



# CHIMNEY EVAR FAILURES and HOW TO PREVENT THEM

**Konstantinos Donas**

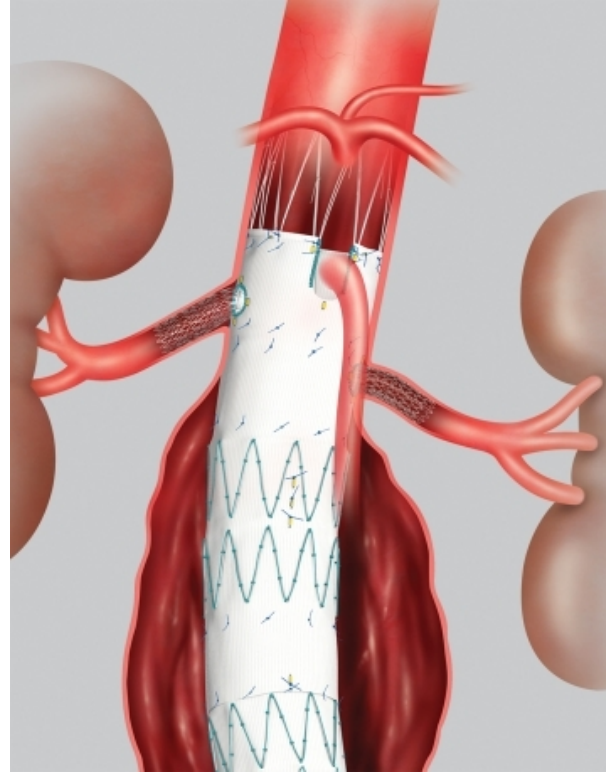
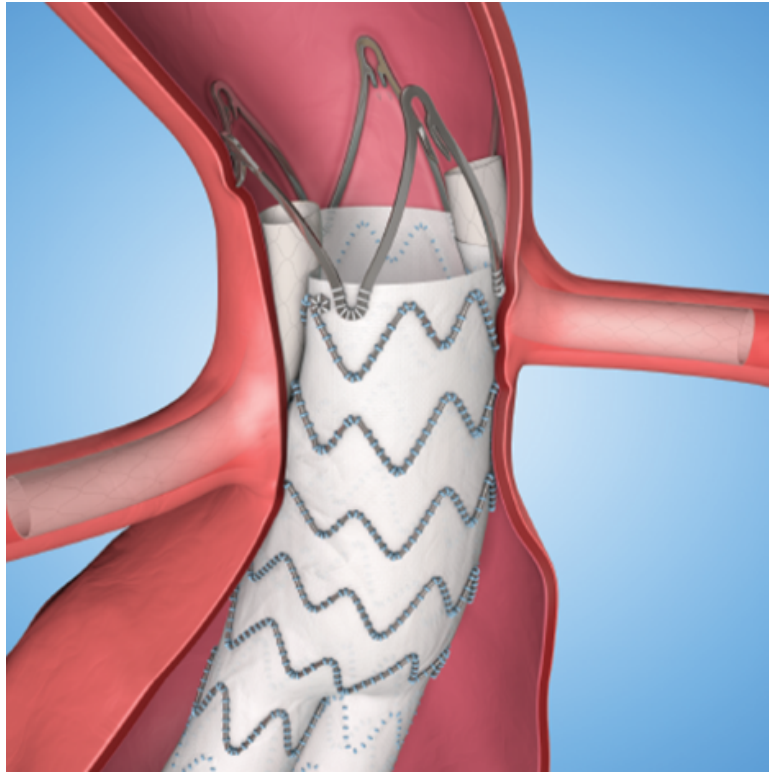
Professor of Vascular Surgery

Head of the Department of Vascular Surgery, Director Research Vascular Ce

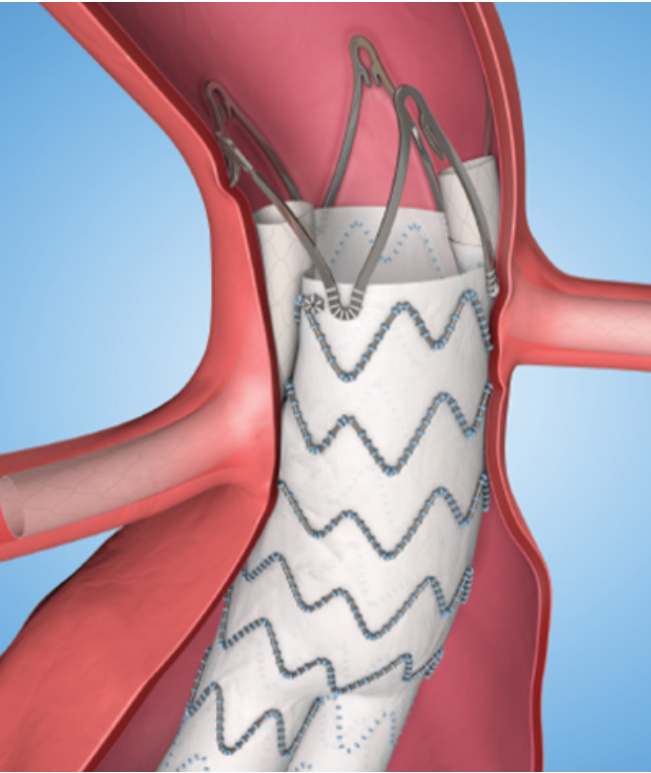
Asklepios Clinic Langen, Langen, Germany



# Endovascular options which improve sealing for pararenal aortic pathologies



# Chimney EVAR: Use of off-the-shelf devices



- Standard abdominal stent graft
- Bare/Covered balloon expandable or self-expanding stents



Results?

