

# EndoAnchors can facilitate and maintain successful standard EVAR for AAAs with challenging proximal necks



L. Mariano Ferreira  
Clínica La Sagrada Familia.  
Hospital Alemán de Buenos Aires  
Argentina





# Disclosure

Speaker name:

L. Mariano Ferreira

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)
  
- I do not have any potential conflict of interest

# Endoanchors for patients without suitable anatomy



- Are we applying EndoAnchors to facilitate and maintain successful standard EVAR for AAAs with challenging proximal necks?

**YES**

- Are we creating a neck with endoanchors?

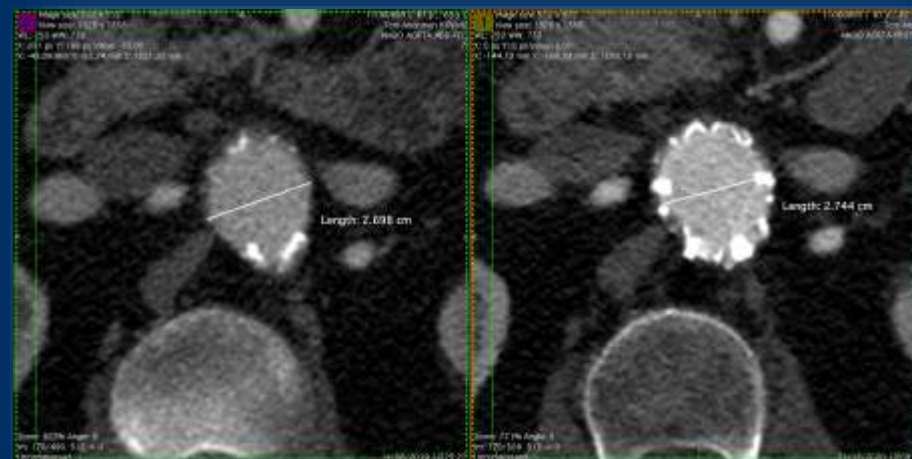
**Sometimes,**

**(Dilemma between proximal neck versus sealing zone)**



# Four Subjects

- Why ESAR?
- In whom?
- Preliminary Anatomical Study
- Importance of Technical Details



*Preserve the proximal neck anatomy*

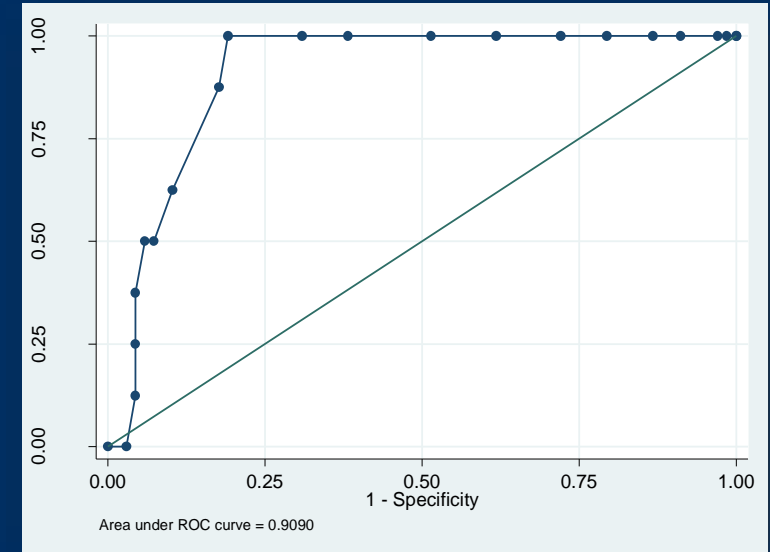


*Shrinkage of the aneurysmal sac*



# Why ESAR (Endosuture Aneurysm Repair)?

- Standard EVAR is not enough for patients with
  - Unsuitable proximal neck anatomy
  - Proximal neck within the IFU but with high risk of late endoleaks ( $\geq 30\text{mm}$  diameter)
  - Spanos et al: 9% incidence of proximal migration after infrarenal EVAR over a 3-year period, 22% were accompanied by a type Ia endoleak.
- FEVAR is too aggressive for patients with infrarenal AAA
  - Mortality  $< 5\%$
  - Morbidity  $\approx 15\%$  (associated to renal complications, like insufficiency, occlusion, stenosis, kinking, redo)



- Per ROC curve analysis, a diameter greater than or equal to 30mm at D5 (1cm below the LRA) was identified as the best cutoff point to the risk of late type IA endoleak (sensitivity 87.5% and a specificity of 82%, LR +5 and LR-0.15).  
Ferreira LM et al. RSAC 2018



