COVERA™ Vascular Covered Stents in the Management of Dysfunctional AV Access

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Dr. Dolmatch has been compensated by Bard Peripheral Vascular, Inc. to participate in this presentation.
1\textsuperscript{0} Circuit Patency after Creation
AV Fistulae and AV Grafts

Huber et al., Patency of autogenous and polytetrafluoroethylene upper extremity arteriovenous hemodialysis accesses: A systematic review (J Vasc Surg 2003;38:1005-11.)
### Summary of Interventions required to achieve Secondary Patency

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Forearm Fistula (n=209)</th>
<th>Upper Arm Fistula (n=74)</th>
<th>Prosthetic Grafts (n=156)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balloon Angioplasty</td>
<td>311</td>
<td>136</td>
<td>279</td>
</tr>
<tr>
<td>Declot Procedures</td>
<td>60</td>
<td>39</td>
<td>158</td>
</tr>
<tr>
<td>Number of Stents Used</td>
<td>18</td>
<td>37</td>
<td>80</td>
</tr>
<tr>
<td>Total Procedures</td>
<td>389</td>
<td>212</td>
<td>517</td>
</tr>
<tr>
<td>Procedures per patient year</td>
<td>1.8</td>
<td>2.9</td>
<td>3.3</td>
</tr>
</tbody>
</table>

Recurrent Stenosis after PTA is Common

The results from case studies may not be predictive for all patients. Individual results may vary depending on a variety of patient specific attributes.
Bare Metal Stents?
Four Level 1 Multicenter, Prospective Randomized Controlled Clinical Trials (RCT) evaluated technologies for patency improvement over standard of care balloon angioplasty in patients dialyzing with an AV Graft.
BSI Peripheral Cutting Balloon (PCB)

Vesely et al., J Vasc Interv Radiol 2005 Dec;16(12):1593-603

<table>
<thead>
<tr>
<th>Patients</th>
<th>Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=340</td>
<td>14 days, 1, 3, 6 Months</td>
</tr>
<tr>
<td>Stenotic (≥ 50 %), AVG [N=195] &amp; thrombosed AV Grafts [N=145]</td>
<td>Clinically driven follow-up</td>
</tr>
<tr>
<td></td>
<td>No mandatory diagnostic imaging during follow up w/o clinical indicator</td>
</tr>
</tbody>
</table>

P = 0.373

Studies vary by design and patient population, and may yield different outcomes.

6 Month
Target Lesion Primary Patency (%)

PTA [n=167]    PCB [n=173]

No Significant Improvement
**BARD FLAIR® Stent Graft “PIVOTAL” Trial**

*Haskal et al., N Engl J Med 2010; 362: 494-503*

### Patients
- N=190
- Stenotic (≥ 50 %), dysfunctional AVG
- No thrombosed grafts

### Follow-Up
- 2 and 6 Months
- Mandatory magnified angiogram at 2 and 6 months

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**6 Month Treatment Area Primary Patency (%)**

<table>
<thead>
<tr>
<th></th>
<th>PTA [n=93]</th>
<th>FLAIR® Stent Graft [n=97]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P &lt; 0.001</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Studies vary by design and patient population, and may yield different outcomes.
### BARD FLAIR® Stent Graft “RENOVA” Trial

**Haskal et al., J Vasc Interv Radiol, 2016 Aug;27(8):1105-1114**

<table>
<thead>
<tr>
<th>Patients</th>
<th>Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>• N=270</td>
<td>• 12 and 24 Months</td>
</tr>
<tr>
<td>• Stenotic (≥ 50 %), dysfunctional AVG</td>
<td>• Clinically driven follow-up</td>
</tr>
<tr>
<td>• No thrombosed grafts</td>
<td>• No mandatory diagnostic imaging during follow up w/o clinical indicator</td>
</tr>
</tbody>
</table>

#### 12 Month Treatment Area Primary Patency (%)

- **PTA [n=132]**
- **FLAIR® Stent Graft [n=138]**

\[ P < 0.001 \]

**Studies vary by design and patient population, and may yield different outcomes.**
# Gore Viabahn™ Endoprosthesis “REVISE”

*Vesely et al., J Vasc Surg 2016 Nov;64(5):1400-1410*

## Patients
- N=293
- Stenotic (≥ 50 %) AVG [N=164] & thrombosed AV Grafts [N=129]

## Follow-Up
- 1,3, 6, 12, 18 and 24 Months
- Clinically driven follow-up
- No mandatory diagnostic imaging during follow up w/o clinical indicator

## 6 Month Target Lesion Primary Patency (%)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Patency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTA [n=148]</td>
<td>20%</td>
</tr>
<tr>
<td>Viabahn™ Endoprosthesis [n=145]</td>
<td><strong>50%</strong></td>
</tr>
</tbody>
</table>

*P = 0.006*

---

*Studies vary by design and patient population, and may yield different outcomes.*
Covera™

Straight and flared implant configuration to accommodate for diameter differences in AV access anatomy.

