

Pursuing the Perfect Seal Zone: Balance between Operative Safety and Long Term Efficacy



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Disclosures

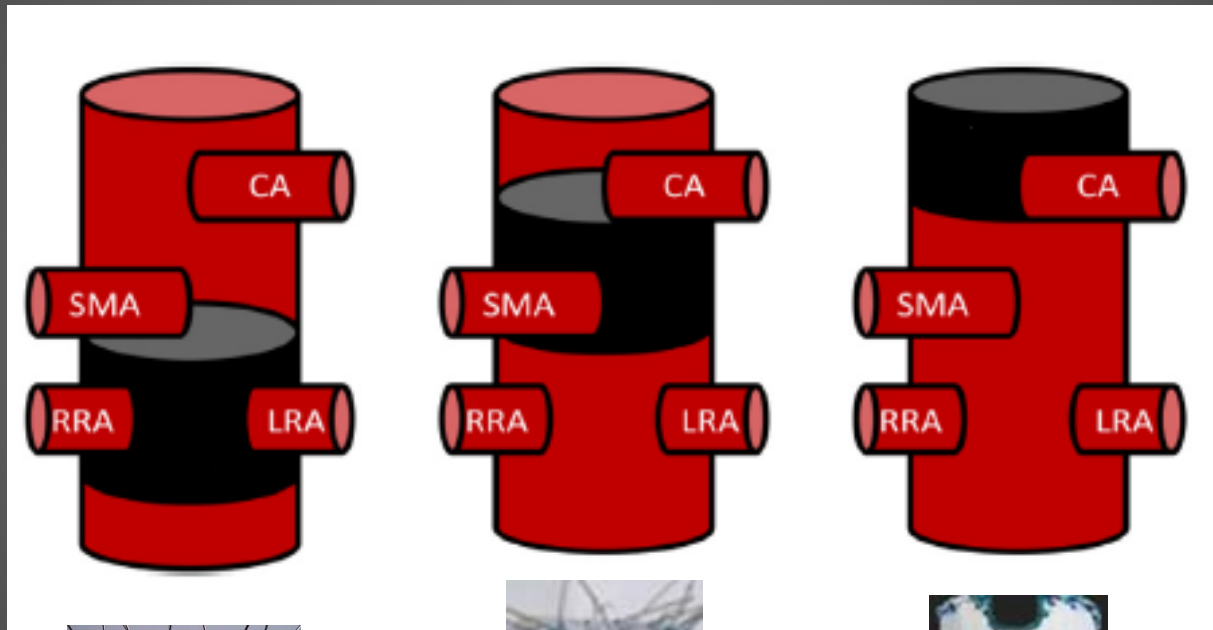
- William Cook Europe/Cook Inc.
 - Research Grants & Consulting
- Atrium Maquet
 - Consulting
- Bentley
 - Consulting

Lay-Out

- Introduction
- Literature Overview
- Evolution in Nuremberg
- Technical advantage of 3xFEVAR over 2xFEVAR