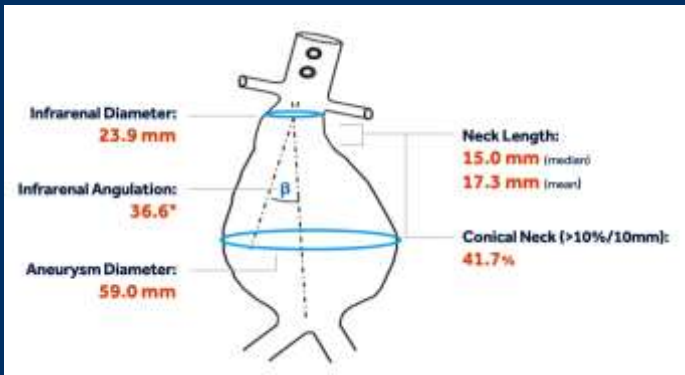
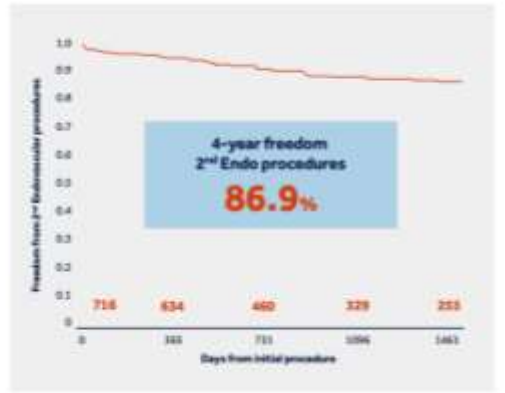
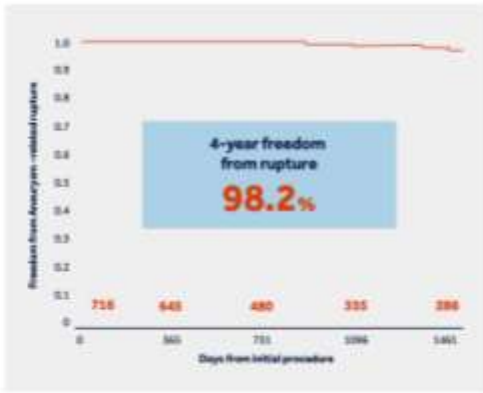
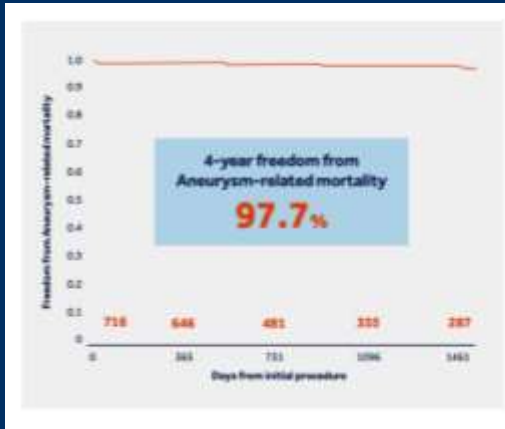
# ANCHOR Registry: Primary Arm (N=716 pts)



**88.6%**

Hostile necks:

- <15mm
- >28mm
- >60°
- Conical
- Ca2+/  
Thrombus >50%



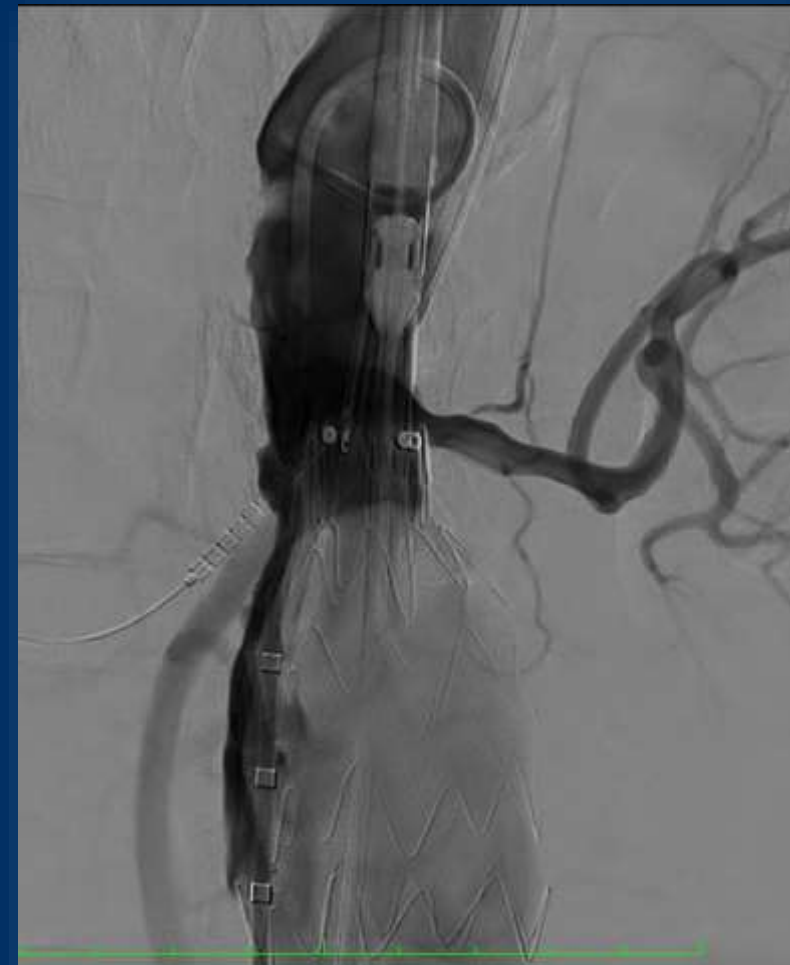
**88.6%**

Hostile necks:

- No migration through 4 years
- Type IA endoleak at 4 years: **3.4%** (4/117)
- Through 4 years, freedom from 2<sup>nd</sup> Endo Proc to treat Type IA's: **97.7%**

# In Whom?

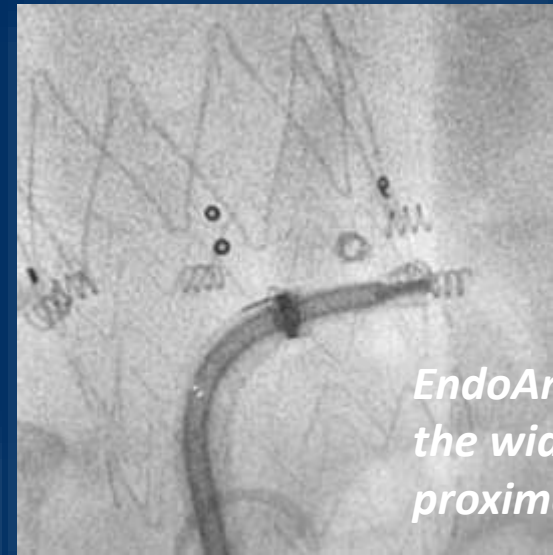
- Patients with
  - *Wide and Conical Necks*
    - Apposition of the endograft for  $\geq 10\text{mm}$
  - *Enlarging necks during FU*
    - PN more than 32mm diameter or associated to sac enlargement due to type II endoleaks
- *Patients with high risk of endoleak due to clinical factors*
  - Anticoagulation therapy, who will have a difficult follow up, “fragile” people with high risk to be re-intervened or followed up or “young” patients





# Wide and long Neck

- 65 y/o male. PMH: Stable CAD and HIV+ with enlarging AAA



*EndoAnchors at the wide proximal neck*

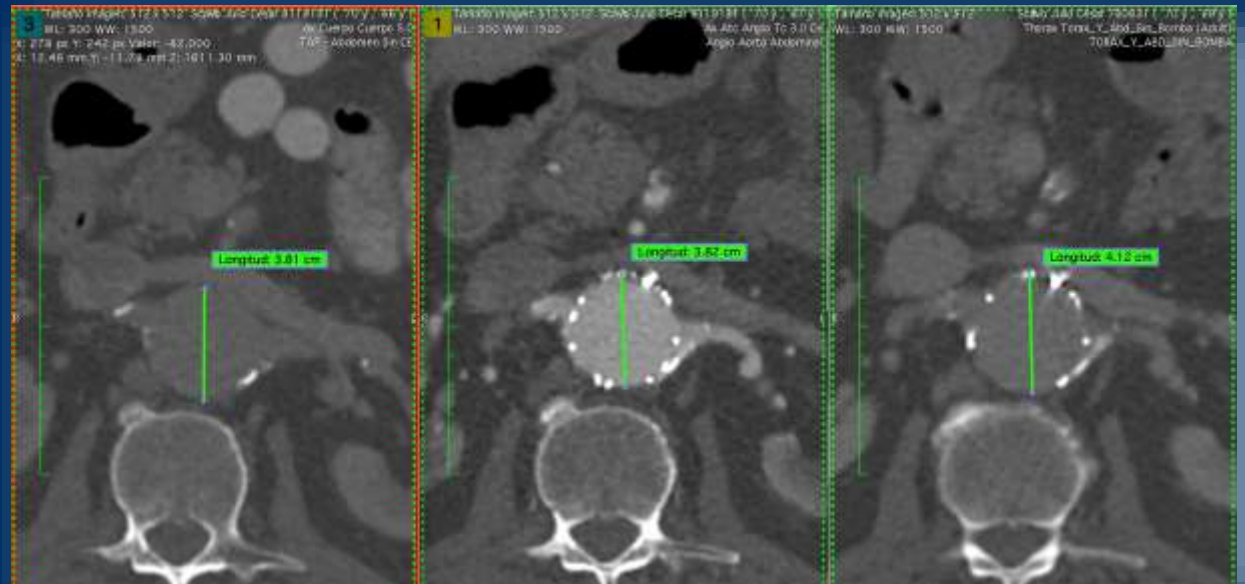
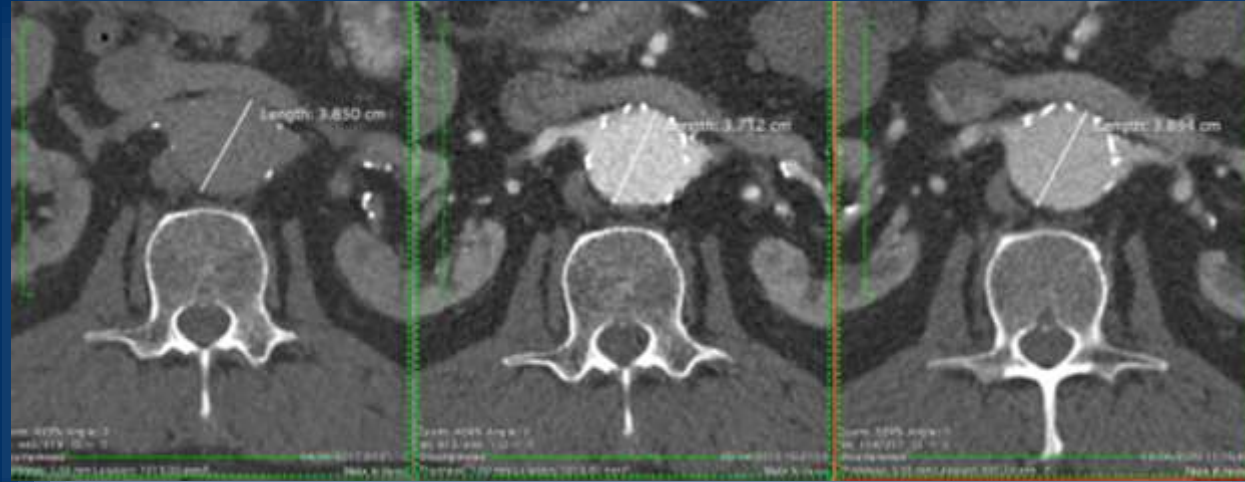


