



Actualización en EVAR

Oscar A. Mendiz.MD. FACC. FSCAI
Director Cardiology & Cardiovascular Institute (ICyCC)
Chief Interventional Cardiology Department
Hospital Universitario Fundación Favaloro

Caren G. Solomon, M.D., M.P.H., *Editor*

Management of Abdominal Aortic Aneurysms

Andres Schanzer, M.D., and Gustavo S. Oderich, M.D.

This Journal feature begins with a case vignette highlighting a common clinical problem. Evidence supporting various strategies is then presented, followed by a review of formal guidelines, when they exist. The article ends with the authors' clinical recommendations.

Andres Schanzer et al. **N Engl J Med. 2021 Oct 28;385(18):1690-1698.**
doi: 10.1056/NEJMcp2108504.

Management of Abdominal Aortic Aneurysms

This was the most read scientific article of November on Solaci.org!!!



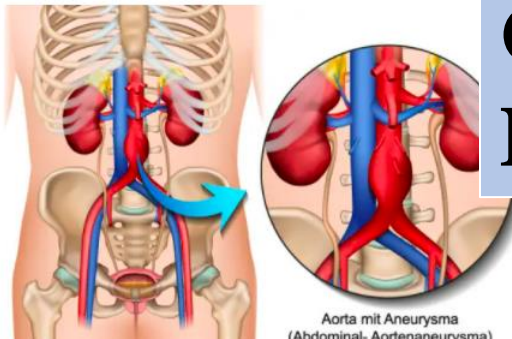
Manejo de los aneurismas de aorta abdominal en
2021



More than 10000 clicks on
this article !!!!

16 / 11 / 2021

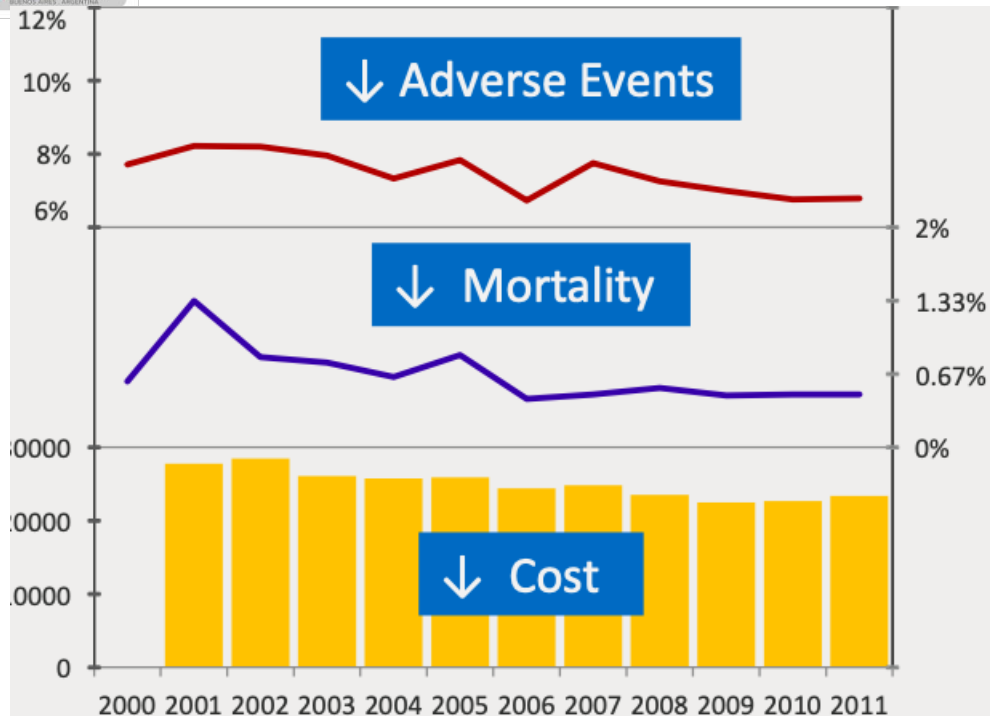
inal son aquellos que tienen un **diámetro aórtico de más de 3 cm**. Su
a y posterior muerte por hemorragia. En consecuencia, el objetivo del
ntes de la rotura.



Coincidence ? Lack of information ?

Con energía y una vigilancia estrecha, cada caso clínico
ha hecho que este diámetro de 5.5 cm represente un corte
adecuado. En este sentido, **vigilar estrechamente los
aneurismas con un diámetro inferior a 5.5 cm es seguro
y costo efectivo.**

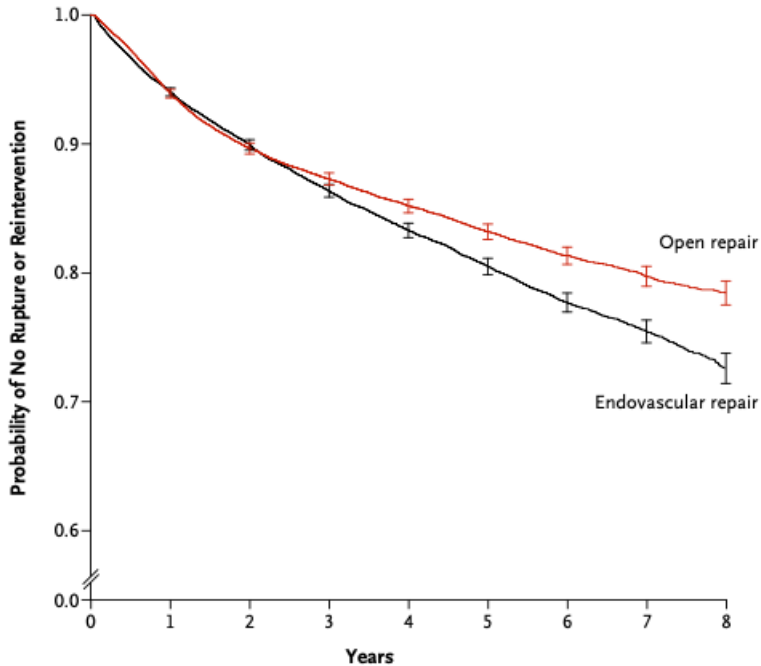
EVAR Trends and Cost Effectiveness



↑ Value
(Value = Quality/Cost)

The perioperative outcomes of EVAR improved significantly despite a higher prevalence of comorbidities among patients undergoing repair. Concurrently, procedure-associated costs declined

Long-Term Outcomes of Abdominal Aortic Aneurysm in the Medicare Population



Endovascular repair, as compared with open repair, of abdominal aortic aneurysm **was associated with a substantial early survival advantage** that gradually decreased over time.

The rate of late rupture was significantly higher after endovascular repair than after open repair.

The outcomes of endovascular repair have been improving over time.



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Buenos Aires - ARGENTINA

If there is some lack of information for AAA that are easy to fix, what about those with hostile anatomy?

hostile anatomy;
to fix, what about those with

Persistent EVAR Challenges: Hostile Neck Anatomy

- Short Aortic Necks (<15mm)
- Reverse Tapered Necks
- Calcium
- Thrombus
- Severe Angulation
- Large Diameter

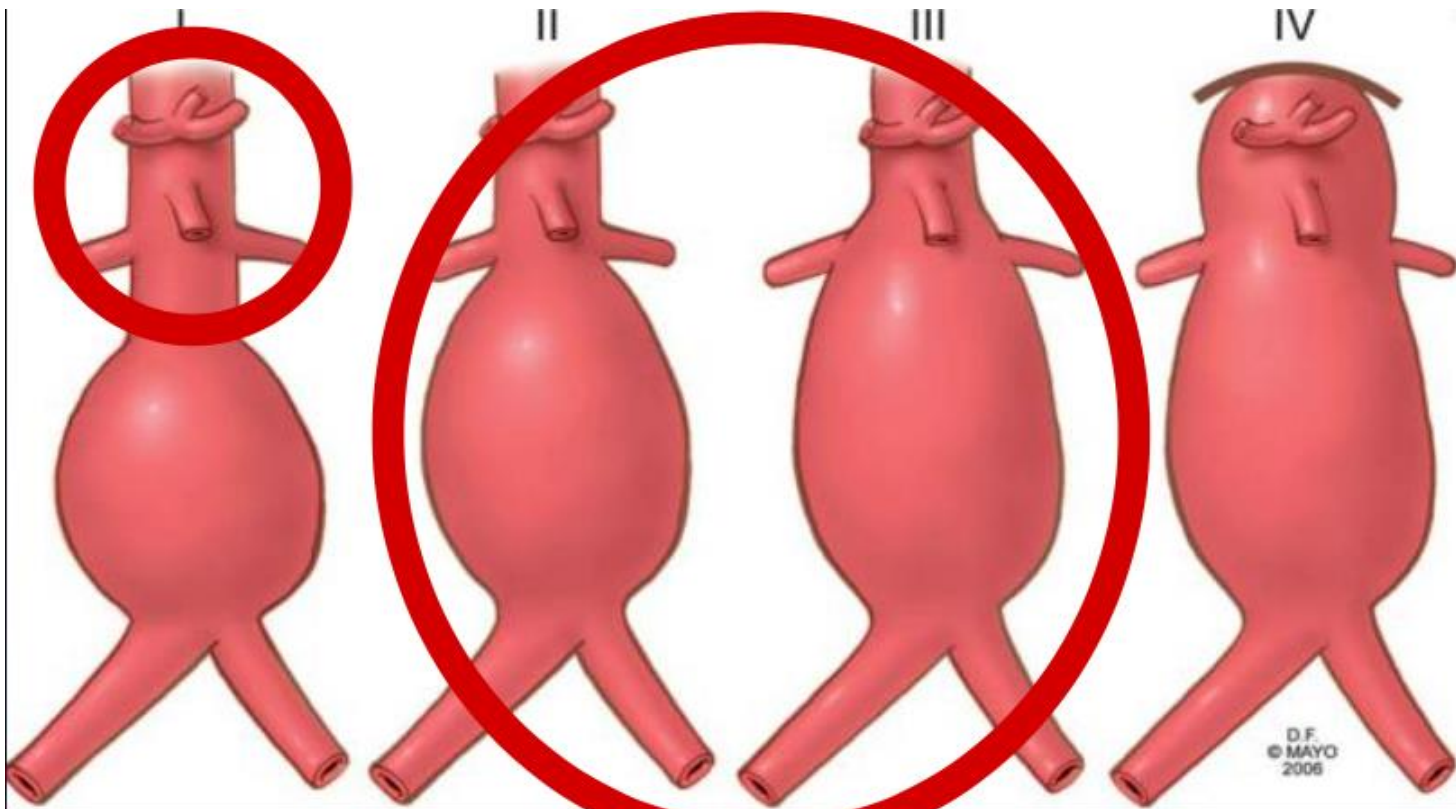
Almost half of all patients and 63% of women have a hostile neck anatomy

What place would you choose to land?



HERE OR HERE?

Types of AAA



D.F.
© MAYO
2006

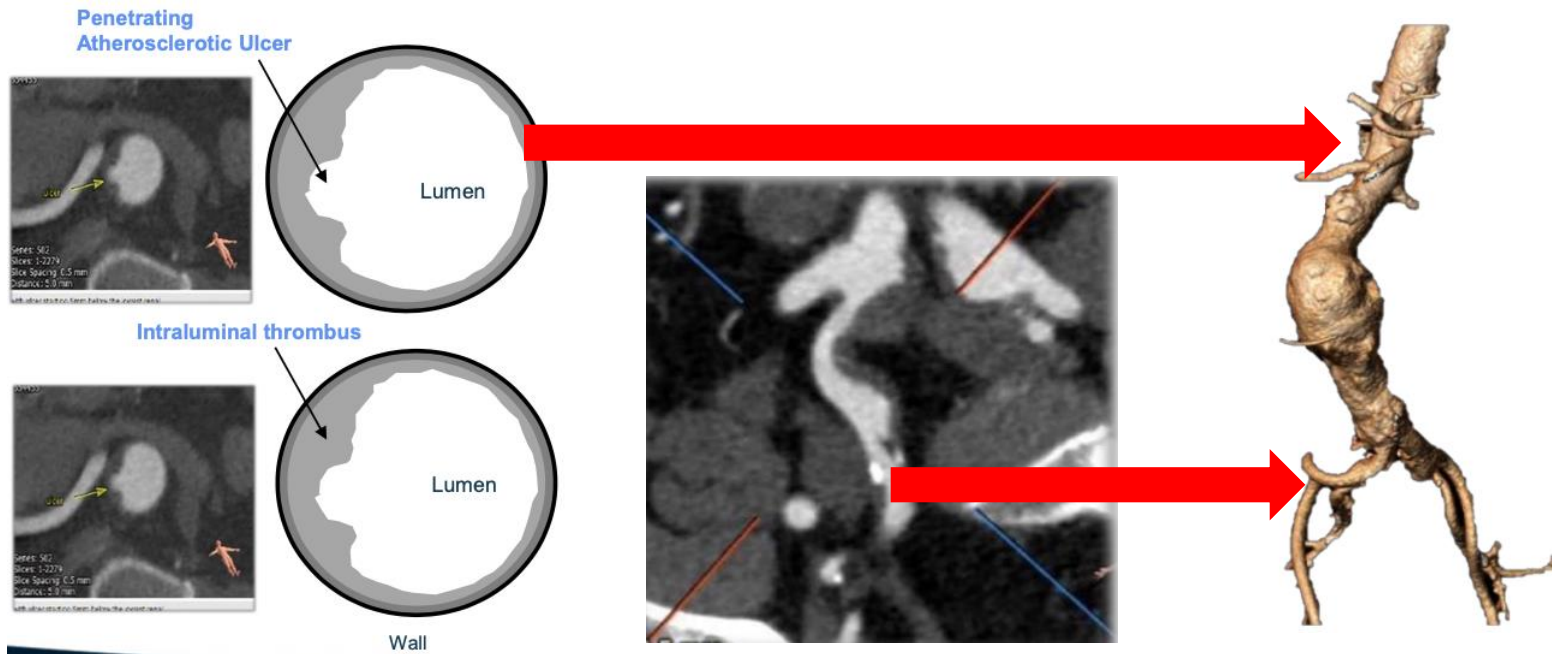
Infra **Juxta – Para** **Supra**



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Yuxtarenal Aneurysms

Hostile Anatomy



- Hostile neck anatomy is associated with perioperative type 1 endoleaks and lower survival undergoing elective EVAR
De Guerre et al. (2019).
 - Conical Neck is strongly associated with proximal failure in standard EVAR
Pitoulas et al. (2017).
 - CIA tortuosity and calcification are associated with early type 1B endoleak
Choi et al.(2021)

Hostile Anatomy Toolbox?