# CX 2021 MESSAGE

A further striking finding to emerge from the discussion was that **parallel grafts** should be used as little as possible in hostile neck anatomy, an idea that found consensus among expert panellists. Concluding a presentation on "disappointing" results in this area, Alexander Zimmermann (Zürich, Switzerland) stated that, in the majority of cases, he aims to "stay away" from using parallel grafts in challenging necks; moderators (Dr. Robert D. White, UK) and Robert D. White, PhD, T

Critical analysis of aneurysm

## ORIGINAL ARTICLES

### Multicentre Experience with the Chimney Technique for Abdominal Aortic Aneurysms in French University Hospitals

Joseph Touma<sup>a</sup>, Caroline Caradu<sup>b</sup>, Raphaëlle Sylvestre<sup>c</sup>, Nicola Settembre<sup>d</sup>, Fabrice Schneider<sup>e</sup>, Alessia Moia<sup>f</sup>, Sabrina Ben Ahmed<sup>g</sup>, Benoit Lebas<sup>h</sup>, Julien Gaudric<sup>i</sup>, Jean-Marc Alsac<sup>j</sup>, Edouard Warein<sup>k</sup>, Raphaël Coscas<sup>l</sup>, for the Association Universitaire pour la Recherche en Chirurgie (AURC) Collaborators<sup>†</sup>

**Conclusion:** In this large national ChEVAR series, early results were concerning.

**Table 2.** Characteristics of chimney endovascular aortic repairs (ChEVAR) performed in French university centres in 2008–2016

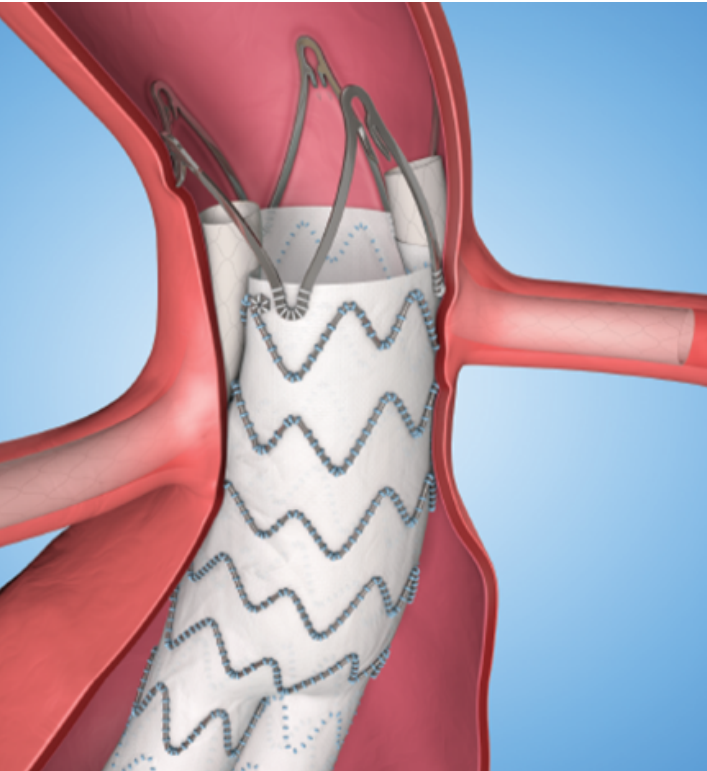
Characteristics of ChEVAR	ChEVAR procedures (n = 201)
<i>Implanted stent grafts</i>	
Zenith (Cook)	113 (56.2)
Endurant (Medtronic)	39 (19.4)
C3 (Gore)	35 (17.4)
AFX (Endologix)	5 (2.5)
Others	9 (4.5)

<i>Type of chimney stent</i>	
Covered stents	
Bare metal stents	
Endolining with a second bare metal stent	





# Suboptimal outcomes about Chimney technique



- **Lack of standardisation** regarding:
  1. Preoperative planning
  2. Selection of abdominal devices
  3. Selection of type of chimney stents
  4. Selection of the number of chimney stents
  5. Degree of oversizing
- Lack of exclusivity due to the broad applica



# Chimney EVAR: On the way to standardization



Education

Scientific evidence



# Chimney EVAR: On the way to standardization



Education

Scientific evidence





# Education: Learning by doing; First chimney workshop 2014





# First transatlantic chimney workshop in USA at Veith Meeting 2018

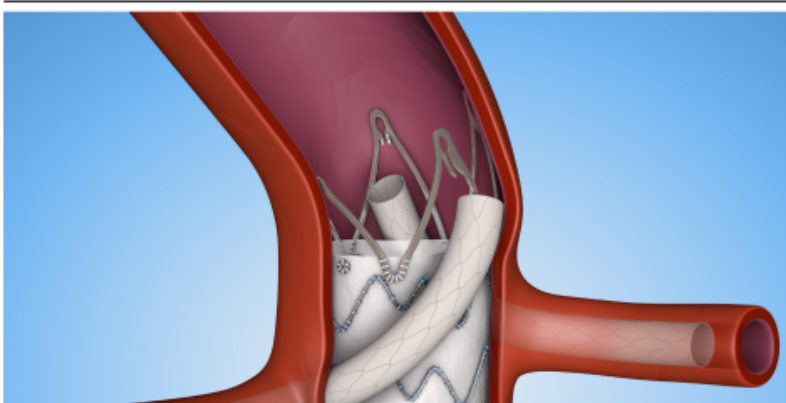


*Groing older, but I am still  
continuing learning*

*Plato*



# Education during the COVID period via social media and webinars



Dear colleagues, dear readers of *Vascular News*,

The clinical evidence on the chimney/snorkel technique has flourished in the last decade, with increasing numbers of key publications and the release of new data. However, the role of the chimney technique at different meetings has been secondary and is very often part of a debate on other therapeutic options. During the COVID-19 period, it has been possible to focus on evidence and standardisation of the procedure. In this *Vascular News* supplement, we will highlight clinical and scientific aspects that will provide relevant, practical advice for readers in order to optimise results and to help in the decision-making process of potential patients with inadequate neck anatomies suitable for chimney endovascular aneurysm repair (ChEVAR).

I am delighted to present to you a supplement in which we include input from various experts on the chimney technique from all over Europe. I hope you enjoy reading this supplement and that you find this information will help to optimise the performance of the chimney technique in your practice.

Yours,  
Konstantinos P. Donas

A handwritten signature in black ink, appearing to read 'Konstantinos P. Donas'.

*Konstantinos P. Donas is professor of vascular surgery, head of the Department of Vascular Surgery, and director of the Research Centre at Asklepios Clinic Langen, Göttinge-University Frankfurt, Frankfurt, Germany.*



## LEARN ABOUT THE STANDARDIZED CHEVAR TECHNIQUE

Become more proficient – increase your knowledge of the ChEVAR

These resources will help to better understand:

- Clinical evidence and indications for ChEVAR
- How to plan for the procedure
- Standard technique and material required
- Practical tips and tricks

### CHEVAR WEBINAR SEASON

**EPISODE 1:** Current evidence of ChEVAR technique

Prof. K. Donas and Prof. M. Reijnen

**EPISODE 2:** Planning for successful ChEVAR

Prof. K. Donas, Dr. S. Fazzini and Prof. G. Torsello

**EPISODE 3:** The ChEVAR technique – tips and tricks

Prof. K. Donas and Prof. R. Milner



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### GUIDED ELE

**VISIT OUR DIA**

to go through a  
eLearning about  
standardized Ch  
technique



## Workshop

### The Chimney Technique in Endovascular Aortic Repair

25th of March 2022

03.00 p.m. - 05.00 p.m.

