Techniques to achieve seal

in short neck aneuryysms

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Disclosures Dr. Kasprzak (grants, speaker fee, development,)
Cook, Gore, Vascutek, Bard, Medtronic, Maquet, UCB, Bentley

Short and hostile infrarenal neck.
I don´t see any problem…

Definition of short neck
<15mm or <10mm?

the long axis of the aneurysm sac, (3) short neck: neck length ≤15 mm, (4) significant

J ENDOVASC THER
2009;16:137–146

mm between 2 axial CT cuts. Patients were categorized into 3 groups according to the infrarenal neck length: >15 mm (group A, n=2822), between 11 and 15 mm (group B, n=485), and ≤10 mm (group C, n=192).

J Endovasc Ther 2006;13:640–648

aneurysm repair [EVAR]) of abdominal aortic aneurysms (AAAs) with **short, straight proximal aortic necks(<1.5 cm).**

J Vasc Surg. 2012 May;55(5):1242-6.

Definitions and end points. Patients were categorized as having favorable neck anatomy (FNA) or HNA. HNA was defined as having one or more of six neck features: neck length of <10 mm, angle of >60°, a diam-

(J Vasc Surg 2011;54:13-21.)

Definitions of hostile neck anatomy were established as (1) *short neck*—a distance of less than or equal to 10 mm

J Vasc Surg 2003;38:657-63.

Influence of Infrarenal Neck Length on Outcome of Endovascular Abdominal Aortic Aneurysm Repair

[1]EUROSTAR Data Registry Centre, Department of Surgery, Catharina Hospital, Eindhoven, The Netherlands. [2]Department of Epidemiology, University of Maastricht, The Netherlands.

J Endovasc Ther 2006;13:640–648

Purpose: To evaluate the influence of the infrarenal neck length on clinical outcome after endovascular abdominal aortic aneurysm repair (EVAR).

