i-MEET

NEXT GENERATION

Multidisciplinary European Endovascular Therapy

Debate - There is no U-turn for the endovascular treatments

On behalf of USZ vascular specialists

Felice Pecoraro, MD

Disclosure of Interest

Speaker name: Felice Pecoraro

- I do not have any potential conflict of interest

1988-First T-EVAR case

Н. Л. Володос, И. П. Карпович, В. Е. Шеганин, В. И. Троян, Л. Ф. Яковенко, Л. С. Кремет, А. С. Иоффе, В. И. Кулеба, А. И. Саньков, Г. И. Гаврилов

СЛУЧАЙ ДИСТАНЦИОННОГО ЧРЕЗБЕДРЕННОГО ЭНДОПРОТЕЗИРОВАНИЯ ГРУДНОЙ АОРТЫ САМОФИКСИРУЮЩИМСЯ СИНТЕТИЧЕСКИМ ПРОТЕЗОМ ПРИ ТРАВМАТИЧЕСКОЙ АНЕВРИЗМЕ

Харьковский НИИ общей и неотложной хирургии (дир. — проф. В. Т. Забиев)

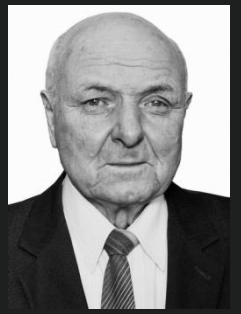
Рис. 1. Аортограмма больного Б.
Контрастирована нисходящая аорта на уровне X—XI грудных позвонков с аневризматическим мешком и стенозом на 50% на уровне VIII—IX грудных позвонков.

Рис. 3. Рентгенограмма грудной клетки больного Б. через 2 мес после операции.
Фиксирующие элементы находятся на том же уровне.

Рис. 2. Аортограмма больного Б. после размещения эндопротеза.
Виден синтетический протез на уровне VIII—XI грудных позвонков, а также фиксирующие элементы на уровне VIII—XI грудных позвонков. Стеноз аорты нет, аневризматический мешок не контрастируется.

Volodos NL, et al. A case of distant transfemoral endoprosthesis of the thoracic artery using a self-fixing synthetic prosthesis in traumatic aneurysm. Grudn Khir. 1988; 6:84-6

N. Volodos



European Heart Journal (2014) 35, 2873–2926
doi:10.1093/eurheartj/ehu281

ESC GUIDELINES

2014 ESC Guidelines on the diagnosis and treatment of aortic diseases

Document covering acute and chronic aortic diseases of the thoracic and abdominal aorta of the adult

The Task Force for the Diagnosis and Treatment of Aortic Diseases of the European Society of Cardiology (ESC)

TEVAR should be considered in patients who have a descending TAA with a maximal diameter ≥55 mm. When surgery is the only option, it should be considered in patients with a maximal diameter ≥60 mm. Lower thresholds can be considered in patients with Marfan syndrome.

Recommendations for (contained) rupture the thoracic aortic aneurysm

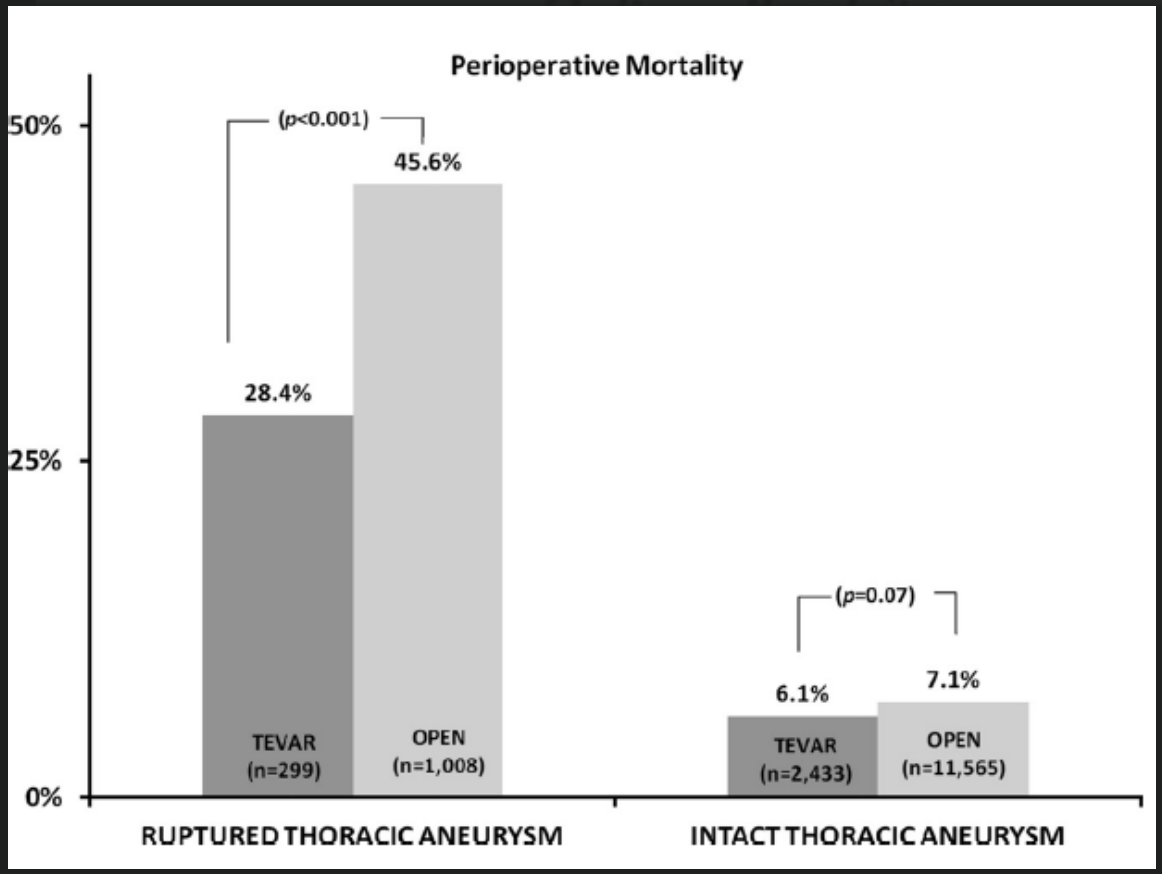
Recommendations	Class[a]	Level[b]
In patients with suspected rupture of the TAA, emergency CT angiography for diagnosis confirmation is recommended.	I	C
In patients with acute contained rupture of TAA, urgent repair is recommended.	I	C
If the anatomy is favourable and the expertise available, endovascular repair (TEVAR) should be preferred over open surgery.	I	C

[a]Class of recommendation.
[b]Level of evidence.
CT = computed tomography; TAA = thoracic aortic aneurysm; TEVAR = thoracic endovascular aortic repair.

European Heart Journal (2014) **35**, 2873–2926

Survival After Open Versus Endovascular Thoracic Aortic Aneurysm Repair in an Observational Study of the Medicare Population

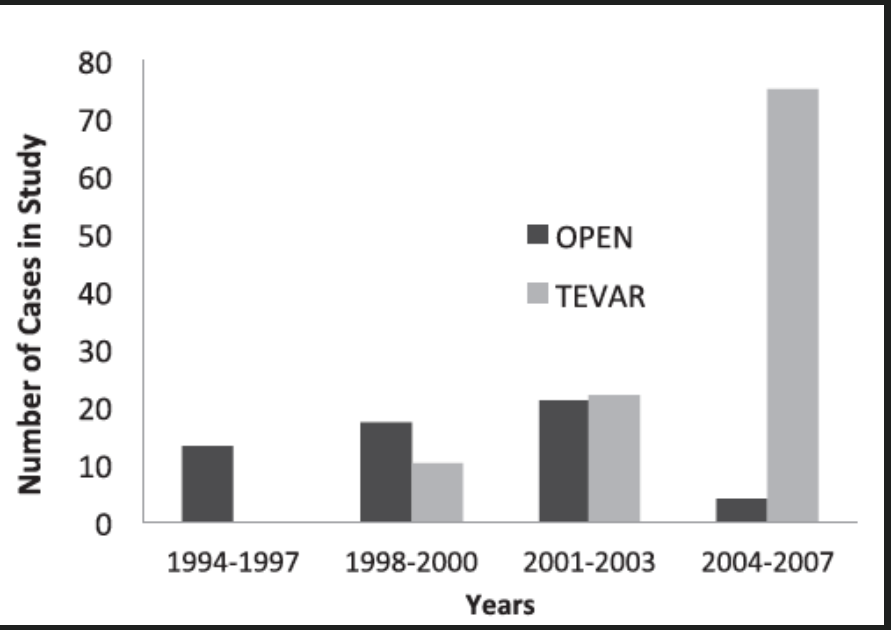
Philip P. Goodney, MD, MS; Lori Travis, MS; F. Lee Lucas, PhD; Mark F. Fillinger, MD;
David C. Goodman, MD, MS; Jack L. Cronenwett, MD; David H. Stone, MD



(*Circulation*. 2011;124:2661-2669.)

Long-term comparison of thoracic endovascular aortic repair (TEVAR) to open surgery for the treatment of thoracic aortic aneurysms

Nimesh D. Desai, MD, PhD, Kristen Burtch, BS, William Moser, MS, Pat Moeller, BS, Wilson Y. Szeto, MD, Alberto Pochettino, MD, Edward Y. Woo, MD, Ronald M. Fairman, MD, and Joseph E. Bavaria, MD



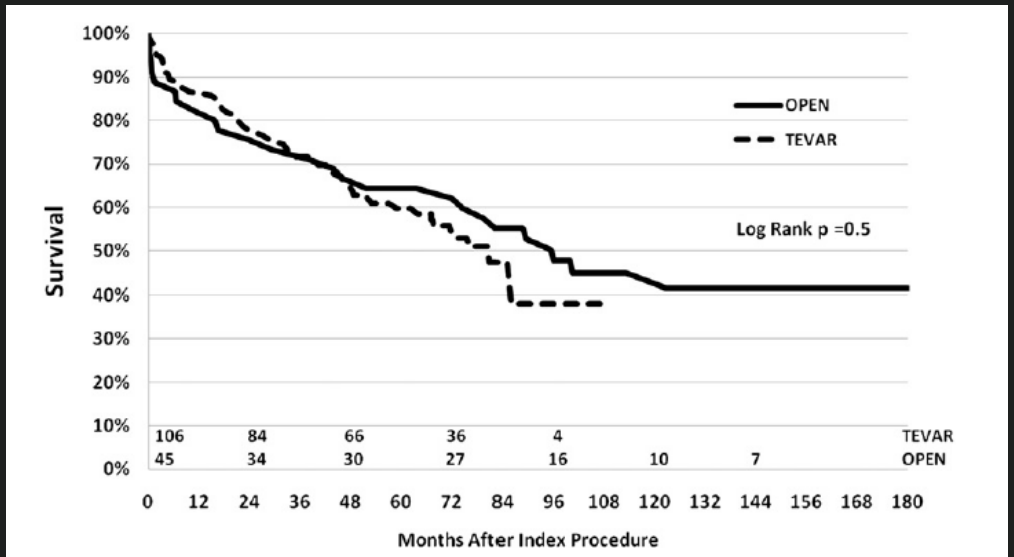


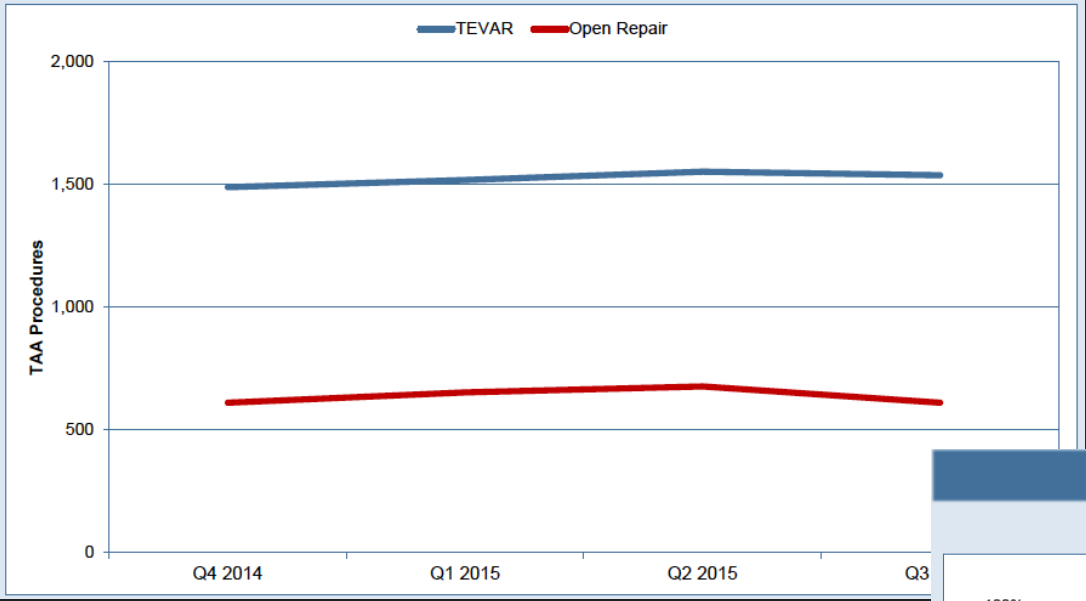
FIGURE 2. Long-term survival. *TEVAR,* Thoracic endovascular aortic repair.