2x, 3x, or 4x FEVAR

Choice According to Landing Zone



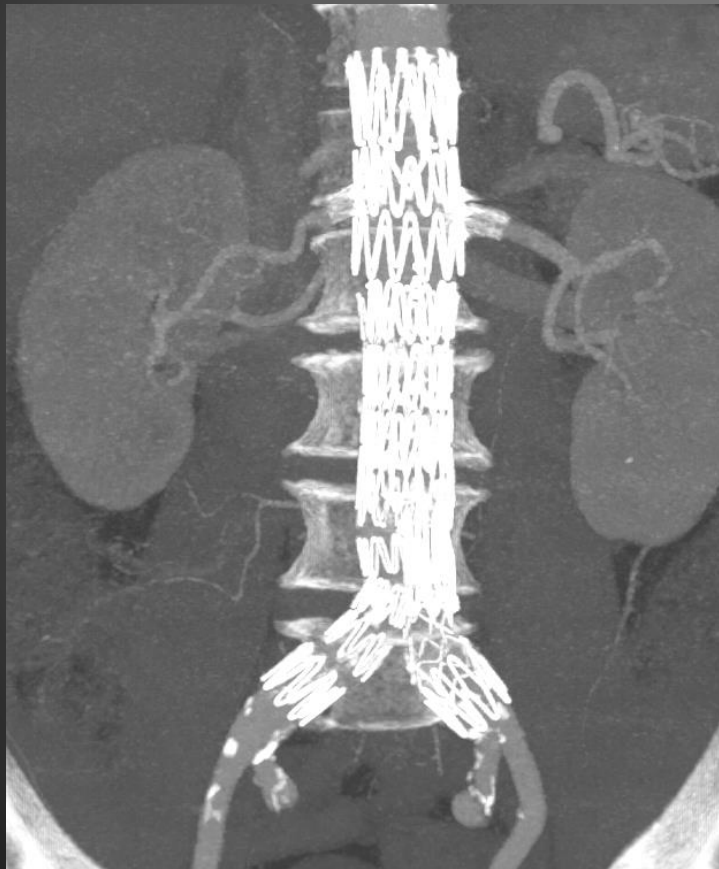
Standard (2x) FEVAR

- Short neck AAA
- Juxtarenal AAA



2xFEVAR for 6cm AAA in 2013

6Y Follow-up



Complex (3x-4x) FEVAR



- Juxtarenal AAA
- Suprarenal AAA
- (Some type IV TAAA)



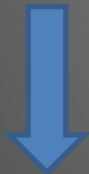
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TAB#180

Complex FEVAR vs. Standard FEVAR

Theoretical Advantages

- Proximal sealing
 - Longer length
 - Healthier aortic wall
- 
- Long term durability
 - Patients with longer life expectancy



Complex FEVAR vs. Standard FEVAR

Theoretical Limitations

- ↑ Planning complexity
- ↑ Set-up requirements
 - Lateral C-Arm views
- ↑ Procedure complexity
 - Duration, Contrast, Fluoro
- ↑ M&M?



Early versus late experience in fenestrated endovascular repair for abdominal aortic aneurysm

Magnus Sveinsson, MD,^a Jonathan Sobocinski, MD, PhD,^b Timothy Resch, MD, PhD,^a Björn Sonesson, MD, PhD,^a Nuno Dias, MD, PhD,^a Stéphan Haulon, MD, PhD,^b and Thorarinn Kristmundsson, MD, PhD,^a *Malmö, Sweden; and Lille, France*

(J Vasc Surg 2015;61:895-901.)

- 2002-2011, 288 pts (Malmö & Lille)

↑ Complexity of stent-graft design over years
– No ↑ OR time, M&M

Results of complex aortic stent grafting of abdominal aortic aneurysms stratified according to the proximal landing zone using the Society for Vascular Surgery classification

Sanjay D. Patel, FRCS, Jason Constantinou, FRCS, Dominic Simring, FRACS, Manfred Ramirez, FRCS, Obiekezie Agu, FRCS, Hamish Hamilton, FRCS, and Krassi Ivancev, PhD, *London, United Kingdom*

(*J Vasc Surg* 2015;62:319-25.)

- 2008-2013, 150 pts (London)

↑ Complexity of stent-graft design

– ↑ OR Time, EBL, M&M, Hospital stay

Twelve-year results of fenestrated endografts for juxtarenal and group IV thoracoabdominal aneurysms

Tara M. Mastracci, MD, Matthew J. Eagleton, MD, Yuki Kuramochi, BScN, Shona Bathurst, and Katherine Wolski, MPH, *Cleveland, Ohio*

(*J Vasc Surg* 2015;61:355-64.)

- 2001-2013, 610 pts (Cleveland)
 - 3x-4x FEVAR
 - ↑ Branch Reinterventions
 - ↓ Type I Endoleak (1.9% vs 10.4%, P<0.01)
- ↑ N of Fenestrations to treat same anatomy...