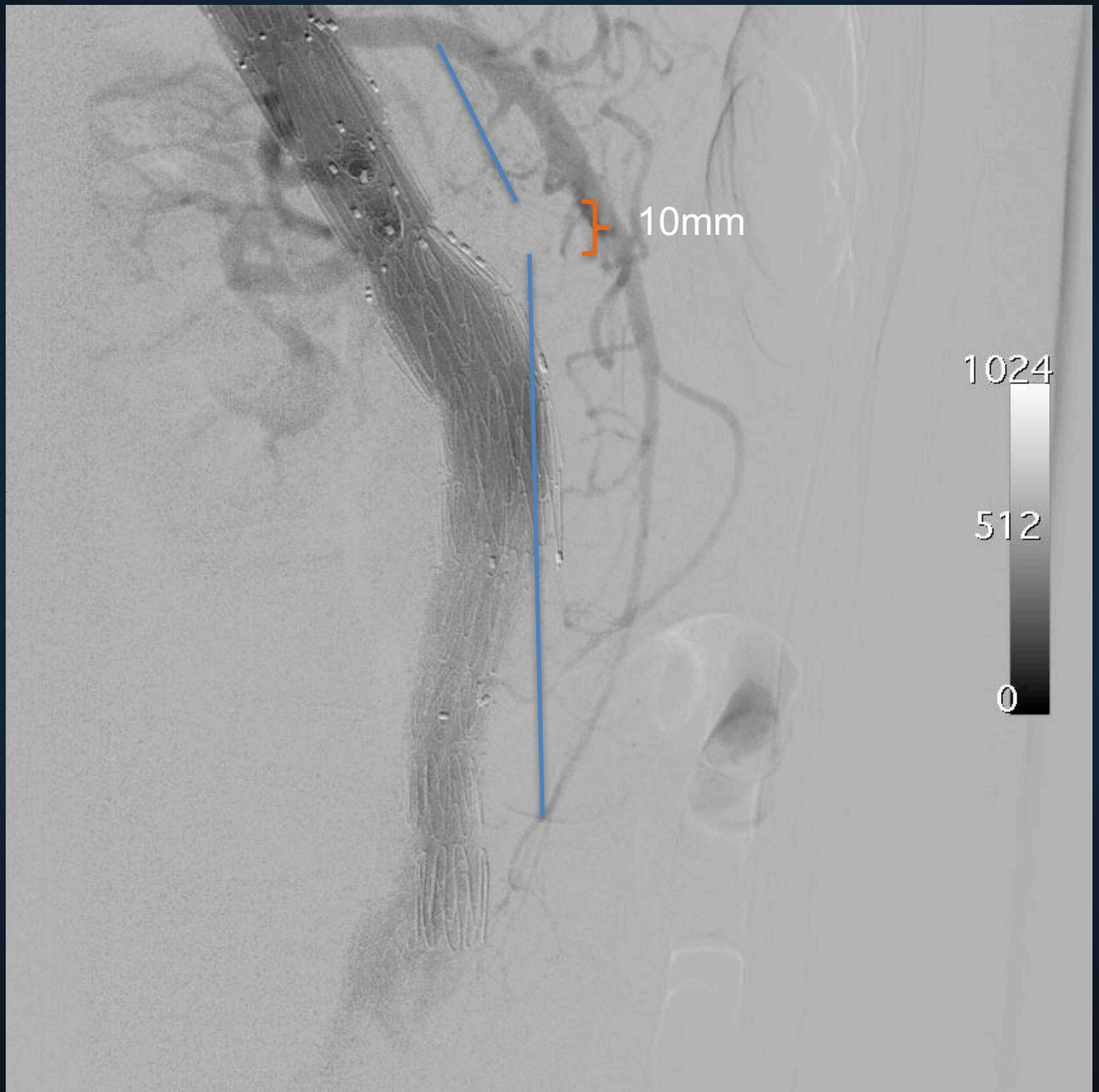
3499 Pts EUROSTAR Register

3 Groups: > 15 mm (A), 11-15 mm (B), und < 10 mm (C)

Results: 30-d Mortality ↑
in Pts with neck <15mm vs Pts with neck >15 mm

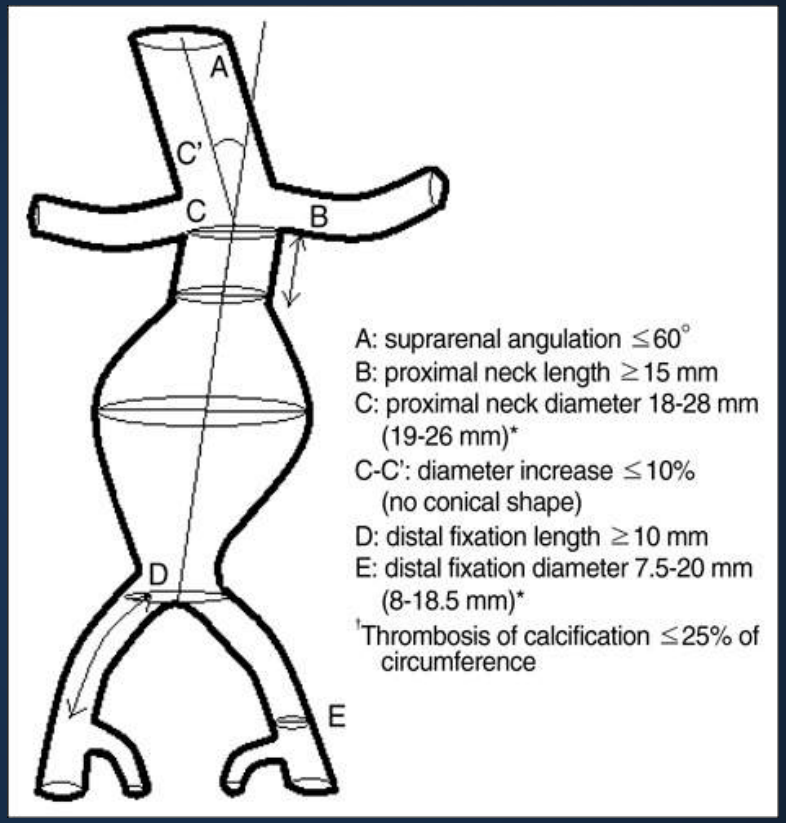
Proximal Endoleak 2x higher
if neck 11 - 15 mm vs neck >15 mm

Conclusion: Our study indicates that endovascular treatment of abdominal aortic aneurysms with infrarenal neck length <15 mm is associated with significantly increased risk of short- and midterm proximal endoleaks after EVAR. The greater risk of proximal endoleaks should be weighed against the risks of alternative treatment modalities.


10mm
1024
512
0

Hostile neck

Short neck
Angulation
Taper
Calcification
Thrombus
> Diameter



Meta-Analysis of 7 major studies in EVAR by Antoniou et al[1] compared outcomes in hostile vs. friendly neck anatomies (total patients N = 1559)

Study	Sample Size	Endografts
Torsello et al, 2011	177	Endurant
AbuRahma et al, 2010	238	AneuRx, Excluder, Zenith, Talent
Hoshina et al, 2010	129	Excluder, Zenith
Abbruzzese et al, 2008	565	AneuRx, Excluder, Zenith
Choke et al, 2006	147	Talent, Zenith, Excluder, AneuRx
Fulton et al, 2006	84	AneuRx
Fairman et al, 2004	219	Talent

- Type I endoleaks 4.5x more likely at 1-year after endograft implantation in hostile proximal aortic neck anatomy (P = .010)
- Aneurysm-related mortality risk 9x greater in hostile neck anatomy (P= .013)

[1]Antoniou GA et al. J Vasc Surg. 2013;57(2)527-38.

