



MEET 2014
MULTIDISCIPLINARY EUROPEAN
ENDOVASCULAR THERAPY

Thoracic branch stent grafts complications Hybrid repair

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MEET²⁰¹⁴

MULTIDISCIPLINARY EUROPEAN
ENDOVASCULAR THERAPY

Faculty disclosure

Ciro Ferrer

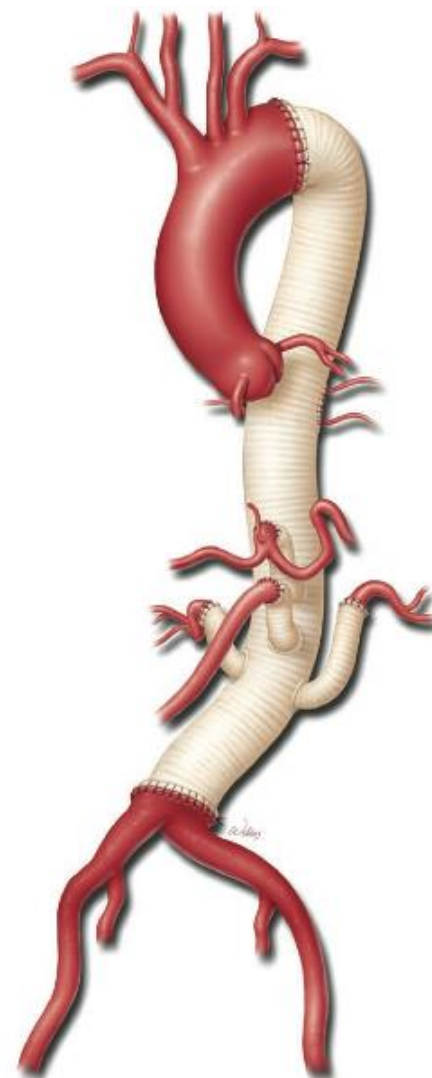
I have **no financial relationships** to disclose.



- Thoracic aortic pathologies tend to develop adjacent to or within the branched segments
- Debranching technique can create suitable landing zones **distally and/or proximally**, extending the applicability of TEVAR

Selective use of several **adjunctive techniques** for organ protection:

- left-sided heart bypass
- cerebral spinal fluid drainage
- selective visceral perfusion



Open Surgical Repair of 2286 Thoracoabdominal Aortic Aneurysms

Joseph S. Coselli, MD, John Bozinovski, MD, and Scott A. LeMaire, MD

The Texas Heart Institute at St. Luke's Episcopal Hospital and Division of Cardiothoracic Surgery, Michael E. DeBakey Department of Surgery, Baylor College of Medicine, Houston, Texas

Table 1. Results of 2286 Open Thoracoabdominal Aortic Aneurysm Repairs

Extent of Repair	Patients (n)	30-day Survival, n (%)	Paraplegia/Paraparesis, n (%)	Renal Failure, n (%)
I	706	671 (95.0)	23 (3.3)	19 (2.7)
II	762	716 (94.0)	48 (6.3)	63 (8.3)
III	391	370 (94.6)	10 (2.6)	24 (6.1)
IV	427	414 (97.0)	6 (1.4)	23 (5.4)
Total	2286	2171 (95.0)	87 (3.8)	129 (5.6)

Hybrid Open Endovascular Technique for Aortic Thoracoabdominal Pathologies

Konstantinos G. Moulakakis, Spyridon N. Mylonas, Efthimios D. Avgerinos, John D. Kakisis,
Jan Brunkwall and Christos D. Liapis

Circulation. 2011;124:2670-2680; originally published online November 15, 2011;
doi: 10.1161/CIRCULATIONAHA.111.041582

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19 studies
507 patients

		95% CIs
Total patients (n)	507	—
Gender (% male)	63.7	59.4–67.8
Age (years)	70.1	69.7–70.5
Comorbidities (%)		
• Nicotine consumption	62.9	61.0–64.8
• DM	21.6	19.9–23.2
• Hypertension	74.7	73.4–76.0
• PVD	16.4	15.5–17.3
• Renal impairment	36.7	35.8–37.6
• Cerebrospinal disease	23.5	22.2–24.8
• CHF (NYHA >1)	21.7	20.1–23.3
• CAD	30.3	29.2–31.4
• ASA ≥3	87.0	84.8–89.2
• COPD	33.3	30.8–35.8
• History of cardiovascular surgery (thorax,abdomen)	41.3	39.3–43.3