(J Thorac Cardiovasc Surg 2012;144:604-11)

EVEM Panel TEVAR

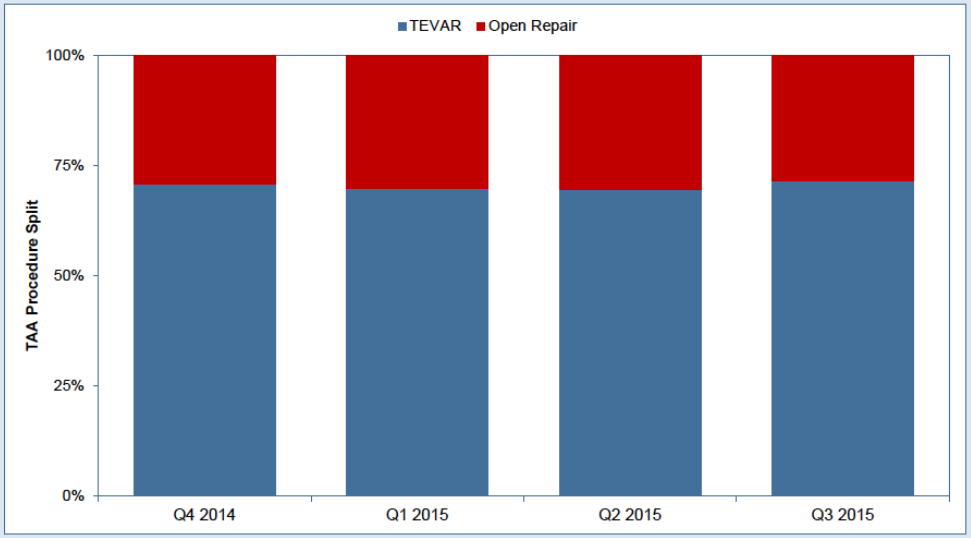
4th quarter 2014 – 3rd Quarter 2015

Chart 3: TAA trend over time, TEVAR & Open Repair



	Endovascular Procedures	Surgical Procedures
AAA	6,895	3,279
TAA	1,538	611
Aorto-Iliac	27,453	4,163
Fem-Pop	51,061	8,048
Overall	**86,947**	**16,101**

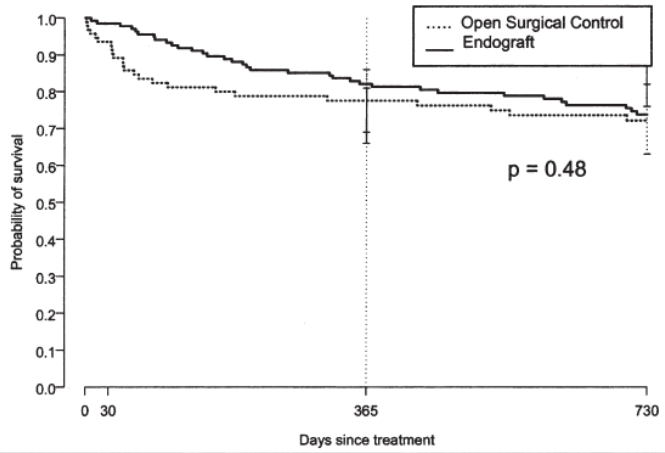
Chart 4: TEVAR vs Open Repair Split



Endovascular stent grafting versus open surgical repair of descending thoracic aortic aneurysms in low-risk patients: A multicenter comparative trial

Joseph E. Bavaria, MD,[a] Jehangir J. Appoo, MD,[a,b] Michel S. Makaroun, MD,[c] Joel Verter, PhD,[d] Zi-Fan Yu, ScD,[d] and R. Scott Mitchell, MD,[e] for the Gore TAG Investigators*

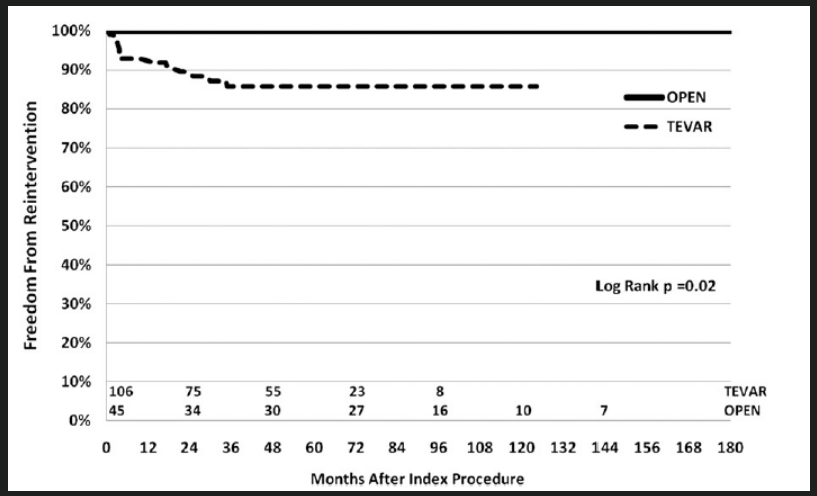
	Endovascular group	Open surgical group	*P* value
Mortality: 30 d or in hospital	2.1% (n = 3)	11.7% (n = 11)	.004
Respiratory failure*	4%	20%	<.001
Postoperative MI	0%	1%	.40
Renal failure†	1%	13%	.01
Wound infection/dehiscence	4%	11%	.07
GI complication (ileus, bowel ischemia, or bowel obstruction)	2%	6%	.16
Peripheral vascular complications‡	14%	4%	.015
Neurologic complications			
CVA	4% (n = 5)	4% (n = 4)	1.00
Paraplegia/paraparesis	3% (n = 4)	14% (n = 13)	.003
Mean ICU length of stay (d)	2.6 ± 14.6	5.2 ± 7.2	<.001
Mean length of hospital stay (d)	7.4 ± 17.7	14.4 ± 12.8	<.001



J Thorac Cardiovasc Surg 2007;133:369-77

Long-term comparison of thoracic endovascular aortic repair (TEVAR) to open surgery for the treatment of thoracic aortic aneurysms

Nimesh D. Desai, MD, PhD, Kristen Burtch, BS, William Moser, MS, Pat Moeller, BS, Wilson Y. Szeto, MD, Alberto Pochettino, MD, Edward Y. Woo, MD, Ronald M. Fairman, MD, and Joseph E. Bavaria, MD



(J Thorac Cardiovasc Surg 2012;144:604-11)

Results of Thoracic Endovascular Aortic Repair 6 Years After United States Food and Drug Administration Approval

Asad A. Shah, MD, Michael E. Barfield, MD, Nicholas D. Andersen, MD, Judson B. Williams, MD, Julie A. Shah, RN, BSN, Jennifer M. Hanna, MD, MBA, Richard L. McCann, MD, and **G. Chad Hughes, MD**

Department of Surgery, Duke University Medical Center, Durham, North Carolina

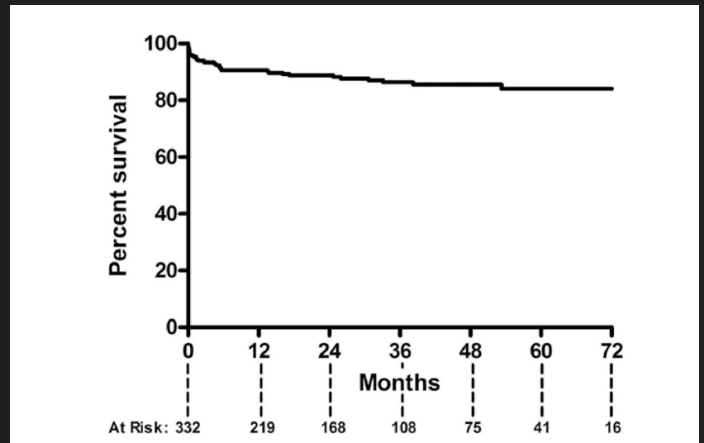


Fig 1.
Kaplan-Meier curve demonstrates an 84% freedom from reintervention at 6 years after thoracic endovascular aortic repair.

Ann Thorac Surg. 2012 November ; 94(5): 1394–1399. doi:10.1016/j.athoracsur.2012.05.072.

Superior nationwide outcomes of endovascular versus open repair for isolated descending thoracic aortic aneurysm in 11,669 patients

Raja R. Gopaldas, MD,[a,b] Joseph Huh, MD,[a,b] Tam K. Dao, PhD,[c] Scott A. LeMaire, MD,[a,b] Danny Chu, MD,[a,d] Faisal G. Bakaeen, MD,[a,d] and Joseph S. Coselli, MD[a,b]

TABLE 1. Patient demographics and baseline characteristics

Characteristic	OAR (n = 9106)	TEVAR (n = 2563)	χ^2 or *t*	*P* value	Effect size*
Age (y)	60.2 ± 14.2	69.5 ± 12.7	31.888	< .001	0.67
Elective admission	7660 (84.1%)	2158 (84.2%)	0.009	.9	NA

TABLE 2. Patient comorbidities

Comorbidity	OAR (n = 9106)	TEVAR (n = 2563)	χ^2	*P* value	φ
Chronic PVD	368 (4.0%)	564 (22.0%)	878.398	< .001	0.274
Previous MI	10 (0.1%)	10 (0.4%)	9.189	.005	0.028
Previous CHF	1441 (15.8%)	264 (10.3%)	48.896	< .001	0.065
Previous cerebrovascular disease	278 (3.1%)	205 (8.0%)	123.315	< .001	0.103
Chronic pulmonary disease	1306 (14.4%)	881 (34.4%)	527.618	< .001	0.213
Rheumatic disease	110 (1.2%)	42 (1.6%)	2.888	.09	0.016
Peptic ulcer disease	25 (0.3%)	24 (0.9%)	20.957	< .001	0.042
Mild liver disease	40 (0.4%)	5 (0.2%)	3.104	.1	0.016
Diabetes mellitus	854 (9.4%)	352 (13.7%)	40.943	< .001	0.059
Diabetic complications	63 (0.7%)	25 (1.0%)	2.149	.2	0.014
Hemiplegia or paraplegia	61 (0.7%)	26 (1.0%)	3.209	.09	0.017
Chronic kidney disease	388 (4.3%)	313 (12.2%)	224.128	< .001	0.139
HIV	10 (0.1%)	0	2.817	.1	0.016
Cancer	120 (1.3%)	36 (1.4%)	0.116	.7	0.003
Metastatic cancer	18 (0.2%)	5 (0.2%)	0.001	1.0	0.001