Nuremberg Experience

2010-2018/6

- 454 Consecutive pts
 - Short neck, Juxtarenal, Suprarenal AAA



Comparison of outcomes for double fenestrated endovascular aneurysm repair versus triple or quadruple fenestrated endovascular aneurysm repair in the treatment of complex abdominal aortic aneurysms

Athanasios Katsargyris, MD,^a Kyriakos Oikonomou, MD,^a George Kouvelos, MD,^a Hozan Mufty, MD,^a Wolfgang Ritter, MD,^b and Eric L. G. Verhoeven, MD, PhD,^a Nuremberg, Germany

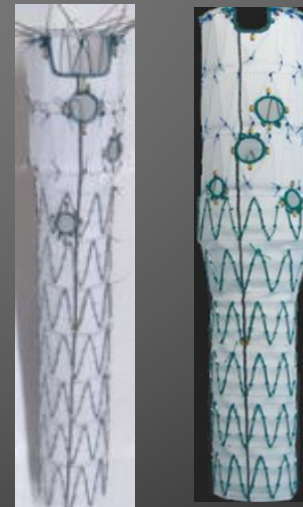
(J Vasc Surg 2017;■:1-8.)

- Standard (2x) FEVAR



VS

- Complex (3x-4x) FEVAR

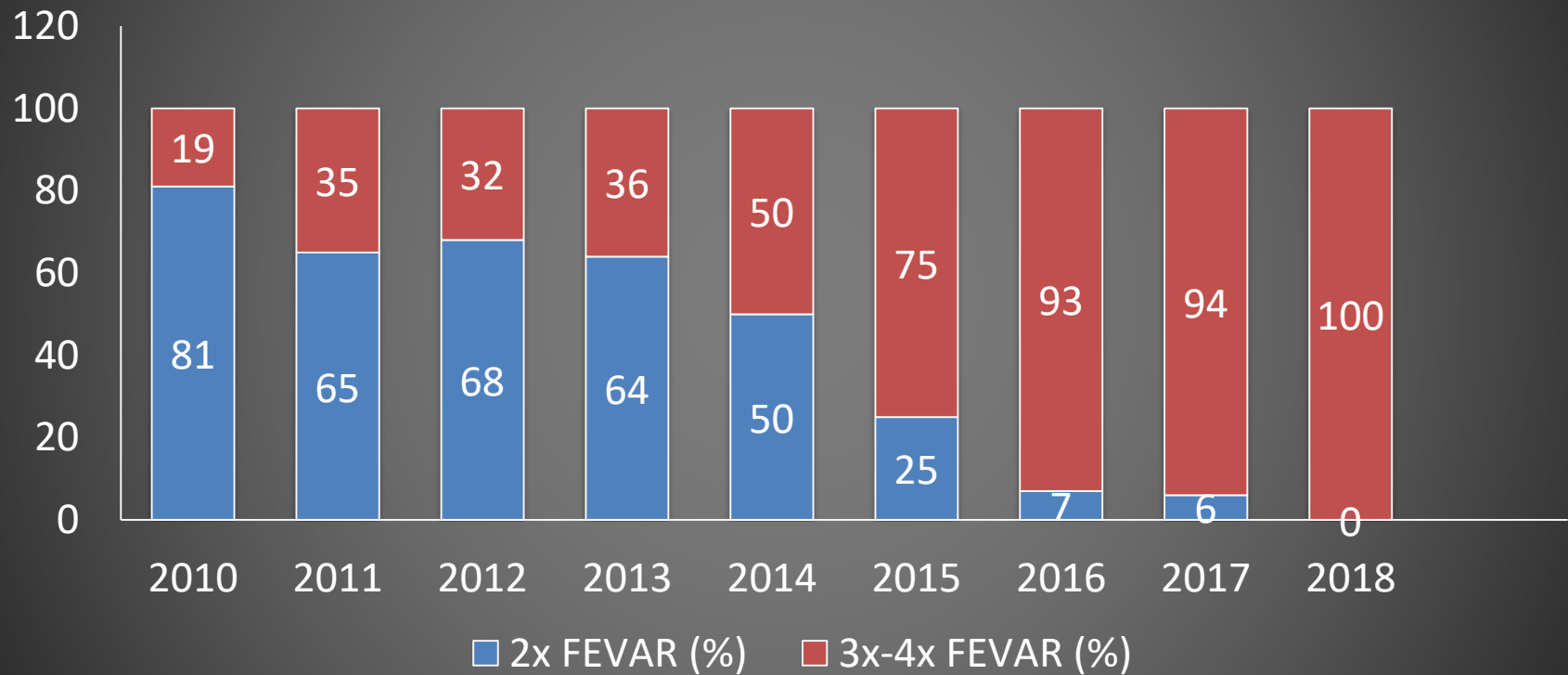


Stent-graft Design

- Standard (2x) FEVAR
 - N=205 (45%)
- Complex (3x-4x) FEVAR
 - N=249 (55%)
 - 3xFEVAR: N=207 (83%)