Type I endoleak and/or migration

What have been our options?

- Ballooning.
- Cuffs.
- Palmaz Stents.
- Coils.
- Onyx.

Standard techniques cannot seal the endoleak?
Patients are unfit for FEVAR or surgical conversion?
Enlarging the toolbox may be the solution.

Cook Zenith Fenestrated (Z-Fen)

Scallop

Scallops along the graft's proximal edge are 10 mm wide and 6–12 mm high.



Small Fenestration

Small fenestrations are 6 mm wide and 6 or 8 mm high.



Large Fenestration

Large fenestrations range from 8–12 mm in diameter.



Results of the United States multicenter prospective study evaluating the Zenith fenestrated endovascular graft for treatment of juxtarenal abdominal aortic aneurysms

Freedom from adverse event, Kaplan-Meier estimate (standard error)

	<i>Aneurysm growth^a</i>	<i>Endoleaks^a</i>	<i>Secondary interventions</i>	<i>MAEs</i>	<i>All-cause mortality</i>
12-month	1.000 (0) (n = 63) (e = 0) (c = 4)	0.668 (0.058) (n = 41) (e = 22) (c = 4)	0.908 (0.036) (n = 57) (e = 6) (c = 4)	0.896 (0.037) (n = 58) (e = 7) (c = 2)	0.970 (0.021) (n = 63) (e = 2) (c = 2)
24-month	1.000 (0) (n = 49) (e = 0) (c = 18)	0.652 (0.059) (n = 31) (e = 23) (c = 13)	0.844 (0.045) (n = 41) (e = 10) (c = 16)	0.862 (0.043) (n = 44) (e = 9) (c = 14)	0.952 (0.027) (n = 49) (e = 3) (c = 15)
36-month	0.935 (0.044) (n = 28) (e = 2) (c = 37)	0.626 (0.062) (n = 18) (e = 24) (c = 25)	0.781 (0.060) (n = 22) (e = 12) (c = 33)	0.791 (0.056) (n = 24) (e = 12) (c = 31)	0.907 (0.041) (n = 30) (e = 5) (c = 32)
48-month	0.935 (0.044) (n = 18) (e = 2) (c = 47)	0.626 (0.062) (n = 12) (e = 24) (c = 31)	0.683 (0.083) (n = 14) (e = 14) (c = 39)	0.791 (0.056) (n = 17) (e = 12) (c = 38)	0.907 (0.041) (n = 19) (e = 5) (c = 43)
60-month	0.880 (0.068) (n = 12) (e = 3) (c = 52)	0.626 (0.062) (n = 7) (e = 24) (c = 36)	0.631 (0.092) (n = 9) (e = 15) (c = 43)	0.791 (0.056) (n = 13) (e = 12) (c = 42)	0.907 (0.041) (n = 14) (e = 5) (c = 48)

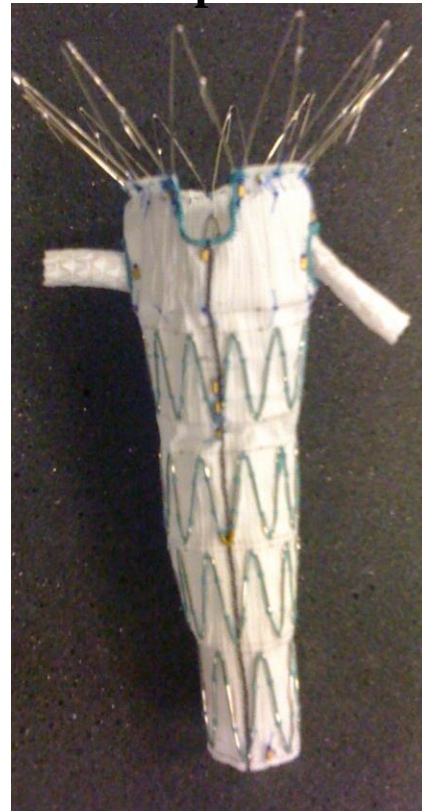
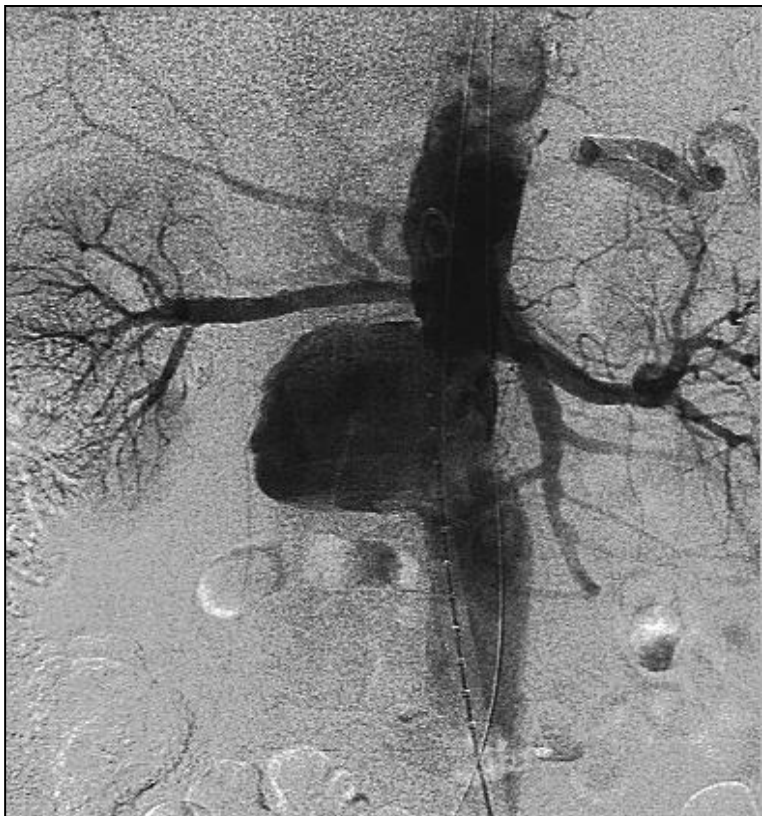
This prospective study demonstrates that endovascular repair of juxtarenal AAAs with the Zenith fenestrated AAA stent graft is safe and effective. Mortality and morbidity are low in properly selected patients treated in centers with experience in these procedures

Z-FEN Limitations

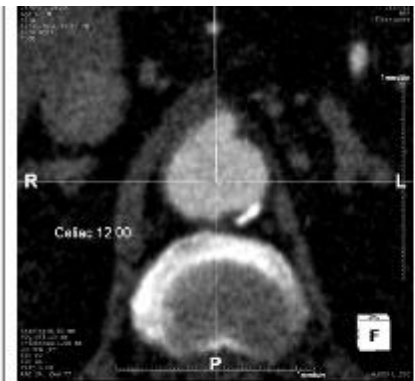
- 4mm infrarenal neck.
- Build restrictions based on visceral vessel topography, clock face orientation, graft diameter.
- Max 3 vessel build.
- Elective cases only – 4-8 weeks from order to delivery.

Juxtarenal pseudoaneurysms: Fenestrated Graft

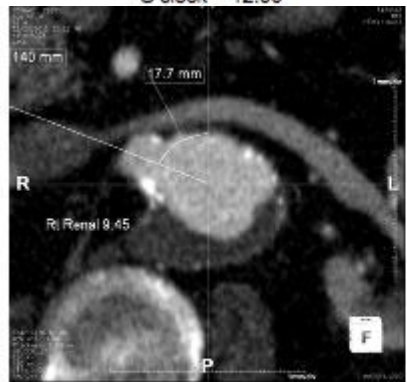
**EVAR Device + Covered
Balloon expandable ST**



Fenestrated Endografts: Selection & Sizing Technique



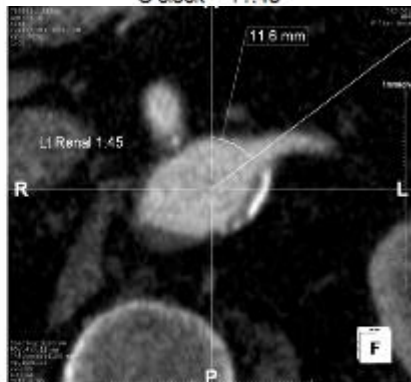
Celiac Trunk
O'clock = 12:00



Rt. Renal Artery
O'clock = 9:45



SMA
O'clock = 11:45



Lt. Renal Artery
O'clock = 1:45

WILLIAM A. COOK AUSTRALIA PTY. LTD.
 95 Danks Street, Danks Technology Park, Danks Mills Pt.
 St. Ives, QLD 4419 AUSTRALIA. Phone: +61 7 5341 1114
 www.cookmedical.com

ZENITH® AAA ENDOVASCULAR GRAFT WORK SHEET

NOTE: This is a photocopying thick document may cause distortion.

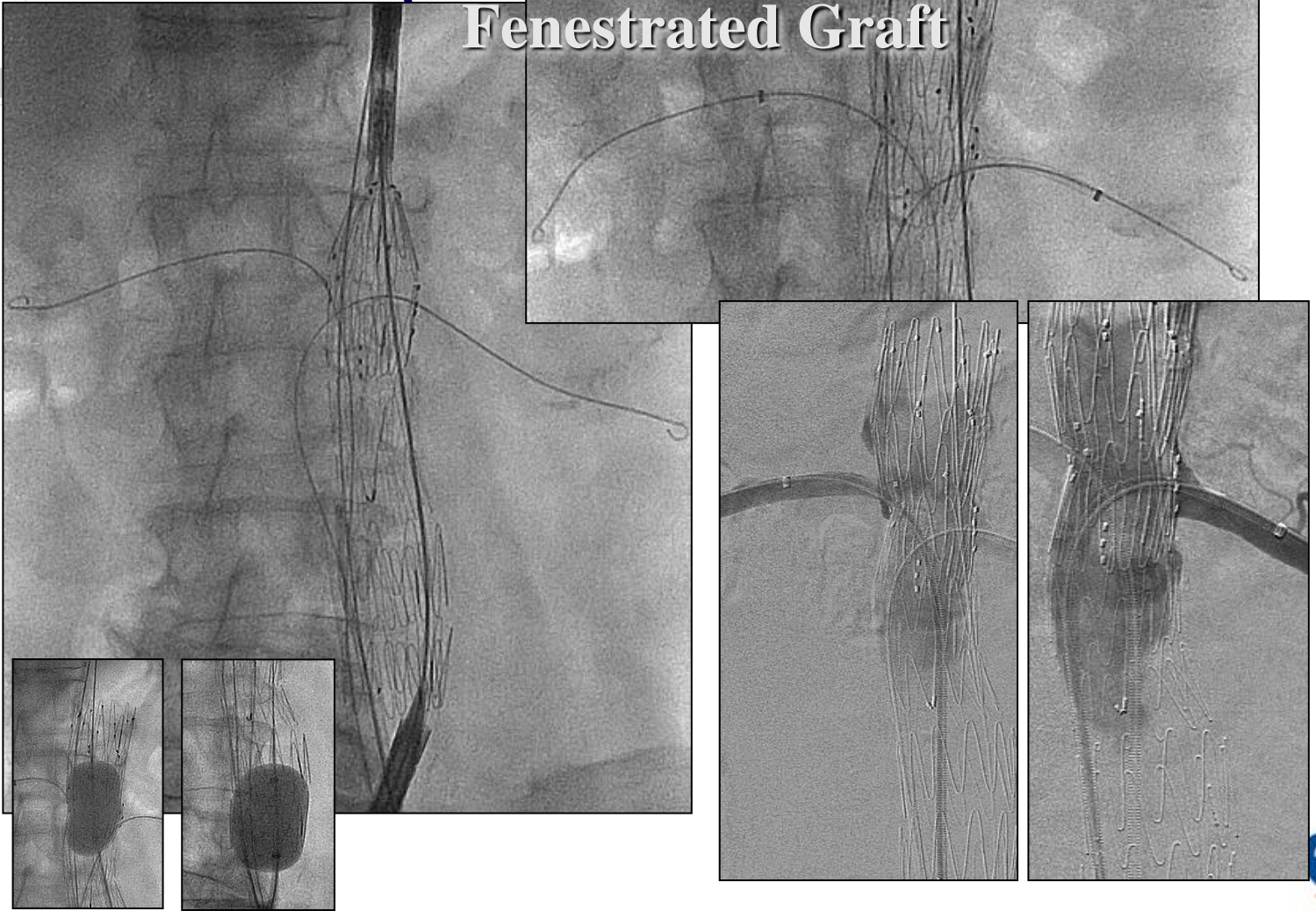
ICIAN: Dr. Oscar Mendiz PATIENT CODE: XXXXXXXXXX