(J Thorac Cardiovasc Surg 2010;140:1001-10)

TABLE 3. Unadjusted outcomes of TEVAR versus OAR

Outcome	OAR (n = 9106)	TEVAR (n = 2563)	*P* value	Effect size
Died during hospitalization	209 (2.3%)	59 (2.3%)	1.0	0*
Complications per patient	0.51 ± 0.79	0.33 ± 0.67	< .001	0.7†
Any complication	3428 (37.6%)	588 (22.9%)	< .001	0.128*
Length of stay (d)	8.77 ± 7.9	7.6 ± 11.1	< .001	0.13†
Routine discharge	4126 (45.3%)	1671 (65.2%)	< .001	0.188*
Intraoperative/procedure-related complications	2066 (22.7%)	294 (11.5%)	< .001	0.116*
Deep venous thrombosis	38 (0.4%)	50 (2.0%)	< .001	0.073*
Infections	488 (5.4%)	140 (5.5%)	.8	0.002*
Neurologic complications	217 (2.4%)	64 (2.5%)	.7	0.003*
Pulmonary embolism	32 (0.4%)	6 (0.2%)	.4	–0.009*
Respiratory complications	951 (10.4%)	110 (4.3%)	< .001	–0.089*
Renal complications	535 (5.9%)	157 (6.1%)	.6	0.004*

Prof G. Melissano

NO DOUBT
TEVAR IS THE FIRST CHOICE

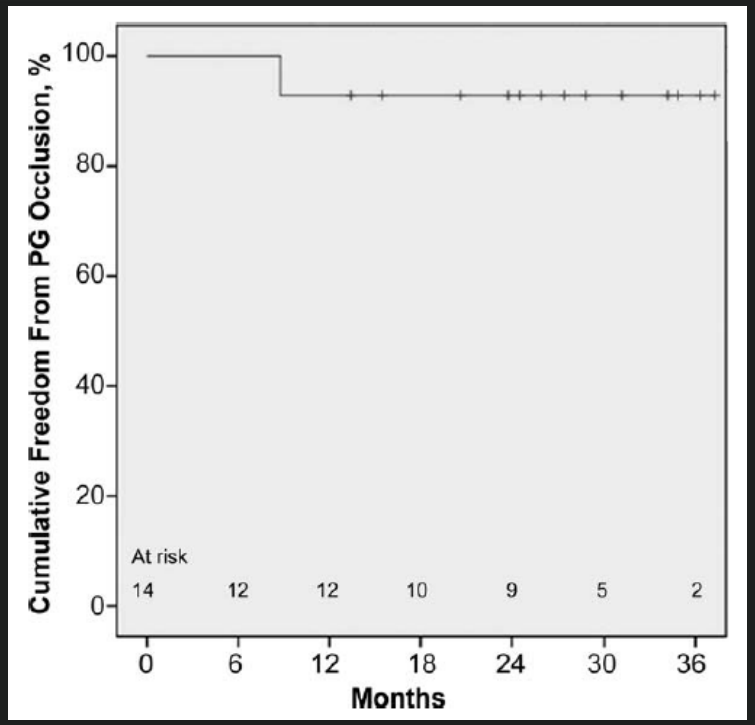
Limitation - Branch Vessels

J ENDOVASC THER
2013;20:728–734

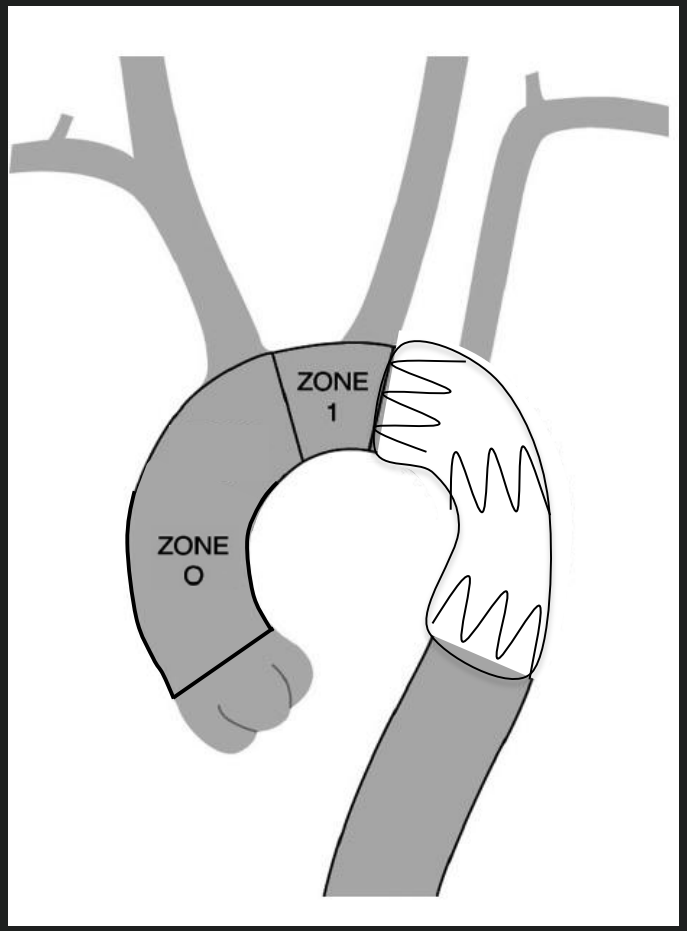
◆CLINICAL INVESTIGATION ◆

Periscope Endograft Technique to Revascularize the Left Subclavian Artery During Thoracic Endovascular Aortic Repair

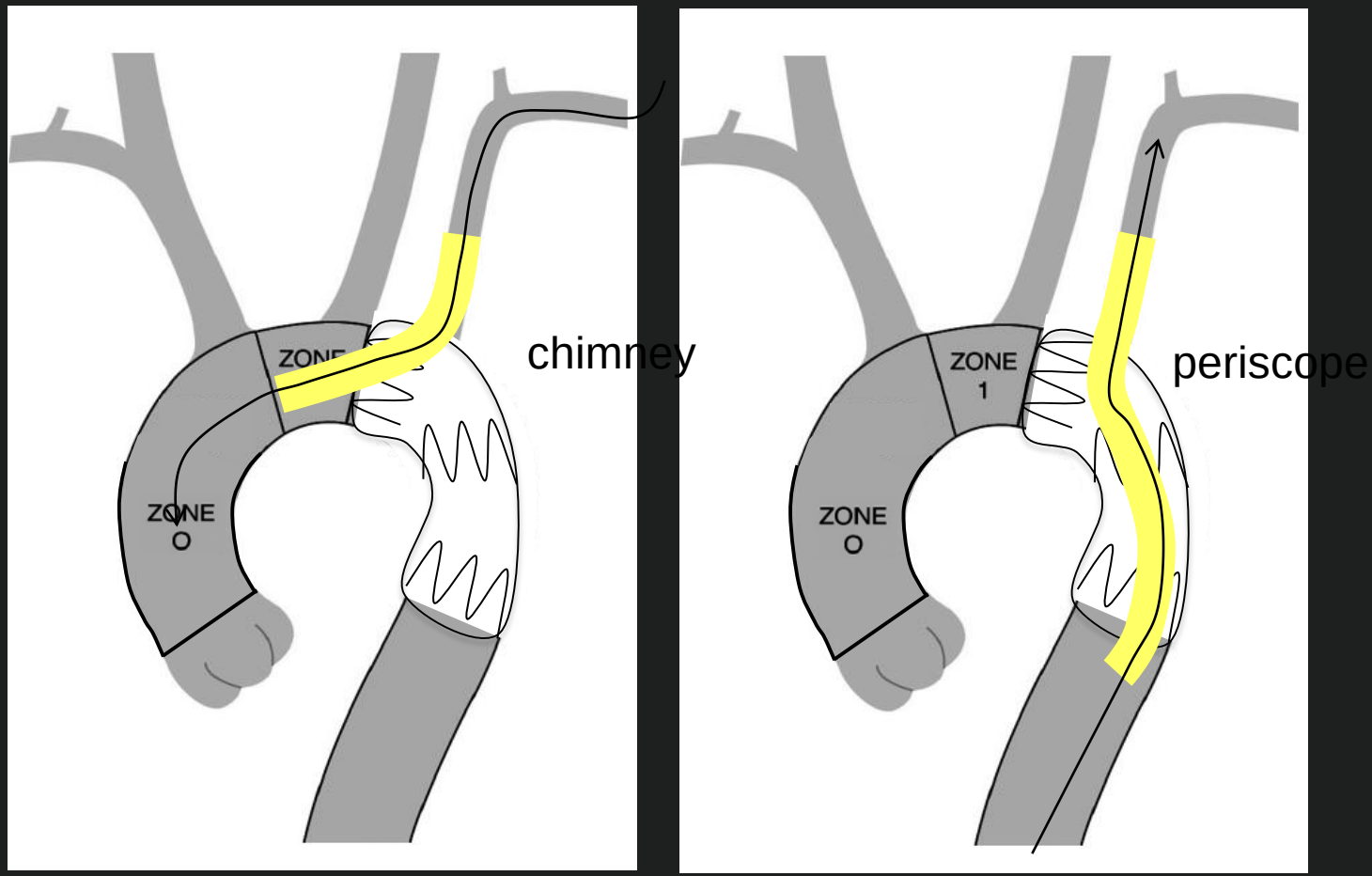
Mario Lachat, MD[1]; Dieter Mayer, MD[1]; Thomas Pfammatter, MD[2]; Frank J. Criado, MD[3]; Zoran Rancic, MD, PhD[1]; Thomas Larzon, MD, PhD[4]; Frank J. Veith, MD[1,5]; and Felice Pecoraro, MD[1,6]