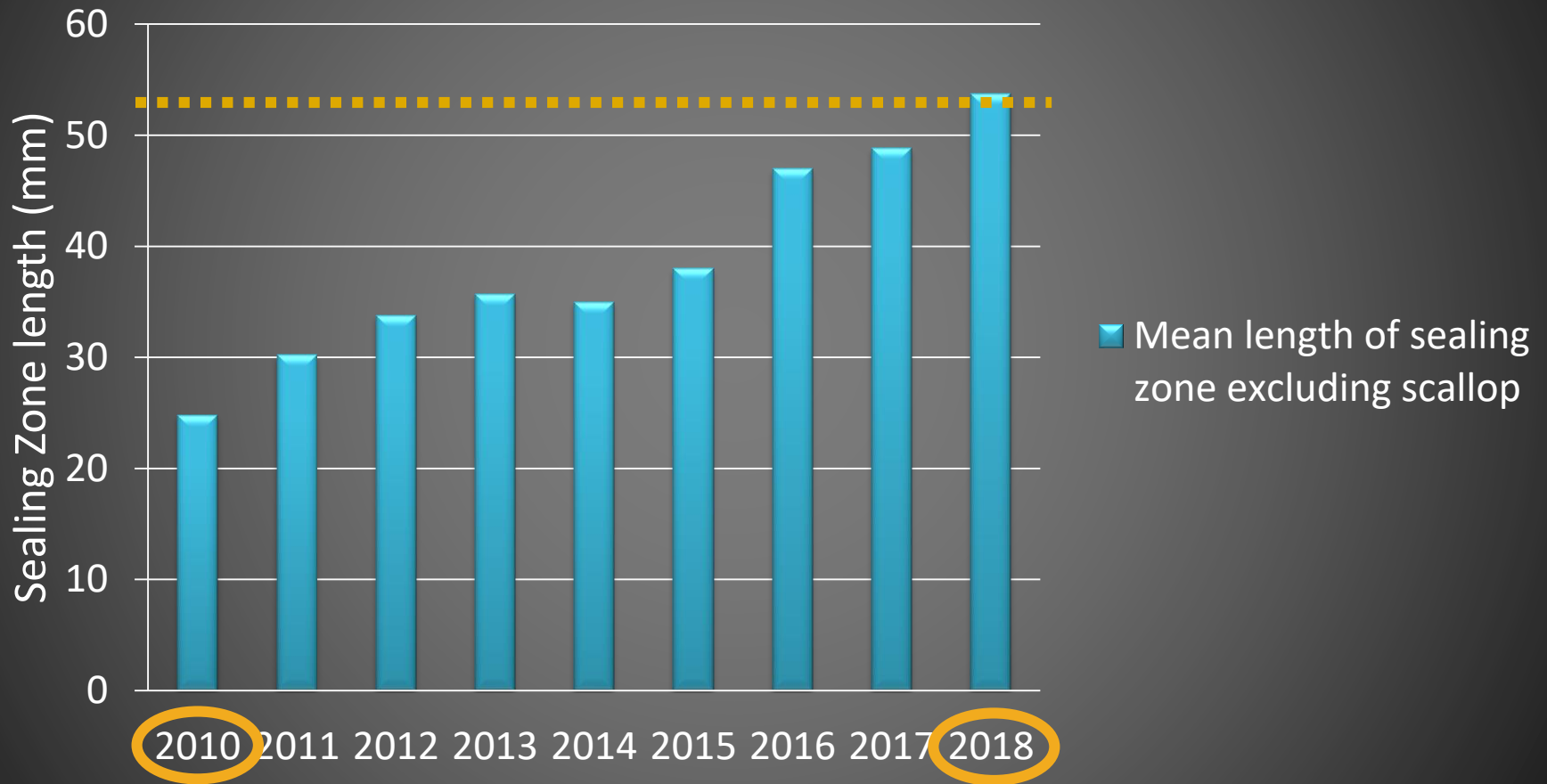


Evolution of Stent-graft Design



↑ Use of Complex FEVAR over the years...

Evolution of Sealing Zone Length



↑ Sealing zone length over the years...

Sealing Zone Length According to Stent-graft Design

- Standard (2x) FEVAR
 - Mean: 42 ± 13 mm
- Complex (3x-4x) FEVAR
 - Mean: 52 ± 12 mm

($P < 0.001$)



Perioperative Outcomes

Technical Success

Overall: N=441/454 (97%)

- Standard (2x) FEVAR
 - N=201/205 (98%)
- Complex (3x-4x) FEVAR
 - N=241/249 (97%)

(P=0.6, NS)

Operative Data



Mean Operation Time

