>
<td>33 US/European sites</td>
<td>• 76.4% K-M patency rate</td>
</tr>
<tr>
<td><strong>TOBA III</strong> (N=201)</td>
<td>Long lesion subset (≤250 mm)</td>
<td>15 European sites</td>
<td>• 98.5% technical success rate</td>
</tr>
<tr>
<td><strong>TOBA BTK</strong> (N=35)</td>
<td>Prospective, single arm</td>
<td>6 Europe/New Zealand sites</td>
<td>• 93.5% K-M freedom from CD-TLR</td>
</tr>
<tr>
<td><strong>TOBA II BTK</strong> (N=233)</td>
<td>Prospective, single arm</td>
<td>41 US and international sites</td>
<td>• 84.5% Amputation-free survival</td>
</tr>
</tbody>
</table>

**Additional Information**

- CIR: Catheterization and Cardiovascular Intervention
- JACC: Cardiovascular Interventions
- JVS: Journal of Vascular Surgery

- **Schneider, JACC Cardiovasc Interv 2015**
- **Bosiers, J Vasc Surg 2016**
- **Brodmann, Cathet Cardiovasc Interv 2018**

**TOBA: Dissection Repair Clinical Trials**

- **ATK**
  - **TOBA**
  - **TOBA II**
  - **TOBA III**

- **BTK**
  - **TOBA BTK**
  - **TOBA II BTK**

*~2300 Tacks in ~830 Patients with Post-PTA Dissection and core laboratory/CEC adjudication*
TOBA II 12 Month Kaplan-Meier Estimates

Primary Patency 79.3%

Freedom from Clinically Driven Target Lesion Revascularization (CD-TLR) 86.5%

100% Dissected Vessel Population
60% Moderate/Severe Calcium

Dissections are site-reported (visual estimate during index procedure); 99.5% core-lab adjudicated dissection rate
TOBA II Patency Observations

DCB-like patency in longer, more occluded and severely dissected vessels

Notably higher patency rate with POBA in severely dissected vessels

TOBA II DCB group and LEVANT 2 DCB arm

- Lesion Length (mm)
- % Total Occlusion: 62.7 (TOBA II) vs. 33.9 (LEVANT II)
- % Dissection ≥ C: 20.6 (TOBA II) vs. 2.5 (LEVANT II)
- K-M Patency: 71.9 (TOBA II) vs. 73.5 (LEVANT II)

TOBA II POBA group and LEVANT 2 POBA arm

- Lesion Length (mm)
- % Total Occlusion: 59.8 (TOBA II) vs. 63.2 (LEVANT II)
- % Dissection ≥ C: 8.9 (TOBA II) vs. 21.9 (LEVANT II)
- K-M Patency: 89.6 (TOBA II) vs. 56.8 (LEVANT II)

Observational data only
- Patient populations and study methodologies differed
- Not powered for statistical significance
TOBA III - Femoropopliteal dissection repair using the Tack Endovascular System following IN.PACT™ Admiral™ DCB

- 97.7% Dissection Resolution
- 97.5% 12m K-M Freedom from CD-TLR
- 95.0% 12m K-M Primary Patency
- 0.6% Bail Out Stent Rate
VascuFlex® Multi-LOC

- Multiple Stent Delivery System (MSDS)
- 6 individual stents on top of one delivery system:

  - Stent-diameter: 5-8 mm
  - Stent-length: 13 mm (6 / system),
  - Delivery system: 6F-system (0.035" guide wire)
  - Shaft lengths: 80 cm / 130 cm

- Indication:
  - pAVK → SFA and popliteal artery (p1-p3 segment)
Initial result

10 weeks later

after 10 weeks:

No restenosis (LL)
No edge phenomenon
LOCOMOTIVE Registry
Lesion Length: Comparison to Other Studies

- LOCOMOTIVE
- FAST
- RESILIENT
- ASTRON
- ABSOLUTE
- SUPERA all comers
- ZIVER DES

Diagram showing lesion length in cm for different categories.
## LOCOMOTIVE Registry
### 12-month follow-up: Clinical outcomes

<table>
<thead>
<tr>
<th></th>
<th>All patients</th>
<th>CLI</th>
<th>No CLI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>75</td>
<td>20</td>
<td>55</td>
<td>-</td>
</tr>
<tr>
<td><strong>12 months</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of follow-ups</td>
<td>75 (100.0%)</td>
<td>20 (100.0%)</td>
<td>55 (100.0%)</td>
<td>-</td>
</tr>
<tr>
<td>Sonogr., clinical and telephone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration to follow-up or event</td>
<td>11.8±3.0</td>
<td>10.8±4.2</td>
<td>12.1±2.3</td>
<td>0.186</td>
</tr>
<tr>
<td>(months)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Primary unassisted patency²</strong></td>
<td>54 (85.7%)</td>
<td>14 (93.3%)</td>
<td>40 (83.3%)</td>
<td>0.334</td>
</tr>
<tr>
<td>(diameter stenosis&lt;50%)</td>
<td>n=63</td>
<td>n=15</td>
<td>n=48</td>
<td></td>
</tr>
<tr>
<td><strong>All Target lesion revascul.</strong></td>
<td>7 (9.3%)</td>
<td>1 (5.0%)</td>
<td>6 (10.9%)</td>
<td>0.437</td>
</tr>
<tr>
<td>= +3 after 6 month</td>
<td>n=75</td>
<td>n=20</td>
<td>n=55 (+3)</td>
<td></td>
</tr>
</tbody>
</table>
Tacks vs. „Mini-Stents“

• Tack
  – Open cell
  – Low compression force
  – Low chronic outward force
  – 6mm length
  – One diameter only
  – ATK and BTK indications

• Multi-Loc
  – Closed cell
  – High compression force
  – High chronic outward force
  – 13mm length
  – 5 to 8mm diameter
  – Femoro-popliteal indication only
Conclusion

- Long distant stent implantation is associated with
  - Reduced patency
  - Increased fracture rate (1\textsuperscript{st} & 2\textsuperscript{nd} generation stents)
  - Impairment of vessel physiology and anatomy during leg motion (first & second generation stents)
- Multiple short stents or Tacks might overcome the limitations of a full metal jacket
- Prospective studies are on the way or already published (LOCOMOTIVE, TOBA series)
- Head to Head studies against 3\textsuperscript{rd} generation stents are warranted
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