Hostile Neck

Different Options

- try EVAR

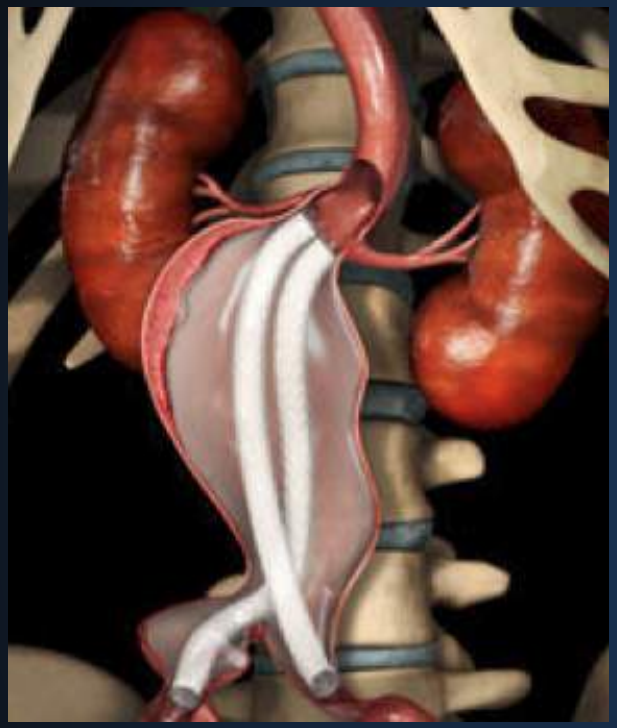
  - **which Stent Prosthesis?**
    (new Concepts
    Ovation, Nellix)

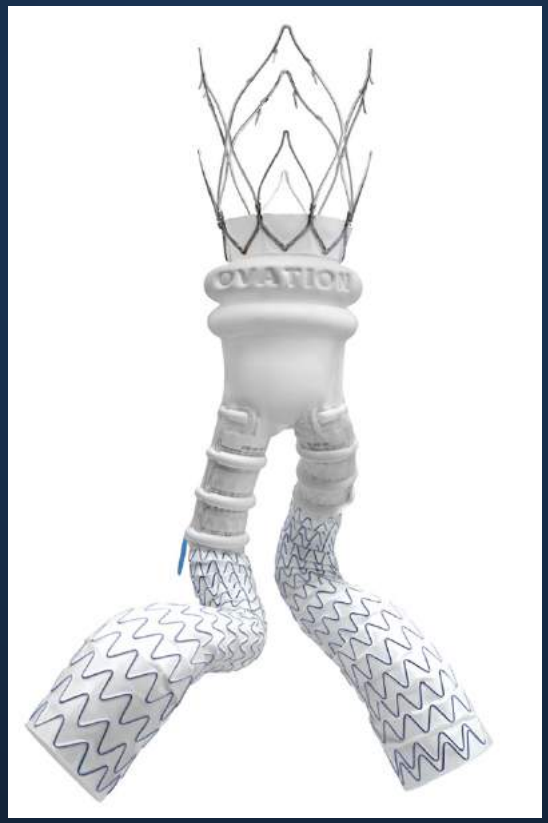
  - **Adjunct Methods**
    (Endoanchors)