*Endograft deployment*

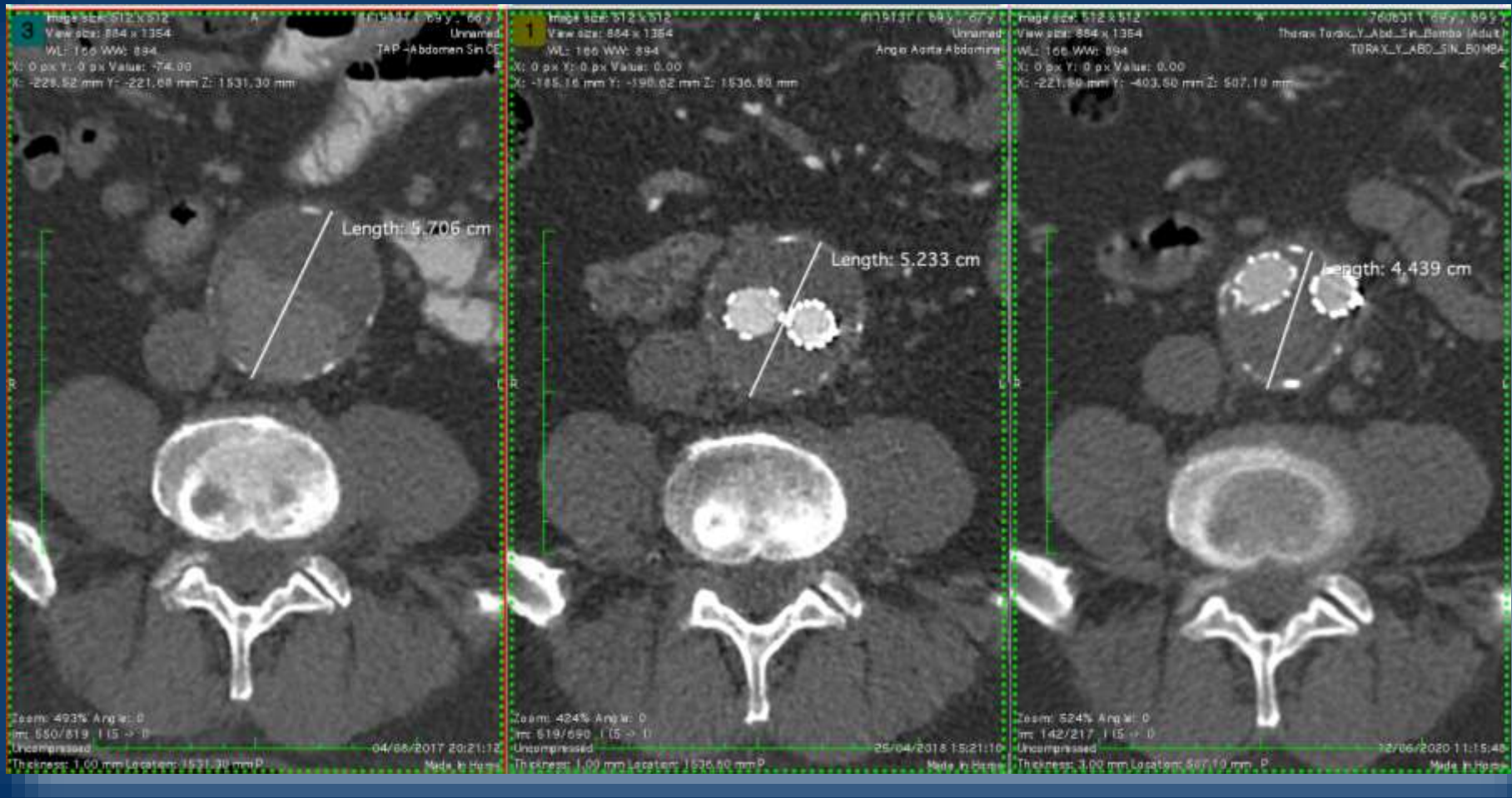


*Completion Angiogram*

Mild dilatation of the pararenal aorta and the proximal infrarenal neck without a proximal endoleak after 3 years