- Standard (2x) FEVAR
 - 136 ± 47 min
- Complex (3x-4x) FEVAR
 - 175 ± 55 min

($P < 0.05$)

Operative Data



Mean Fluoroscopy Time

- Standard (2x) FEVAR
 - 44 ± 17 min
- Complex (3x-4x) FEVAR
 - 56 ± 20 min

($P < 0.05$)

Operative Data



Mean Contrast Volume

- Standard (2x) FEVAR
 - 141 ± 32 ml
- Complex (3x-4x) FEVAR
 - 147 ± 40 ml

(P=0.14, NS)

30-Day Mortality

Overall: N=3/454 (0.7%)

- Standard (2x) FEVAR
 - N=1/205 (0.5%)
- Complex (3x-4x) FEVAR
 - N=2/249 (0.8%)

(P=0.7, NS)

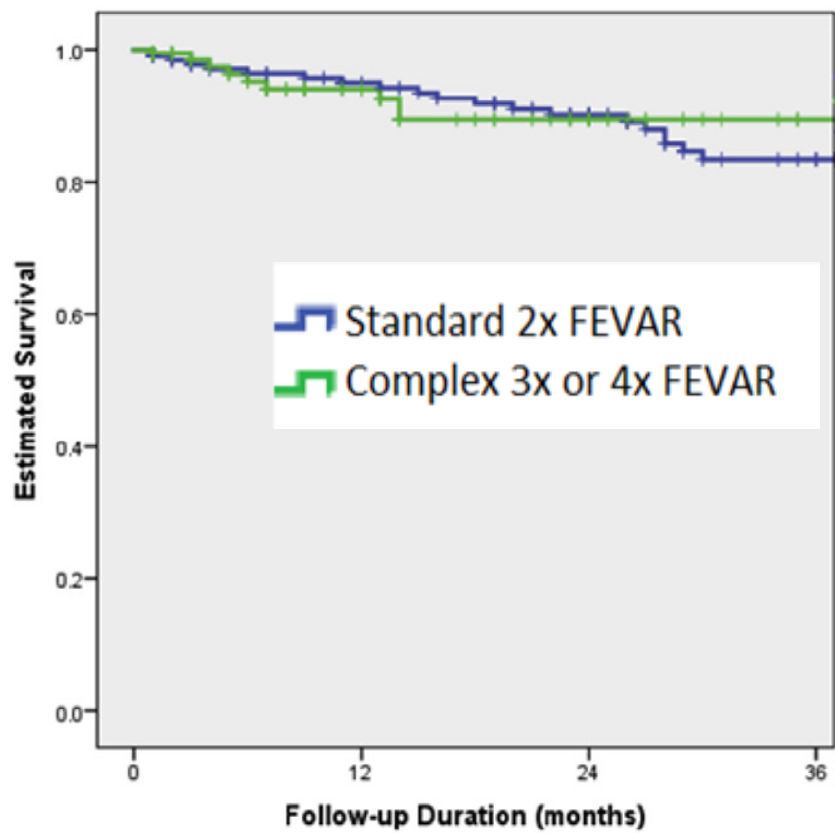
Major Complications

Overall: N=47/454 (10%)