3 mm larger flared outflow end

Not Available for Sale in the U.S.
Caution: Investigational Device Exemption, Limited by United States Law to Investigational Use
Covera™ Vascular Covered Stent

- Dual layer ePTFE covering
- Carbon impregnation on the luminal (blood contacting) surface
- Diameters 6 mm – 10 mm
- Lengths 30 mm – 100 mm

Not Available for Sale in the U.S.
Caution: Investigational Device Exemption, Limited by United States Law to Investigational Use
COVERA™ Vascular Covered Stent Ongoing Clinical Studies

**AVeNEW CLINICAL STUDY**

Prospective, Multi-Center, Randomized, Concurrently-Controlled Clinical Study of the Bard® Arteriovenous (AV) Stent Graft in the Treatment of Stenosis in the Venous Outflow of AV Fistula Access Circuits

**(AV Fistula)**

**AVeVA CLINICAL STUDY**

Prospective, Multi-Center, Clinical Study of the Bard® COVERA™ Arteriovenous (AV) Stent Graft in the Treatment of Stenosis at the Graft-Vein Anastomosis of AV Graft Circuits

**(AV Graft)**
**Study Design**  
Prospective, Multi-Center, Single-Arm

**Objective**  
To assess the safety and effectiveness of the BARD® COVERA™ Vascular Covered Stent for the treatment of stenotic lesions at the graft-vein anastomosis of hemodialysis patients dialyzing with an AV graft.

**Number of Patients**  
110 patients enrolled at 14 US sites
Key Inclusion Criteria

**CLINICAL**
- AV access graft in an arm that has been implanted for ≥ 30 days, undergone ≥ 1 dialysis session
- Thrombosed and non-thrombosed AV grafts

**ANGIOGRAPHIC**
- Stenosis ≥ 50% at graft-vein anastomosis with clinical or hemodynamic evidence of AV graft dysfunction
- Target lesion ≤ 9 cm long
- Reference vessel diameter 5.0 - 9.0 mm
<table>
<thead>
<tr>
<th><strong>Primary Safety Endpoint</strong></th>
<th>Freedom from any protocol defined safety event(s) involving the AV access circuit through 30 days: <strong>Performance Goal = 88%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Effectiveness Endpoint</strong></td>
<td>Target Lesion Primary Patency (TLPP) - 6 months: <strong>Performance Goal = 40%</strong></td>
</tr>
<tr>
<td><strong>Follow Up</strong></td>
<td>30 &amp; 90 days, 6, 12, 18, &amp; 24 months</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>6 Month Follow Up completed</td>
</tr>
</tbody>
</table>
• Case Description

• Male, 47 Y

• Pre dilatation with 7 x 40 PTA balloon

• 9 x 60 flared COVERA® Vascular Covered Stent
### Demographics

<table>
<thead>
<tr>
<th>Age Categories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;65 years</td>
<td>47.3%</td>
</tr>
<tr>
<td>≥ 65 and &lt; 75 years</td>
<td>28.2%</td>
</tr>
<tr>
<td>≥ 75 years</td>
<td>24.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>45.5%</td>
</tr>
<tr>
<td>Female</td>
<td>54.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BMI Categories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30</td>
<td>61.8%</td>
</tr>
<tr>
<td>≥ 30</td>
<td>38.2%</td>
</tr>
</tbody>
</table>
Lesion and Circuit Characteristics

