Prospective, multicentre evaluation of the DESolve® Novolimus-Eluting coronary BRS: imaging outcomes and 5Y clinical and imaging results

Stefan Verheye, MD PHD
ZNA Middelheim
Antwerp, Belgium

DESolve is CE Mark approved; Not available for sale in the U.S.
Potential conflicts of interest

Speaker's name:

☐ I do not have any potential conflict of interest to report:

☐ I do have the following potential conflict of interest to report:
Early BRS sought to resorb early so the vessel could uncage

<table>
<thead>
<tr>
<th>Early Resorption &lt; 1 year</th>
<th>LLL In scaffold (mm) 6m</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Absorb® A</strong></td>
<td>0.43±0.37</td>
</tr>
<tr>
<td><strong>AMS</strong></td>
<td>1.08±0.49</td>
</tr>
<tr>
<td><strong>Dreams 1G</strong></td>
<td>0.65±0.50</td>
</tr>
<tr>
<td><strong>Magmaris®</strong></td>
<td>0.44±0.36</td>
</tr>
</tbody>
</table>

- High lumen loss demonstrated limited efficacy of these early resorbing scaffolds
- Insufficient structural integrity to support the lumen through the critical healing period contributed to chronic recoil

Absorb A: EuroInv 2009 Vol. 5 F15-F22
J Am Coll Cardiol 2008;52:1616–20
Dreams: Lancet 2013; 381: 836–44
Magmaris M. Haude TCT 2016
After challenges with early resorbing scaffolds, both existing and new entrants moved to long resorbing scaffolds.

<table>
<thead>
<tr>
<th>Late Resorption</th>
<th>LLL In scaffold (mm) 6m</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 – 5 years</td>
<td></td>
</tr>
<tr>
<td><strong>Absorb® B</strong></td>
<td>0.15 ± 0.19</td>
</tr>
<tr>
<td><strong>Rezolve®</strong></td>
<td>1.81 ± 0.76</td>
</tr>
<tr>
<td><strong>Fantom®</strong></td>
<td>0.25 ± 0.40</td>
</tr>
<tr>
<td><strong>Fortitude®</strong></td>
<td>0.27 ± 0.41 (9m)</td>
</tr>
</tbody>
</table>

- However, late resorption, inflammation, fatigue, dismantling and fractures leading to strut malaposition have been associated with late and very late events including late ScT.
- This issue has come to light after many new entrants moved to long resorbing scaffold approach.

Absorb B; B de Bruyne, TCT 2014
Magmaris M. Haude TCT 2016
Fantom: Costa TCT 2016
Fortitude: Colombo TCT 2016
Raber et al. J Amer Coll Cardiol 2015:1901-14

44m VLscT Malapposed BVS struts surrounded by thrombus

Absorb is a registered trademark of Abbott Vascular
Rezolve and Fantom are registered trademarks of Reva Medical
Fortitude is a registered trademark of Amaranth
The industry chose to focus on efficacy over early resorption and moved to long resorption profiles taking for granted the most important piece of the puzzle - *clinical safety*

1. Early degradation and resorption to uncage the vessel

2. Efficacy Functional integrity through the critical period

3. Clinical safety
DESolve is the first platform technology to solve the early resorption and efficacy contradiction, achieving safety in the process.
DESolve delivers early degradation within 6 months and near complete resorption in one year

- ~90% degradation at 6 months allowing early healing and recovery
- Mass loss in less than half the time of other polymeric scaffolds
- Potentially addresses late and very late scaffold events

**DESolve Number Average Molecular Weight Change ($M_n$) vs. Time**

- $M_n(t)/M_n(0)$
- DESolve in vivo
- DESolve in vitro

<table>
<thead>
<tr>
<th>Time (Days)</th>
<th>$M_n(t)/M_n(0)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>200</td>
<td>80%</td>
</tr>
<tr>
<td>400</td>
<td>60%</td>
</tr>
<tr>
<td>600</td>
<td>40%</td>
</tr>
<tr>
<td>800</td>
<td>20%</td>
</tr>
<tr>
<td>1000</td>
<td>0%</td>
</tr>
</tbody>
</table>

**DESolve**

- Mass Loss
  - 6M: ~50%
  - 12M: ~70%
  - 24M: >95%

1~70% resorption in preclinical studies; data on file.
2.Rippy M., Vascular safety of Biodegradable scaffolds made from biomaterials designed for use in interventional cardiology, EuroPCR 2014

DESolve is CE Mark Approved; Not available for sale in the U.S.
DESolve demonstrated early vascular uncaging within 6 months

DESolve Nx Clinical Trial
(6M IVUS Imaging)

Abizaid A et al, JACC, Mar 2016, Vol 9, no.6
Excellent and sustained efficacy confirmed DESolve early resorption success

### Primary Imaging Endpoint  QCA Results

<table>
<thead>
<tr>
<th></th>
<th>Paired Analysis</th>
<th>Dante</th>
<th>ZNA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Post Procedure</td>
<td>18 Months</td>
<td>36 Months</td>
</tr>
<tr>
<td>Nₗ = 122*</td>
<td>6 Months</td>
<td>N = 19</td>
<td>N = 19</td>
</tr>
<tr>
<td>RVD (mm)</td>
<td>3.05 ± 0.25</td>
<td>3.01 ± 0.29</td>
<td>2.95 ± 0.33</td>
</tr>
<tr>
<td>MLD (mm)</td>
<td>2.64 ± 0.28</td>
<td>2.39 ± 0.43</td>
<td>2.45 ± 0.45</td>
</tr>
<tr>
<td>LLL (mm)</td>
<td>-</td>
<td>0.29 ± 0.34</td>
<td>0.22 ± 0.33</td>
</tr>
<tr>
<td>Diameter Stenosis (%)</td>
<td>13.2 ± 7.5</td>
<td>20.8 ± 11.1</td>
<td>16.4 ± 13.5</td>
</tr>
</tbody>
</table>