- Standard (2x) FEVAR
 - N=19/205 (9%)
- Complex (3x-4x) FEVAR
 - N=27/249 (11%)

(P=0.63, NS)

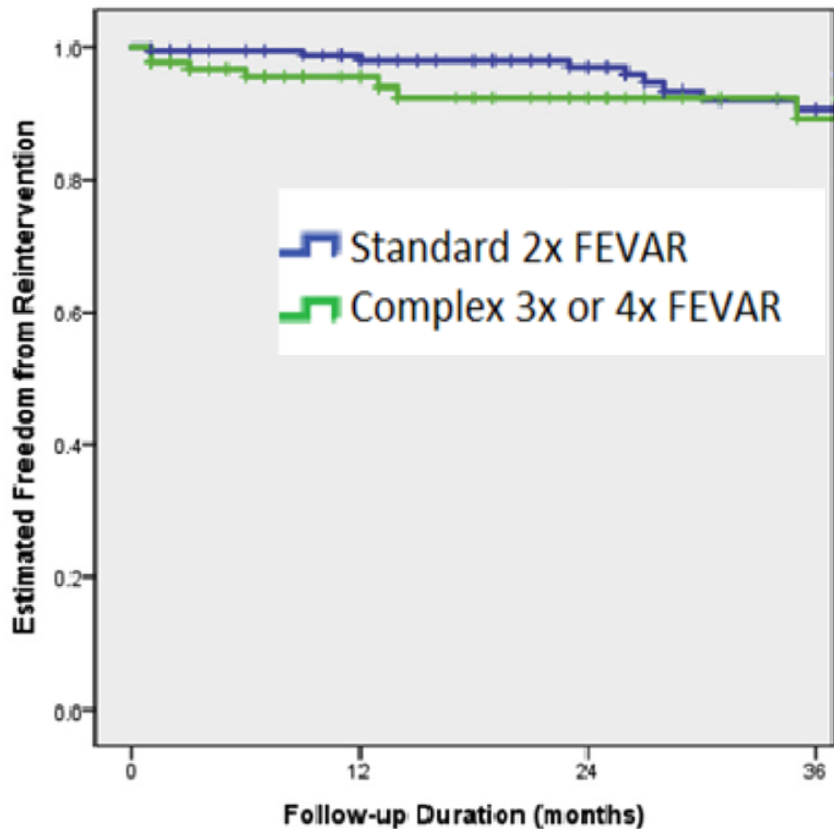
Estimated Survival



- Standard (2x) FEVAR
 - $95 \pm 1.7\%$ at 1 year
 - $83.4 \pm 3.6\%$ at 3 years
- Complex (3x-4x) FEVAR
 - $94 \pm 2.4\%$ at 1 year
 - $89.4 \pm 3.5\%$ at 3 years

