

Clinic for Vascular Surgery and Phlebology
Institute for Vascular Research
Director: PD Dr. M. J. Austermann

FRANZISKUS STIFTUNG

St. Franziskus Hospital Münster
Hohenzollernring 70
48145 Münster

Which Bridging Covered Stents Or Stent-Grafts Work Best For F/B/EVAR: A European Perspective: Why Renal Artery Bridging Stent-Grafts Are The Achilles Heel In B/EVAR And What To Do About It

M. J. Austermann
Director
Clinic for Vascular Surgery and Phlebology
St. Franziskus Hospital Münster

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St. Franziskus Hospital Münster
Hohenzollernring 70
48145 Münster

PD Dr. med. Martin J. Austermann
Director Clinic for Vascular Surgery
St. Franziskus Hospital Münster

Disclosure

Speaker name:
I have the following potential conflicts of interest to report:

- Receipt of grants/research support
- Receipt of honoraria and travel support
- Participation in a company-sponsored speaker bureau
- Employment in industry
- Shareholder in a healthcare company
- Owner of a healthcare company
- I do not have any potential conflict of interest

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Fenestrated and branched EVAR since 2 decades







**Crucial part of the procedure:
Bridging stent grafts (BSG).**

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Balloon expandable covered stents (BECS)


| Advanta V12™ Getinge | BeGraft™ Bentley | BeGraft+™ Bentley | VBX™ Gore |
|--|---|---|--|
|  |  |  |  |
| 2002 Durability | 2015 Flexibility | 2017 Radial force kink-resistance | 2017 Flexibility Additional length |
| ePTFE outside stainless steel (encapsulated) ePTFE inside | ePTFE outside Kobalochrom inside | ePTFE outside Kobalochrom in-between Kobalochrom inside | Thin layer ePTFE outside Stainless steel (independent struts) ePTFE inside Heparin surface |

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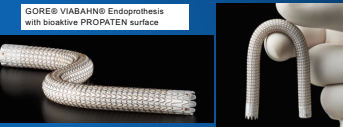
Self expandable covered stents (SECS)



Features:
Selfexpandable
Flexibility
Conformability
Compression recovery

Gore® VIABAHN® Endoprosthesis
with bioactive PROPATEN® surface

Peripherer Stentgraft - FLUENCY® Plus - Bard
Medical - Venen











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FEVAR: FEVAR - Fatigue-Test:

| | Pre | After 100 Mio |
|---------------------|---|---|
| Advanta V12 6x38 |  |  |
| BeGraft 6x38 |  |  |
| BeGraft+ 6x38 |  |  |
| VBX 6x39 |  |  |

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FEVAR - Fatigue-Test: Results:

Initial changes (IC) Initial rust (IR) PTFE-Perforation (point of break PB)

BeGraft Advanta/i-Cast BeGraft Advanta/i-Cast Advanta/i-Cast

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FEVAR - Fatigue-Test: Results:

| Stent | 2-6 | 2-7 | 2-8 | 2-9 | 2-10 |
|-------------------------|-----------|-----------|-----------|-----------|-----------|
| Advanta | | | | | |
| Number of Fatigue Tests | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| # (point of fatigue) | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| # (point of break) | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| BeGraft | | | | | |
| Number of Fatigue Tests | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| # (point of fatigue) | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| # (point of break) | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| BeGraft plus | | | | | |
| Number of Fatigue Tests | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| # (point of fatigue) | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| # (point of break) | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| VBX | | | | | |
| Number of Fatigue Tests | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| # (point of fatigue) | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| # (point of break) | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |

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BEVAR: „Achilles Heel Renal artery Branches“

N= 449pt
BEVAR pt =235 (5 centers-)
FEVAR pt =214 (1 center-Lille)

Mid-term Outcomes of Renal Branches Versus Renal Fenestrations for Thoraco-abdominal Aneurysm Repair²⁴

T. Martín-González¹, T. Mastracci², T. Cornell³, J. Constantinou⁴, N. Diaz⁵, A. Katsargiris⁶, B. Modarai⁷, T. Resch⁸, E. Verhoeven⁹, S. Haulon¹⁰