[REGISTRATION](#)

- chEVAR – When to use it
- Procedural tips
- The importance of bridging stents
- Factors to consider for long term durability
- Q&A session



**Pham Minh Anh, MD.**  
Head of Vascular Surgery  
Van Hanh Hospital - H.C.M.C.



**Prof. Dr. Dr. Konstantinos Donas**  
Head of Vascular Surgery Department  
Asklepios Clinic Langen Seligenstadt - Germany



# On the way to standardization



Education

Scientific evidence





# Systematic Review of the Current In Experience of the Endovascular Treat of Juxtarenal Abdominal Aortic Aneurysm by Fenestrated and Parallel Endografts

Gergana T. Taneva<sup>1\*</sup>, Hadi Mirgolbabaee<sup>2\*</sup>, Erik Groenewegen<sup>3</sup>, Michel M. P. J. Reijnen<sup>2,3</sup>, and Konstantinos P. Donaldis<sup>1†</sup>

Author year, paper	Studied technique	Material/ specification	Geometry: type/ anatomy	Design	Fabrication
Mestres 2012, EJVES	CHEVAR	Silicone	Simplified/ jAAA neck	Straight intersecting tubes with different inner diameters and 1 side branch	N/S
Niepoth 2013, J EVT	CHEVAR + EndoAnchors	Silicone	Simplified/ jAAA	- Straight tubes with 2 sizes of branch arteries and 2 sizes of aorta - diverging tube design	N/S
de Bruin 2013, J EVT	CHEVAR	Silicone	Simplified/ jAAA	- Straight tubes with 2 sizes of branch arteries and 2 sizes of aorta - diverging tube design iliac arteries.	N/S
Mestres 2017, JVS	CHEVAR	Silicone/external mesh to deflect silicone elasticity	Simplified/ jAAA neck	Straight intersecting tubes with different diameters and 2 or 3 side branches simulating SMA and renal arteries	N/S
Overeem 2018, J EVT	CHEVAR	Silicone	Generalized/ jAAA	Average measurements from 25 preoperative CTAs	Elastrat Inc (Geneva Switzerland)
Shukuzawa 2019, IJAO	CHEVAR	Silicone/arterial stiffness parameter was adjusted	Generalized/ jAAA	General anatomical human data reference common	N/S
Taneva 2019, J EVT	CHEVAR	Silicone/ultraviolet-cured silicone stiffer than the aortic wall	Patient-specific/ jAAA	Anatomical preoperative 7 cm jAAA CHEVAR	
Meekel 2020, J EVT	CHEVAR	Silicone	Simplified/ jAAA	Straight tubes with different inner diameters and 1 side branch	





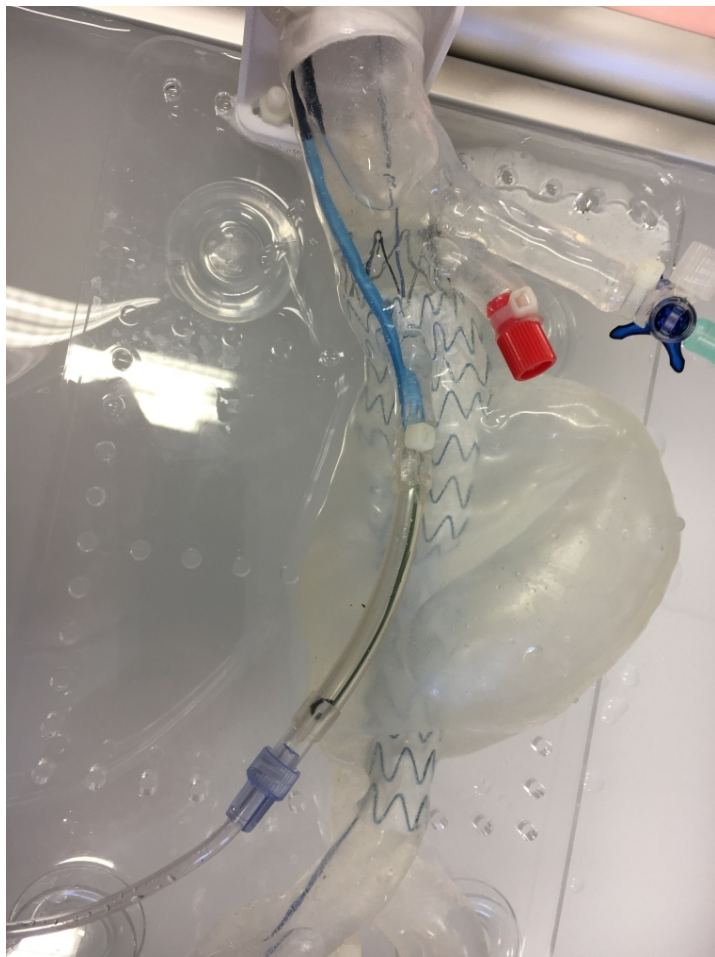
# In vitro testing of the impact of different BECS in combination with the Endurant device