- Ch-EVAR
- F-EVAR

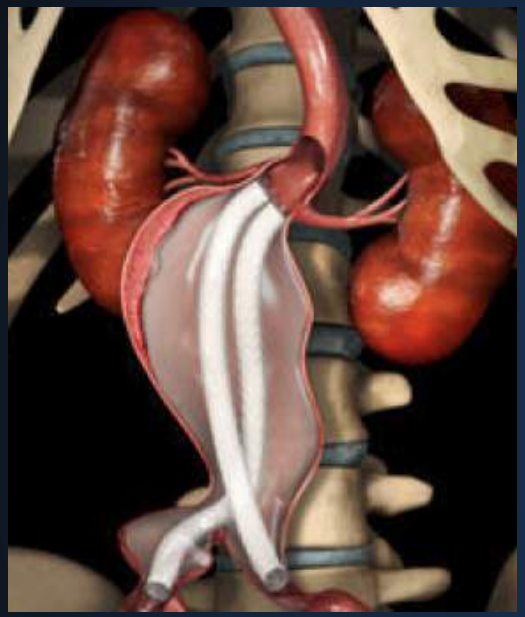
- Open Operation

Different Concepts





Different Concepts

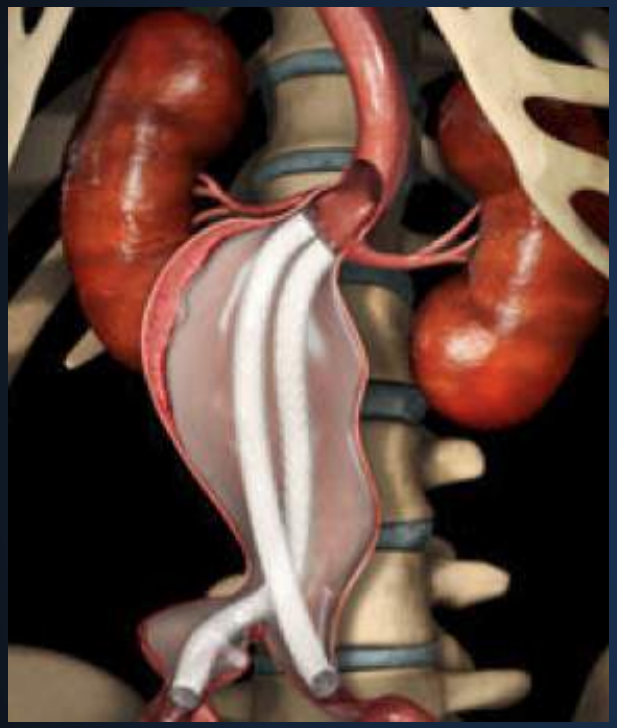


An EVAR revolution may have truly arrived

30th October 2013 301

- Iliac and femoral artery access that allows for atraumatic device introduction
- Aortic proximal neck diameter range of 18 to 32 mm
- Minimum aortic proximal neck length ≥ 10 mm
- Infrarenal aortic neck angulation of ≤ 60°
- Aortic aneurysm with a blood lumen diameter ≤ 70 mm
- Iliac arteries luminal diameter range of 9 to 35 mm

Different Concepts



Endologix' Nellix receives CE mark with refined Instructions for Use

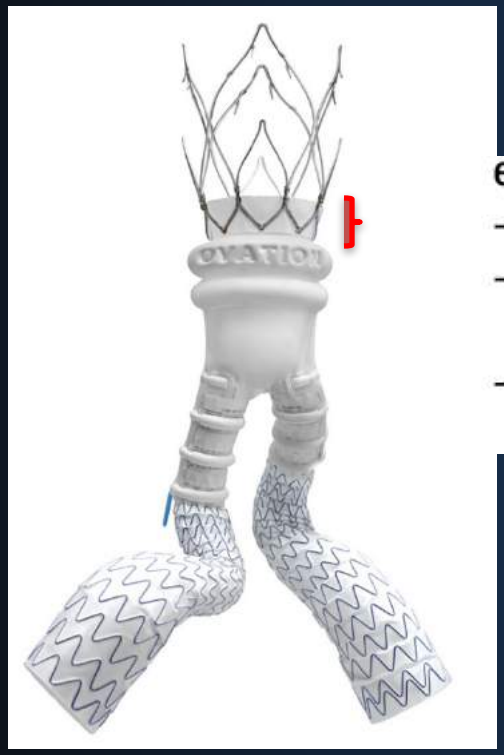
22nd September 2017 211

Endologix' Nellix

Different Concepts

Indications for Use		
Current (Next Generation Nellix & Nellix 35Q+)	**Next Generation Nellix**	**Nellix 35Q+**
Iliac and femoral artery access that allows for atraumatic device introduction	No Change	
Aortic proximal neck diameter range of 18 to 32mm	**Aortic proximal neck diameter range of 18 to 28mm**	
Minimum aortic proximal neck length of ≥ 10mm	Criteria remains the same; however, the definition of aortic proximal neck length is updated to diameter change of 10% vs. previous 20%	
Proximal aortic neck angulation of ≤60°	No Change	
Aortic aneurysm with a blood lumen diameter of ≤70mm (60mm for Nellix 35Q+)	No Change	
N/A	Ratio of maximum aortic aneurysm diameter to maximum aortic blood lumen diameter <1.4	
Iliac arteries luminal diameter range of 9 to 35mm	• Iliac artery blood lumen diameter range of 9 to 35mm outside the distal seal zone • Distal seal zone: o with length of ≥ 10mm and o diameter range of 9 to 25mm	• Iliac artery inner wall diameter range of 9 to 20 mm outside the distal seal zone • Distal seal zone: o with length of ≥ 10mm and o diameter range of 9 to 20mm