Renal occlusions p=0,01

BEVAR 9,6% vs FEVAR 2,3%

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BEVAR and VBX™: EXPAND Registry (3 Y data):

| | Total Enrollment | Miscral Percutaneous | BEVAR |
|--------------------|------------------|----------------------|------------|
| Number of Subjects | 294 | 141 | 73 |
| Enrolled Gender | | | |
| Male | 200(75.0%) | 115(81.6%) | 57(78.1%) |
| Female | 74(27.0%) | 26(18.4%) | 16(21.9%) |
| Age (years) | | | |
| Mean (SD) | 72.6 (7.0) | 74.1 (7.0) | 73.1 (7.0) |
| Median | 72 | 75 | 75 |
| Min-Max | 22-89 | 42-89 | 42-89 |

| RM estimates | BEVAR | Celiac | SMA | Renal arteries |
|-------------------|-------|--------|-------|----------------|
| Primary Patency | 94.2% | 97.0% | 93.9% | 93.1% |
| Secondary Patency | 97.5% | 100% | 100% | 95.2% |

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Renal artery-BSG in BEVAR 2010 -2022: 255 pt, 414 target vessels

1. Era: Advanta/i-cast + SES 2010 - 2014
2. Era: Advanta/i-cast + Viabahn selfexpandable 2015 - 2017 (today)
3. Era: VBX 2017-today

N=118 target vessels N=142 target vessels N=154 target vessels

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Renal artery - BSG in BEVAR

1. Era: Advanta/i-cast + SES 2010 - 2014

N=118 TV

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Renal artery – BSG in BEVAR

2. Era: Advanta/i-cast + Viabahn selfexpandable
2015 – 2017 (today) **N=142 TV**

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Renal artery – BSG in BEVAR

3. Era: VBX
2017–today **N=154 TV**

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Renal artery – BSG in BEVAR

3. Era: VBX 2017–today

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Bridging Stentgrafts in renal arteries in BEVAR – Münster Experiences (n = 255pt)

Renal artery – BSG in BEVAR – Est. Primary Patency at 3 Years

| | | |
|-----------------|-------|--------|
| Advanta/ i cast | 82,7% | P=0,06 |
| Advanta/Viabahn | 96,8% | P=0,01 |
| VBX | 89,0% | |

Mean FU 22 month

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Bridging Stentgrafts in renal arteries in BEVAR – Münster Experiences (n = 255pt)

Renal artery – BSG in BEVAR – Est. Secondary Patency at 3 Years

| | | |
|-----------------|-------|----|
| Advanta/ i cast | 93,1% | ns |
| Advanta/Viabahn | 97,5% | ns |
| VBX | 95,8% | |

Mean FU 22 month

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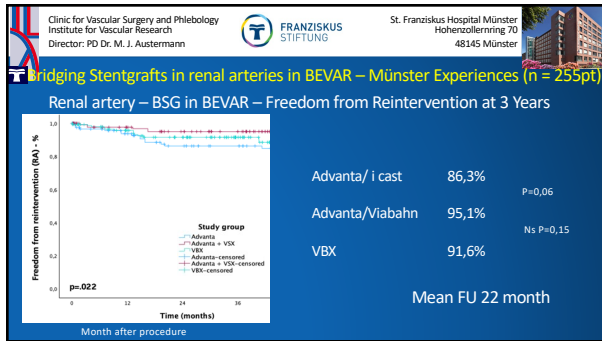
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Bridging Stentgrafts in renal arteries in BEVAR – Münster Experiences (n = 255pt)

Renal artery – BSG in BEVAR – Freedom from TVI at 3 Years

| | | |
|-----------------|-------|--------|
| Advanta/ i cast | 82,4% | P=0,06 |
| Advanta/Viabahn | 94,1% | P=0,06 |
| VBX | 85,4% | |

Mean FU 22 month



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Conclusion:

Fatigue-Tests shows the best durability for **BeGraft+** and **VBX** in our FEVAR model.

Patency of renal artery BSG in **BEVAR** was best in the **Advanta/Viabahn selfexpandable** group.

VBX is the most flexible ballon expandable covered stentgraft. Avoid type 1c EL.

BeGraft+ deliver the highest radial force and best kink resistance.