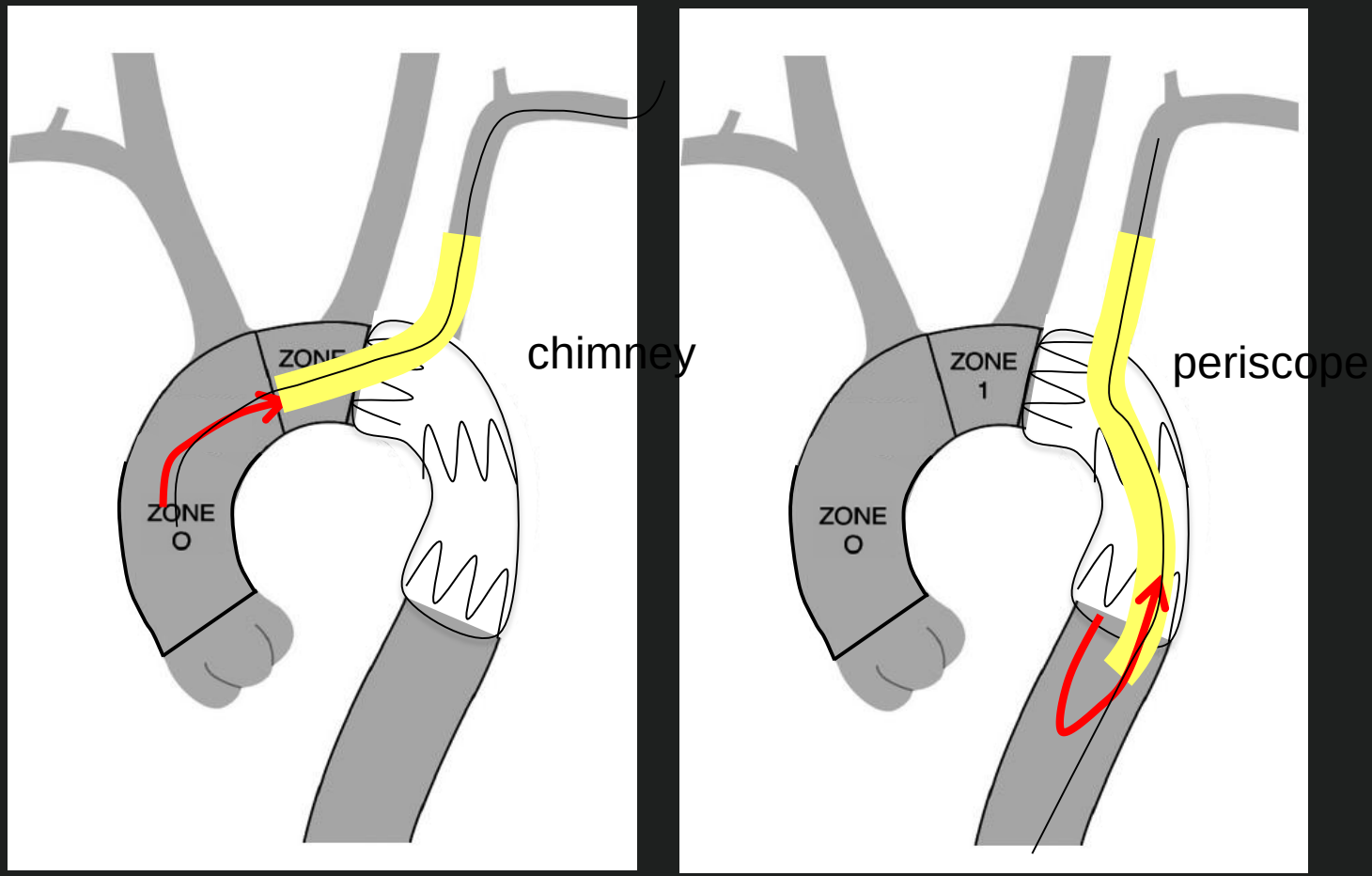
Aortic stentgraft landing in **zone 2**

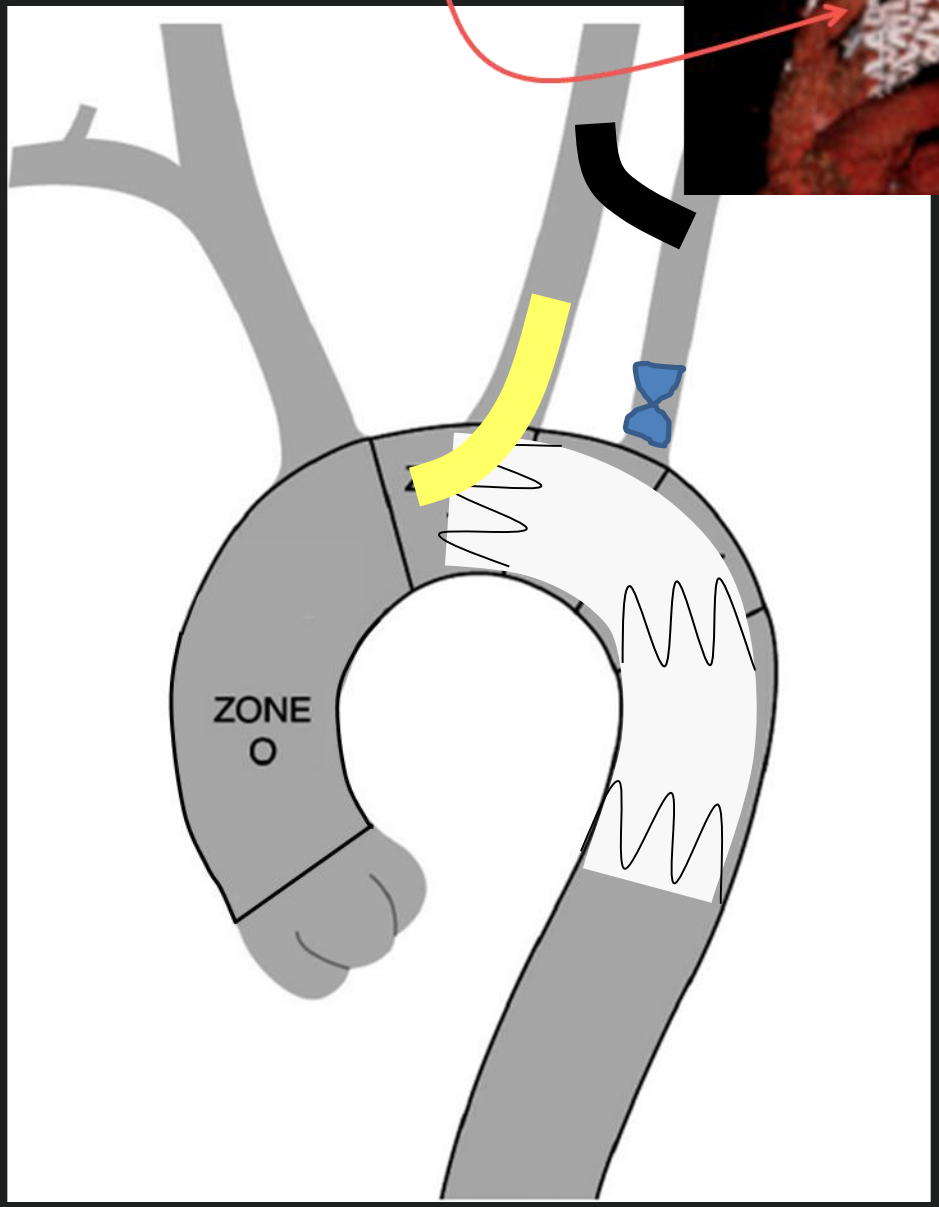


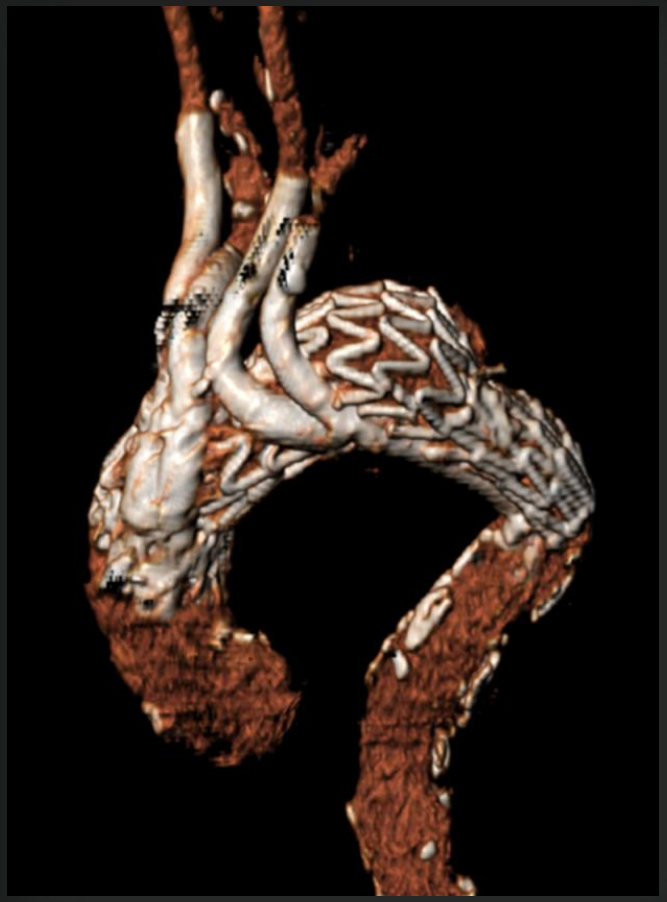
Parallel Graft (chimney, periscope)

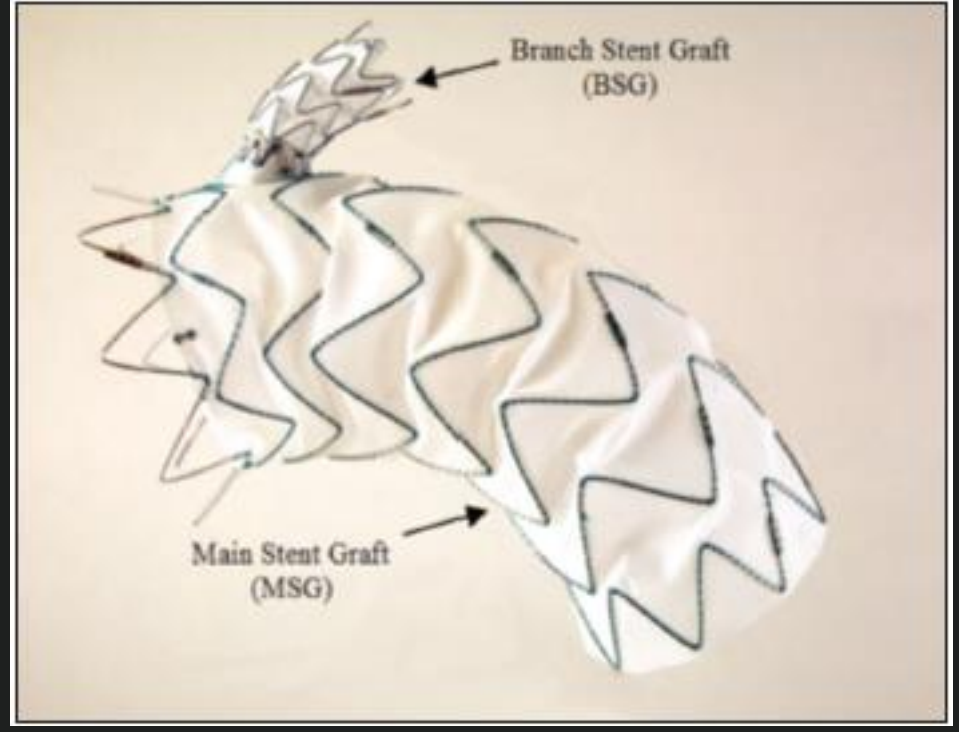


Parallel Graft (chimney, periscope)

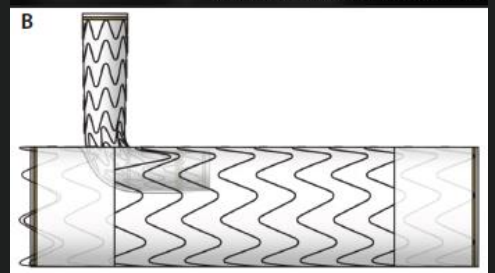







Branch Stent Graft
(BSG)
Main Stent Graft
(MSG)


