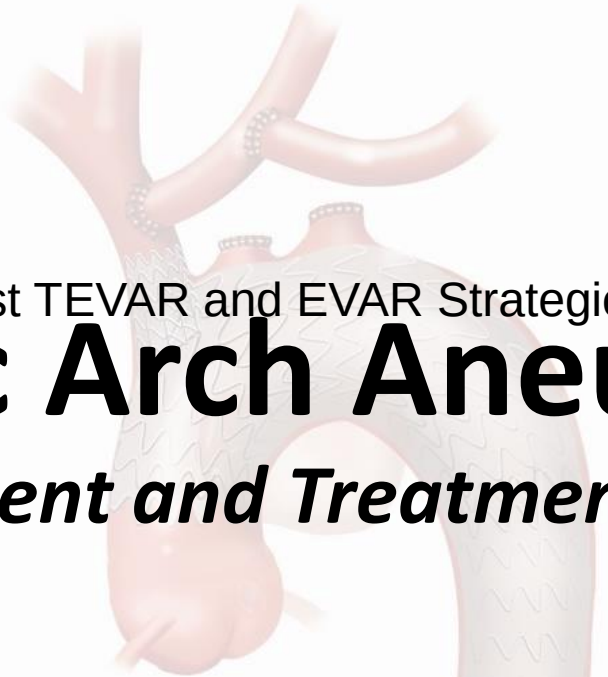
TCT 2018: Latest TEVAR and EVAR Strategies

Aortic Arch Aneurysm:

Management and Treatment Options



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Co-Chair, Society of Thoracic Surgeons Aortic Surgery Task Force

Disclosures

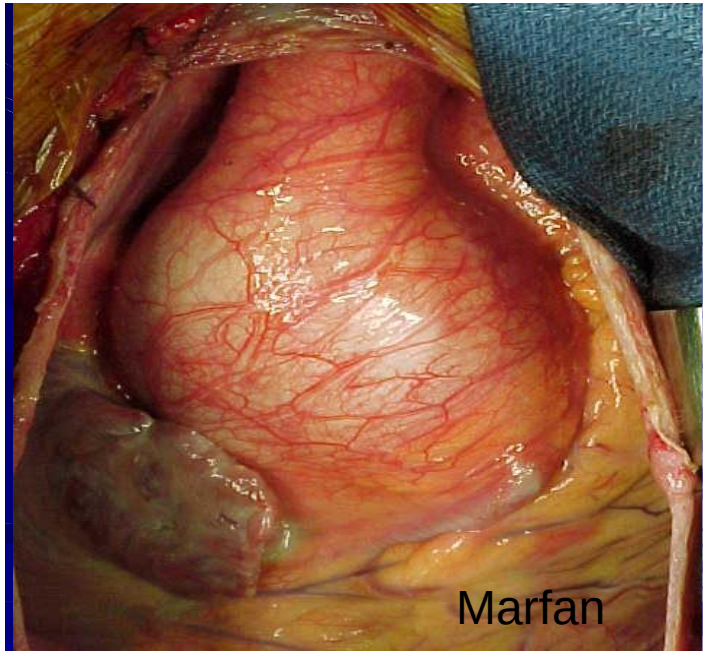
- EVERYTHING is OFF-Label…

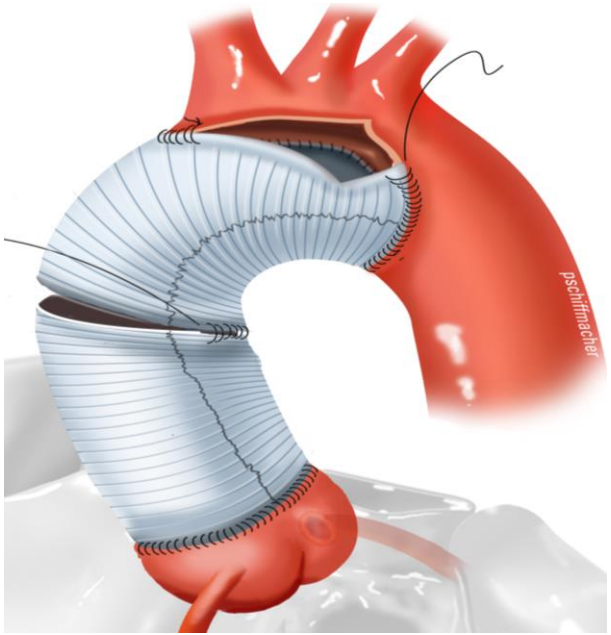
- Investigator
  - Gore
  - Medtronic
  - Cook
  - Edwards
  - Abbott

- Speaking Honoraria:
  - Abbott
  - Gore
  - Medtronic
  - Terumo Aorta
  - Edwards

Who does NOT need Ascending /Arch TEVAR:

Congenital Aortic Syndromes – Ascending only pathology



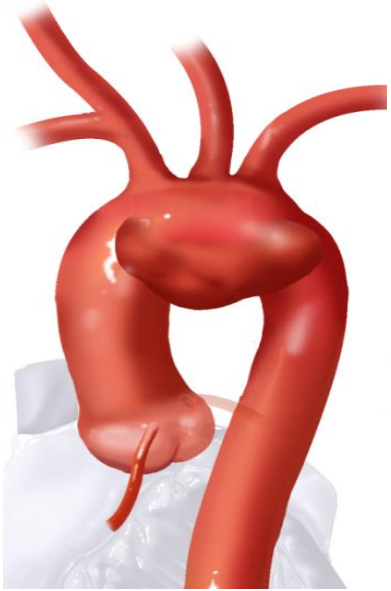


<2% Mortality/Stroke for straight forward Ascending/Hemiarch +/- Root in experienced centers

Who is Eligible for Branched Graft Therapies in the Aortic Arch?

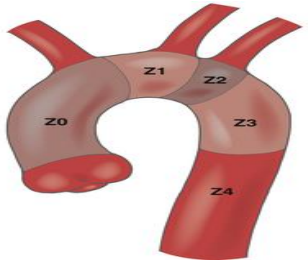
Distal Arch Aneurysm

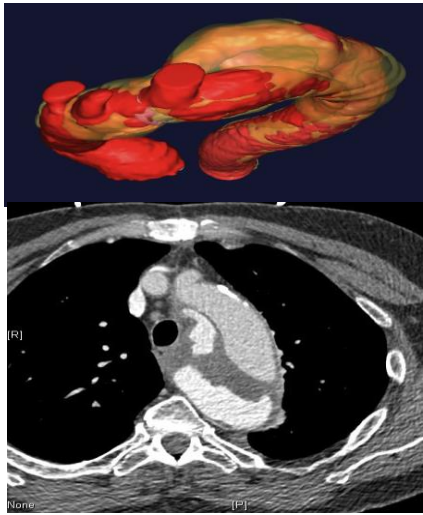
Zone 2 Landing



Saccular Arch Aneurysm

Mega aorta – intact ascending LZ

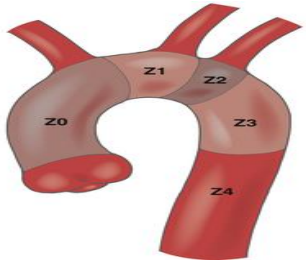




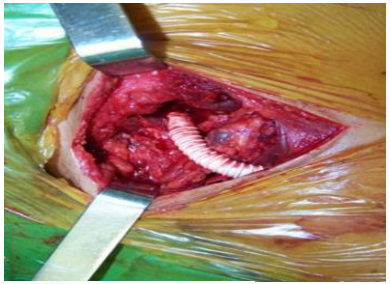
Residual Dissection after Type A repair

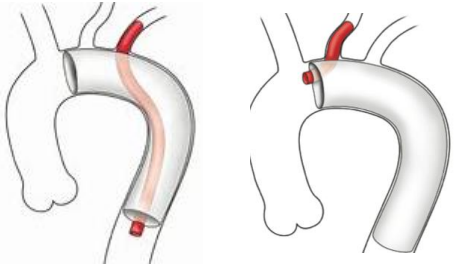
Zone 0/1

Extending TEVAR to Zone 2: Coverage of the Left Subclavian Artery



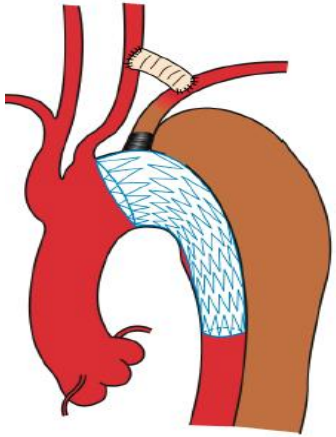
- Extension of the proximal landing zone
  - Proximal aneurysm extent
  - Angulated arch
  - Traumatic aortic injuries
  - Type B dissection