P=0.96, NS

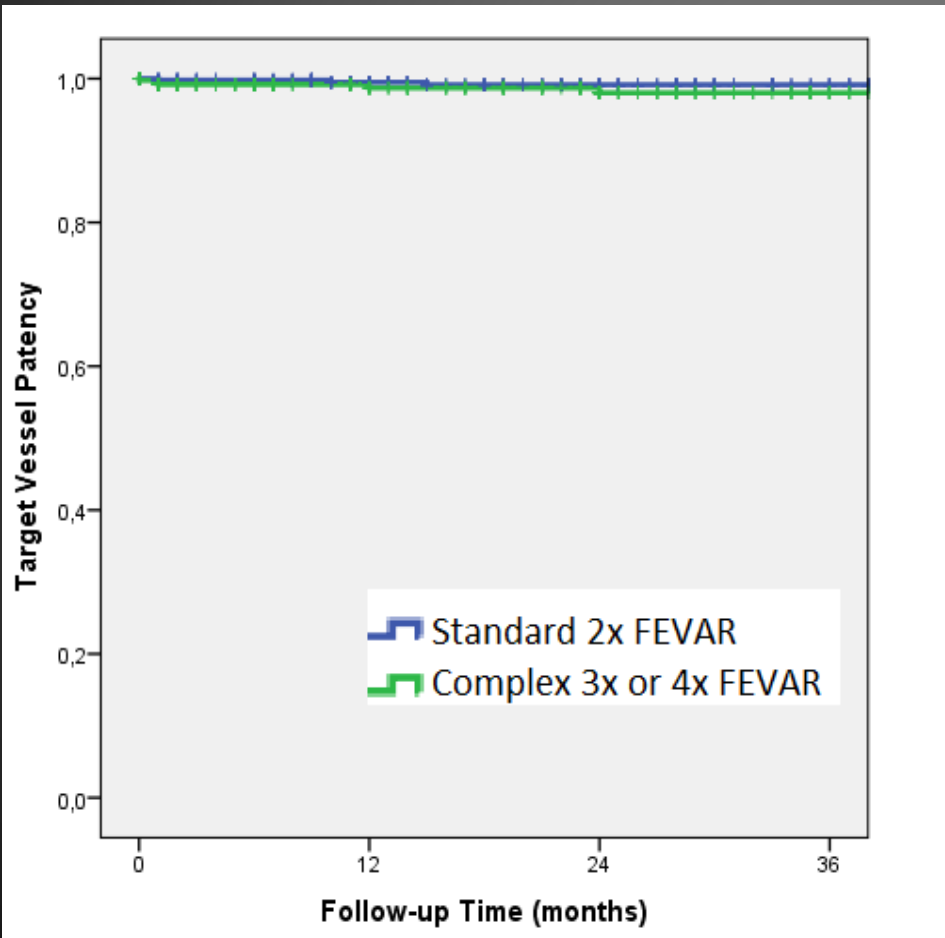
Freedom from Reintervention



- Standard (2x) FEVAR
 - $97.9 \pm 1.2\%$ at 1 year
 - $90.5 \pm 3.1\%$ at 3 years
- Complex (3x-4x) FEVAR
 - $95.4 \pm 2.0\%$ at 1 year
 - $90.1 \pm 4.2\%$ at 3 years

P=0.5, NS

Target Vessel Patency



- Standard (2x) FEVAR
 - 99.2 ± 0.4% at 1 year
 - 98.6 ± 0.6% at 3 years
- Complex (3x-4x) FEVAR
 - 98.7 ± 0.6% at 1 year
 - 98.0 ± 0.9% at 3 years

P=0.48, NS

SMA

Events?

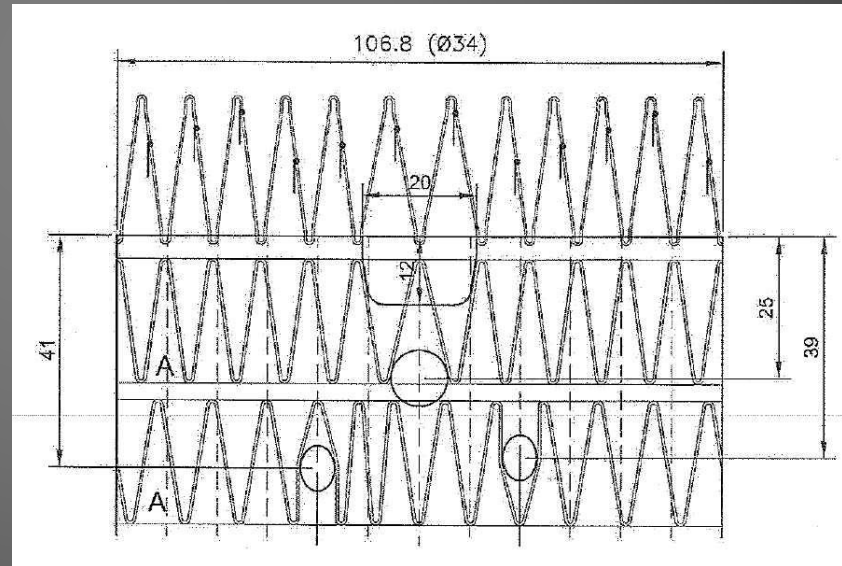
- Occlusions
 - Unstented (all 2xFEVAR)
 - N=1 (fatal)
 - Stented (all 3-4xFEVAR)
 - N=1 (asymptomatic)
- *Other Complications*
 - *Shuttering of Single Width scallop?*
 - *Intra-op complications*
 - *Dissection*
 - *Wire perforation*