ac = 6.5mm
 \ = 7.5mm
 renal = 5.5mm
 lenal = 5mm

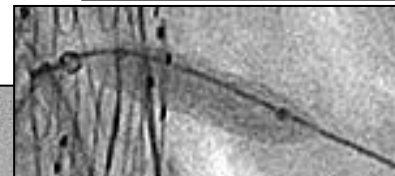
CTA EXAM DATE 12/15/2011

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 HOSPITAL UNIVERSITARIO

Fenestrated Graft



Fenestrated Graft

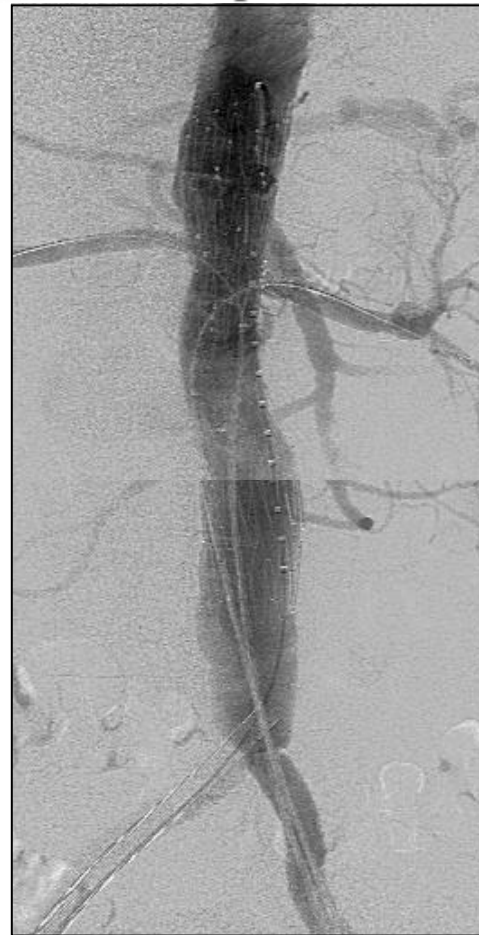


Renal stenting with balloon expandable stent

Fenestrated Graft

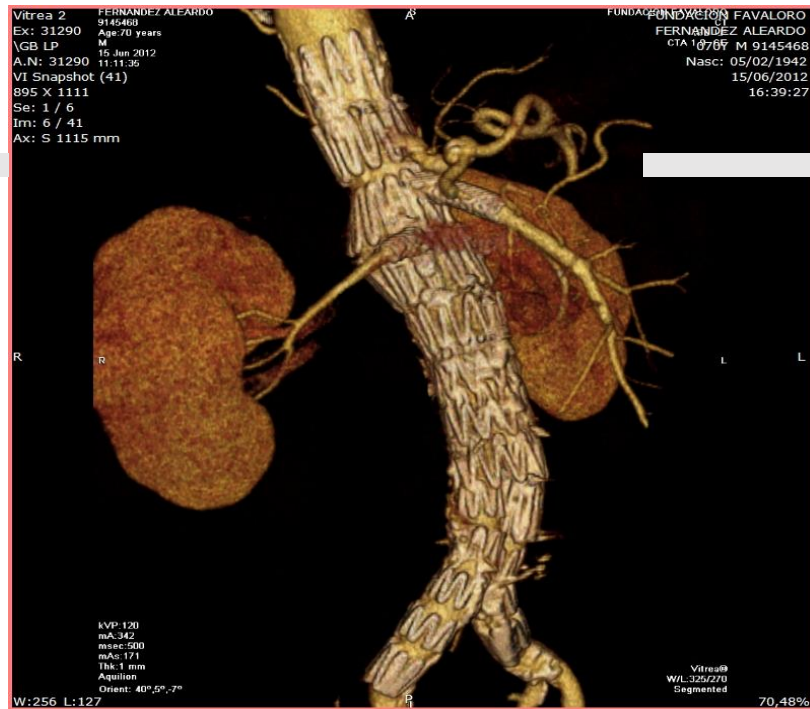
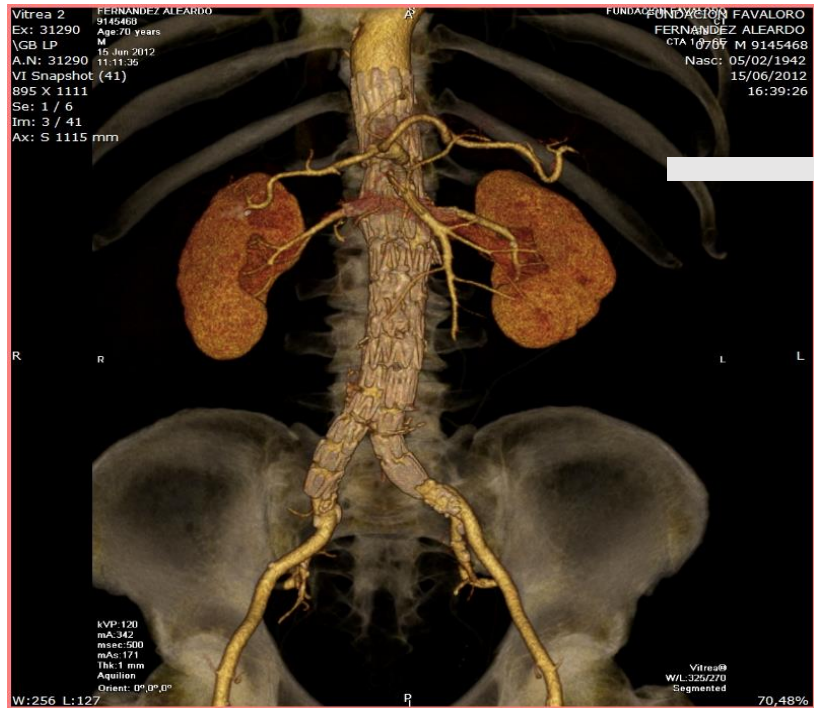
Postprocedure

Preprocedure

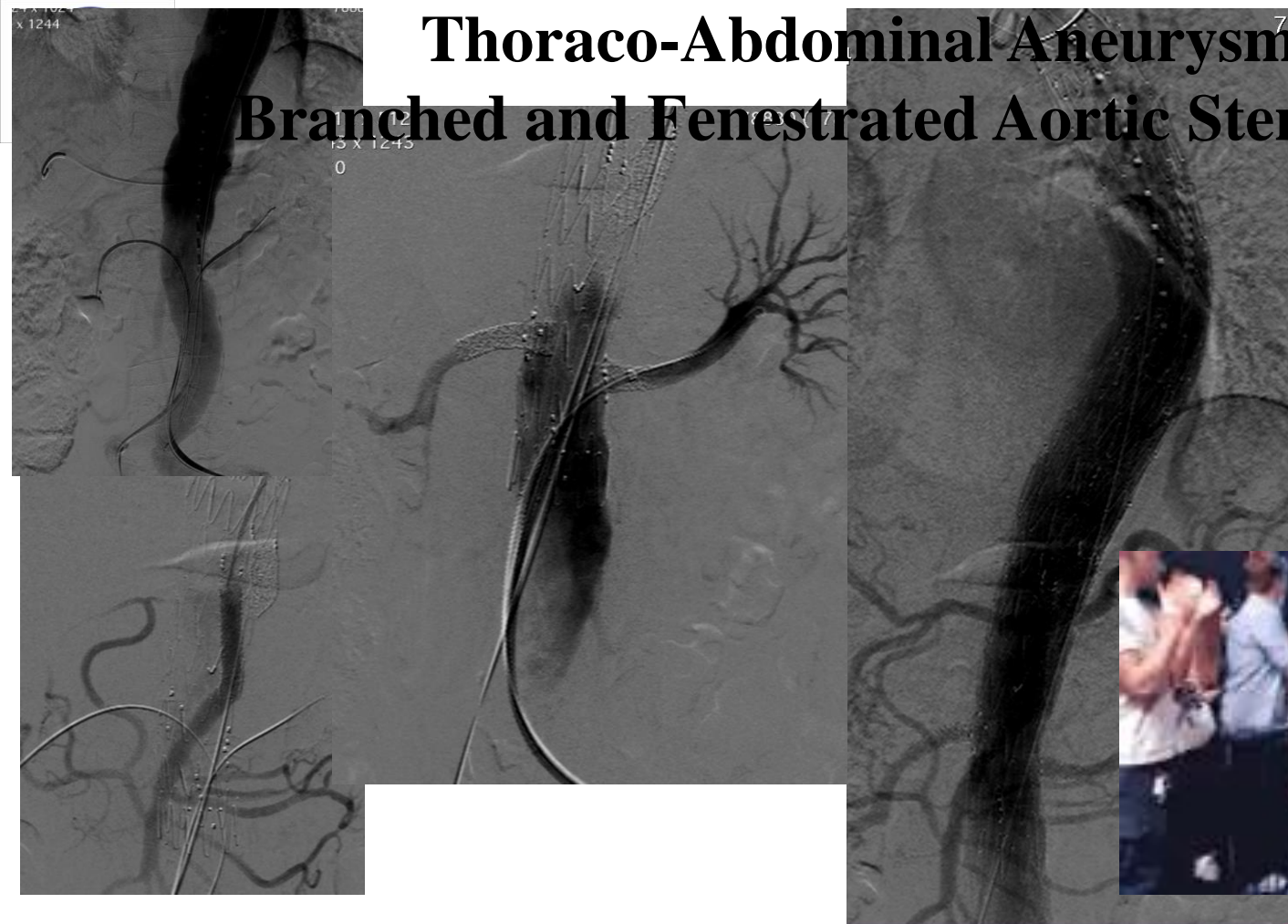


Fenestrated Endovascular Repair:

Same patient CT scan at 12 months



Thoraco-Abdominal Aneurysm: Branched and Fenestrated Aortic Stent Graft



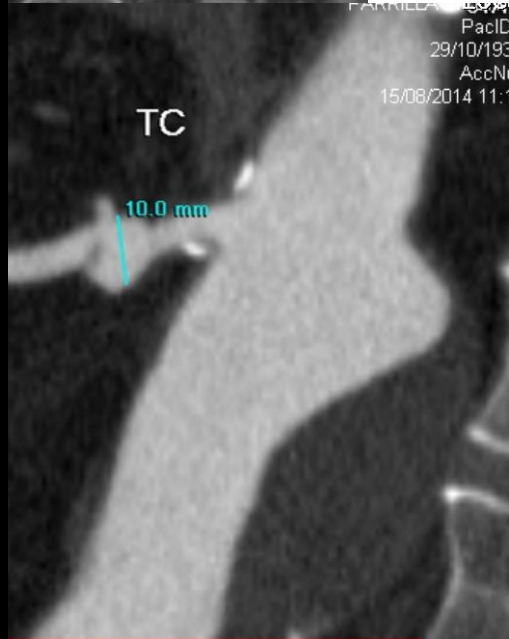
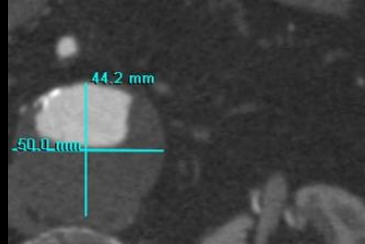
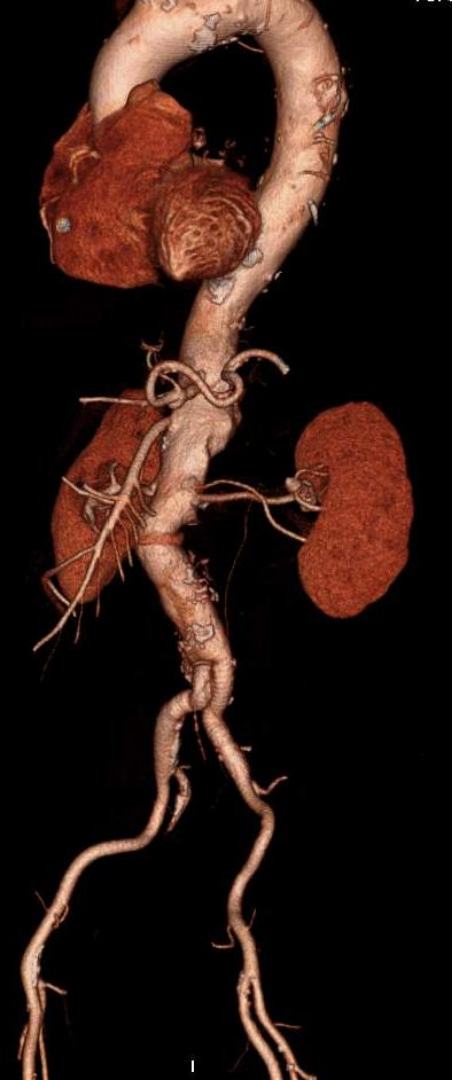
Procedural complication: Type A, Aortic dissection requiring urgent surgery

Thoraco-Abdominal Aneurysm: Branched Aortic Stent Graft



Procedural complication: Type A, Aortic dissection requiring urgent surgery

Fenestrated Graft



PACIELLA 1979
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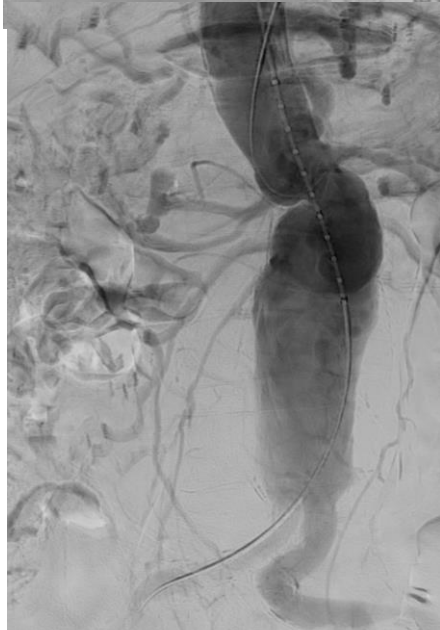
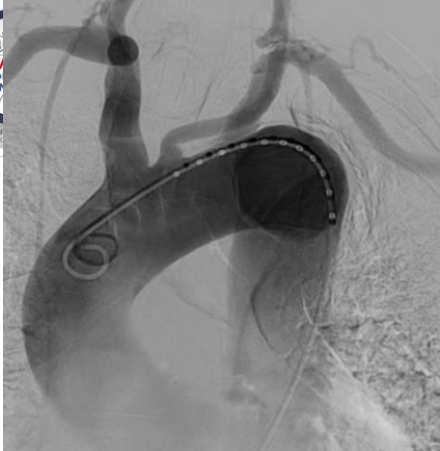
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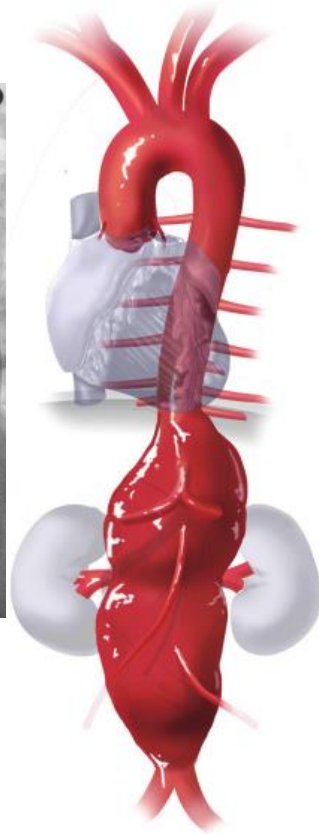
Modo In