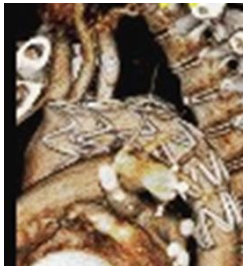


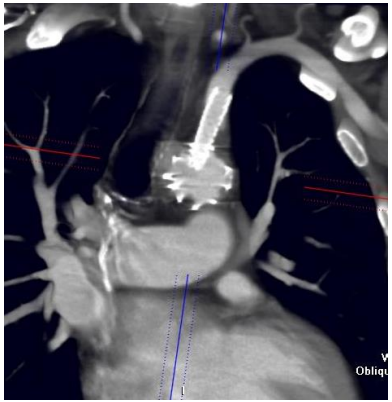
Parallel Grafts

- Options
  - LCC-LSCA bypass
  - Parallel Grafts
  - In situ Fenestration



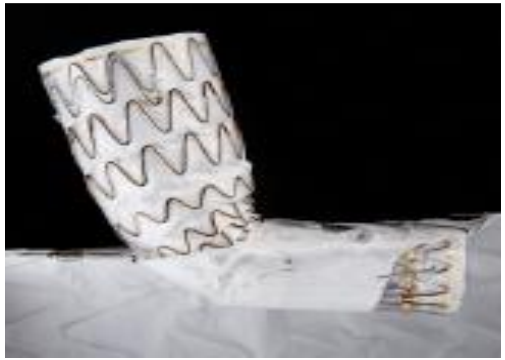
C-S Bypass

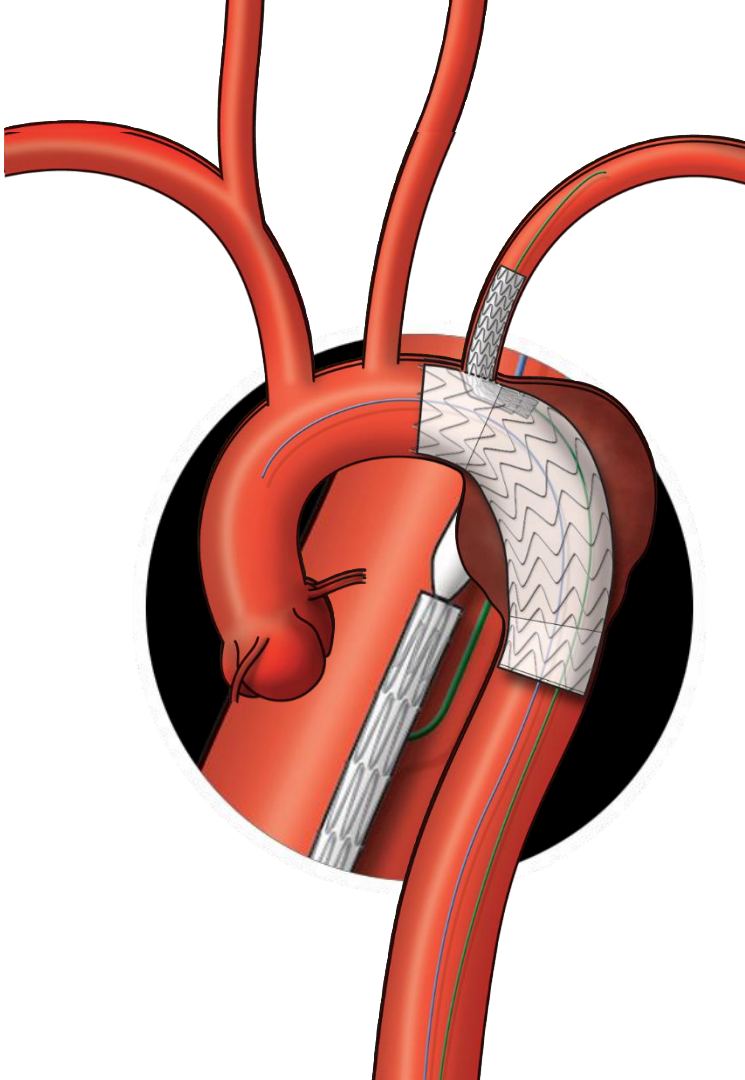




In-situ fenestration

GORE TAG Thoracic Branch Endoprosthesis





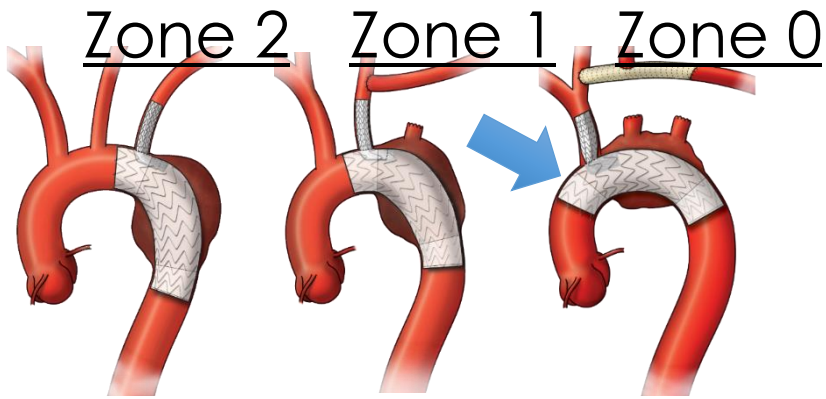
Gore TBE EARLY FEASIBILITY: Summary of Early Results

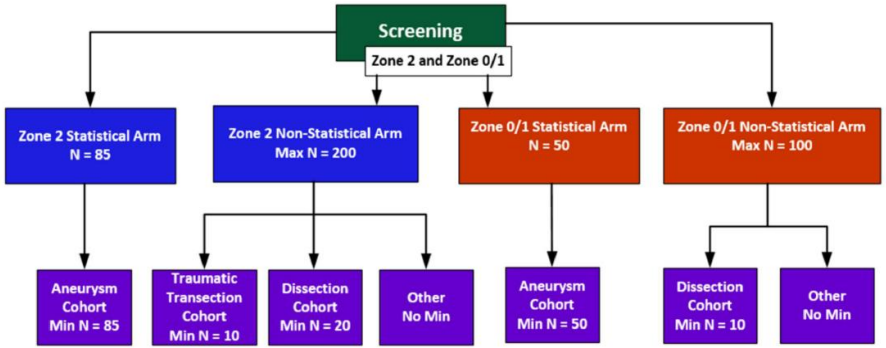
- 31 Zone 2, 9 Zone 0
- 100% Technical success
- 100% Survival at 1 month