Technical Advantage

3xFEVAR over 2xFEVAR

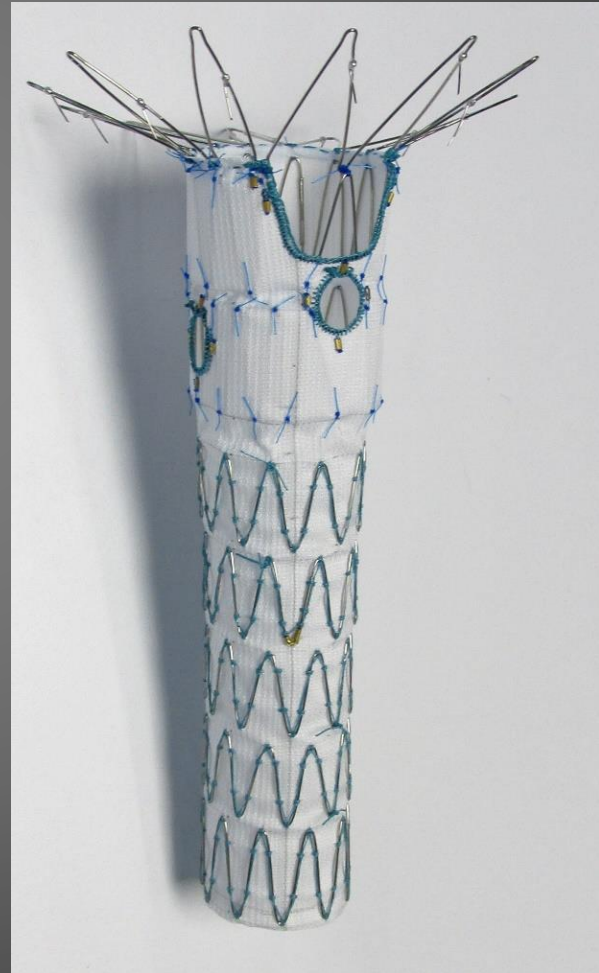
- Planning feasibility
- DW (20mm) scallop

Technical Advantage 3xFEVAR over 2xFEVAR



Technical Advantage

3xFEVAR over 2xFEVAR



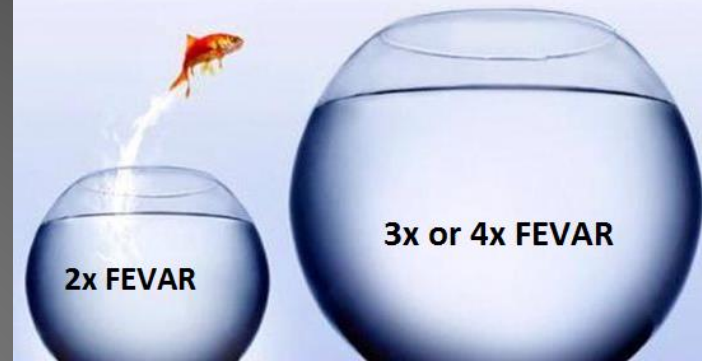
Conclusions

- Complex FEVAR vs. Standard FEVAR
 - More complex graft planning (not an issue!)
 - ↑ OR & Fluoroscopy Time

but...

Same very Low Perioperative Risk

Go For It



Take Home Message

- Move up to complex FEVAR if anatomically necessary...
- In Nuremberg 2xFEVAR replaced by 3xFEVAR
- Option
 - 4xFEVAR without stenting Celiac Artery?