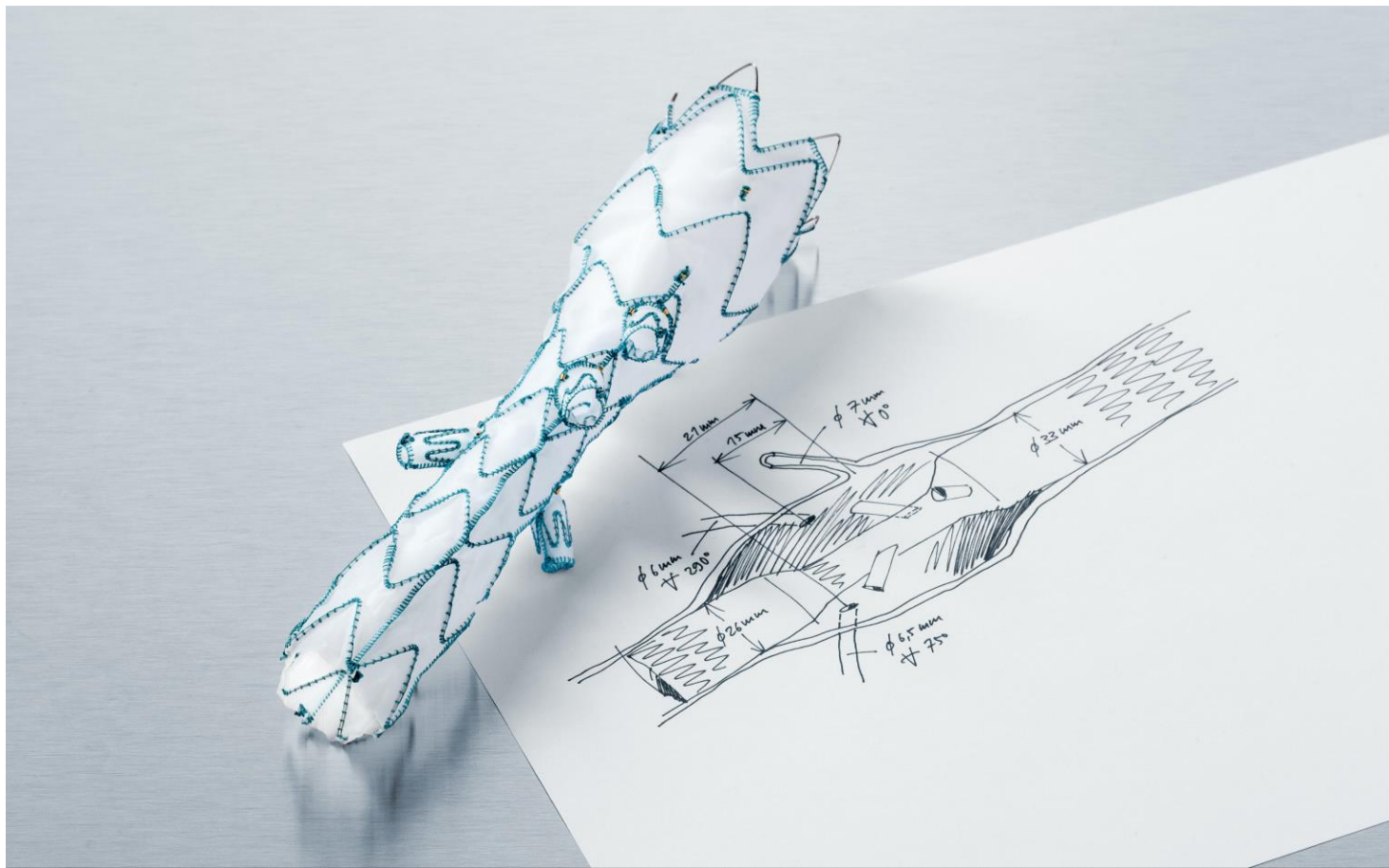
AAA Without Neck



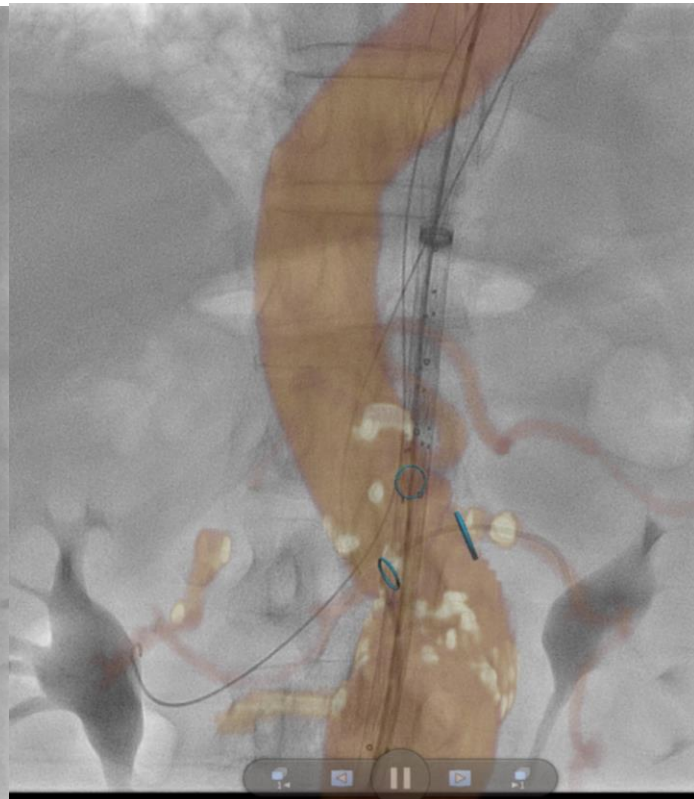
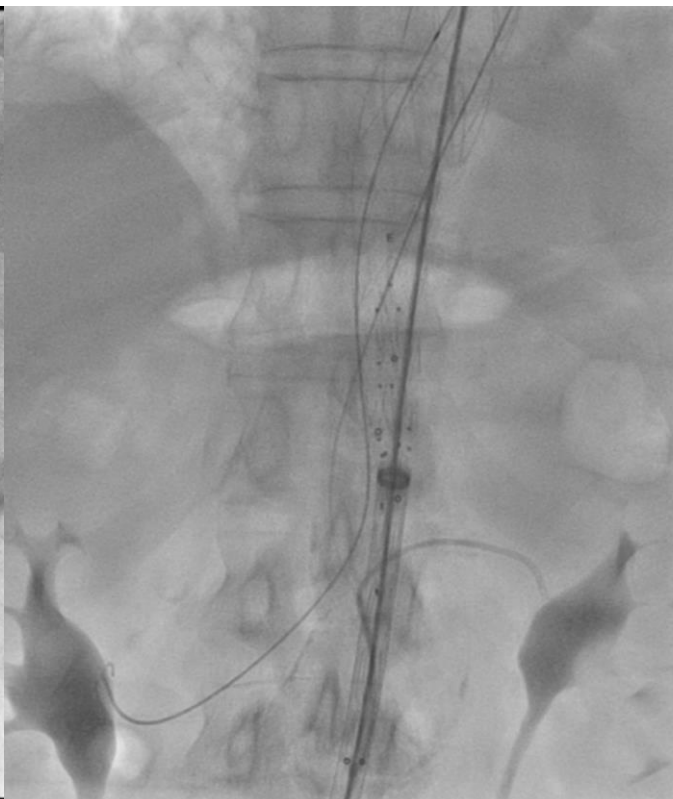
Extent IV



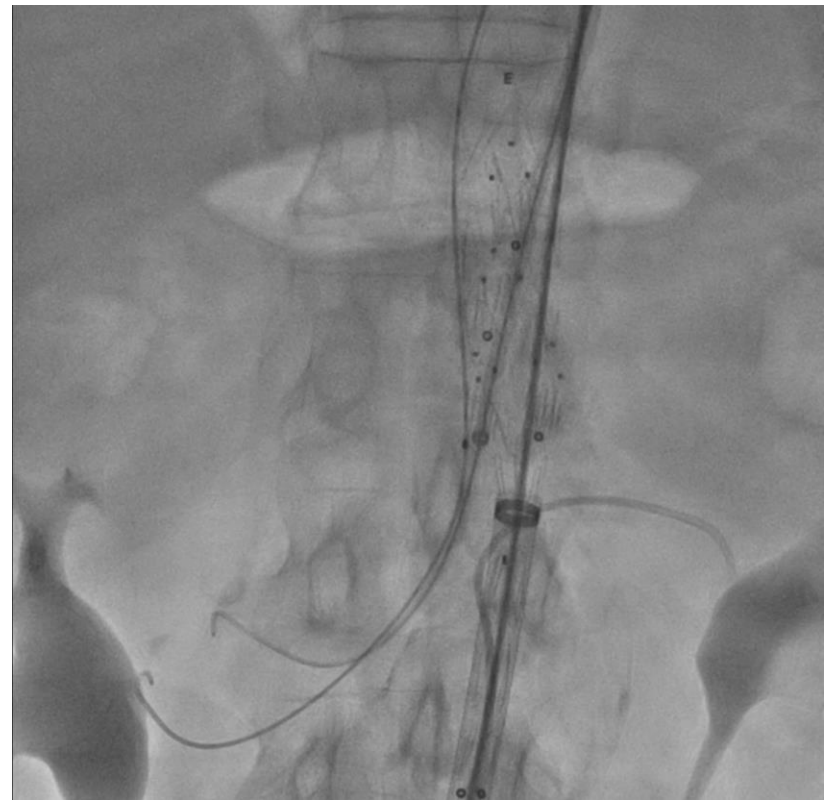
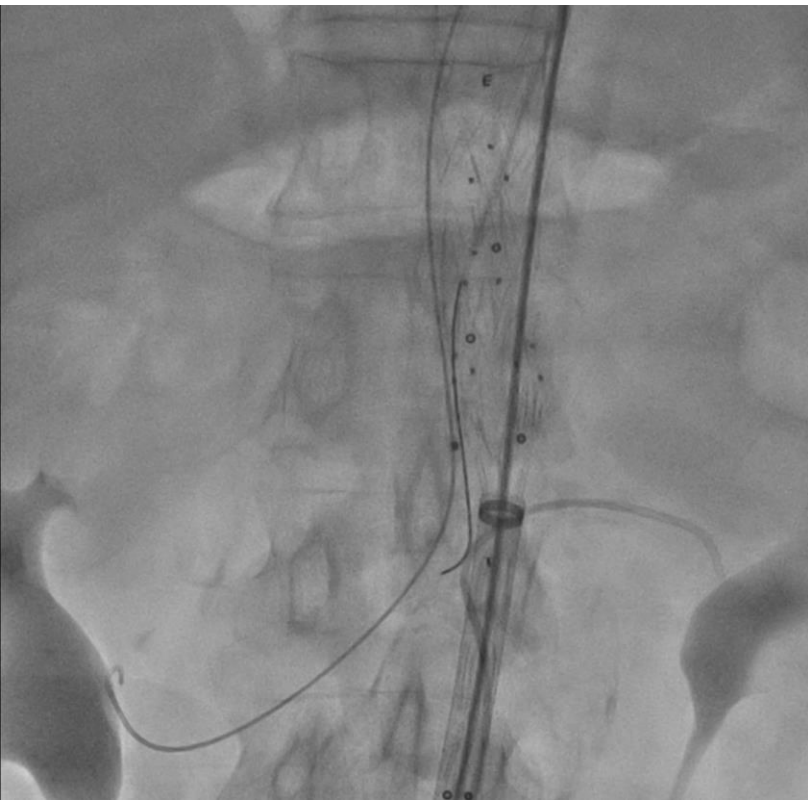
Branched Endograft: Jotec® E-xtra Design