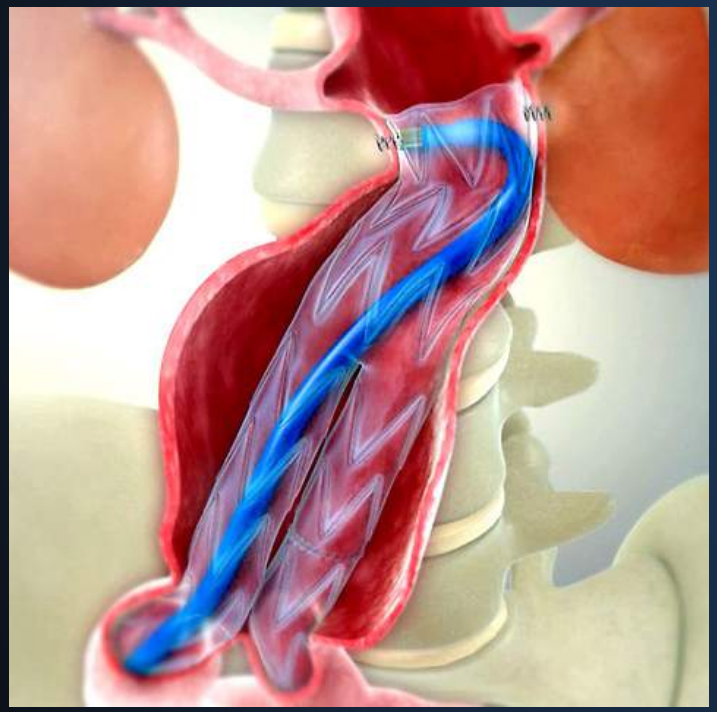
Different Concepts

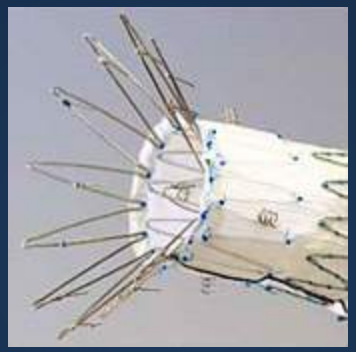


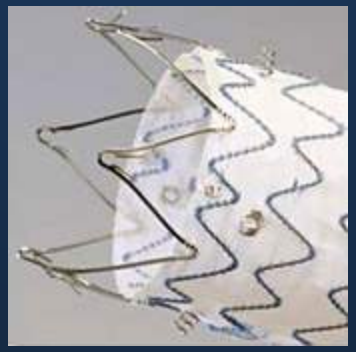
ein aneurysmafreier, proximaler Aortenhals

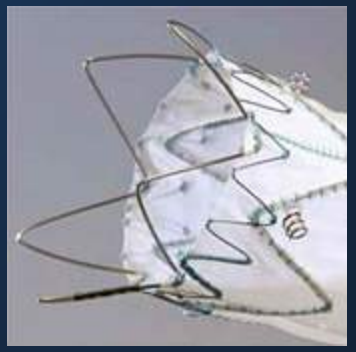
- mit einer Länge von mindestens 7 mm proximal zum Aneurysma,
- mit einem Innenwanddurchmesser von mindestens 16 mm und maximal 30 mm und
- mit einer Aortenabwinklung von ≤ 60 Grad, falls der proximale Hals ≥ 10 mm ist, und ≤ 45 Grad, falls der proximale Hals < 10 mm ist,

Adjuncts









EndoAnchors – De Novo Indication vs. Revision

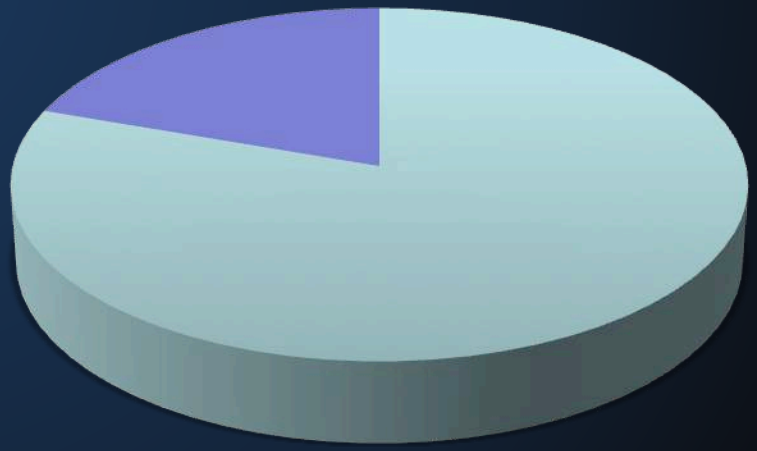
Regensburg 2011 – 2015

88 Patients

Age 69 (±10) 42-87

Primary 80,3%

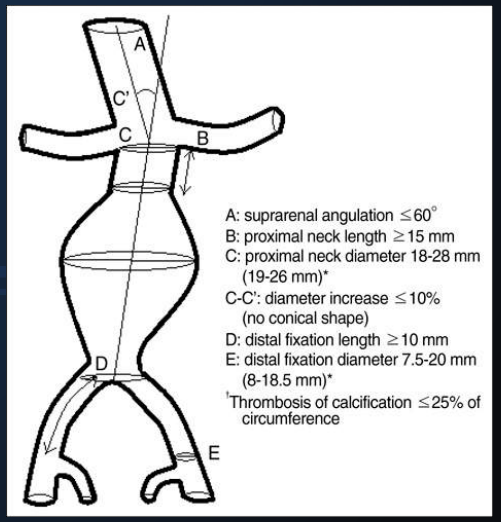
Revision 19,7%



EndoAnchors in Regensburg

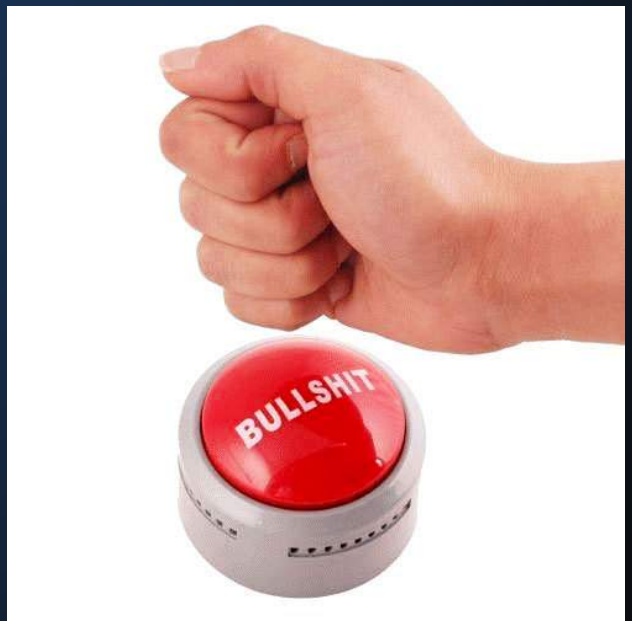
Proximal neck with Thrombus
or Kinking > 45 ° or tapered