A
© 2010 W. L. Gore & Associates, Inc.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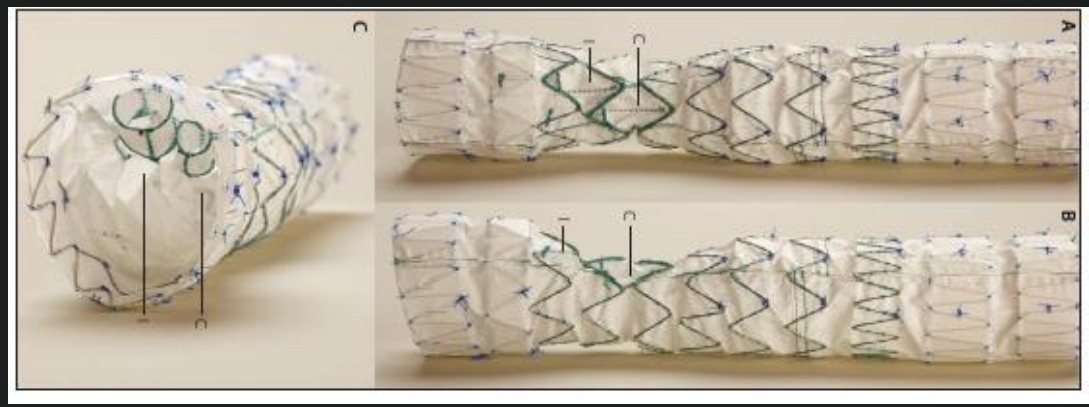
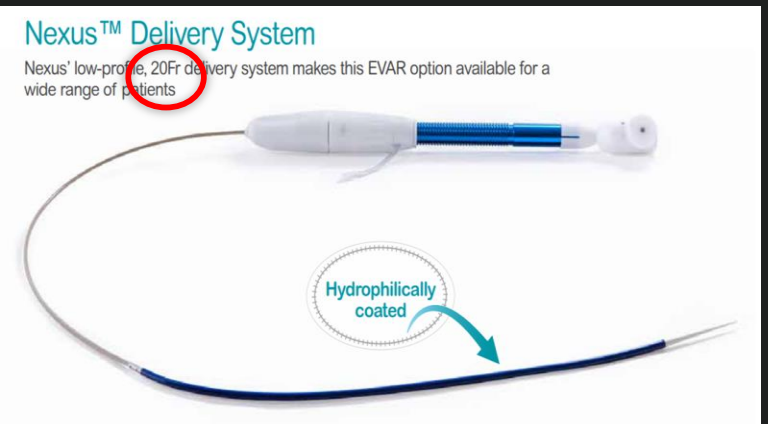
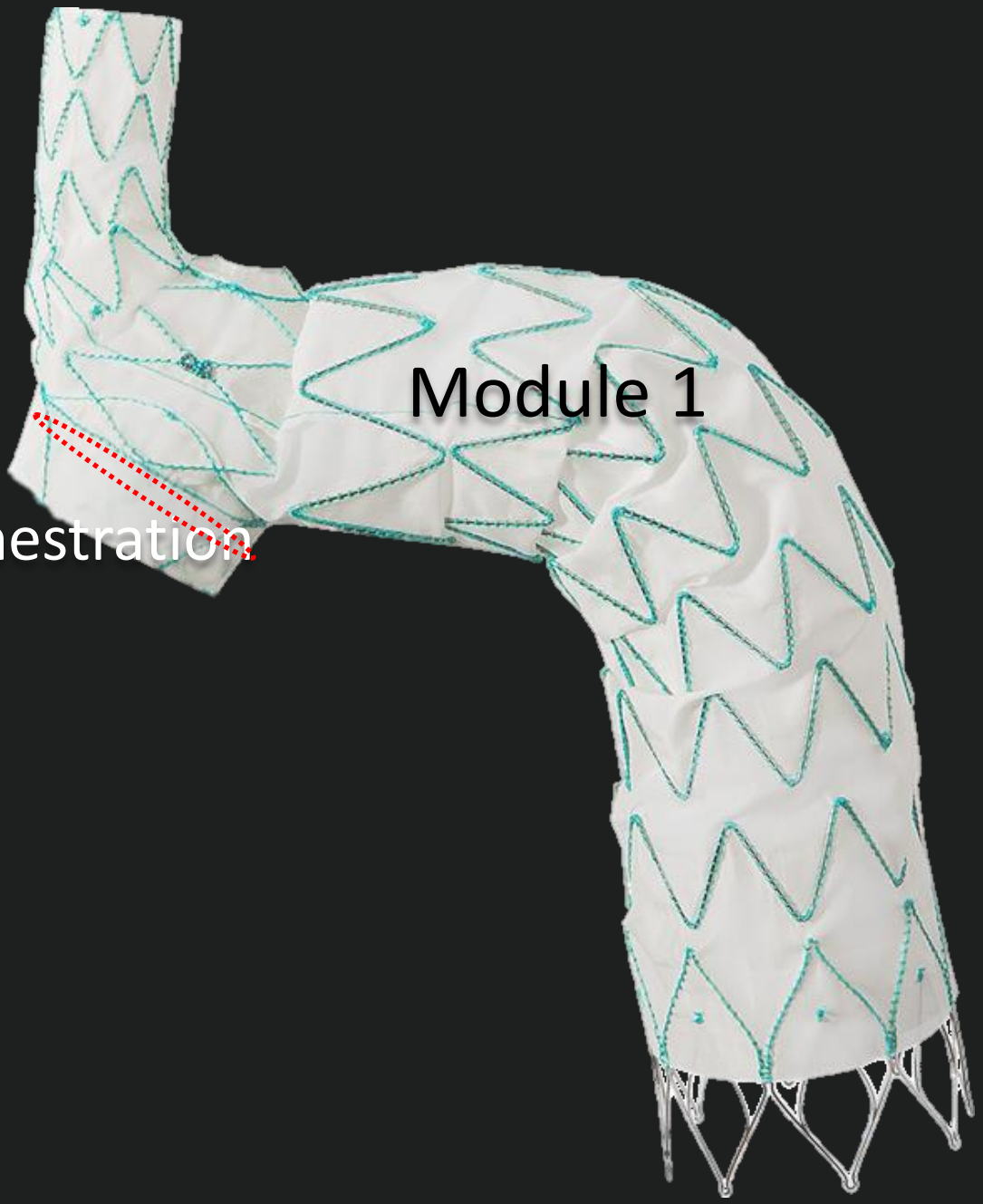
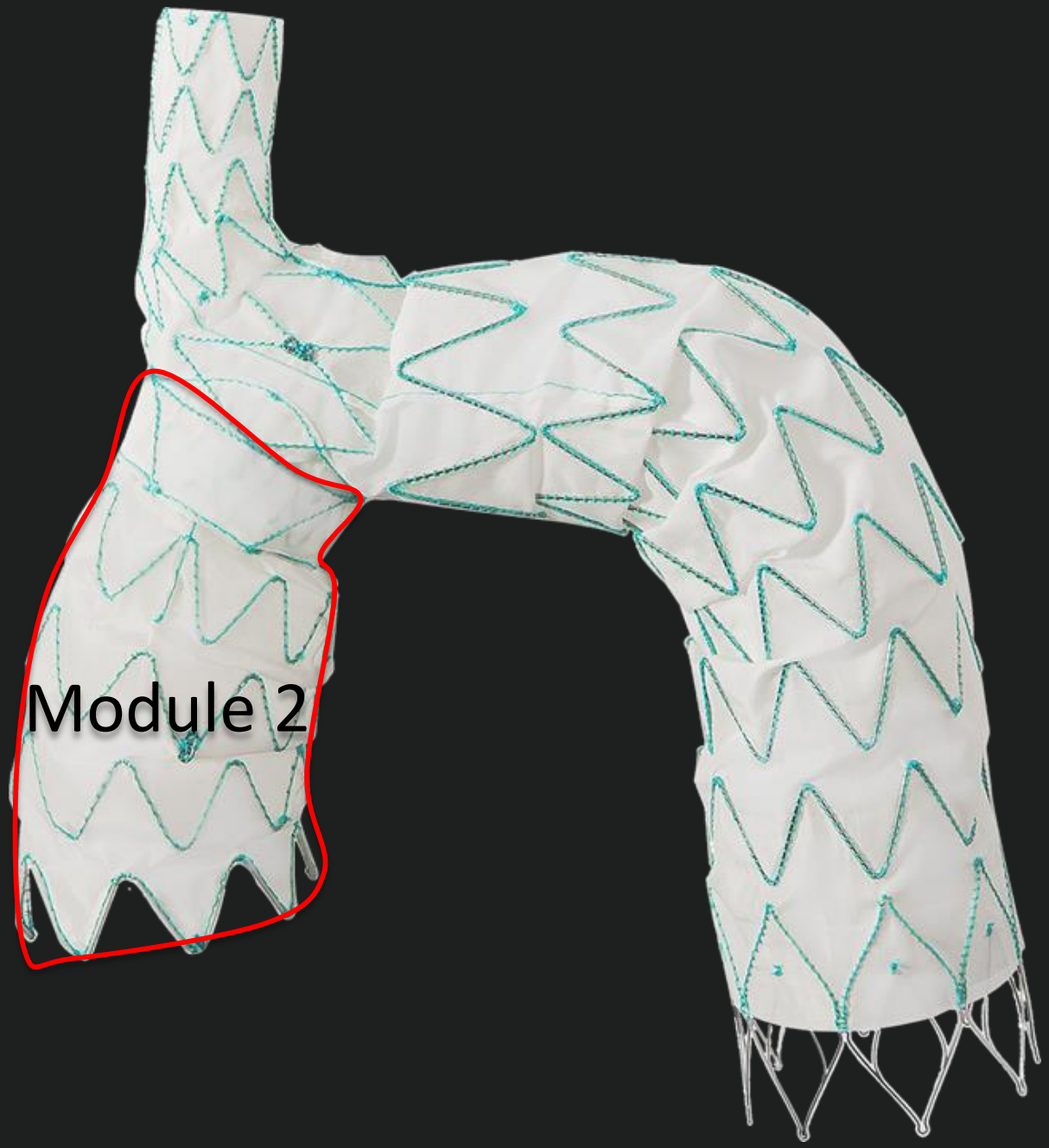