- Peri-Procedural Stroke
  - 3.3% (1/31) Zone 2
  - 22.2% (2/9) Zone 0/1

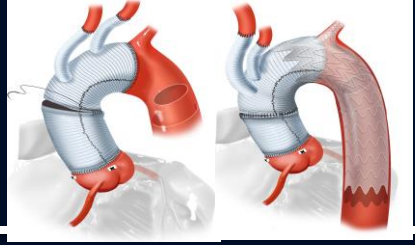
- Side Branch Patency
  - 1/31 Zone 2 patency loss
  - No loss of patency in Zone 0

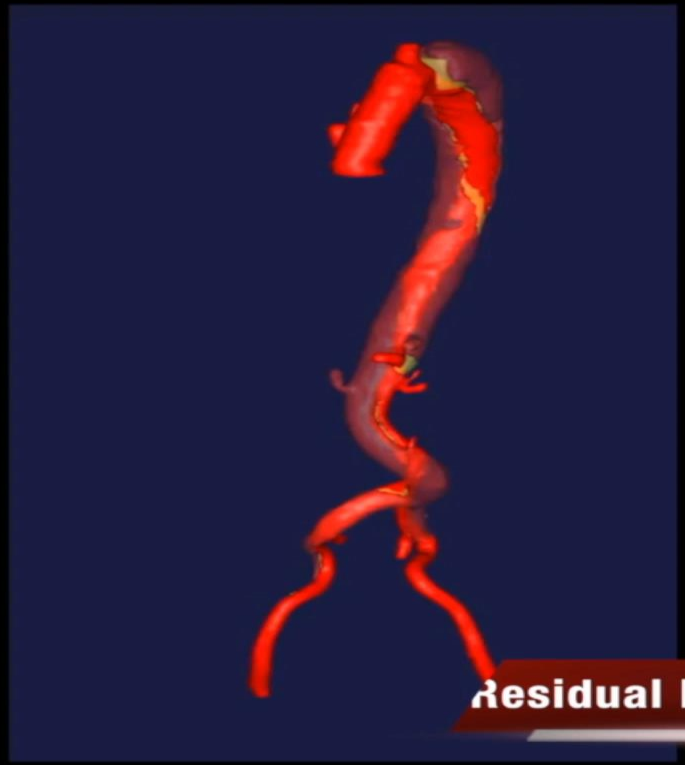
- NOW in PIVOTAL
  - >200pts enrolled





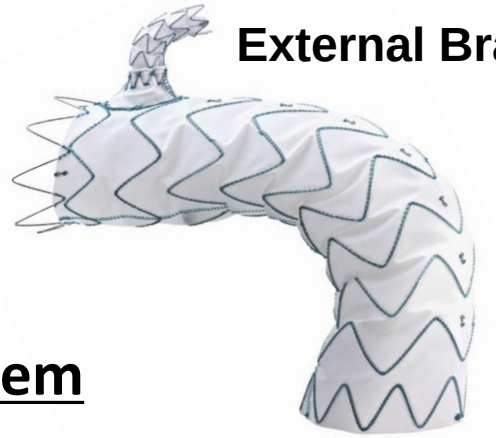
Zone 2 Branched TEVAR
Gore TBE – Residual Type A





Residual Dissection After Zone 2 Arch

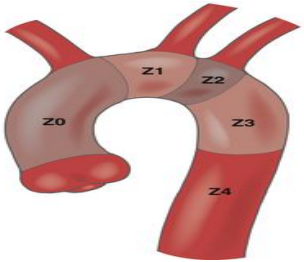
Medtronic Valiant Mona LSA
Early Feasibility



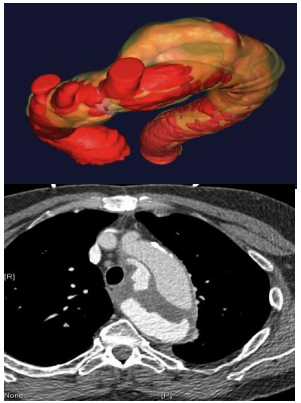
Delivery System

- Two wire system
  - Main/primary aortic tracking wire
  - LSA cannulation wire
- Pre-cannulated LSA cuff
- Tip capture for precise MSG delivery