> 15 mm (IFU 10mm)	10 - <15 mm	0 - < 10 mm
EVAR	EVAR + EndoAnchors	FEVAR/BEVAR



Summary

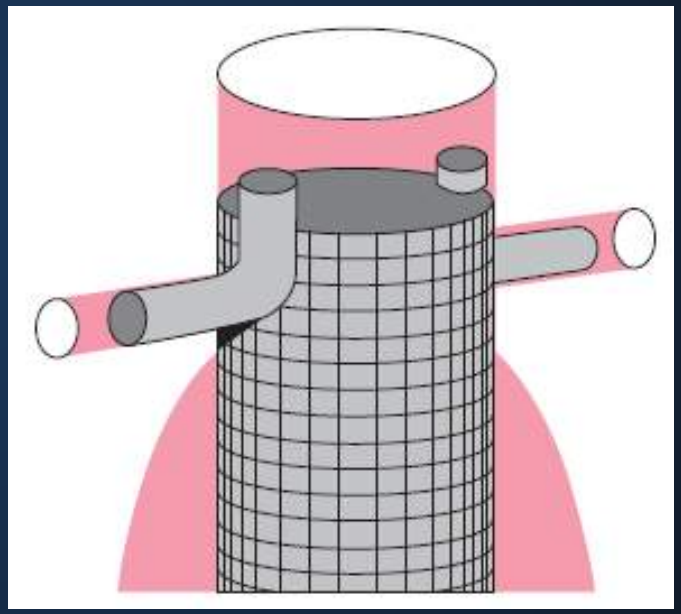
- Proximal Neck >15mm → st. EVAR
- Proximal Neck 10-15 mm or 15mm mit Angulation, Thrombus, Bell-Shape, Taper → st. EVAR + Endoanchors
- Proximal neck <10mm