Branched Endograft: Jotec® E-xtra Design



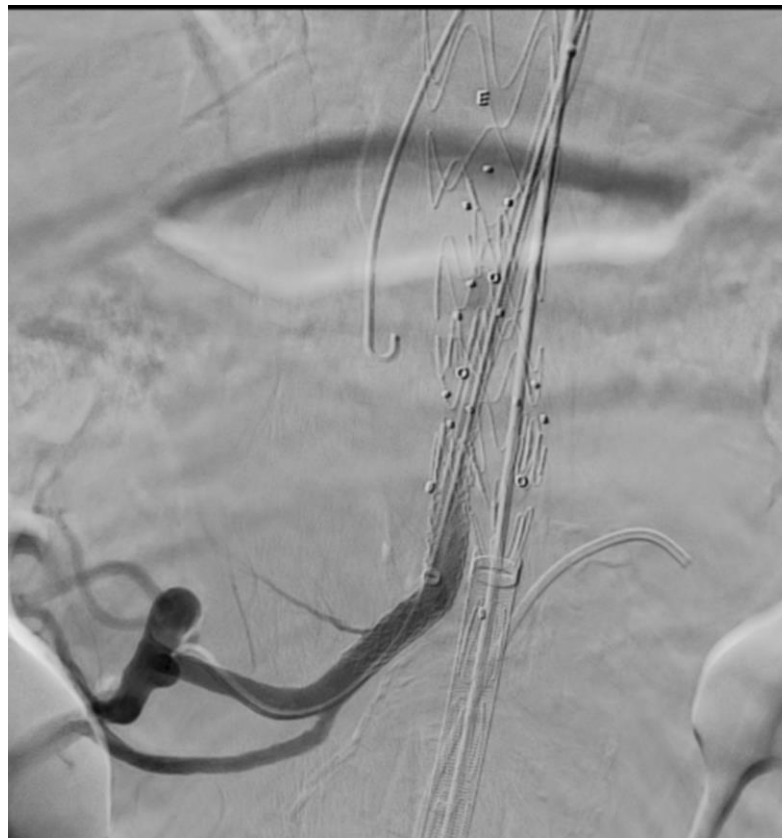
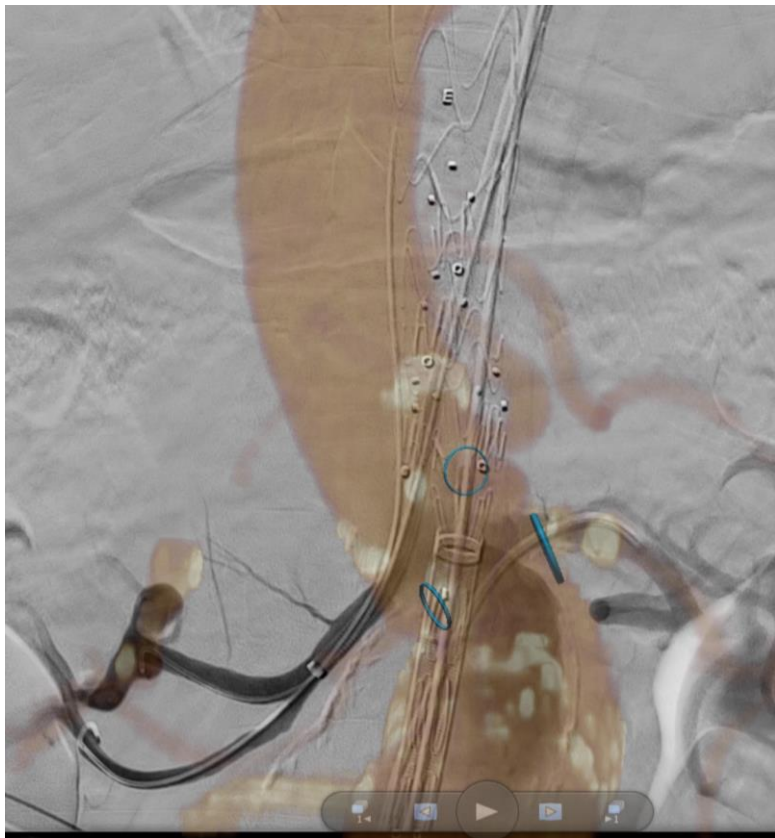
Branched Endograft: Jotec® E-xtra Design



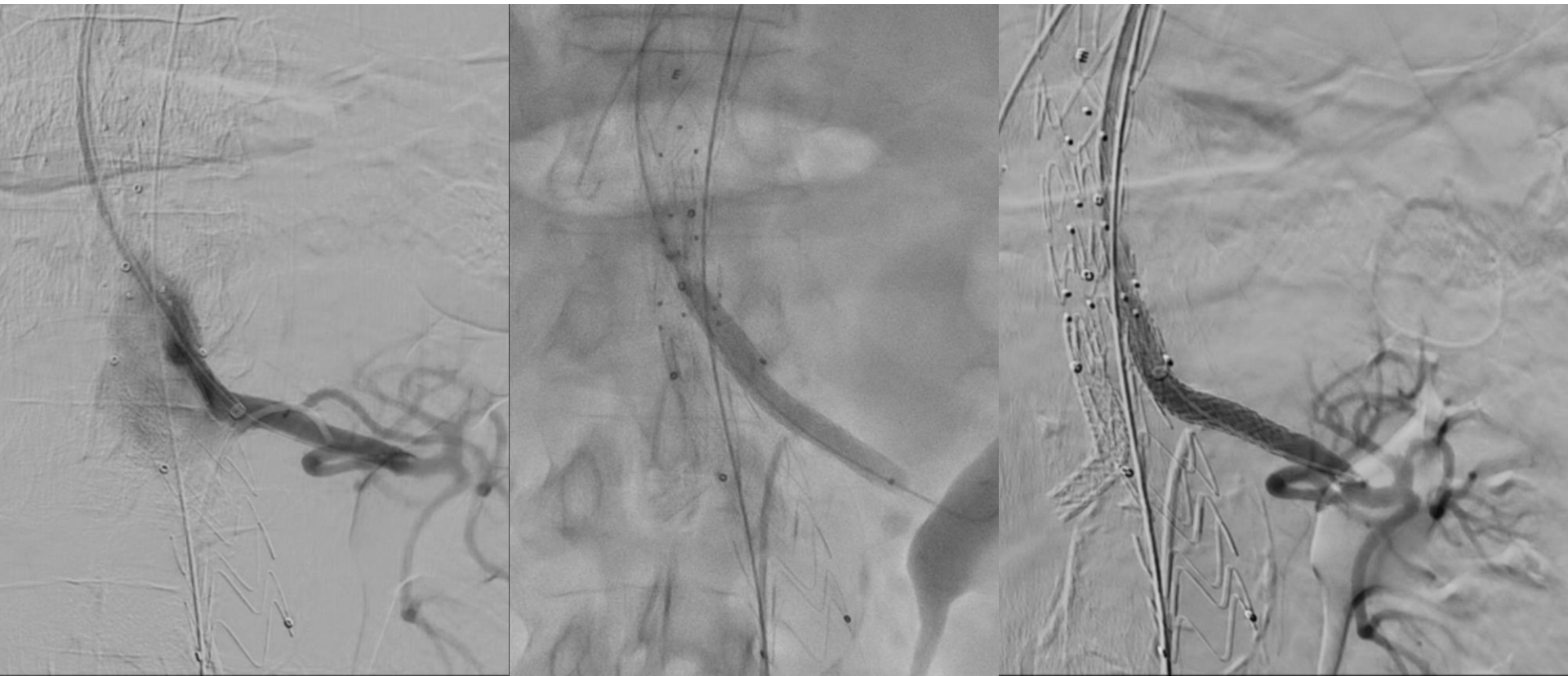
Branched Endograft: Jotec® E-xtra Design



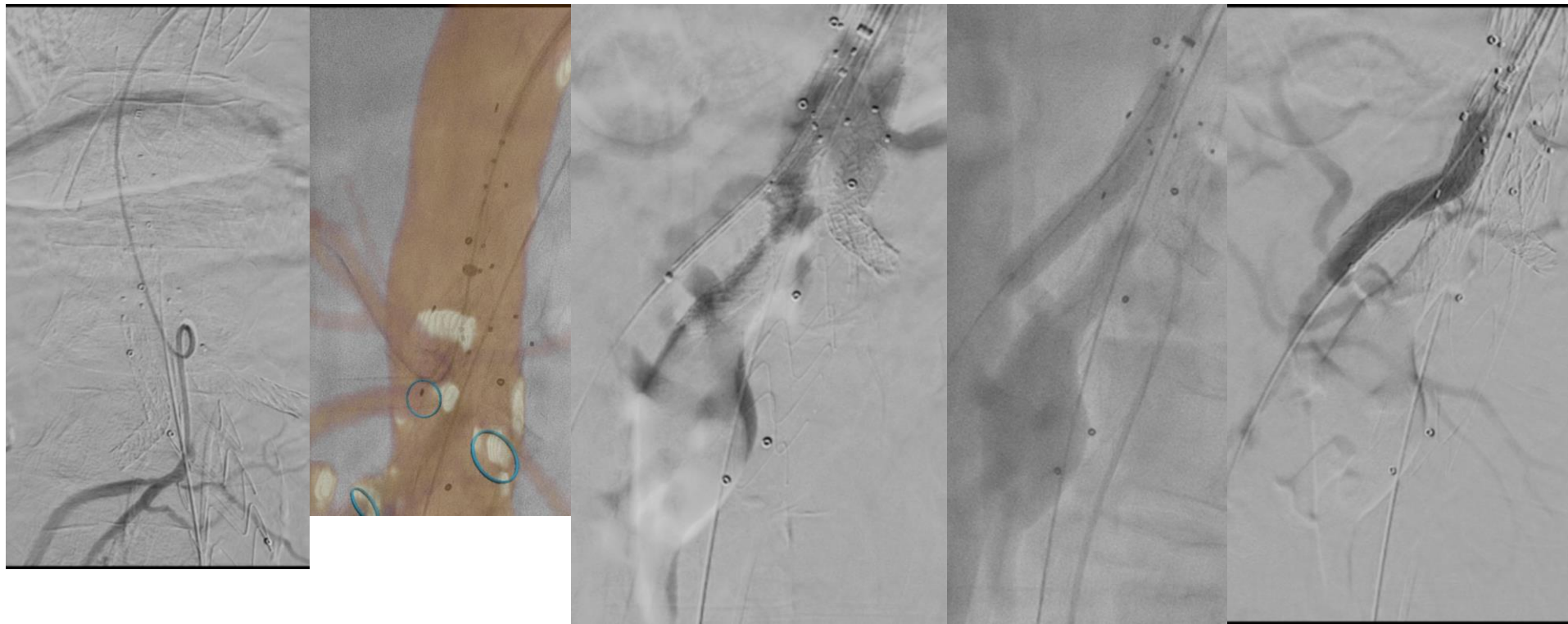
Branched Endograft: Jotec® E-xtra Design



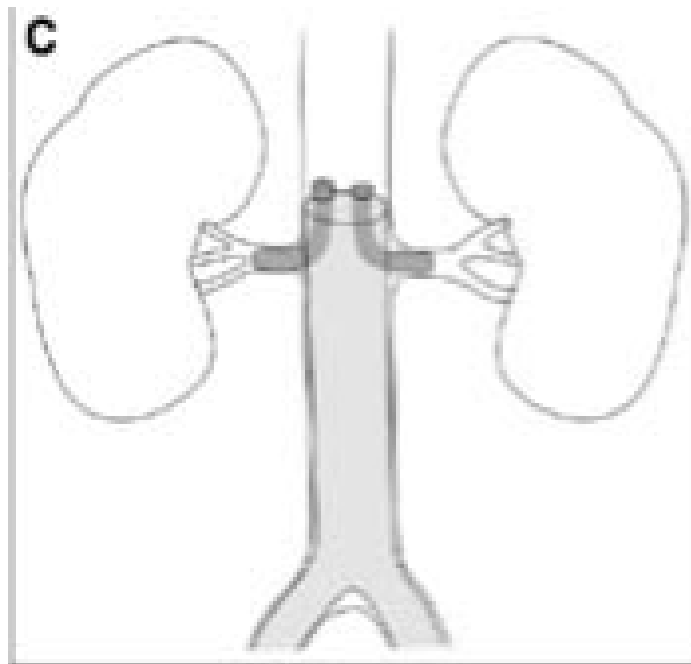
Branched Endograft: Jotec® E-xtra Design



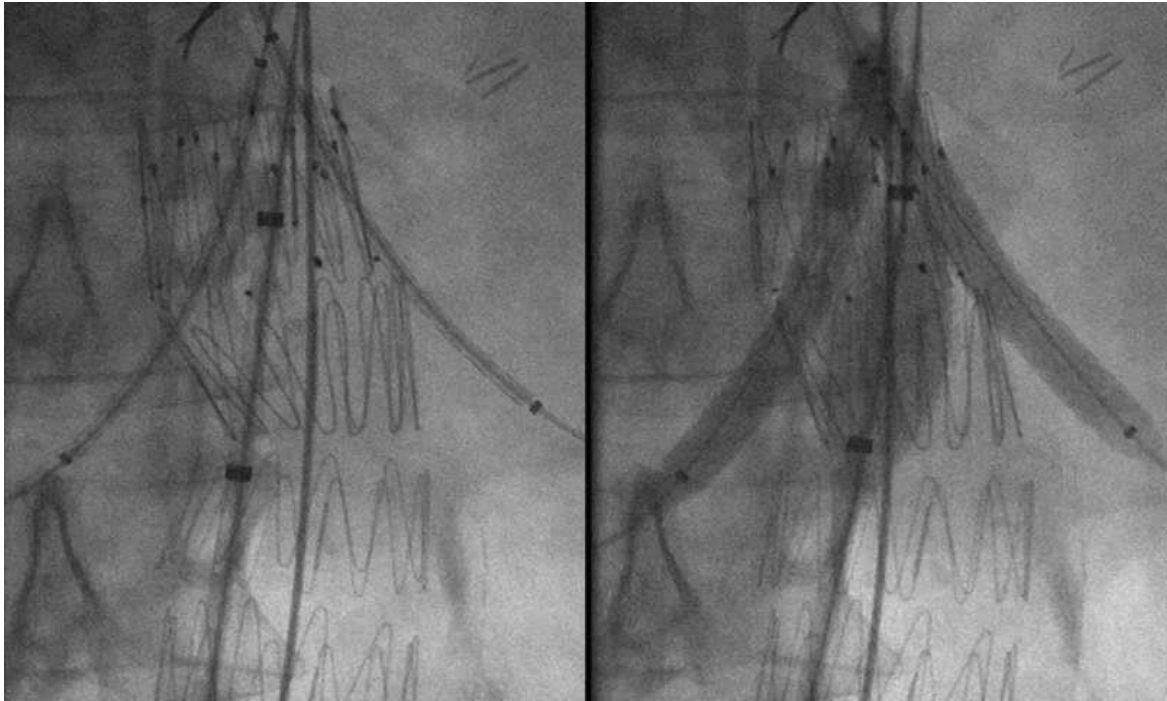
Branched Endograft: Jotec® E-xtra Design



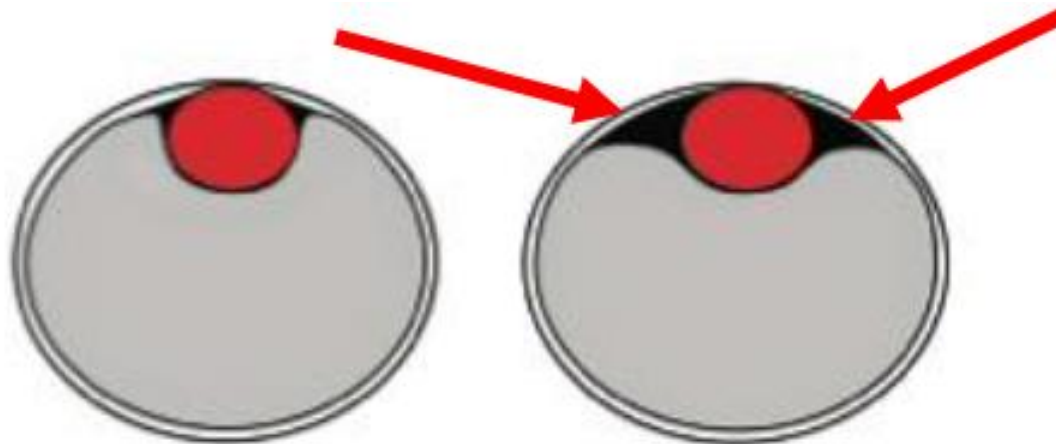
EVAR in Short Neck AAA: Chimney Technique