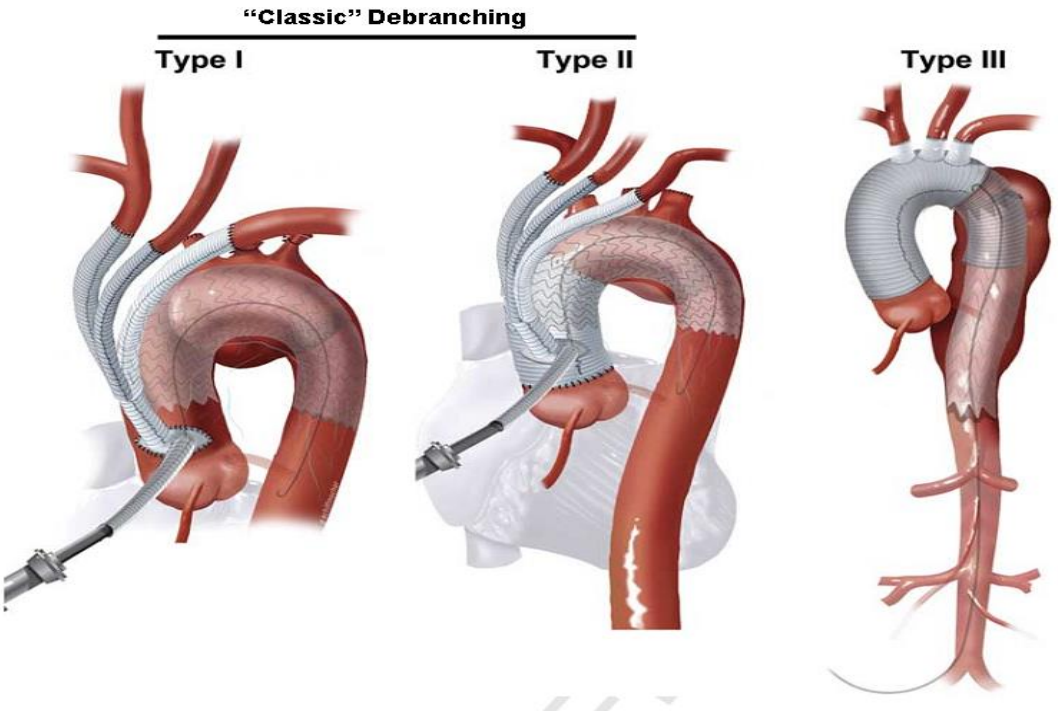
Zone 0/1 Landing



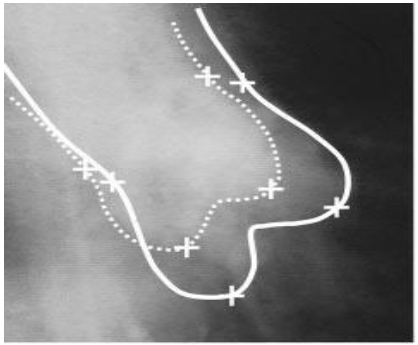
Saccular
Mid Arch

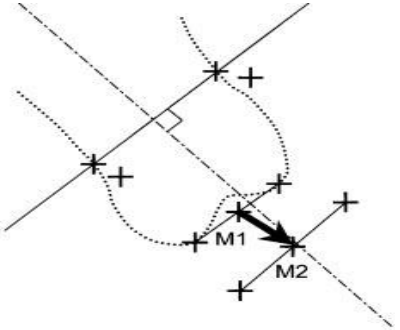


Residual Type A
s/p repair



Zone 0 Landing:
The problem of TEVAR in the proximal Aorta





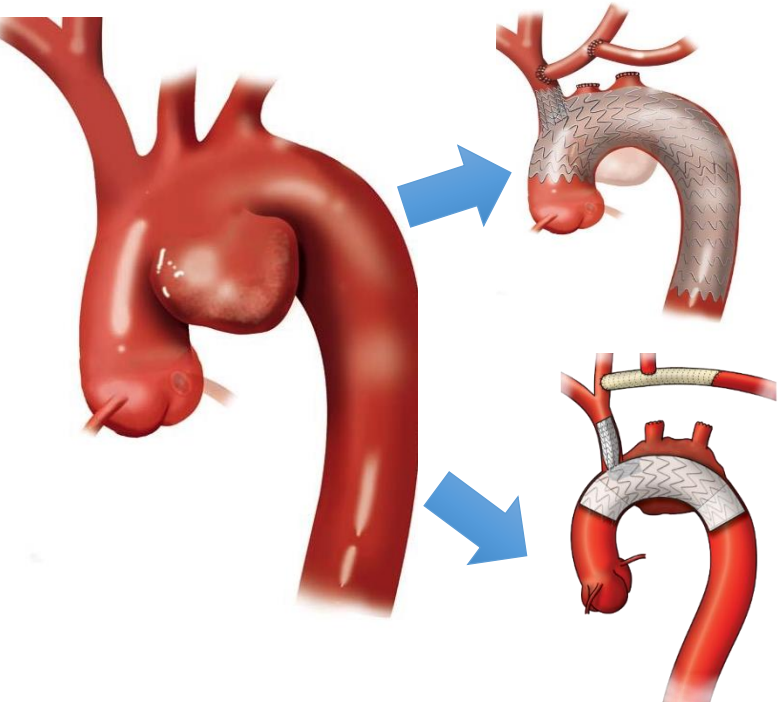