*Taneva GT, Donas KP, Torsello*



# In vitro evaluation of all **in vivo** published chimney grafts in combination with the Endurant stent graft

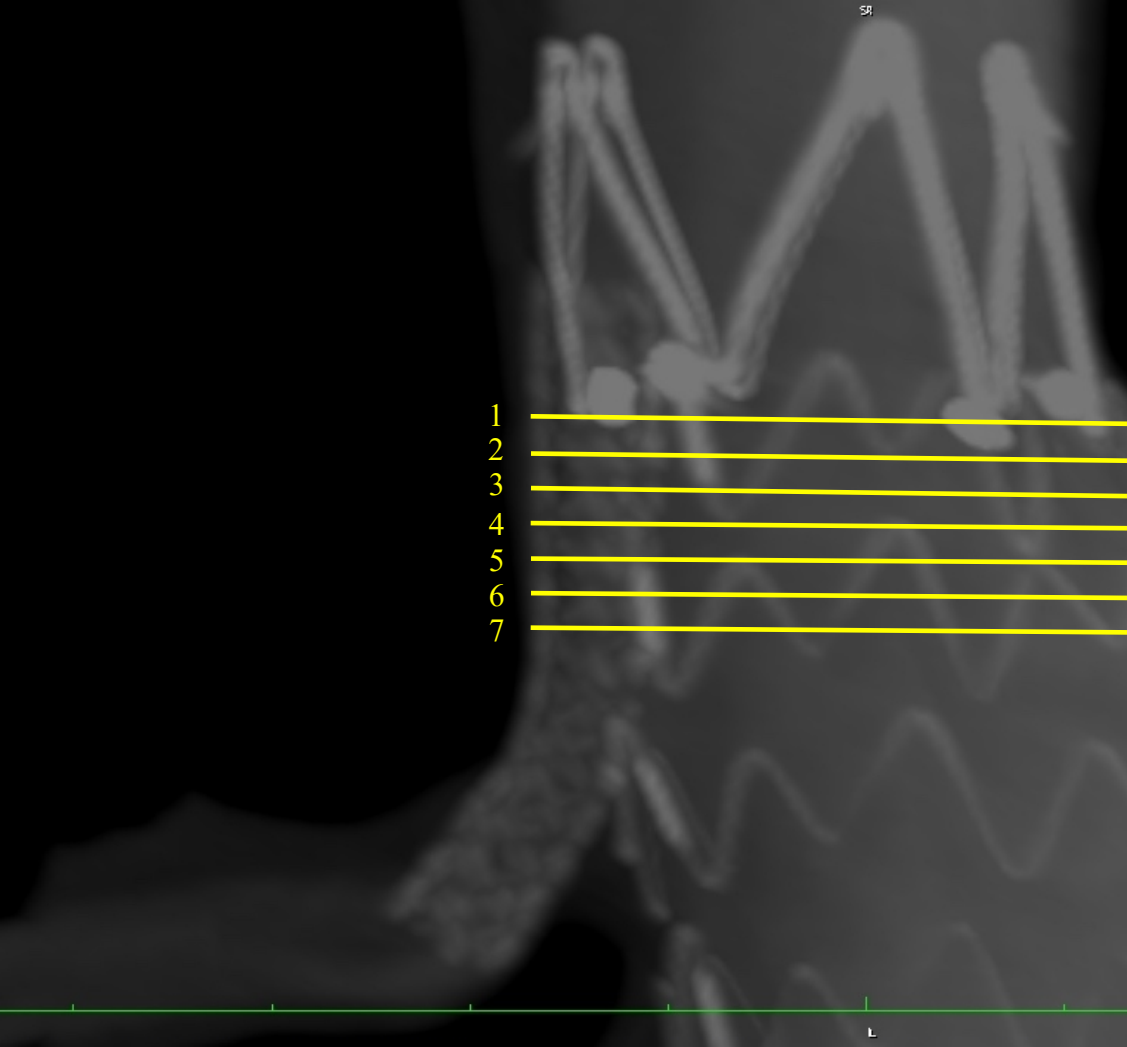


*Taneva GT, Donas KP, Torsello G, et*





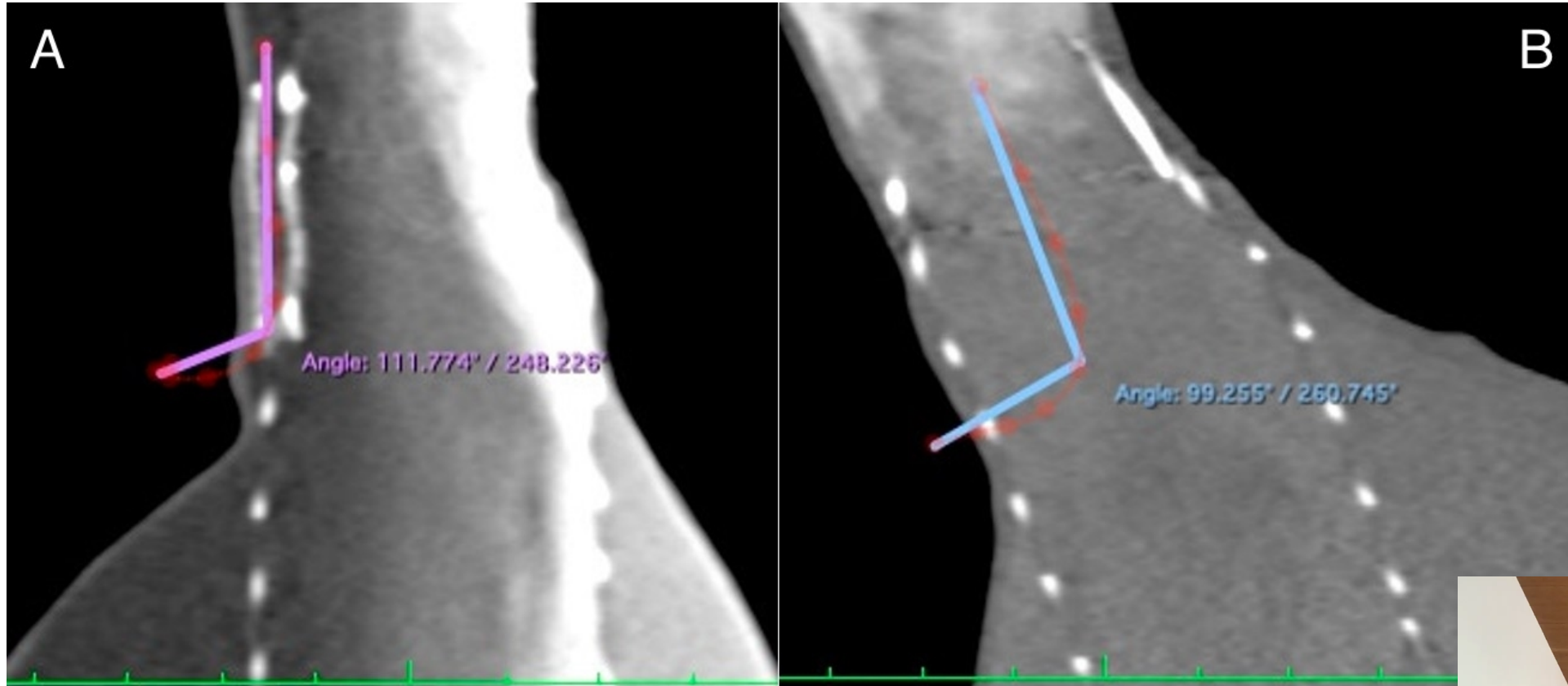
# 7 MPR measurements on subsequent CTA slices separated 2mm



Courtesy Ass. P.