Chimney technique

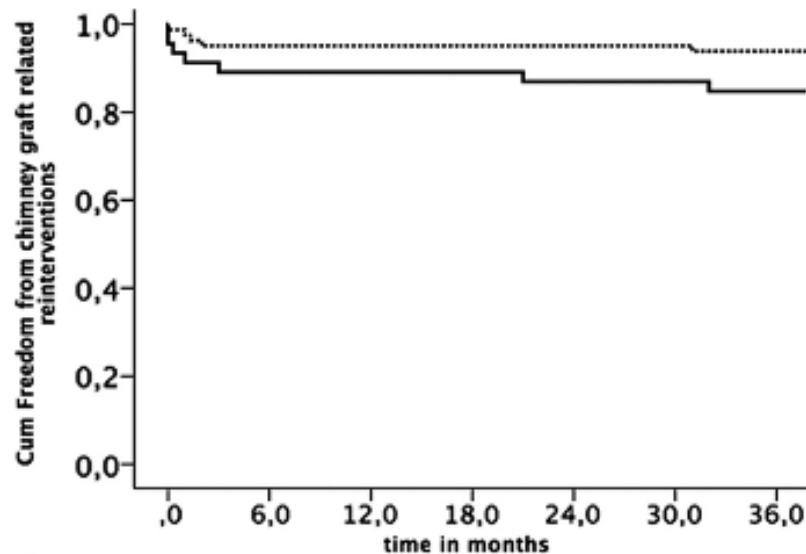
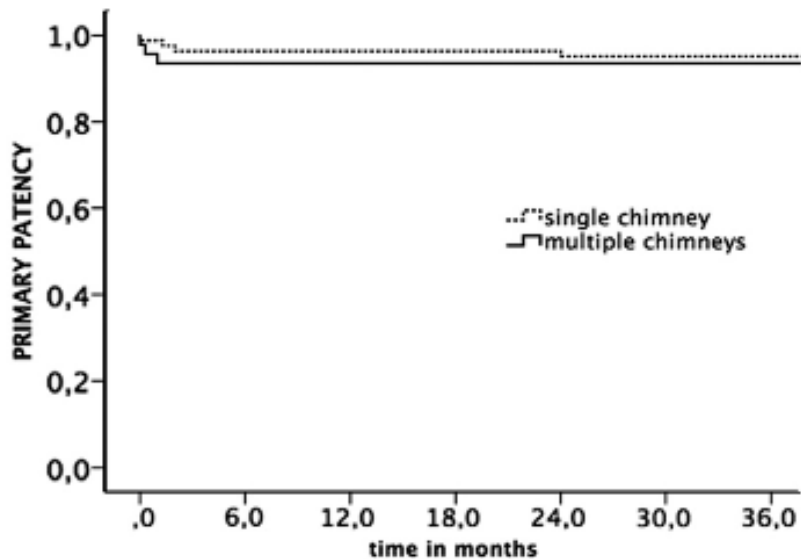


Parallel Graft Complications



Graft kink or crush, thrombosis, leak type Ia

The **PROTAGORAS** study to evaluate the performance of the Endurant stent graft for patients with pararenal pathologic processes treated by the chimney/snorkel endovascular technique



Standard use of the Endurant abdominal device for **ch-EVAR in >120 patients is associated with high technical success, significant aneurysm sac regression, and low incidence of secondary procedures after 2-year radiologic follow-up.**

f-EVAR vs Chi-EVAR

Original Article

Treatment of complex aortic aneurysms with fenestrated endografts and chimney stent repair: Systematic review and meta-analysis

Yang Yaoguo^{1,2}, Chen Zhong^{1,2}, Kou Lei^{1,2} and Xiao Yaowen^{1,2}

Abstract

Objective: We reviewed data pertaining to fenestrated endograft technique and chimney stent repair of complex aortic aneurysm for comparative analysis of the outcomes.

Methods: A comprehensive search of relevant databases was conducted to identify articles in English, related to the treatment of complex aortic aneurysm with fenestrated endovascular aneurysm repair and chimney stent repair, published until January 2015.

Results: A total of 42 relevant studies and 2264 patients with aortic aneurysm undergoing fenestrated endovascular aneurysm repair and chimney stent repair were included in our review. A total of 4413 vessels were involved in these processes. The cumulative 30-day mortality was 2.4% and 3.2% ($p=0.459$). The follow-up aneurysm-related mortality was 1.4% and 3.2% ($p=0.018$), and target organ dysfunction was 5.0% and 4.0% in fenestrated endovascular aneurysm repair and chimney stent repair, respectively ($p=0.27$). A total of 156 vessels showed restenosis or occlusion after primary intervention (3.6% and 3.4% in fenestrated endovascular aneurysm repair and chimney stent repair, respectively, $p=0.792$). The cumulative type I endoleak was 2.0% (38/1884) after fenestrated endovascular aneurysm repair compared with 3.4% (13/380) after chimney stent repair ($p=0.092$), and the type II endoleak was 5.4% (102/1884) and 5.3% (20/380), respectively ($p=0.905$). Approximately, 1.1% and 1.6% increase in aneurysm was observed following fenestrated endovascular aneurysm repair and chimney stent repair, respectively ($p=0.437$). The re-intervention frequency was 205 and 19 cases after fenestrated endovascular aneurysm repair and chimney stent repair, respectively (11.7%, $p=0.001$).

Conclusions: Fenestrated endovascular aneurysm repair and chimney stent repair are safe and effective in treating patients with complex aortic aneurysm. A higher aneurysm-related mortality was observed in chimney stent repair while fenestrated endovascular aneurysm repair was associated with a higher re-intervention rate.

Vascular

Vascular
2017, Vol. 25(1) 92-100
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DOI: 10.1177/1708538116627718
journals.sagepub.com/home/vas




Table 4. Outcomes of patients in each groups.

	F-EVAR	Ch-EVAR	P value
Technical success	98.1% (3810/3878)	99.5% (623/626)	0.028
30-day mortality	2.4% (47/1884)	3.2% (12/380)	0.459
Aneurysm-related mortality	1.4% (27/1884)	3.2% (12/380)	0.018
Type I endoleak	2.0% (38/1884)	3.4% (13/380)	0.092
Type II endoleak	5.4% (102/1884)	5.3% (20/380)	0.905
Target organ function impaired	5.0% (185/3658)	4.0% (25/626)	0.27
Vessels restenosis/occluded	3.6% (135/3787)	3.4% (21/339)	0.792
Aneurysm growth	1.1% (20/1811)	1.6% (6/380)	0.437
Re-intervention	11.7% (205/1746)	5.6% (19/380)	0.001

Clinical outcome analysis in the HNA and non-HNA groups

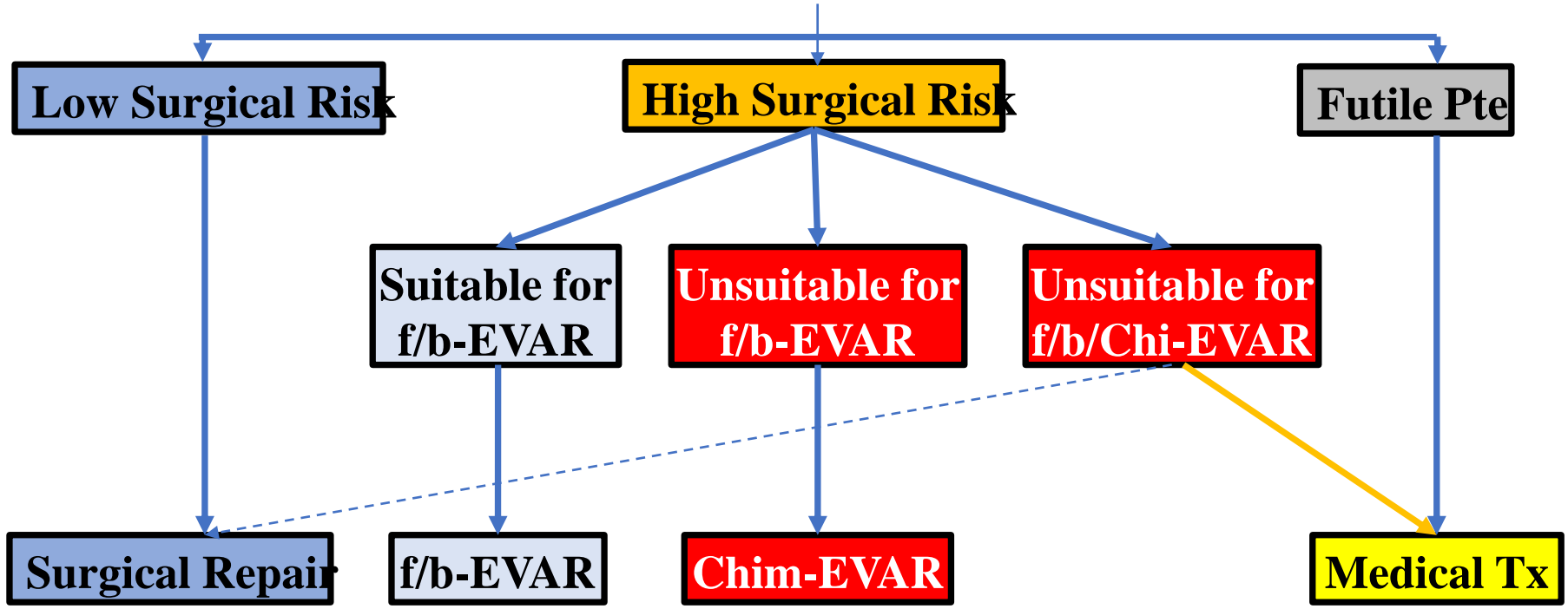


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BACHILLERES - BARRIO

	Non-Hostile Proximal Necks Group n=296	Hostile Proximal Necks group n=139	P-value
Technical success	292 (98.6)	136 (97.8)	0.83
30-day death	3 (1.01)	3 (2.1)	0.6
30-day Type I endoleak	4 (1.3)	6 (4.3)	0.11
30-day re-intervention	13 (4.3)	3 (2.1)	0.37
Late all-cause mortality			
Late aneurysm related mortality	4 (1.3)	0	0.56
Late type I endoleak	9 (3.04)	10 (7.1)	0.076
Late type II endoleak	25 (8.44)	9 (6.47)	0.6
Late re-intervention	16 (5.4)	15 (10.79)	0.066

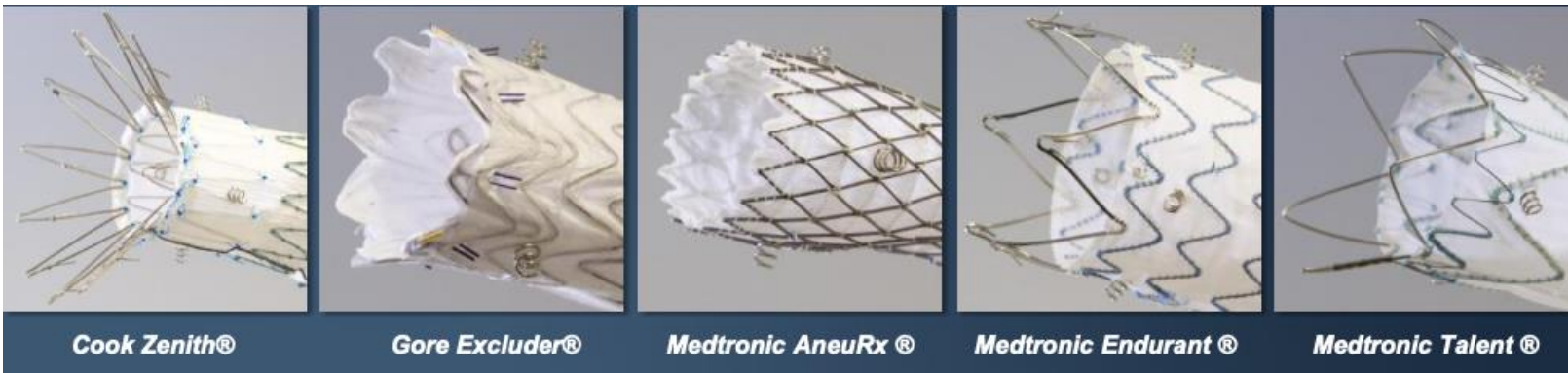
Conclusion: Patients with HNA are amenable to EVAR without an increase inherent mortality. Nonetheless, more complex morphology is associated with a late increased risk of type I endoleaks and re-intervention rates.