Systolic-diastolic motion

- at the root base 4-7mm
- at the brachiocephalic trunk 3-4 mm

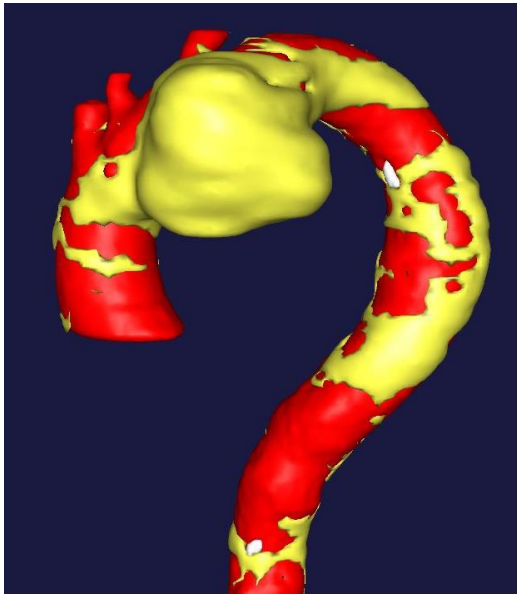
Robicsek et al. 2004

- Systolic-diastolic twist of 6°

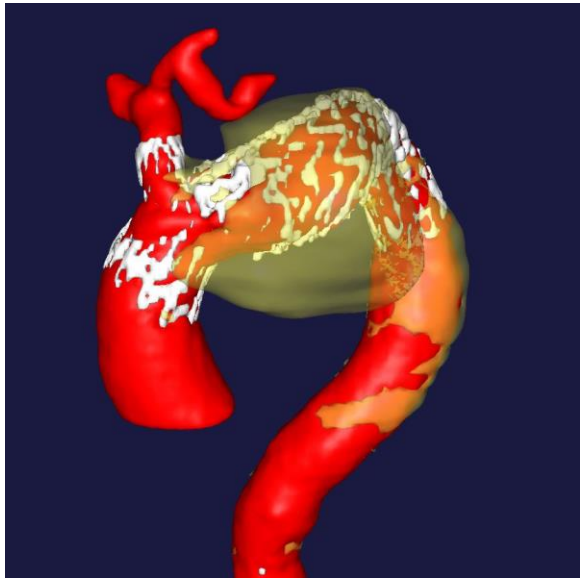
Gore TBE – Single Branch in Zone 0 Proximal Arch Saccular Aneurysm