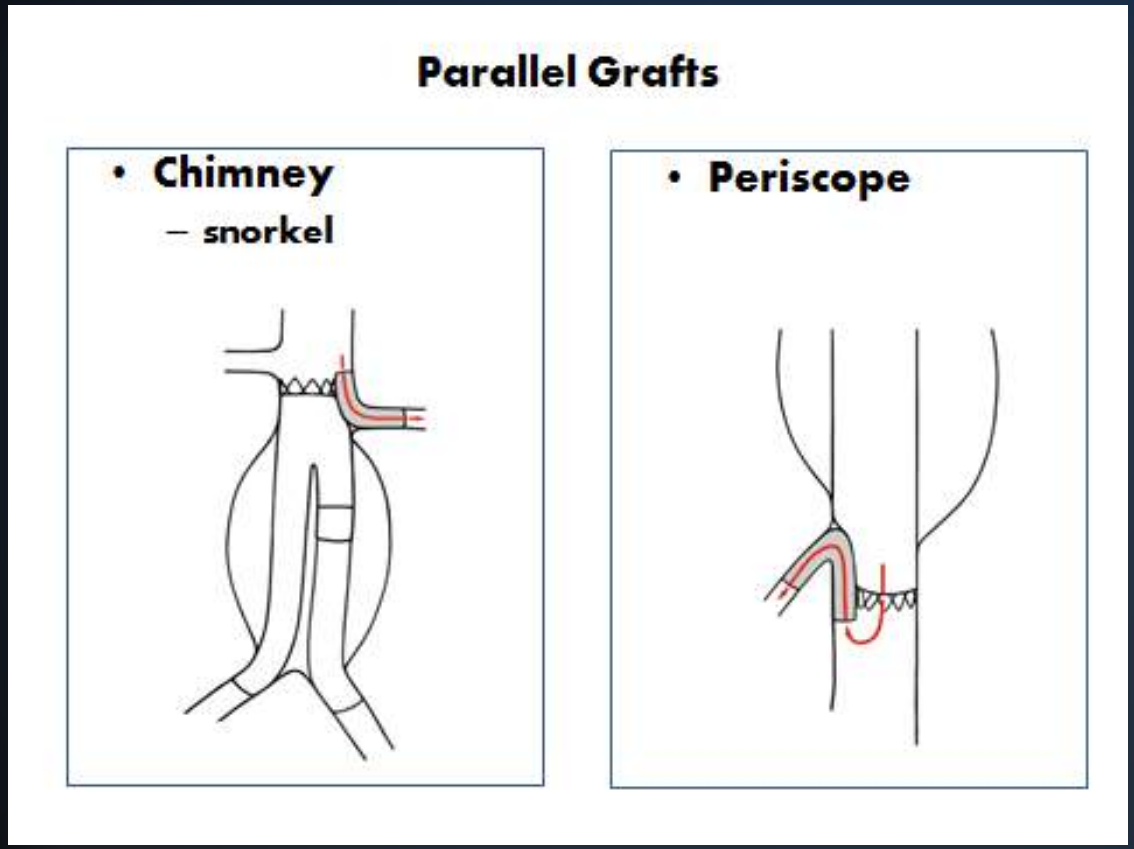
Alternatives

F-EVAR

Ch-EVAR

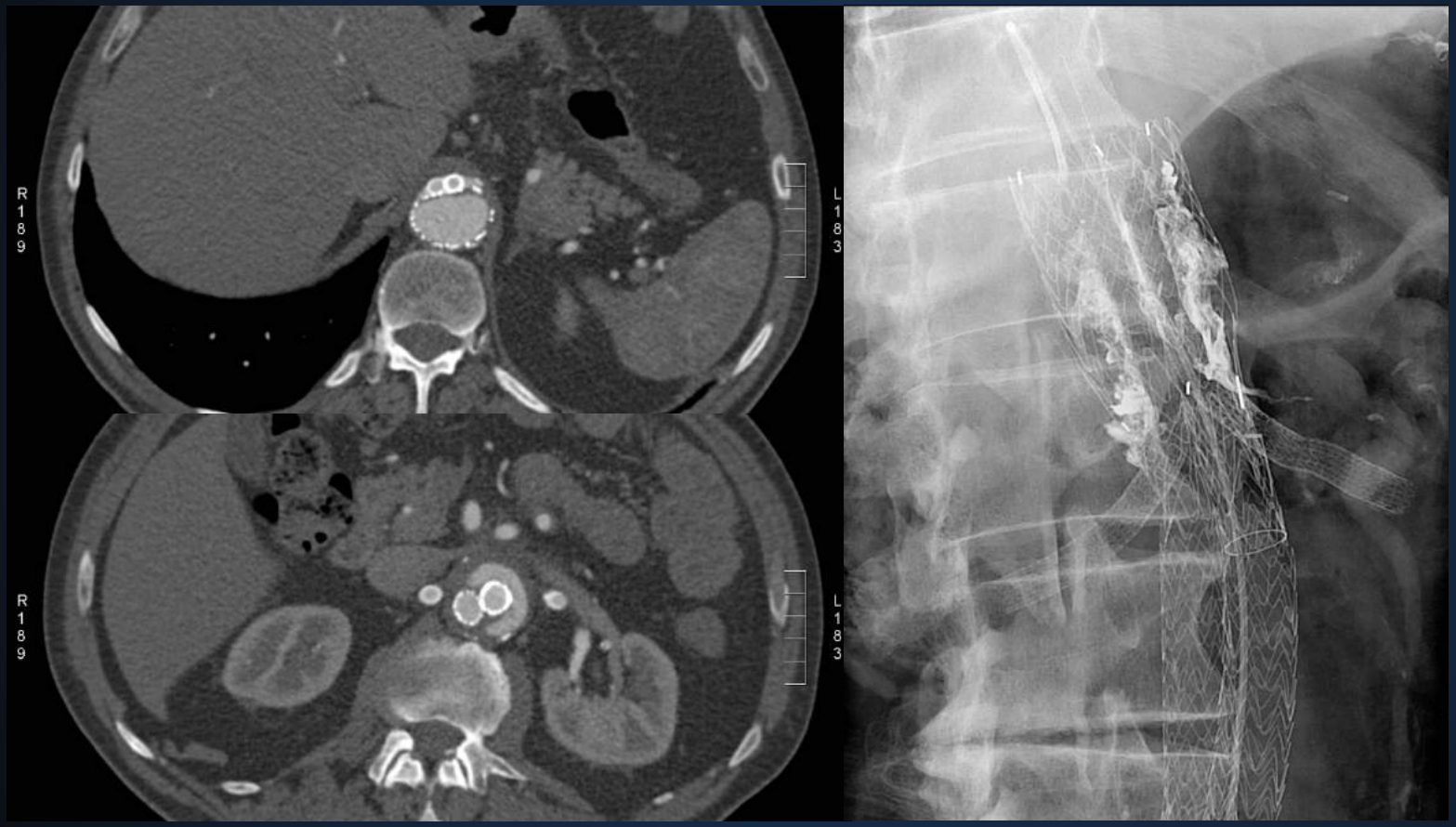


CHIMneyPeriscopeSandwich (CHIMPS)



Courtesy M. Lachat

Gutter sealing (embolization)



Up to 10%

Ch-EVAR

Primarily as Bail-out for overstentet renal arteries

Ch-EVAR

Ch-EVAR advantages F-EVAR

- Less complex
- ↓ Costs
- Off-the-shelf

Ch-EVAR

but...

Ch-EVAR

but...