# Shrinkage of the aneurysmal sac

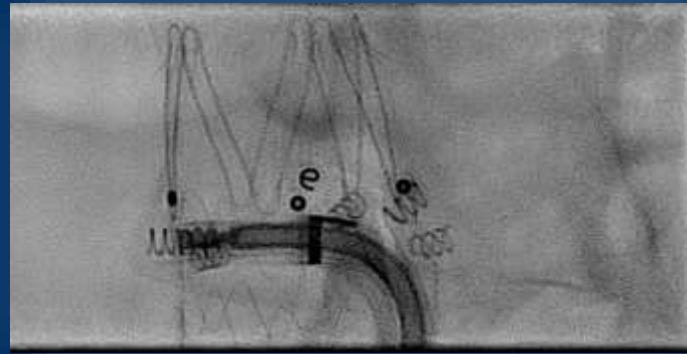


*June 2017*

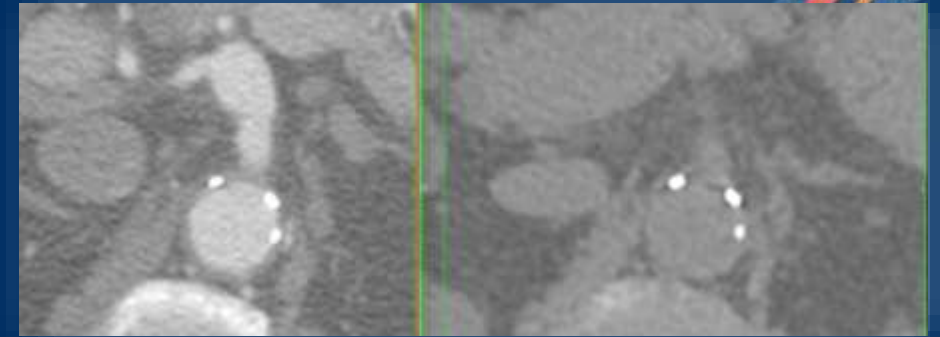
*April 2018*

*June 2020*

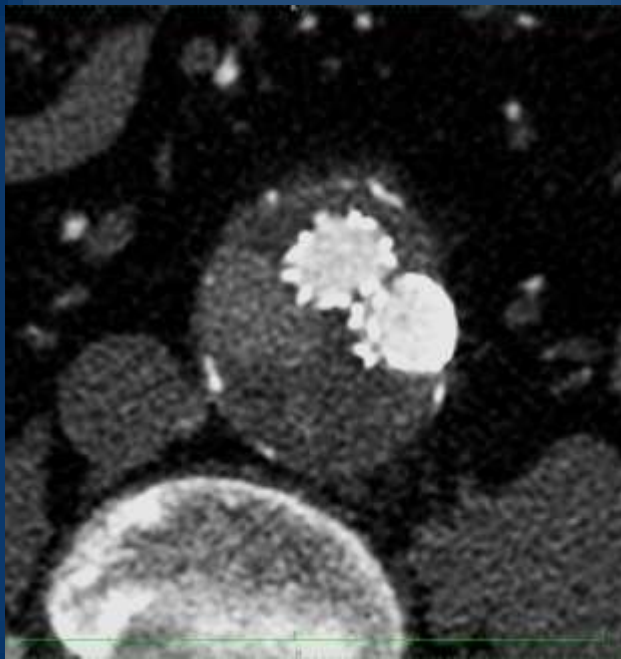
Enlargement of the proximal neck with a type II endoleak and **enlargement of the sac >10mm**