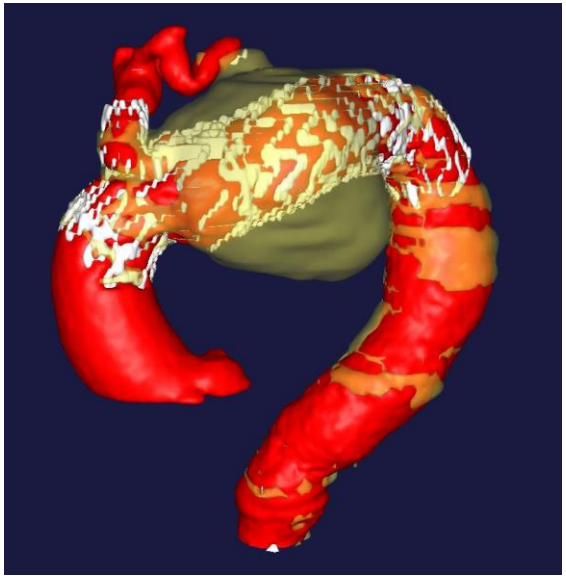
Arch Aneurysm Zone 0 Treatment



Pre-
Op

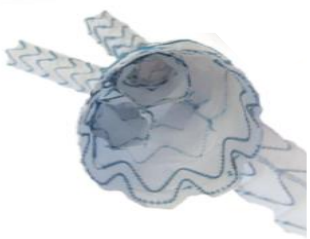


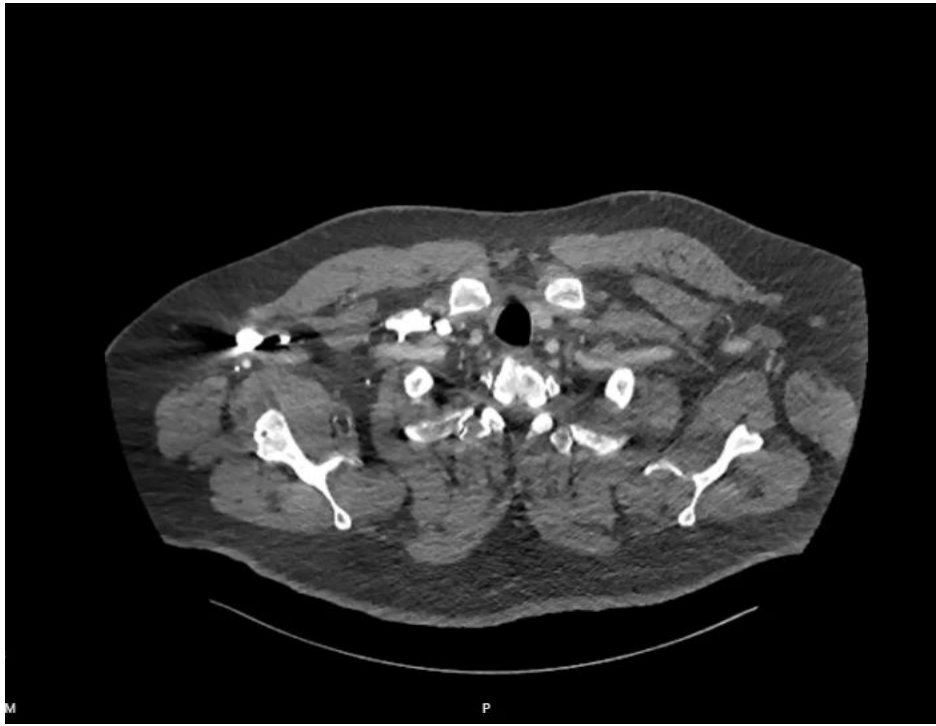
30 Days
Post Op



2 Years
Post Op

Bolton Relay Dual Branch – Internal Branch



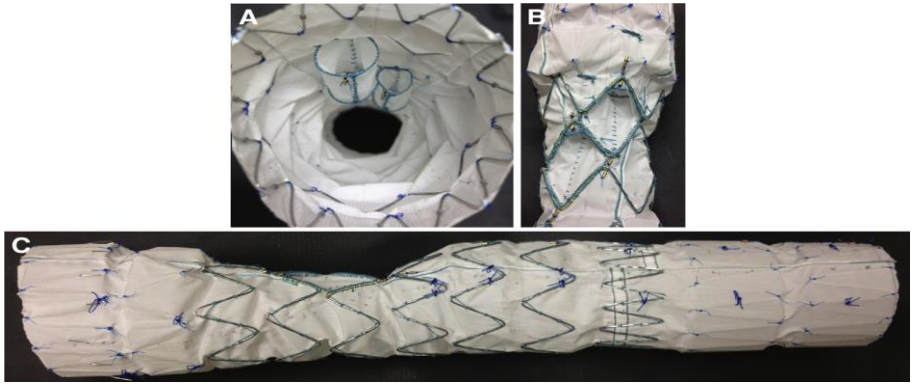


Center	Investigator	City	Country
Ospedale San Camillo Forlanini	Prof. Cao	Roma	Italy
Ospedale G. Brotzu	Dr. Camparini	Cagliari	Italy
Hopital Rangueil	Prof. H. Rousseau	Toulouse	France
Osaka University Hospital	Dr. Kuratani	Osaka	Japan
UMC Utrecht	Prof. F. Moll – dr. Van Herwaarden	Utrecht	Netherlands
Hopital George Pompidou	Dr. J. M. Alsac	Paris	France
Hospital UCA de Oviedo	Dr. M. Alonso	Oviedo	Spain
St. Mary's Hospital - London	Dr. M. Hamady	London	United Kingdom
Linköping University Hospital	dr. C. Forssell	Linköping	Sweden

	Total
N	26
Male	69,2%
Mean Age	72y
TAA	80,8%
PAU	3,8%
Type B Dissection	15,4%
Procedure completed	100%
Freedom from endoleak	92,3%
Perioperative overall death	11,5%
Perioperative procedure related death	3.8%

- "Large single window for ease of cannulation of 2 internal tunnel(s)

Cook TX2 Arch Graft (2-3 branch): Internal Branch



Courtesy of Cherrie Abraham, MD

Table 3. Comparative analysis (median [Q1—Q3] or *n* [%]).

	Group 1 (*n* = 38)	Group 2 (*n* = 27)	*p*
Procedure			
Length (min)	250 (210—330)	295 (232—360)	.35
X-ray time (min)	46 (32—84)	39.3 (34—61)	.07
Volume of contrast (mL)	150 (95—207)	183 (120—290)	.03
Early post-operative			
Endoleaks	11 (28.9%)	3 (11.1%)	.08
Secondary procedures	4 (10.5%)	4 (14.8%)	.61
Cerebrovascular events	6 (15.8%)	3 (11.1%)	.60
Systemic complications	17 (44.7%)	13 (43.3%)	.79
Mortality	5 (13.2%)	0 (0%)	.05
Follow up (*n* = 33)			
Endoleaks	3 (9.1%)	2 (7.4%)	.82
Secondary procedures	3 (9.1%)	2 (7.4%)	.82
Mortality	4 (12.1%)	1 (3.7%)	.24
Overall mortality	9 (23.6%)	1 (3.7%)	.02

Group 1: early experience study.
Group 2: current study.