Non-Target Lesion(s) present at Index Procedure?
- YES 40.0%
- NO 60.0%

Thrombosis present at Index Procedure?
- YES 25.5%
- NO 74.5%

De Novo Lesion
- YES 28.2%
- NO 71.8%
<table>
<thead>
<tr>
<th>Study Device Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary of Study Device Details</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Stent Graft Configuration</strong></td>
<td></td>
</tr>
<tr>
<td>Flared</td>
<td>83.6%</td>
</tr>
<tr>
<td>Straight</td>
<td>16.4%</td>
</tr>
<tr>
<td><strong>Stent Graft Diameter</strong></td>
<td></td>
</tr>
<tr>
<td>7 mm</td>
<td>9.1%</td>
</tr>
<tr>
<td>8 mm</td>
<td>56.4%</td>
</tr>
<tr>
<td>9 mm</td>
<td>30.0%</td>
</tr>
<tr>
<td>10 mm</td>
<td>4.5%</td>
</tr>
<tr>
<td><strong>Stent Graft Length</strong></td>
<td></td>
</tr>
<tr>
<td>40 mm</td>
<td>49.1%</td>
</tr>
<tr>
<td>60 mm</td>
<td>42.7%</td>
</tr>
<tr>
<td>80 mm</td>
<td>8.2%</td>
</tr>
</tbody>
</table>
### Safety Analysis

<table>
<thead>
<tr>
<th>Primary Safety Endpoint</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freedom from any Primary Safety Event through 30 Days</td>
<td>96.4%</td>
</tr>
</tbody>
</table>

- The proportion of subjects free from primary safety events was 96.4%, which was superior to the PG of 88% (p-value = 0.0021).
- Primary safety endpoint was met.
Effectiveness Analysis

<table>
<thead>
<tr>
<th>Primary Effectiveness Endpoint</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Lesion Primary Patency at 6 Months</td>
<td>70.3 %</td>
</tr>
</tbody>
</table>

- 70.3 % target lesion primary patency was superior to the PG of 40% (p-value < 0.0001).
- Primary effectiveness endpoint was met.
Target Lesion Primary Patency to 6 Months *(Kaplan-Meyer)*

Survival Probability

Time to Event (Days)

+ Censored

71.1%

PG = 40%

Treatment: Covera™ Vascular Covered Stent
Conclusions

• The AVeVA Clinical Study is the 4\textsuperscript{th} large multicenter clinical study that \textit{demonstrated a primary patency benefit when covered stents are used} for the treatment of AV Access Graft dysfunction.

• At 6 months, the \textsc{COVERA™} Vascular Covered Stent was an effective therapy for the treatment of stenosis at the graft – vein anastomosis in patients with thrombosed and non-thrombosed AV Grafts.

• The target lesion primary patency was significantly higher compared to the performance goal of 40%.
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COVERA™ Vascular Covered Stent

Prescriptive Information

Prior to use, please see the complete “Instructions for Use” for more information on Indications, Contraindications, Warnings, Precautions, Adverse Events and Operator’s Instructions.

INDICATIONS
The COVERA™ Vascular Covered Stent is indicated for the treatment of stenoses in the upper extremity venous outflow of patients dialyzing with an arterio-venous (AV) access graft or fistula.

CONTRAINDICATIONS
There are no known contraindications for the COVERA™ Vascular Covered Stent.

SELECT WARNINGS
- DO NOT use in patients whose AV access grafts have been implanted less than 30 days or in an immature fistula.
- DO NOT use the device in patients where full expansion of an appropriately sized PTA balloon catheter could not be achieve during pre-dilation with an angioplasty balloon.
- Placing a covered stent across a vessel side branch may impede blood flow and hinder or prevent future procedures.
- Covered stent placement beyond the ostium of the cephalic vein into the axillary/subclavian vein may hinder or prevent future access.
- DO NOT place a flared covered stent with the flared end in a straight vessel segment since this may lead to flow turbulences.
- The device has not been tested for tracking and deployment around an AV loop graft.

SELECT PRECAUTIONS
- The safety and effectiveness of the device when placed across an aneurysm or a pseudo-aneurysm has not been evaluated.
- The safety and effectiveness of the device when used in central veins has not been evaluated.
- The safety and effectiveness of the device when placed across a previously placed bare metal stent has not been evaluated.
- The safety and effectiveness of the device when placed across the antecubital fossa has not been evaluated.
- The safety and effectiveness of the device when used in pediatrics has not been evaluated.
- The effects of direct cannulation of the covered stent have not been evaluated. Notify the patient that the covered stent should not be directly cannulated for hemodialysis and that applying pressure to the implant area should be avoided.
- The device has not been tested for use in an overlapped condition with a bare metal stent or covered stent.
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