CS angulation measured in two axes  
(anterior-posterior and lateral).

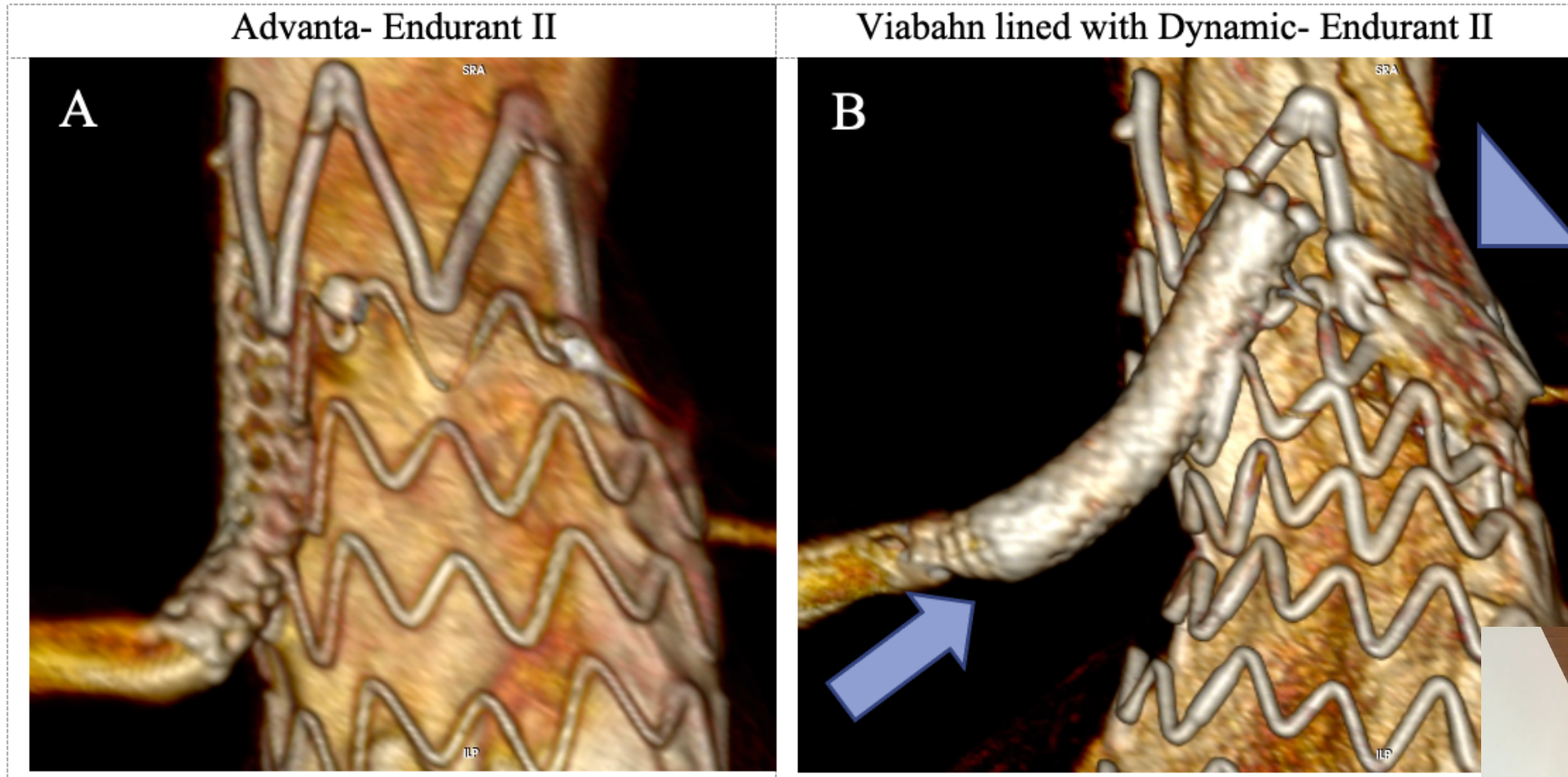


Courtesy Ass. Prof. T





# Combination of Advanta-Endurant: less gutters and more parallel configuration

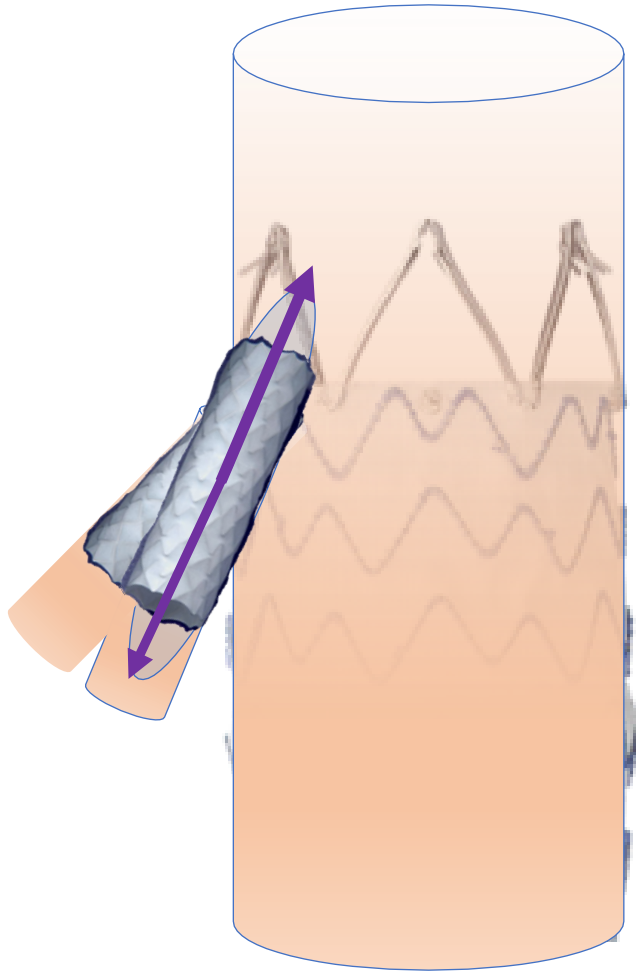


*Taneva, Pitoulis, Donas, Rome, ESVS*



# Impact of renal angulation on chimney graft behavior

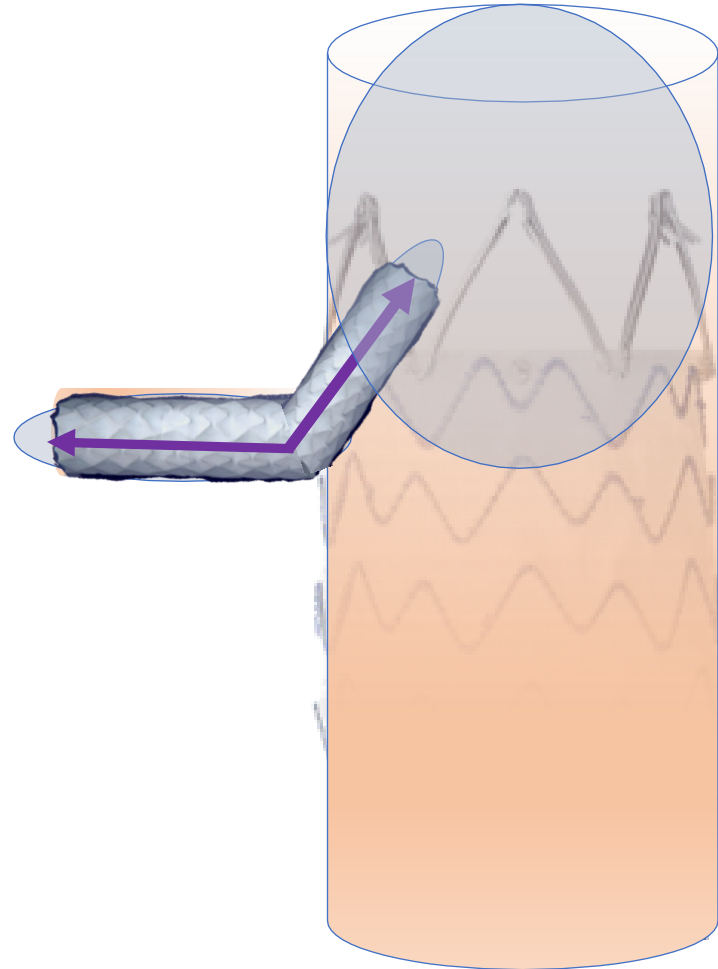
Balloon-expandable CS



*Taneva, Pitoulis, Donas, Rome,*



# Impact of renal angulation on chimney graft behavior



*Taneva, Pitoulas, Donas, Rome, I*



# Impact of endolining on chimney graft patency

## ORIGINAL ARTICLES

### Multicentre Experience with the Chimney Technique for Aneurysms in French University Hospitals

Joseph Touma <sup>a</sup>, Caroline Caradu <sup>b</sup>, Raphaëlle Sylvestre <sup>c</sup>, Nicla Settembre <sup>d</sup>, Fabrice <sup>e</sup>, Sabrina Ben Ahmed <sup>f</sup>, Benoit Lebas <sup>h</sup>, Julien Gaudric <sup>i</sup>, Jean-Marc Alsac <sup>j</sup>, Edouard W <sup>k</sup>  
Association Universitaire pour la Recherche en Chirurgie (AURC) Collaborators <sup>†</sup>


Endolining with a second bare metal 18  
stent

## Clinical Investigation

### Use of Stainless-Steel, Balloon-Expandable Chimney Grafts Is Durable Though Caution Is Required When Lining Angulated Renal Arteries

Gergana T. Taneva, MD<sup>1\*</sup> , Stefano Fazzini, MD<sup>2\*</sup> ,  
Marco Damiano Pipitone, MD<sup>2</sup>, Georgios Karaolanis, MD<sup>2</sup> ,  
Giovanni Torsello, MD<sup>2</sup> , Christoph Bremer, MD<sup>3</sup>,  
Martin Austermann, MD<sup>2</sup>, and Konstantinos P. Donas, MD<sup>1</sup>

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- Mainly in angulated renal arteries in combination with the Advanta V12
- Lining is associated with risk for ear