C
A
B

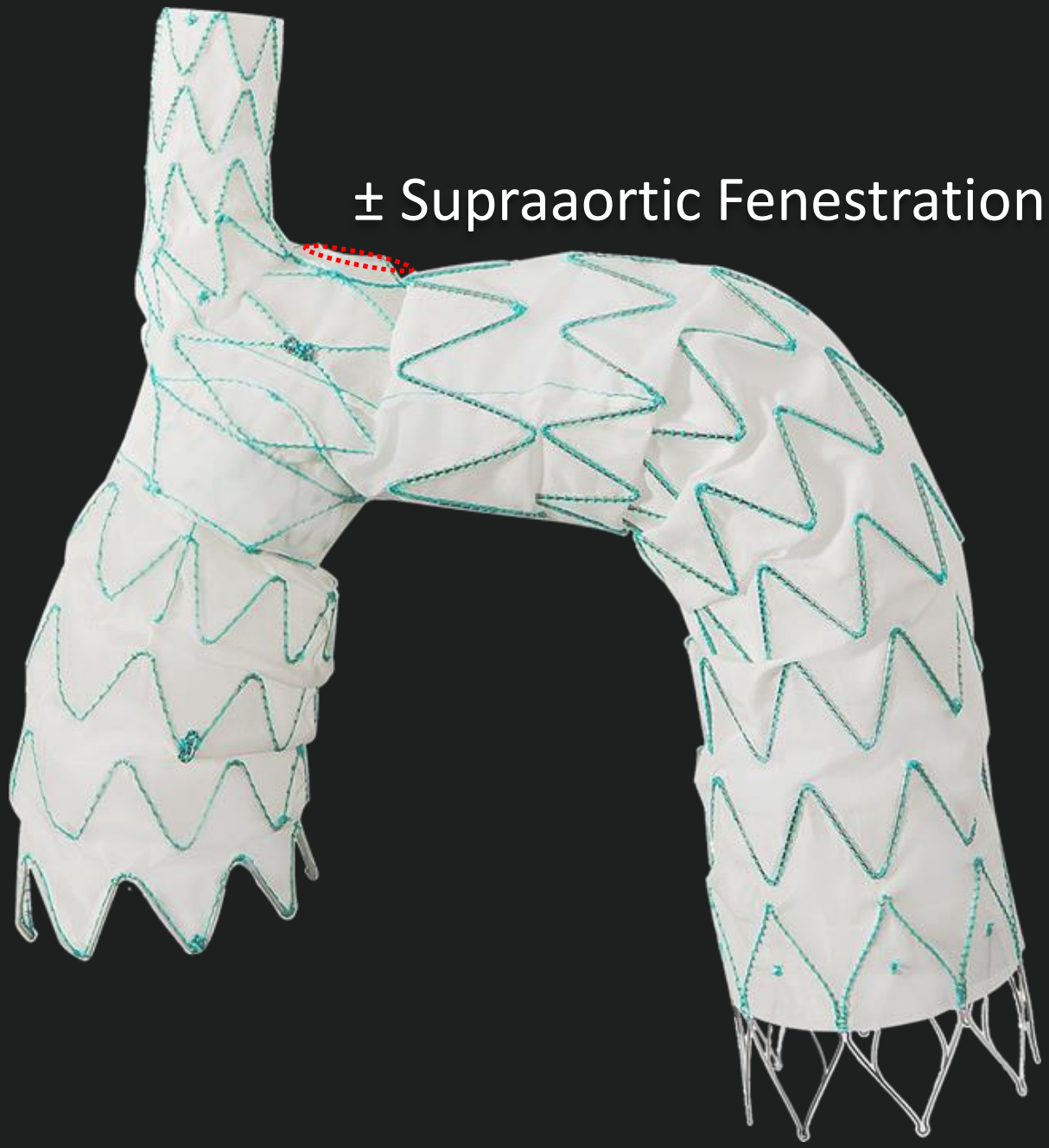
Innominate branch

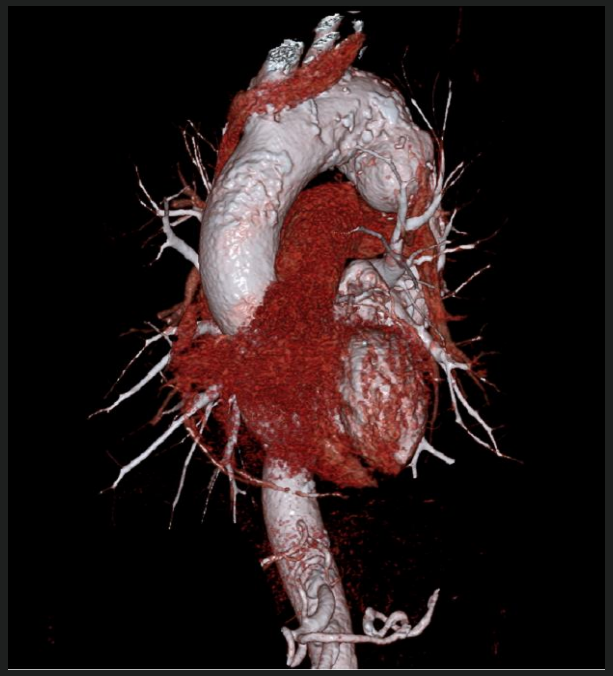
Module 1



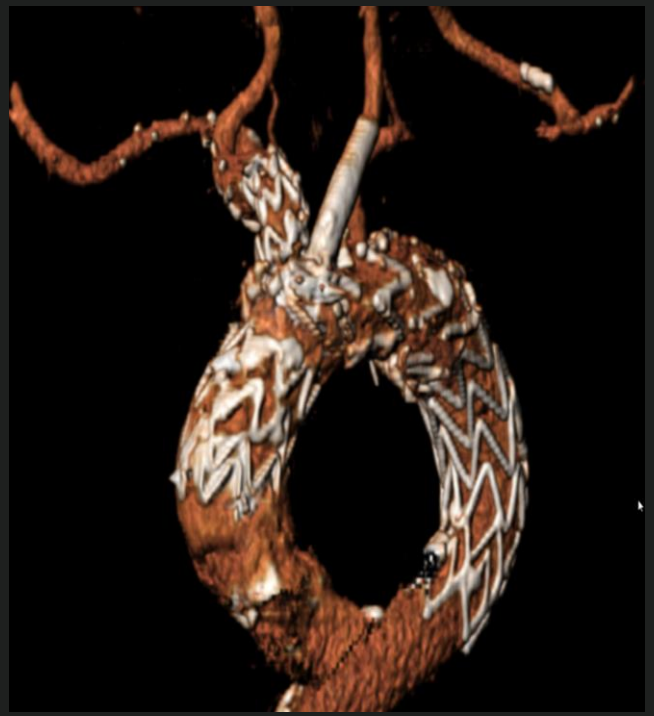

Module 1
Ascending fenestration


Module 2

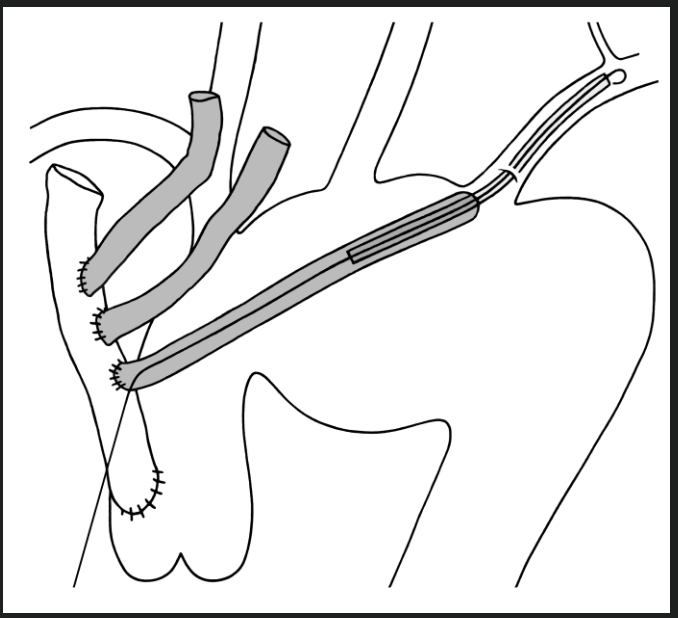

± Supraaortic Fenestration

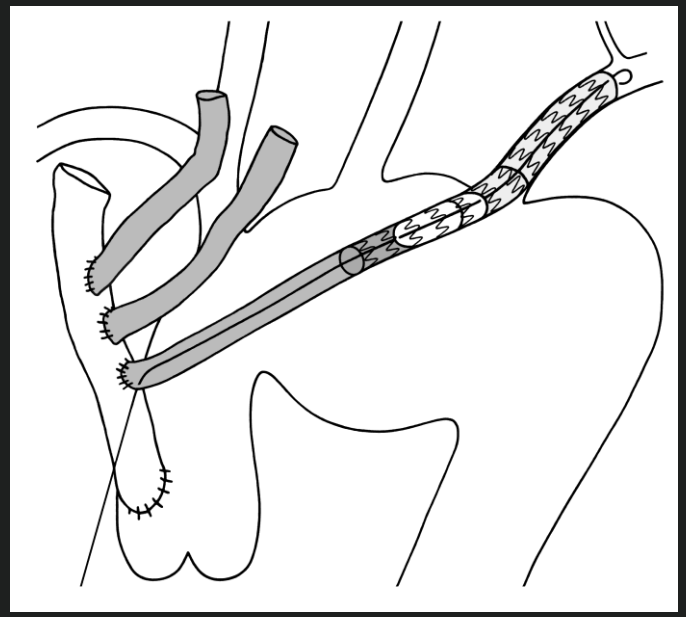


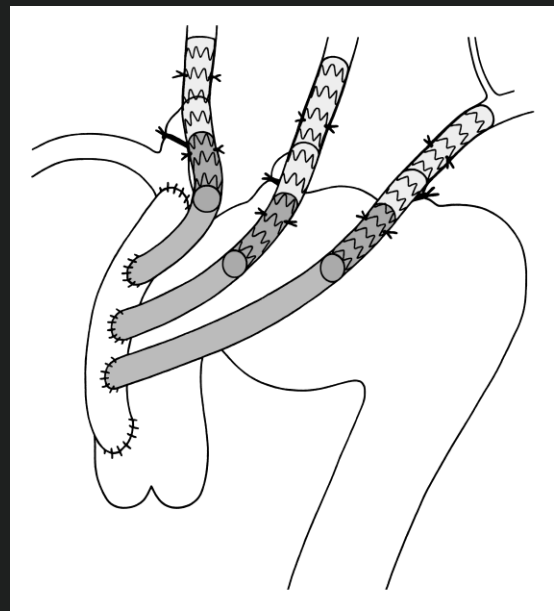
al CTA

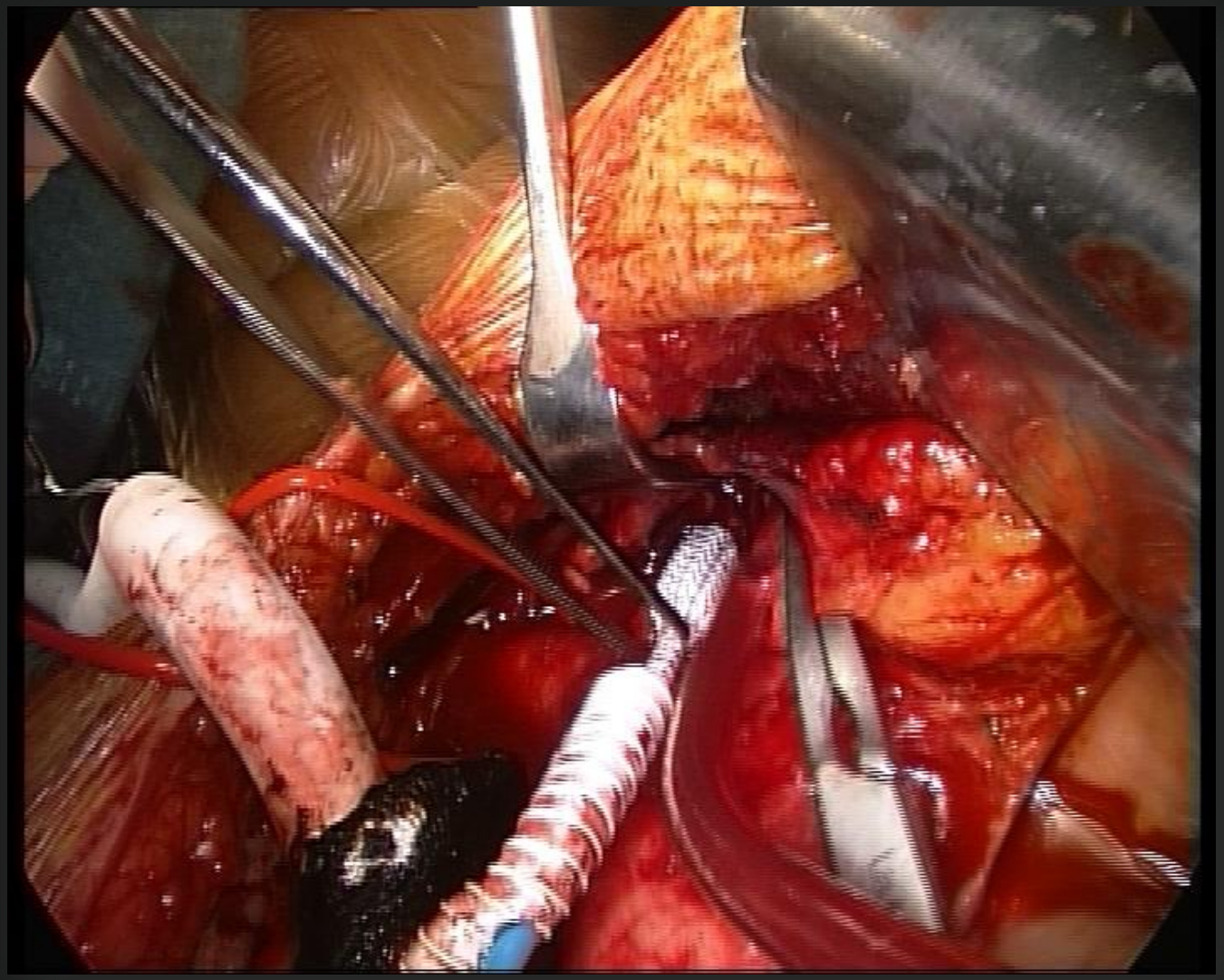


Debranching + TEVAR

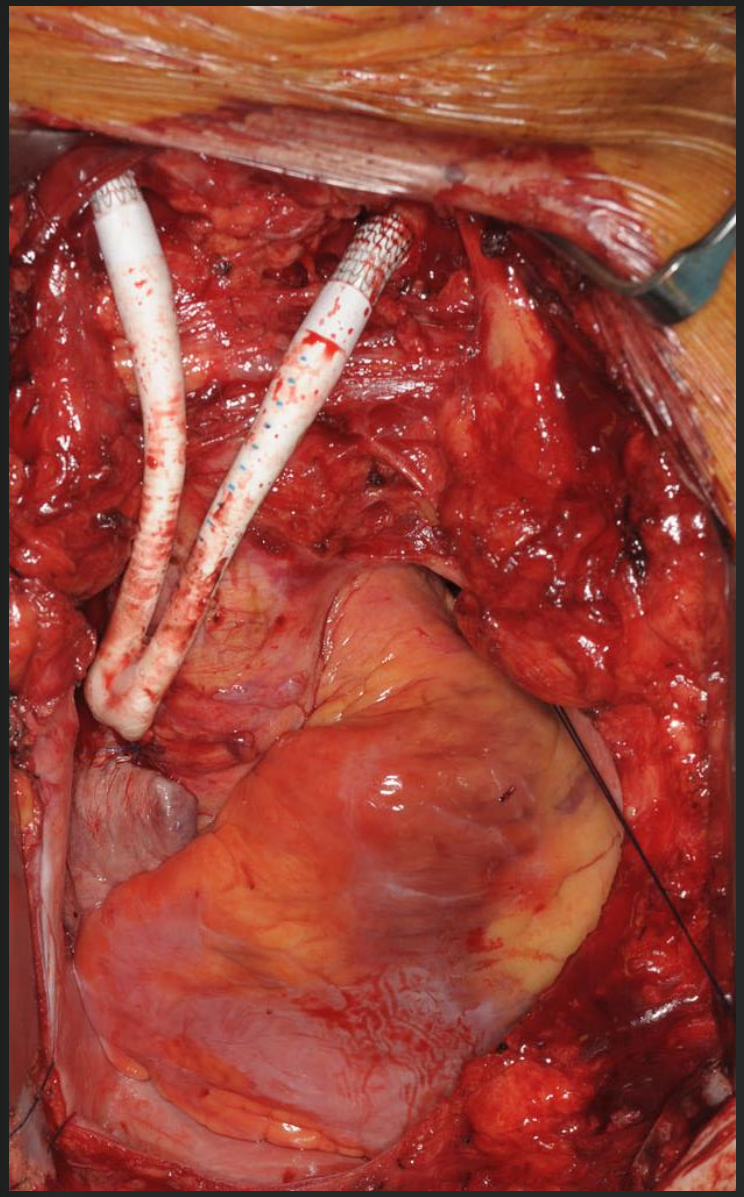




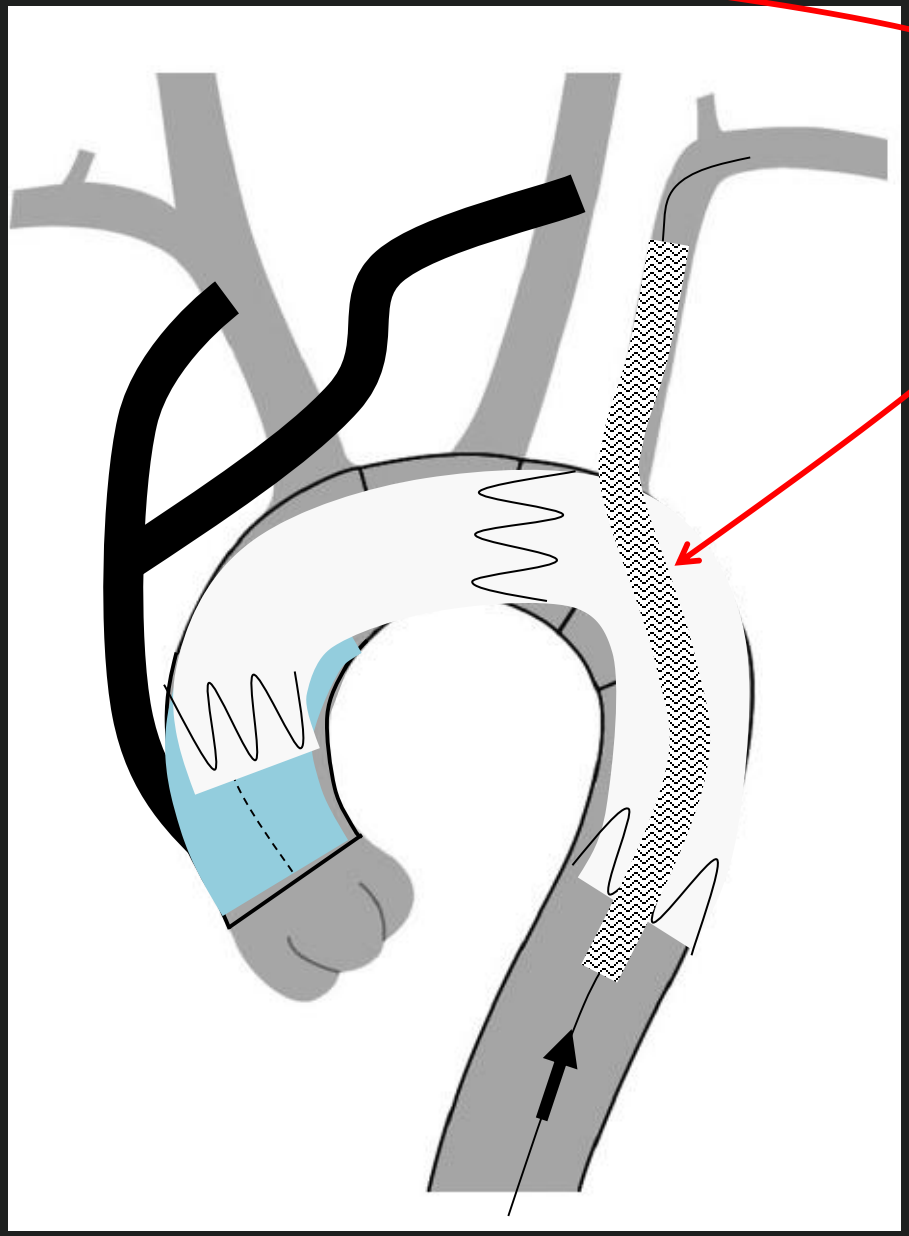


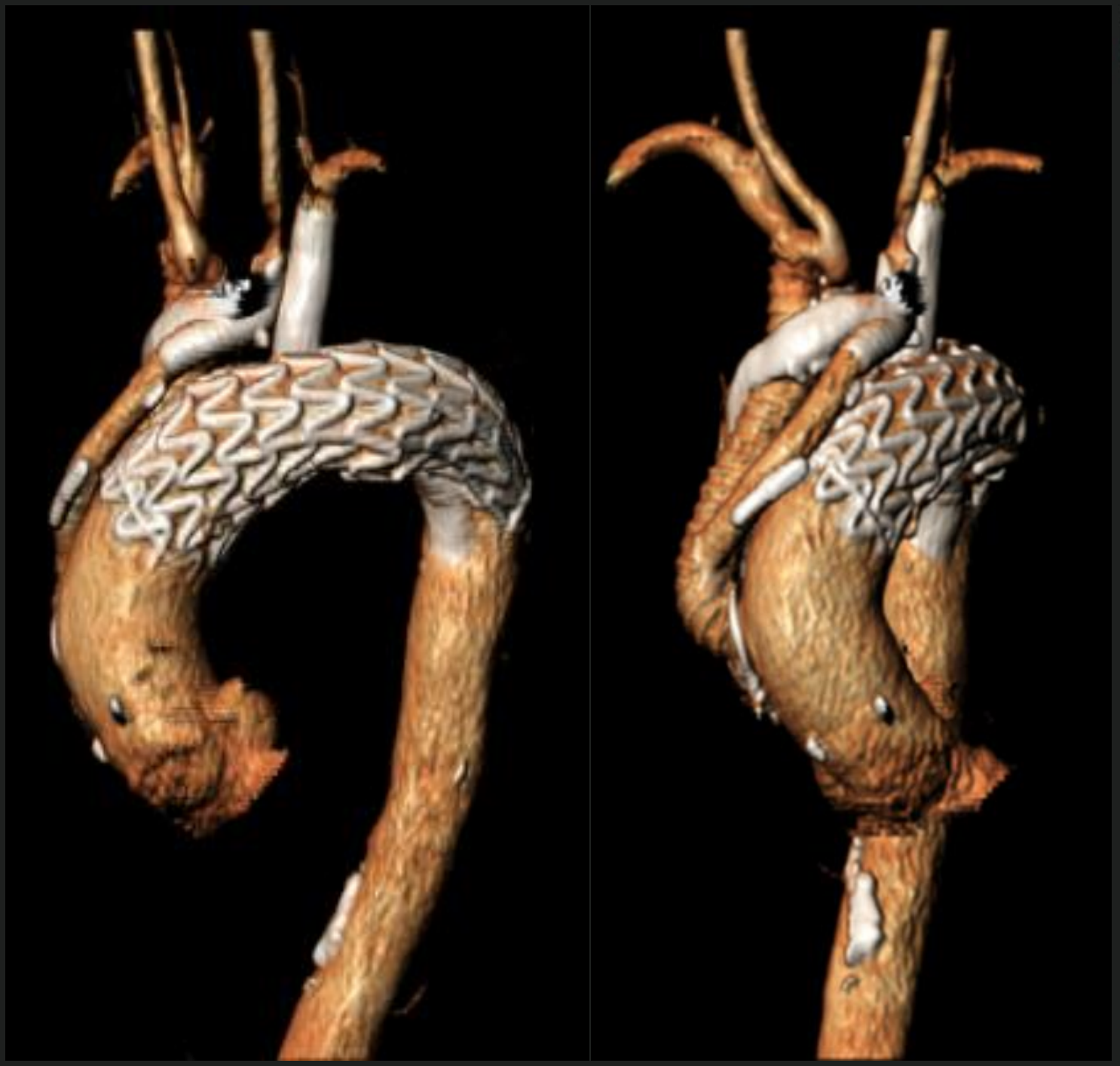


Gore Hybridgraft (Carotid arteries)



EVAR with periscope endograft on LSA

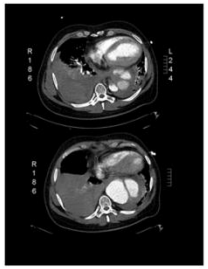


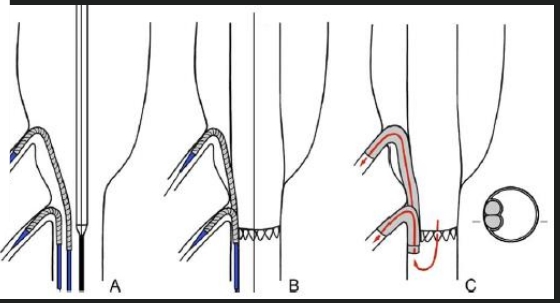


Periscope graft to extend distal landing zone in ruptured thoracoabdominal aneurysms with short distal necks

Zoran Rancic, MD, PhD,[a] Thomas Pfammatter, MD,[b] Mario Lachat, MD,[a] Lukas Hechelhammer, MD,[b] Thomas Frauenfelder, MD,[b] Frank J. Veith, MD,[c,d] Frank J. Criado, MD,[e] and Dieter Mayer, MD,[a] *Zurich, Switzerland; New York, NY; and Baltimore, Md*

Endovascular aneurysm repair (EVAR) of ruptured thoracoabdominal aortic aneurysms may be compromised or even impossible due to short proximal and/or distal necks or landing zones, respectively. Supra-aortic branches may limit the proximal anchorage and visceral or renal arteries the distal anchorage of endografts. While solutions have been proposed to overcome the problem of a short proximal neck, no technique has been described that solves the problem of a short distal neck. We present the "periscope technique," which allows extension of the distal landing zone and complete endovascular treatment of ruptured thoracoabdominal aneurysms with short distal necks using devices already stocked in most centers performing EVAR procedures. (J Vasc Surg 2010;51:1293-6.)