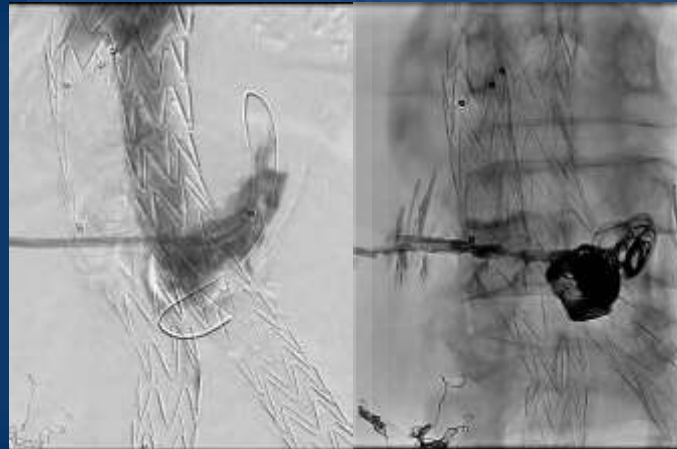
**EndoAnchors at the proximal neck**



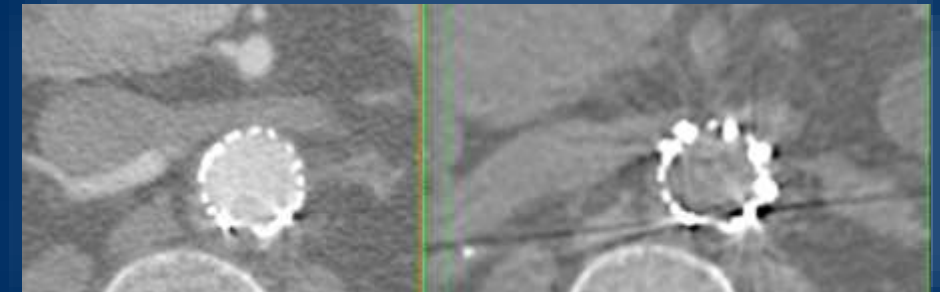
**No migration**



**Type II Endoleak**



**Embolization of the TIEEL w/coils y Onix®**



**No enlargement of the neck**

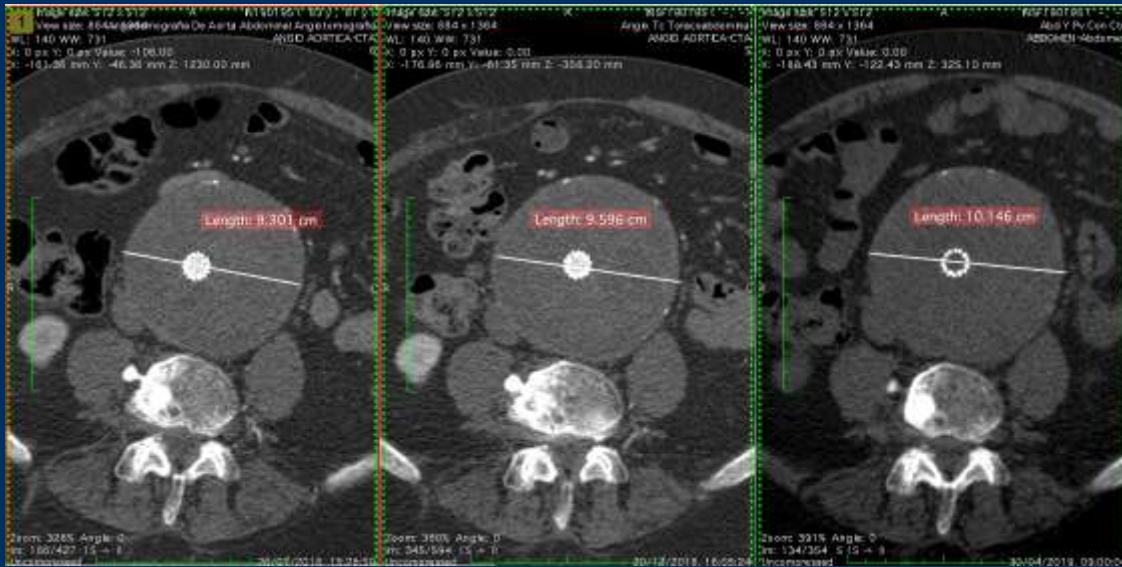


**Shrinkage of the sac**

# Open Surgical Conversion due to endotension



- 1st STEP
  - R retroperitoneal approach
  - Banding of the CIA



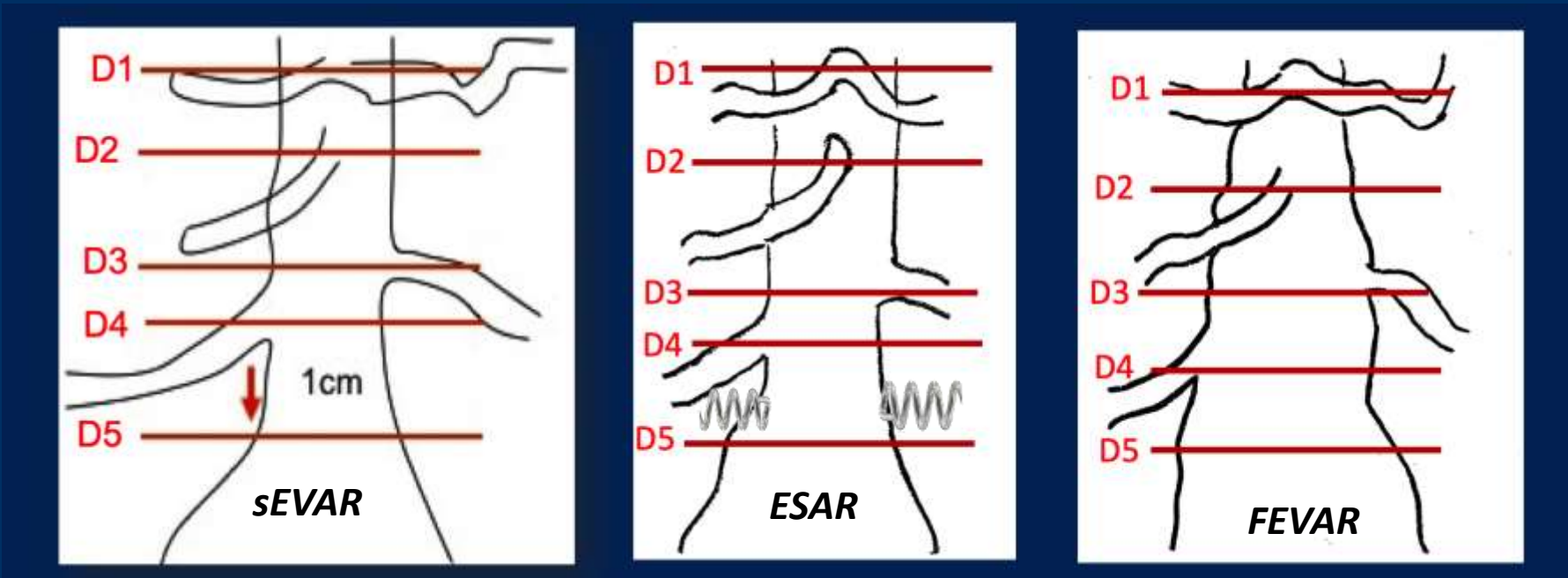
# Open Surgical Conversion

- 2nd Step
  - L retroperitoneal mini-laparotomy
  - sacotomy,
  - Ligation of the IMA, upper lumbar arteries and oversew of the sac wall



# Preliminary Anatomical PN Analysis

- The aortic diameters were measured, at the level of the celiac trunk (D1), superior mesenteric artery (D2), renal arteries (D3 and D4), 1 cm below the lowest renal artery (D5), maximal aneurysmal sac (D6).
- Preoperative and last follow-up aortic diameters were compared by paired t-test.



# Preliminary Anatomical Analysis of the Yuxtarenal aorta

- Yuxta-visceral aortic dilatation was universal in the three groups from D1 to D4.
- At the level of D5 (1cm below LRA), while in the EVAR group the aorta underwent a statistically significant growth [ $25.18 \pm 5.55\text{mm}$  vs  $27.45 \pm 6.64\text{ mm}$  ( $p = .01$ )], in the ESAR group the aortic neck remained stable [ $30.91 \pm 8.53$  vs  $32.27 \pm 10.46\text{ mm}$  ( $p = .16$ )], and in the FEVAR group, D5 increased the diameter from  $32.22 \pm 7, 51\text{ mm}$  ( $p = .08$ ), again without significance.







# Technical Details

- The only predictor on multivariate analysis for two or more EndoAnchors with inadequate aortic wall penetration was being an occasional user.

*J Cardiovasc Surg* (Torino). 2020 Dec;61(6):738-744. doi: 10.33774/ISSN1569-333315248-6. Epub 2020 Jun 19.

**Predictors of inadequate EndoAnchors aortic wall penetration for the Endosured therapy in hostile neck patients**

Andrea Reyes Galbala T, Africa Ouzar Santos F, Georges Pissolun R J, Driozzi Azeil Santos A, Julia Osella Duska S, Claudio Gerónimo Zúñiga J

ABSTRACT + expand

PMID: 32624635 DOI: 10.33774/ISSN1569-333315248-6