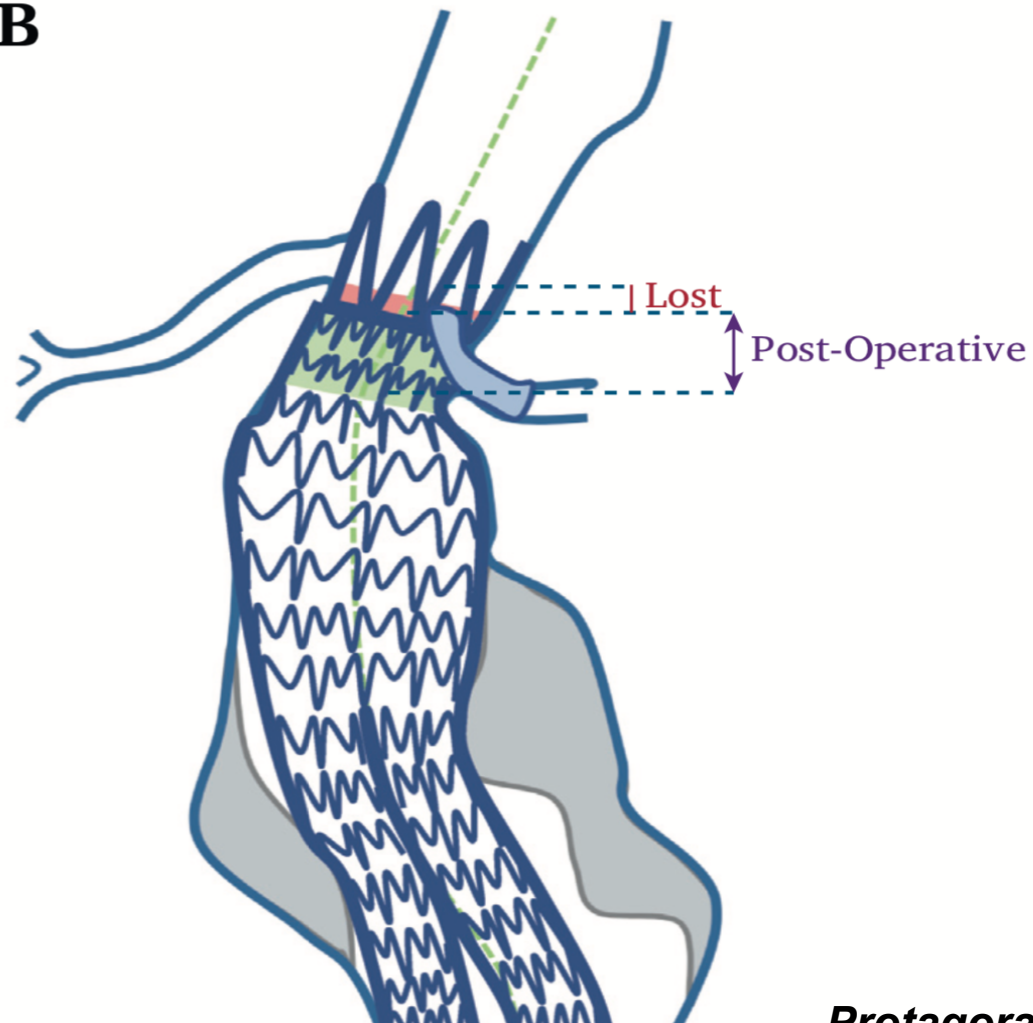


# Ch-EVAR Sizing: SEAL LENGTH

*keep  
in  
mind*

**3 mm  
Lost  
Neck**

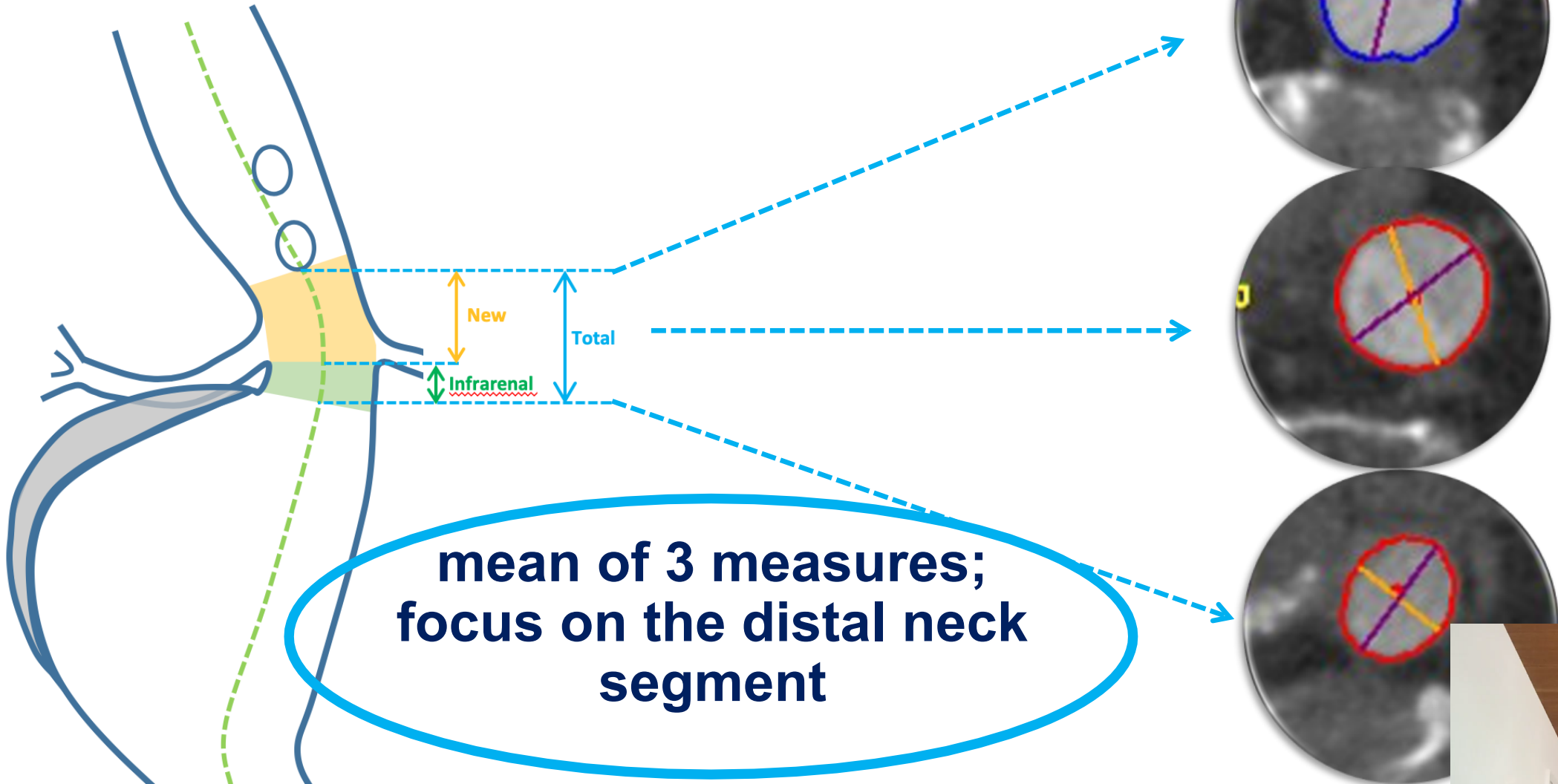
**B**



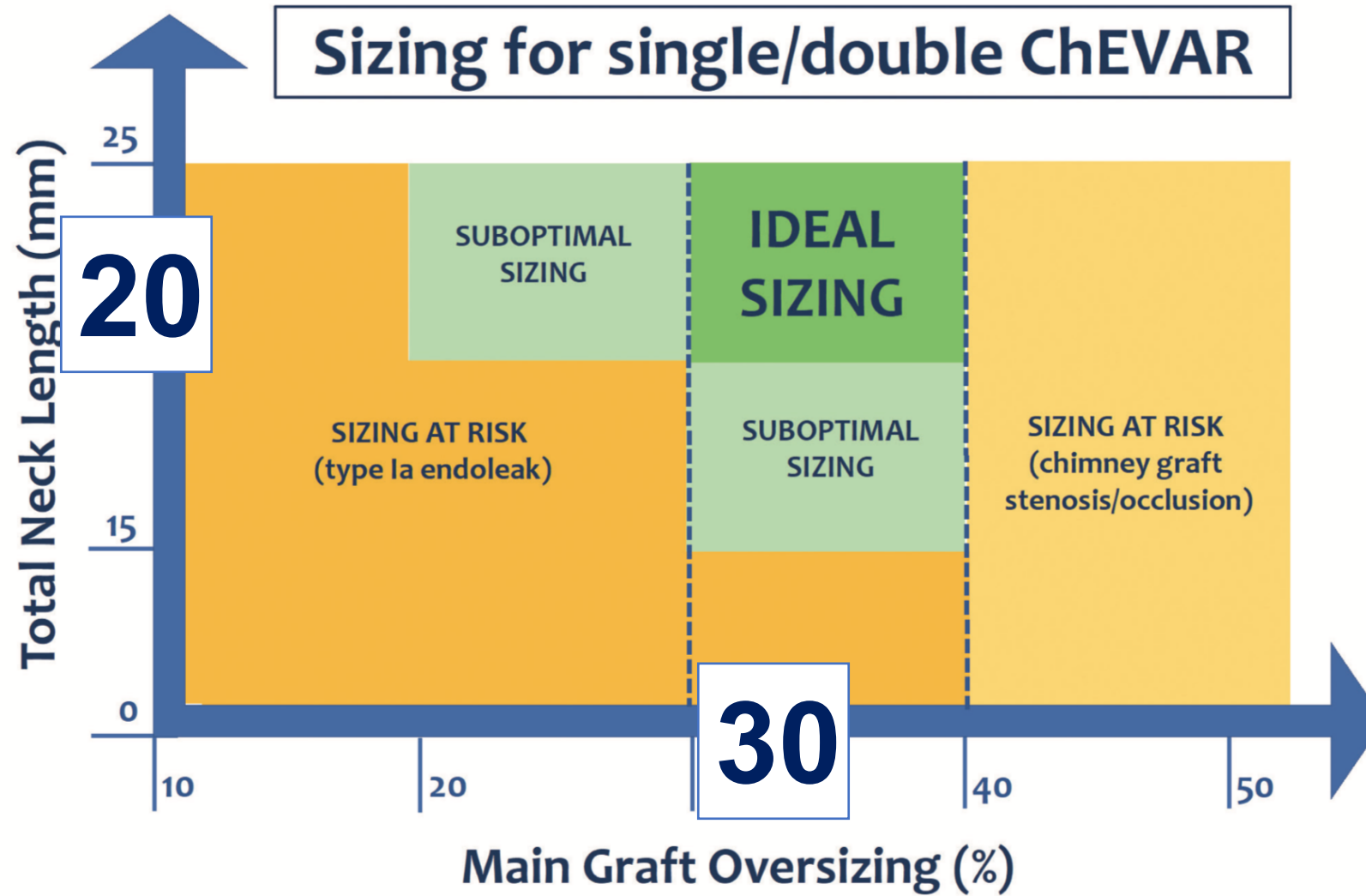
*Protagoras*



# NECK DIAMETER



# Ch-EVAR: IDEAL SIZING

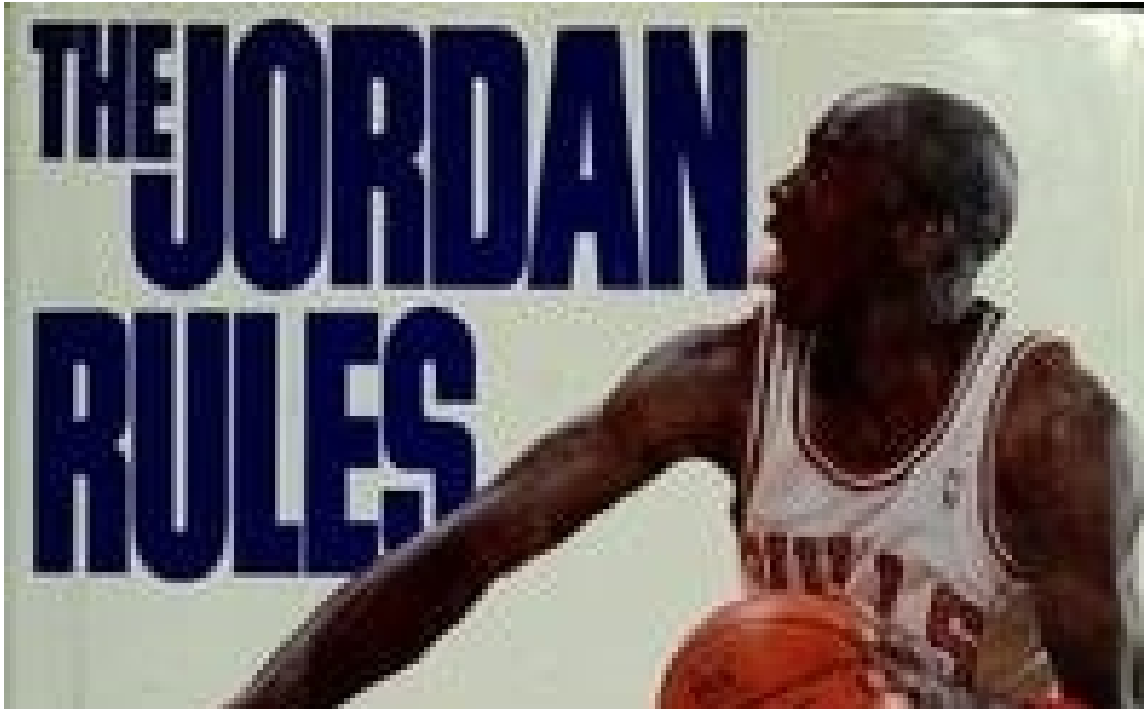


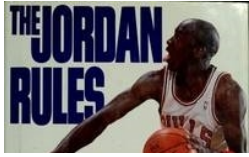
Protagoras





# Pistons defensive strategy





# The CHIMNEY RULES TO PREVENT FAILURES

- Use aortic stent graft with nitinol endoskeleton
- Use BECS with stainless steel or cobalt chromium as chimney graft
- Select aortic stent-graft with 30% oversizing of the seal zone diameter
- Create a dedicated endovascular nurse team





Following those rules, CHEVAR is also in a newly established Department of Vascular Surgery, as in Langen, successful

Combined use of lithotripsie for challenging access and CHEVAR for challenging neck