Paired LLL at 6 and 18m, p=ns; LLL at 6 and 36m, p=ns.
Slide combines all QCA time points

Low late lumen loss at 6m sustained through 18 and 36m
DE Solve 6 month lumen area gain is sustained out to 36 months

No other BRS technology achieves early and sustained lumen area gain

* Dante Pazzanese, Sao Paulo, Brazil - single center follow-up
^ ZNA Antwerpen, Belgium – single center follow-up

DESolve is CE Mark approved; Not available for sale in the U.S.
DESolve NX Clinical Trial Results from 1 to 5 years confirm strong safety profile

6 to 60 M Clinical Outcomes

<table>
<thead>
<tr>
<th>Hierarchical Events 0 to 1800 days, n (%)</th>
<th>6M (N=122)*</th>
<th>12M (N=122)</th>
<th>24M (N=122)</th>
<th>36M (N=122)</th>
<th>48M (N=122)</th>
<th>60M (N=122)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Adverse Cardiac Events</td>
<td>3.3%</td>
<td>5.7%</td>
<td>7.4%</td>
<td>8.2%</td>
<td>9.0%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Cardiac Death**</td>
<td>1 (0.8%)</td>
<td>2 (1.6%)</td>
<td>3 (2.5%)</td>
<td>4 (3.3%)</td>
<td>4 (3.3%)</td>
<td>4 (3.3%)</td>
</tr>
<tr>
<td>Target Vessel MI***</td>
<td>1 (0.8%)</td>
<td>1 (0.8%)</td>
<td>1 (0.8%)</td>
<td>1 (0.8%)</td>
<td>2 (1.6%)</td>
<td>2 (1.6%)</td>
</tr>
<tr>
<td>Clinically Indicated-TLR</td>
<td>2 (1.6%)</td>
<td>4 (3.3%)</td>
<td>5 (4.1%)</td>
<td>5 (4.1%)</td>
<td>5 (4.1%)</td>
<td>5 (4.1%)</td>
</tr>
<tr>
<td>Definite Scaffold Thrombosis</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Modified Intent to Treat = those patients in which a scaffold was implanted in target lesion

**One death with probable ST based on ARC, scaffold undersized as assessed by IVUS; one death with suspected pulmonary embolus with right heart failure, non-scaffold related; one death due to non-target vessel occlusion and PCI, non-scaffold related; one death due to sudden death at home

***MI during follow up attributed to multi modality imaging procedure, + ARC-defined

No additional target lesion revascularizations from 2 - 5 years
DESolve NX shows no definite scaffold thrombosis though years 1 and 5

<table>
<thead>
<tr>
<th>Definite Scaffold Thrombosis</th>
<th>DESolve Nx (n=122)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 year</td>
</tr>
<tr>
<td>Late (31-365 days)</td>
<td>0</td>
</tr>
<tr>
<td>Very Late (&gt;365 days)</td>
<td>0</td>
</tr>
</tbody>
</table>

No definite scaffold thrombosis

1 A. Abizaid, DESolve NX 4 YR, TCT 2016
DESolve is CE Mark approved; Not available for sale in the U.S.
DESolve NX Clinical Trial Results from 1 to 5 years confirm strong safety profile

1. No definite stent thrombosis

2. No late or very late definite or probable stent thrombosis

3. No TLR between years 2 and 5

4. Low MACE rate through 5 years

DESolve is CE Mark approved; Not available for sale in the U.S.
DE Solve delivers on the promise of BRS

DE Solve’s key differences:

- Early degradation at 6 months and near complete resorption in one year
- Maintains structural integrity through the critical healing period
- Fracture resistance with the ability to over-expand across an extended range of diameters
- Self-correction mechanism potentially minimizes malapposition and chronic recoil

Collectively these features allow DE Solve to achieve early lumen growth at 6 months by IVUS and excellent safety and effectiveness at 5 years

As with all BRS, proper procedure (i.e., PSP) is recommended to achieve optimal acute results

DE Solve is CE Mark approved; Not available for sale in the U.S.
DE Solve innovation is addressing achieving user-friendly platforms on several fronts.

- **DE Solve Cx**: Thinner 120µm struts *NOW AVAILABLE*
- **DE Solve NXT**: 120µm contoured struts for improved embeddedness
- **TRANSFORM** balloon technology for preferentially enhanced force transmission

DE Solve and DE Solve Cx are CE Mark approved; Not available for sale in the U.S. DE Solve NXT is not available for sale.

Original images magnification: 1000x.
120µm contoured struts designed for improved acute performance

- Enhanced force transmission to minimize “snow shoe” effect
- Augment scaffold embedding into the vessel
- Optimize lesion expansion
- DES-like inflation

DE Solve NXT is not available for sale.

Pre-clinical. Data on file
Balloon technology developed to provide preferential force transmission within the lesion segment without causing edge dissection, and potentially reducing the need for post dilatation.
Early Degradation and Resorption: Key to Successful Long Term Clinical Outcomes

- DESolve achieves early degradation and resorption while achieving excellent efficacy by maintaining the functional integrity of the scaffold in the early critical period. Long term angiographic results confirmed sustained efficacy well beyond the resorption of the scaffold.

- DESolve NX clinical data demonstrates long term safety well beyond the full resorption of the scaffold with no probable or definite late or very late stent thrombosis

- Elixir continues to innovate a robust pipeline of user friendly DESolve platforms