AAA with Hostile Neck

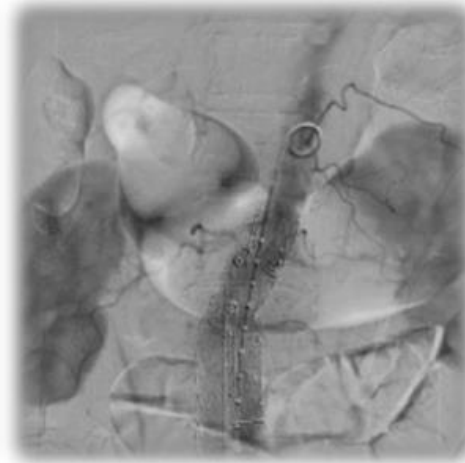
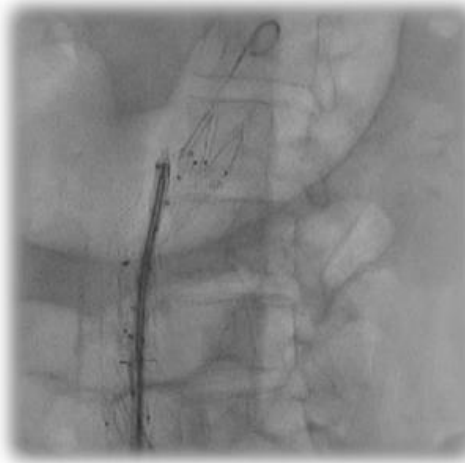
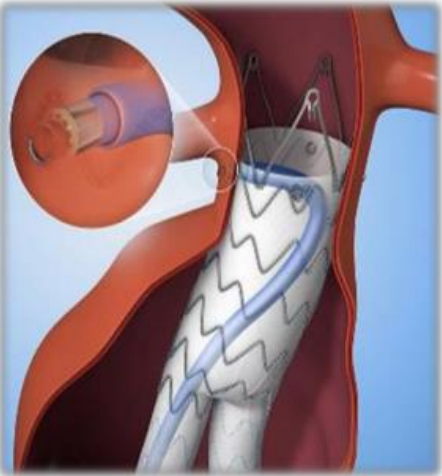


Aptus EndoAnchor System

Indicated for use in endografts that have exhibited migration or endoleak, or are at risk of such complications



APTUS ENDOSYSTEM “ENDOSUTURE TECHNIQUE”



4 EndoAnchors

Modified from Zvonimir Krajcer

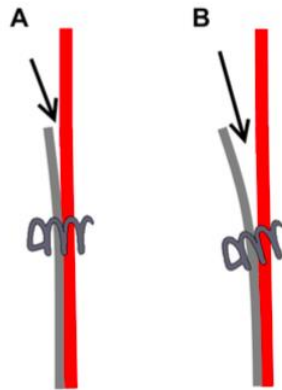
Endosuture Aneurysm Repair in Patients Treated with Endurant II/IIIs in conjunction with Heli-FX EndoAnchor implants for short-neck AAA

Table IV. Primary outcomes in the short-neck cohort

Primary outcomes	Short-neck cohort
Technical success rate at index procedure ^a	88.6 (62/70)
Delivery to target site	
Access to the targeted aortic site was achieved by the EndoAnchor system	100.0 (70/70)
Successful delivery of the main body to the intended landing zone	94.3 (66/70)
Deployment of device	
Successful deployment of the endovascular stent graft at the intended implantation site ^b	100.0 (70/70)
Successful and accurate deployment of EndoAnchor implants was achieved ^c	92.9 (65/70)
Absence of unintentional coverage of the renal arteries	97.1 (68/70)
Type IA endoleak at 1 month ^d	6.8 (4/59)
Type IA endoleak at 1 year ^d	1.9 (1/53)
Secondary procedures through 1 year	4.7 (3/64)
Conversion to open surgical repair through 12 months	0.0 (0/64)
Other secondary open surgical procedures through 12 months	1.6 (1/64)

Heli-FX EndoAnchor implants (ESAR) appears to be a safe and effective treatment option with a high technical success rate and low incidence of type IA endoleaks and secondary interventions. Despite the complex and hostile anatomies, the ESAR method required short procedure and fluoroscopy times. These short-term outcomes suggest that ESAR could be complementary to therapies currently available for treatment of hostile AAA anatomy

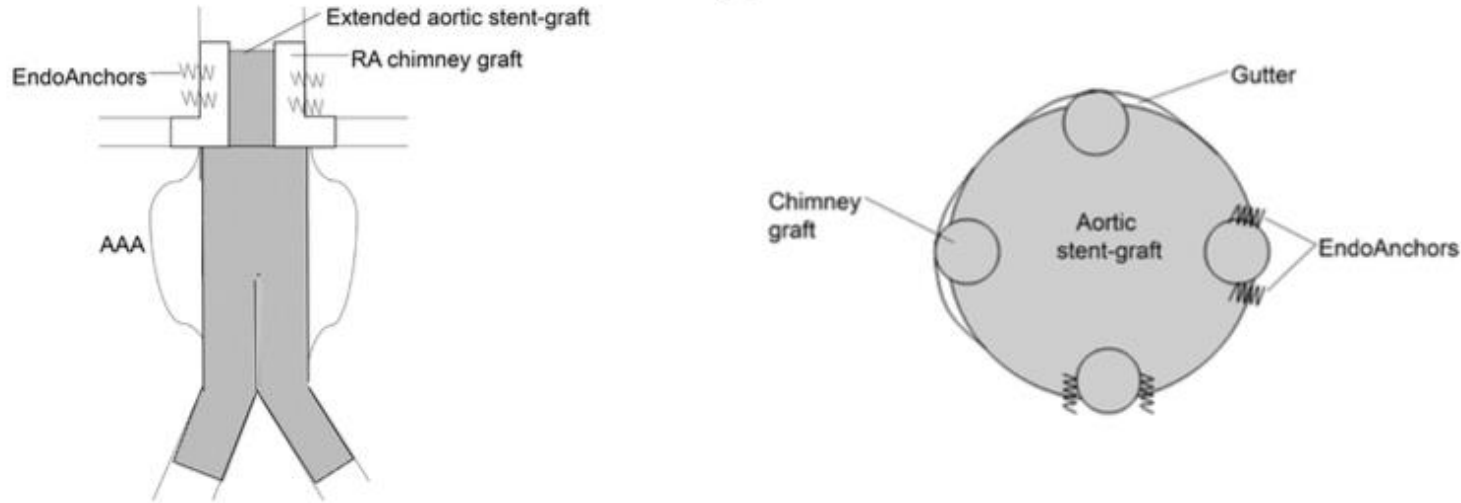
Sustainability of Individual EndoAnchor Implants in Therapeutic Use to Treat Type Ia Endoleak After Endovascular Aneurysm Repair



(A) an EndoAnchor penetrating the aortic wall (red line); however, there is a space between the aortic wall and the endograft (gray line) proximal to the EndoAnchor implant. (B) Over time, the gap at the proximal edge of the endograft increases due to the pressurization of the gap, which may cause the EndoAnchor to become borderline or even nonpenetrating.

Despite the small number of EndoAnchors analyzed, this study showed that the sustainability of EndoAnchor implants with initially good penetration is satisfactory at 1-year follow-up. The vast majority of EndoAnchor implants with good penetration initially remained in good position; <3% of implants became borderline or nonpenetrating, without any clinical consequence.

EndoAnchors Minimize Endoleaks in Chimney-Graft Endovascular Repair of Juxtarenal Abdominal Aortic Aneurysms



We found it feasible to use EndoAnchors with the chimney-graft technique to prevent type Ia endoleaks in the treatment of juxtarenal AAAs. Further studies are needed to validate this adjunctive technique and to determine its durability.



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Buenos Aires - Argentina

Limitations of EndoAnchors

- Mural thrombus >2mm thick and and 180⁰ of circumference.
- Porcelain aorta (severe circumferential calcification).
- Attaching endograft layers without Aortic wall penetration.
- Loss of graft apposition.



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Buenos Aires - Argentina

Yuxtarenal Aneurysms

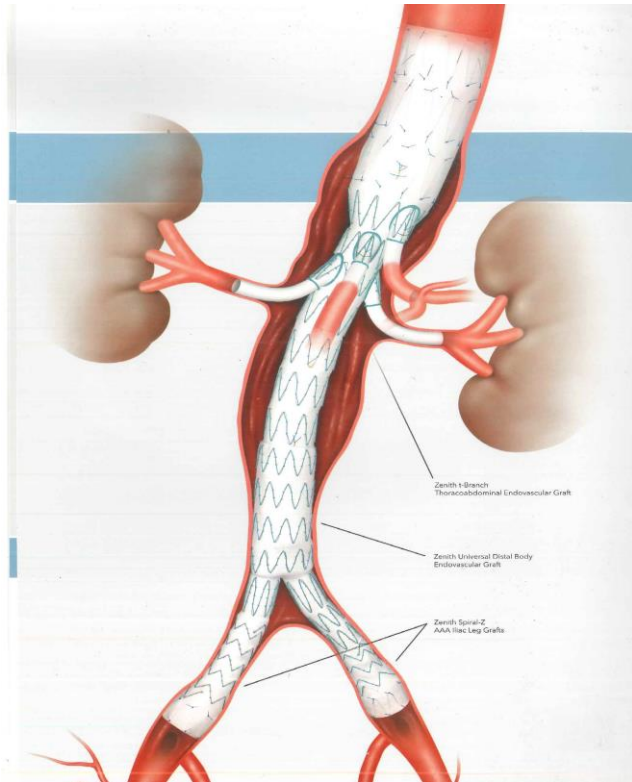
Off-the-Shelf Devices

GORE - TAMBE

- Off-the-shelf modular device
- 2 configurations / Pre-loaded guidewires
- Repositionability / multi-staged deployment
- GORE Viabahn BX bridging stent



Zenith® t-Branch® Thoracoabdominal Endovascular Graft



Zenith platform / Off the shelf design for
TAA repair
4 caudally directed branches.
Delivery sequence optimized for early
pelvic re-perfusion

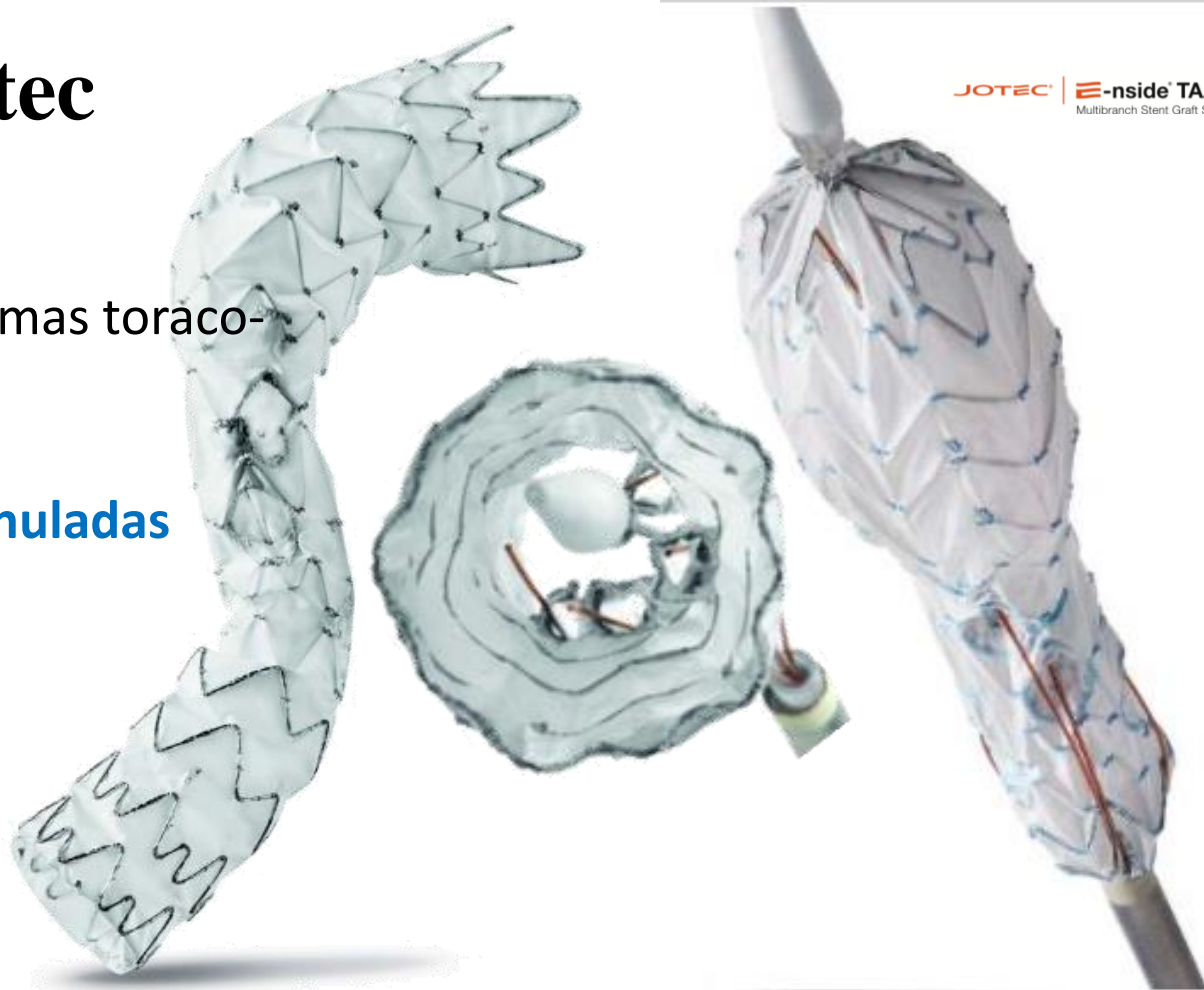
Zenith® t-Branch® Thoracoabdominal Endovascular Graft



E-nside Jotec

JOTEC | E-nside TAAA
Multibranch Stent Graft System

- Tratamiento de aneurismas toraco-abdominales
- Producto *off-the-shelf*
- 4 ramas internas **precanuladas**
 - Catéteres de poliamida
 - DE 0.035"
 - DI 0.018"
 - 146 cm de largo
- 4 configuraciones