Spear, R., et al. (2016). Editor's Choice - Subsequent Results for Arch Aneurysm Repair with Inner Branched Endografts. EJVES, 51(3), 380–385

Additional Method for Aortic Arch Aneurysm

Device 2 :Φ 34-30mm

Device 1 :Φ 30mm

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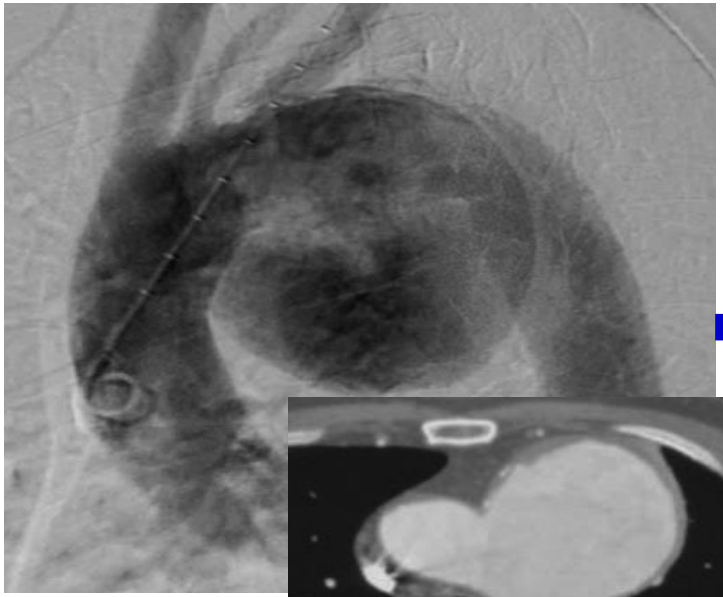
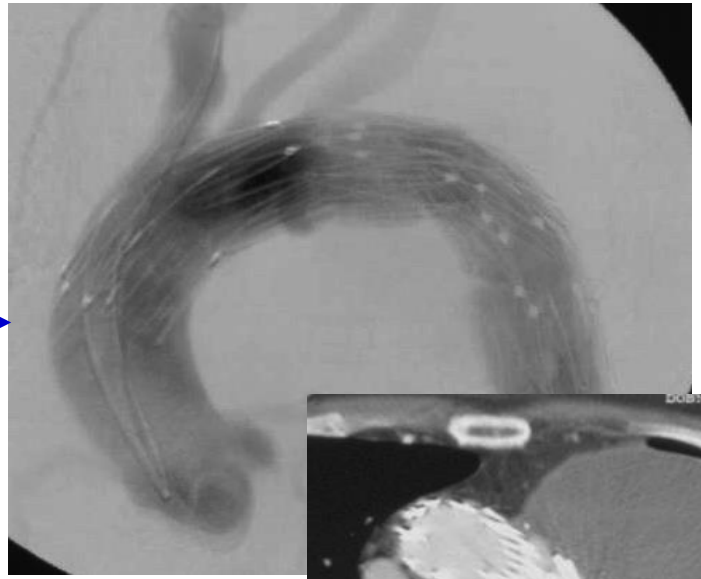
Department of Vascular Surgery, Tokyo Medical University

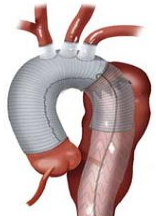
TEVAR for Aortic Arch Aneurysm

with **Fenestrated** Endograft

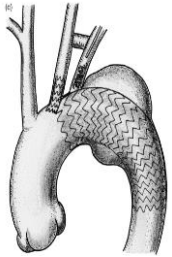




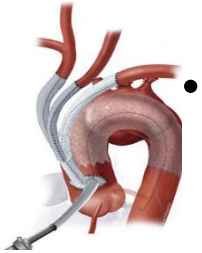
Current treatment outcomes for Complex aortic arch



- Open surgical repair
  - Longer hospital stays
  - Younger, healthier patients



- Endovascular Repair (parallel, branched, and fenestrated)
  - High risk for open repair



- Hybrid Repair
  - High risk for open repair
  - Not intended use of devices

- Perioperative mortality
  - Open = 8.6% (Leshnower, 2011)
  - Endovascular= 4-15% (Moulakakis, 2013)
  - Hybrid = 10.8% (Cao, 2012)
- Stroke/neurological events
  - Open = 8.2% (Hiraoka, 2014)
  - Endovascular= 8-15% (Moulakakis, Cook)
  - Hybrid = 6.8% (Cao, 2012)
- Reinterventions
  - Open = 9% (Sundt III, 2008)
  - Endovascular= 30.8% (Mangialardi, 2014)

Conclusions

- Branched graft solutions for Zone 0-2 Arch pathology are rapidly evolving

- Rigorously controlled studies must be done to appropriately study these procedures, particularly related to stroke

- Strong Collaboration between multidisciplinary teams is needed for optimal results:
  - Imaging, CT surgery, Vascular Surgery, Interventional Cardiology, Neurology, Anesthesia, Critical care