.... and supraaortic access for one/multiple sheaths

Comparison of Outcomes with Open, Fenestrated and Chimney Graft Repair of Juxtarenal Aneurysms

%	Mortality	Crea	Cardiac	Stroke	Endoleak Ia
Open surgery	3,4	**18,5**	**11,3**	0,1	-
FEVAR	2,4	9,8	3,7	0,3	4,3
Ch-EVAR	5,3	12	7.4	3,2	10

Katsagyris et al., J Endovasc Ther 2013;20:159-169

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Ch-EVAR	5,3	12	7.4	**3,2**	**10**

Katsagyris et al., J Endovasc Ther 2013;20:159-169

F-EVAR

Longer proximal seal in parallel aortic segment

The AAA With a Challenging Neck: Outcome of Open Versus Endovascular Repair With Standard and Fenestrated Stent-Grafts

J ENDOVASC THER
2009;16:137–146

[1]Vascular and Endovascular Surgery Unit, University of Siena, Italy. [2]Vascular Center Malmö-Lund, Malmö University Hospital, Malmö, Sweden.

Open (group A) vs stEVAR (group B) vs fEVAR (group C) FU 19,5 mth´s

- ↑ Aneurysm diameter in stEVAR vs fEVAR (12.2% vs 1.9%, p=0.036)

Conclusion: The results of EVAR and OR were similar for AAAs with a challenging proximal neck. Endovascular reinterventions were more frequent after EVAR, particularly in patients with an angulated or short neck. Open reinterventions were more common after OR. More patients and long-term data are needed to confirm these findings.

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- ↑ Reinterventions for stEVAR in short neck (p=0024)
- ↓ Reinterventions and Type I Endoleaks in fEVAR

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Ch-EVAR

J Cardiovasc Surg (Torino). 2016 Oct 27. [Epub ahead of print]

Chimney versus fenestrated endovascular aortic repair for juxta-renal aneurysms.

Caradu C[1], Berard X, Sassoust G, Midy D, Ducasse E.

RESULTS: Fifteen studies on F-EVAR, 8 on CG-EVAR and 5 on both techniques were included; 1748 F-EVAR patients (3993 target vessels) vs 757 (1158 target vessels, 13% symptomatic and 7% ruptured). F-EVAR patients suffered from significantly less comorbidities, technical success was lower (94% vs 99%; $p < 0.0001$) but with more reconstructed vessels/patient (2.2±0.4 vs 1.5±0.3 ; $p < 0.0001$) and 30-day mortality was lower (2% vs 4%, $p = 0.02$). There were more reinterventions after F-EVAR (20% vs 8%; $p < 0.0001$); mainly EL (44% vs 25%) and target vessels related (36% vs 32%); less type I ELs (1% vs 6%; $p = 0.002$) but more type III (2% vs 0%; $p < 0.0001$). The rates of chronic kidney disease (9% vs 15%; $p = 0.0002$) and dialysis (1% vs 3%; $p = 0.007$) were lower after F-EVAR, with less target vessel's occlusions (3% vs 6%; $p < 0.0001$). The meta-analysis on 5 comparative studies supported F-EVAR in terms of 30-day mortality (OR 0.94 [0.25, 3.55]), target vessel's occlusions (OR 2.40 [0.95, 6.06]) and type I EL (OR 0.62 [0.10, 3.93]); and CG-EVAR in terms of technical success (OR 3.28 [0.67, 15.93], type II (OR 1.25 [0.48, 3.28]) and III ELs (OR 1.62 [0.29, 8.94]) and reintervention (OR 1.77 [0.89, 3.52]) without a significant difference.

CONCLUSION: Current evidence does not support CG-EVAR's widespread use in all elective patients but CG-EVAR seems justified in symptomatic patients, as bailout, or in elective patients who are poor candidates for open repair and F-EVAR.

F-EVAR

Eur J Vasc Endovasc Surg. 2016 Jun;51(6):775-81. doi: 10.1016/j.ejvs.2015.12.014. Epub 2016 Feb 6.

Fenestrated Endovascular Aortic Aneurysm Repair as a First Line Treatment Option to Treat Short Necked, Juxtarenal, and Suprarenal Aneurysms.

Verhoeven EL[1], Katsargyris A[2], Oikonomou K[2], Kouvelos G[2], Renner H[2], Ritter W[3].

CONCLUSIONS: FEVAR as a first line strategy was associated with high technical success and a low operative mortality rate. Efficacy and durability in the mid-term appear very good, with significant regression of aneurysm sac diameter, high target vessel patency, and acceptabl rate of re-intervention.

J Endovasc Ther. 2017 Apr;24(2):230-236. doi: 10.1177/1526602817691752. Epub 2017 Feb 16.

Graft Complexity-Related Outcomes of Fenestrated Endografting for Abdominal Aortic Aneurysms.

Oikonomou K[1], Kasprzak P[1], Schierling W[1], Kopp R[1], Pfister K[1].

CONCLUSION: The use of FEVAR for juxta- and suprarenal aneurysms is associated with low 30-day mortality/morbidity and high midterm efficacy. So far, perioperative and midterm results are not affected by the use of more complex fenestrated designs.

Summary

- Proximal neck >15mm → st. EVAR
- Proximal neck 10-15 mm
  Angulation, Thrombus, Bell-shape → st. EVAR + Endoanchors
- Proximal neck <10mm → F-EVAR
  Ch-EVAR in emergency

Fit the anatomy to the solution…?

…or the solution to the anatomy?