2 reversed chimneys
(Periscopes)

TEVAR LT results: 18 years TAI

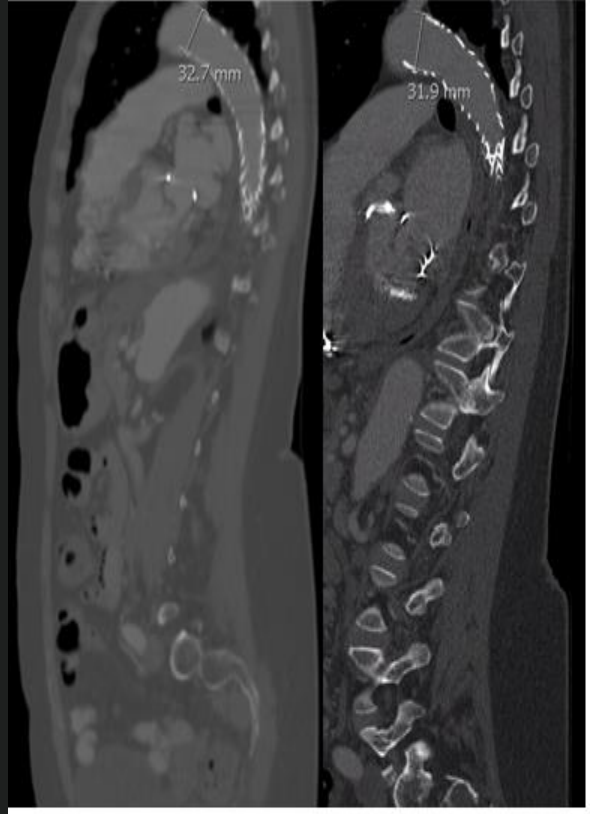
Connective Tissue diseases

- Surgery should be preferred over TEVAR
- TEVAR could be employed as a bridge to surgical therapy in emergent setting for initial stabilization.

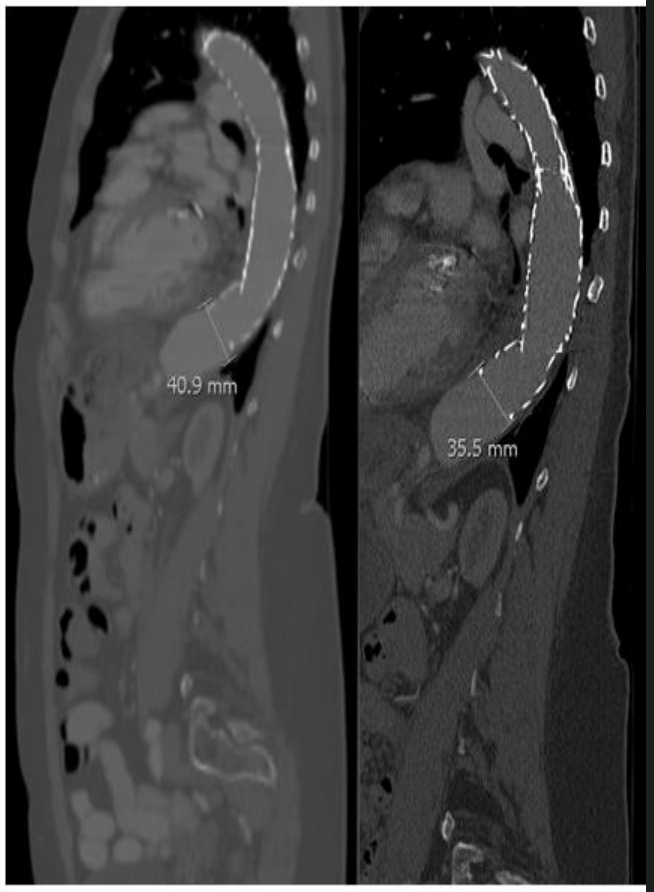
Sister in law

- 42 yo, Marfan
- 4.2.2010: «sudden death»
  - Root and ascending replacement & mitral valve reapir
- 2.3.2010: AICD
- 10.6.2010: Acute B type Dissection
- 23.6.2010: TEVAR
- 2.3.2011: redo TEVAR

FUP 30 months post EVAR



30 months FUP



30 months FUP

Costs

J Vasc Surg. 2015 March ; 61(3): 596–603. doi:10.1016/j.jvs.2014.09.009.

Cost Analysis of Endovascular versus Open Repair in the Treatment of Thoracic Aortic Aneurysms

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Mid-term Survival and Costs of Treatment of Patients with Descending Thoracic Aortic Aneurysms; Endovascular vs. Open Repair: a Case-control Study

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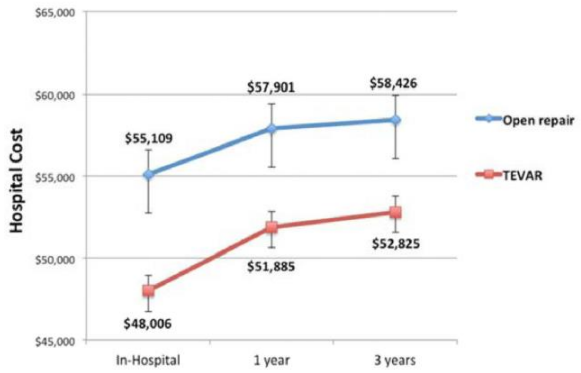


Figure 1.
Cost Forecast of TEVAR vs. Open TAA Repair over time. Each forecast reflects the mean surrounded by error bars reflecting the interquartile range.

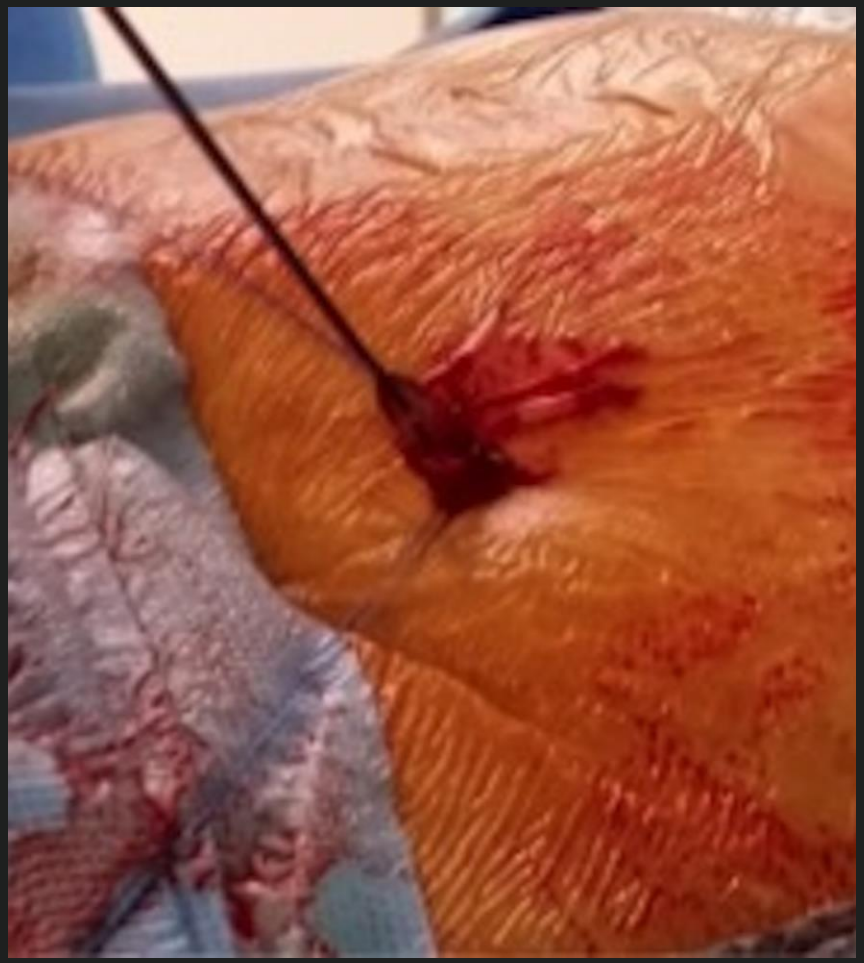
Table 5. Costs per patient operated by endovascular or open repair

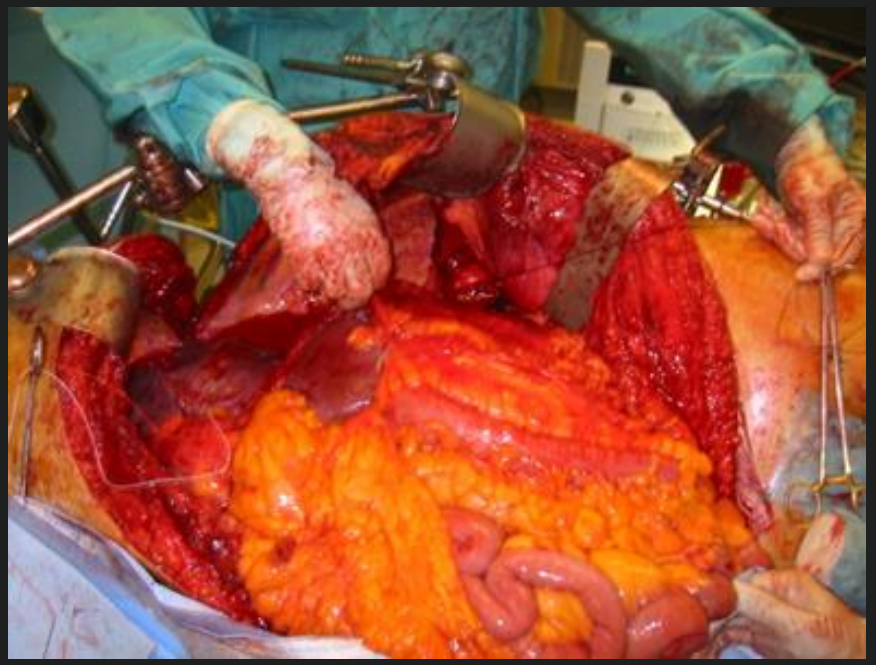
		Endo (€)	Open (€)	Costs calculation remarks
Peri-operative				
	Operation costs. Including anaesthesia time	1333	4000	Endo: €500/h, Open: €800/h. including distal perfusion and personnel
	Prosthesis	10,000	500	Two Talent stents/patient Dacron graft for open
	Specialists	600	1000	Endo: surgeon and radiologist; open surgeon and cardiothoracic surgeon
	Radiological investigations	2000	400	
	Laboratory	200	200	
Nursing costs				
	Intensive care	2310	18,150	Mean stay see text
	Ward	1620	3420	Mean stay see text
Post-operative				
	Paraplegia rehabilitation	2600	6100	Costs of life long care (rehospitalisation etc.) not included. Calculation according to percentages in text
Total		20,663	33,770	

Conclusion

- TEVAR has lower perioperative mortality and morbidity compared to OSR
- TEVAR has lower costs compared to OSR
- TEVAR has superior QOL when compared to OSR
- TEVAR has lower/similar SCI incidence compared to OSR
- Survival long-term outcomes are similar for TEVAR and OSR
- CTDs still represent indications to OSR
- Most of the reinterventions after TEVAR are performed endovascularly

Surgical trauma TEVAR VS OSR
Patient's treatment preference





SORRY… BUT

THERE IS NO U-TERM FOR TEVAR!!!

BYE-BYE OPEN

THANK YOU FOR YOUR ATTENTION

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