**Abstract**

**Background:** The use of EndoAnchors is increasing; however, not much about appropriate use in terms of aortic wall penetration (AWP) is described. We aim to evaluate the procedural and anatomical conditions related with borderline (B) or absence (A) of AWP when checked on first CT-scan after the Endosured aortic repair (ESAR) for hostile neck anatomies (HNA).

**Methods:** This study with NCT04730489 is a single-center prospective evaluation of patients receiving EndoAnchors for prevention or treatment of a proximal EVAR failure. AWP was evaluated on first CT-scan and findings correlated with neck anatomical features and procedural data. The sum of borderline and absence of AWP was considered as inadequate - in AWP (InAwp). Adjunctive procedures, reinterventions, all-cause mortality, absence of type Ia-III, and aneurysm-related mortality are also described.

**Results:** Forty-eight patients were treated during the study period and 62 high-surgical-risk patients were finally included in the study for analysis with at least one HNA criteria (88%) and associated type Ia-III or even type Ia-III. A total of 232 EndoAnchors were deployed at a median 6 frange, 4-10) per case. From those, 31 (13.3%) achieved B-AWP and 11 (4.7%) achieved A-AWP (total 18.0%) EndoAnchors with InAwp. Univariate analysis showed being an occasional user and a therapeutic case as predictor for at least one and none failures. The only predictor on multivariate analysis for two or more EndoAnchors with InAwp was being an occasional user. Cumulative survival and freedom from type-Ia-III at 2-years was 84% and 95% respectively.

*J Cardiovasc Surg*  
(Torino). 2020  
Dec;61(6):738-744.

## In this subcohort of ANCHOR patients, almost 30% of the EndoAnchor implants had maldeployment

**Analysis of the position of EndoAnchor implants in therapeutic use during endovascular aneurysm repair**

Selma S, Douchkova Y, Mota T, Kim van Houten JHC, Garcia Z M, Sarmiento BA, Alvarez Daniel AG, Williams D, Sison D, INC, Jones M, Pavlovich MC, Cornelia H, Duma M, PND, and Juan-Pedro R de los Angeles MD. *J Cardiovasc Surg*. 2019;69:1726-35.

**ABSTRACT**

**Objective:** The aim of this study was to analyze the position of EndoAnchor implants in patients with EndoAnchor implants for the prevention of proximal EVAR failure.