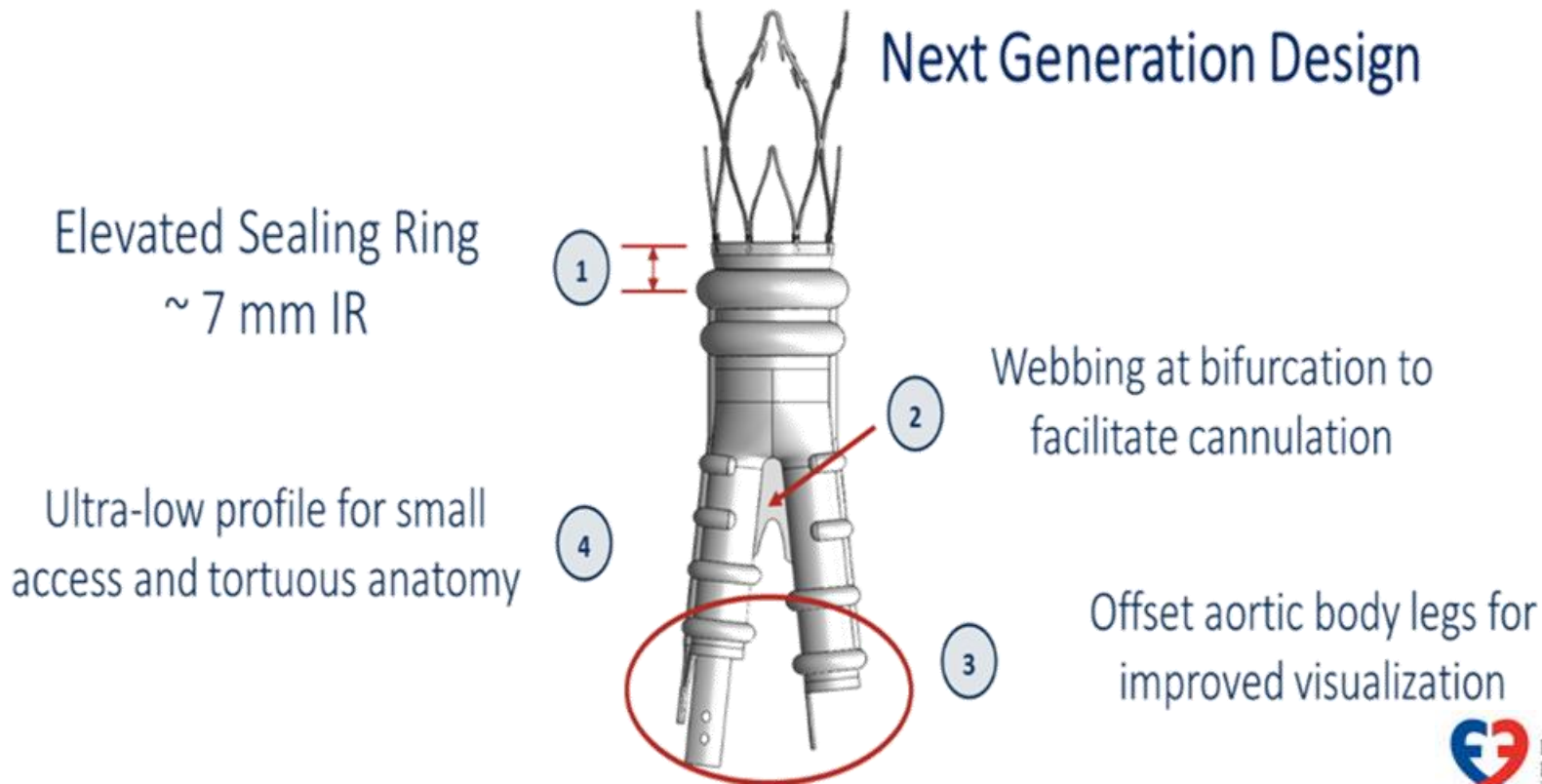


Low Profile New Device

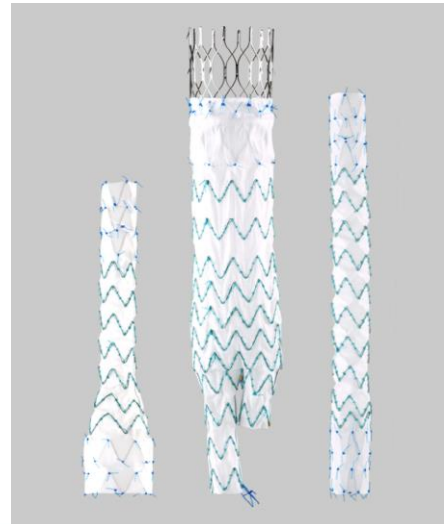
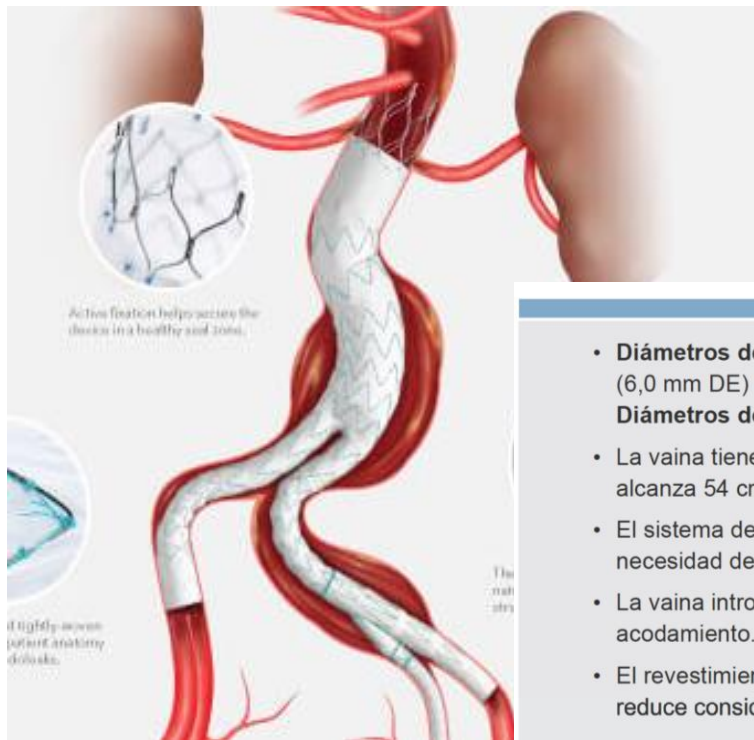
LOW PROFILE NEW DEVICE

Ovation Alto

First sealing ring is 7mm below fabric collar instead of 13 mm



Zenith Alpha® Abdominal



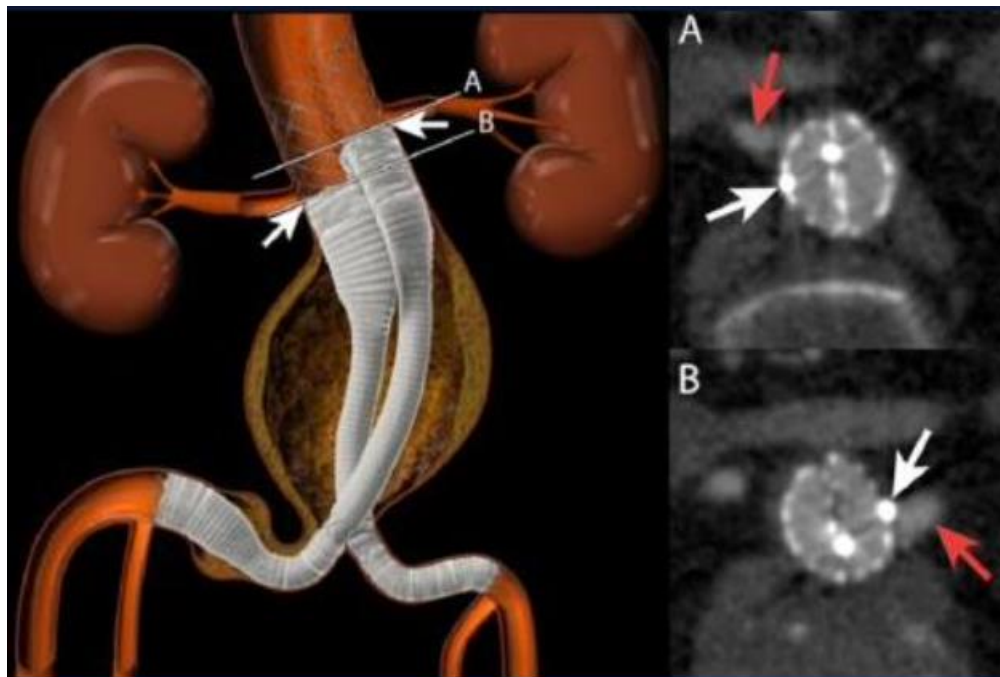
- **Diámetros de 22 a 32 mm:** vaina introductora de 16 Fr DI, 18 Fr DE (6,0 mm DE)
- **Diámetros de 36 mm:** vaina introductora de 17 Fr DI, 19 Fr DE (6,5 mm DE)
- La vaina tiene 43 cm de largo; con la válvula incluida, su longitud alcanza 54 cm.
- El sistema de perfil bajo reduce el traumatismo a los vasos y disminuye la necesidad de conductos ilíacos.
- La vaina introductora proporciona óptima flexibilidad y resistencia al acodamiento.
- El revestimiento hidrofílico aumenta el control del desplazamiento ya que reduce considerablemente la fricción contra la superficie.



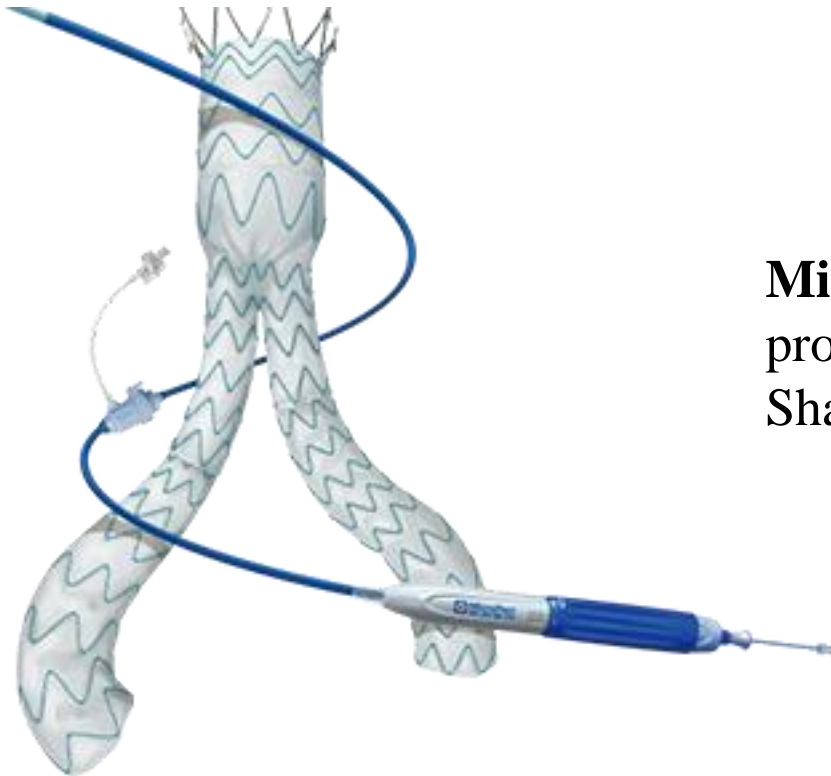
Altura™ Double D Endograft (Lombard Medical)



- Clinical Success 99.0%.
- Aneurysm-related mortality 0.0%.
- Type I endoleak 1.1%.
- Re-intervention rate 6.7%.



Other 14Fr Devices



Minos® Stent Graft System), a product developed by Shanghai **MicroPort** Endovascular

Calcium and tortuosity

- Serial dilators or use hydrophilic sheath to go past calcified segments.
- PTA when necessary but avoid tiny iliacs to avoid perforation.
- Solopath Balloon Expandable Sheath.



19Fr/18Fr Insertion Profiles (mm)



22Fr Insertion Profiles (mm)



24Fr Insertion Profiles (mm)



CTA with Fluoroscopy Image Fusion Guidance in Endovascular Complex Aortic Aneurysm Repair



The use of CTA with fluoroscopy image fusion guidance for complex endovascular aortic aneurysm repair:

⬇ ⬇ significantly reduce procedure time and volume of iodinated contrast material. ▼ A non-significant reduction in fluoroscopy time was observed.

Respiration-related vessel displacement and straightening of elongated vessel segments by stiff devices are currently the main limitations in fusion image overlay accuracy.

Conclusiones

- Los progreso en la tecnología ha traído soluciones para anatomías complejas
- No todos los dispositivos son igual no aplicarían a todos los pacientes
- Los dispositivos de bajo perfil ayudan para el approach minimalista en especial en aquellos con acceso vasculares complejos
- EndoAnchors son útiles para prevenir y/o tratar endoleaks en EVAR-TEVAR, en especial cuando se usan stents en paralelo.
- f-EVAR es una alternativa viable en pacientes con alto riesgo para cirugía y opciones limitadas.
- Los nuevos “off-the-shelf devices” proveen alternativas de más fácil acceso cuando se necesita una prótesis fenestrada/ramificada.

gracias....



JORNADAS CIENTÍFICAS
Y GREMIALES CACI 2021
4 Y 5 DE DICIEMBRE 2021
HOTEL HILTON - PRESENCIAL





ENDO AORTA 2021

9 Y 10 DE DICIEMBRE
Modalidad Presencial y On-Line

Conferencias, casos clínicos y temas de actualización. Revisión y puesta al día del cuidado del paciente con enfermedad aneurismática de la aorta.



DR. MARIANO FERREIRA (ARG)
JEFE DE SECCION ENDOVASCULAR
CLINICA LA SAGRADA FAMILIA
HOSPITAL ALEMÁN



DR. MARTIN RABELLINO (ARG)
JEFE DEL SERVICIO DE RADIOLOGIA
HOSPITAL ITALIANO



DR. OSCAR MENDIZ (ARG)
JEFE DEL SERVICIO DE CARDIOLOGIA INTERVENCIONISTA DE LA FUNDACION FAVALORO

PROGRAMA

12 sesiones en vivo - 8 Módulos:

DÍA 1:

Accesos. Avances tecnológicos. Cuello proximal, Cuello distal, Endoleaks.

Día 2:

TEVAR, Disección Aórtica, Aorta Compleja.

4 Simposios de la Industria:

2 Lunch Symposium.
2 Evening Symposium

12 sesiones compactas e intensas para mostrar un enfoque terapéutico integral del paciente con enfermedad aneurismática de la aorta torácica y abdominal. **Invitados Nacionales e Internacionales.**
Av. Caseros 3039 P. 11, CABA. **CUPOS LIMITADOS.**



AUSPICIAN:



Los esperamos !!