**Methods:** Thirty-one patients had received proximal EVAR devices (ESAR) and EndoAnchor implants (EA) were included in the study. EndoAnchor implant position was defined as the absence of 4 frange in analysis or the total appropriate placement respectively, both after the Endosured aneurysm repair procedure. Preimplant malposition along the axis reference was assessed at the first postoperative computed tomographic scan and measured in degrees angle and upper to determine the malposition such that the angle was translated to 0 degree. The position and penetration of each EndoAnchor implant were measured in the first 3 months postoperative. EndoAnchor implants were divided into the upper and lower part. Distribution of malposition, distance of malposition, and angle of malposition were analyzed. The difference between the angle of malposition and the angle of malposition between the implant and the wall of the aorta was also measured. The difference of malposition was measured by each EndoAnchor implant was divided as malposition angle. It was also the ratio of malposition between the angle of malposition and the angle of malposition in malposition of the EndoAnchor implant before the axial scan.

**Results:** A total of 75 EndoAnchor implants had maldeployment and most maldeployment occurred in the lower part. After EndoAnchor implantation the average angle of malposition was 13.8 degrees (range 0-26) and a 15% of maldeployment occurred in the lower part. The angle of malposition was significantly different between the upper and lower part of the EndoAnchor implant. The angle of malposition was significantly different between the upper and lower part of the EndoAnchor implant. The angle of malposition was significantly different between the upper and lower part of the EndoAnchor implant.

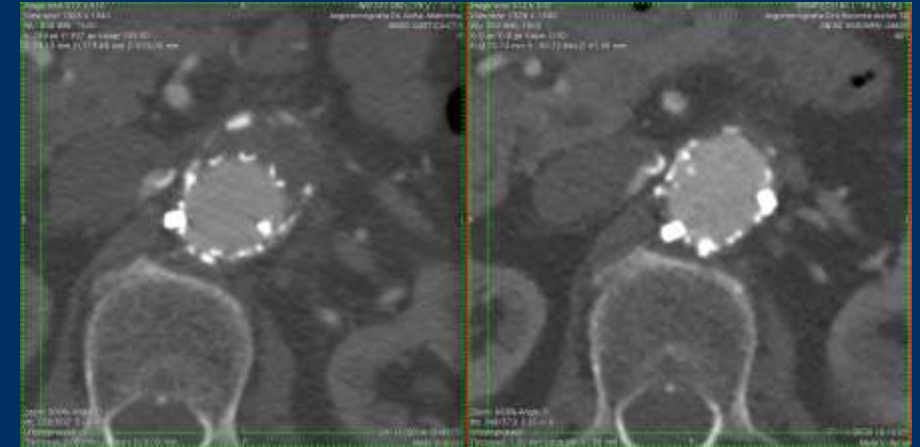
**Conclusions:** In this subcohort of patients with EndoAnchor implants for the prevention of proximal EVAR failure, almost 30% of the EndoAnchor implants had maldeployment. The angle of malposition was significantly different between the upper and lower part of the EndoAnchor implant. The angle of malposition was significantly different between the upper and lower part of the EndoAnchor implant.

**Keywords:** Endovascular repair; Endovascular aneurysm repair; Malposition; Aortic aneurysm; Type II aortic aneurysm.

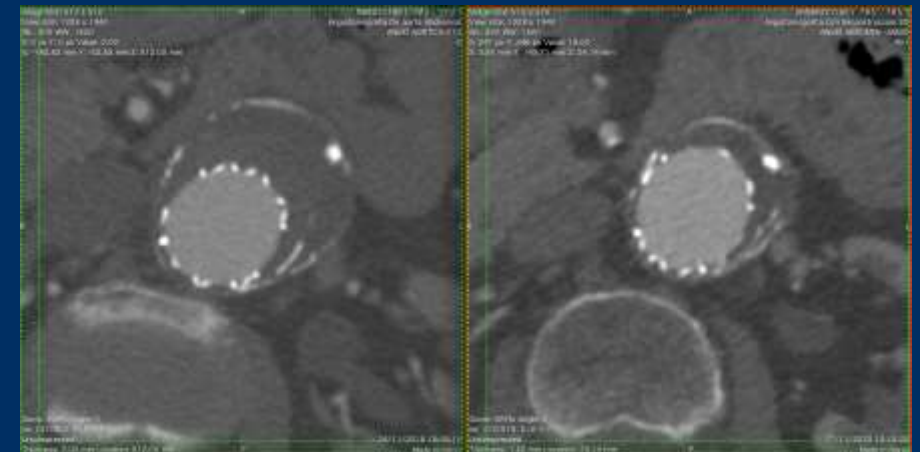
*J Vasc Surg*  
2019;69:1726-35

# Conclusion – Endoanchors

- Our mid-term experience suggests that EAs can stabilize high-risk seal zones, with significant sac regression.
- ESAR has shown low rates of migration and type I endoleak, probably reflecting the absence of significant dilatation of the yuxtarenal aorta
- However, EA use in hostile neck anatomy should not be considered an easy approach. Maldeployment can be prevented by careful preoperative planning and measured intraoperative deployment.



*Proximal Neck (D5)*



*Sac shrinkage*