Hybrid Open Endovascular Technique for Aortic Thoracoabdominal Pathologies

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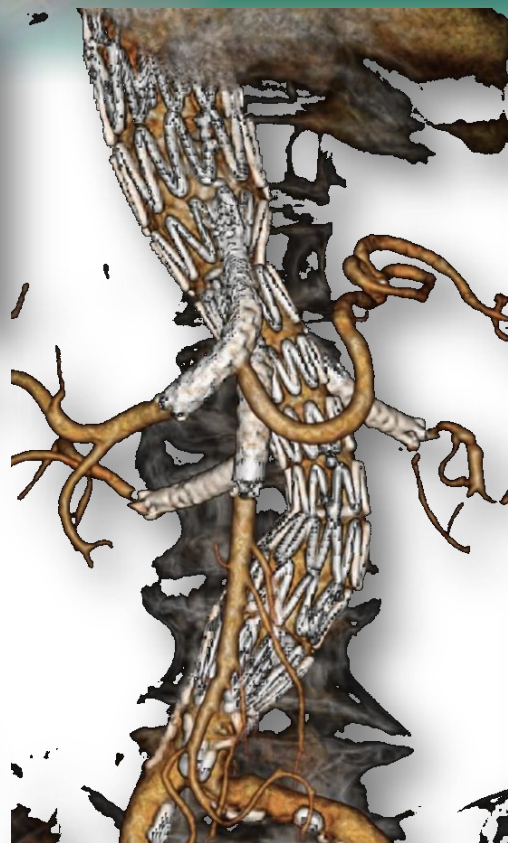
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19 studies
507 patients

- 30-day mortality	12.8%
- SCI (any)	7.5%
- Paraplegia	4.5%
- Emodyalisis	8.8%
- Cardiac	3.7%
- Mesenteric ischemia	5.2%
- Pulmonary	8.2%

✓ The high comorbidity of patients referred to hybrid TAAA repair may negatively affect the results

TAAA ENDO REPAIR



78 TAAA

- 30-day mortality
- Paraplegia

8.9%

8.9%

Factor	1.Single Staged (N=32)	2.Two Stage (N=27)	p-value
SCI	12(37.5)	3(11.1)	0.025 ^c
Duration of sci			0.033 ^d
0.None	20(62.5)	24(88.9)	
1.Improved	7(21.9)	3(11.1)	
2.Permanent	5(15.6)	0(0.0)	
30 day mortality	6(18.8)	0(0.0)	0.052 ^d

Callaghan; SVS Annual Meeting 05/06/2014

✓ Patients considered at high-risk for TAAA
open repair should be addressed to endo repair

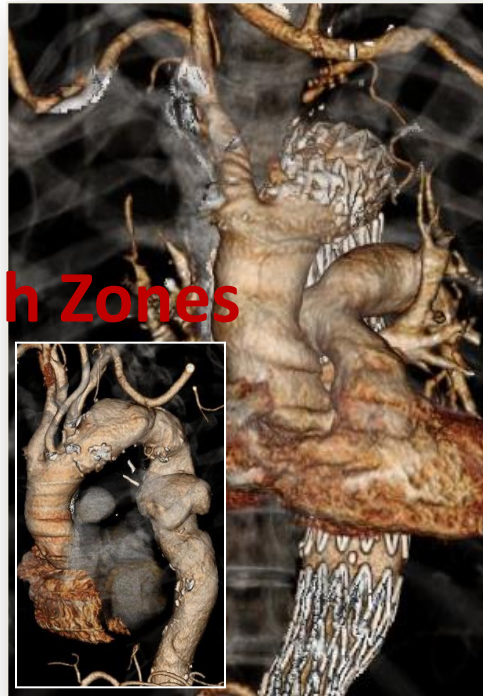
HYBRID ARCH REPAIR

✓ Debranching + TEVAR



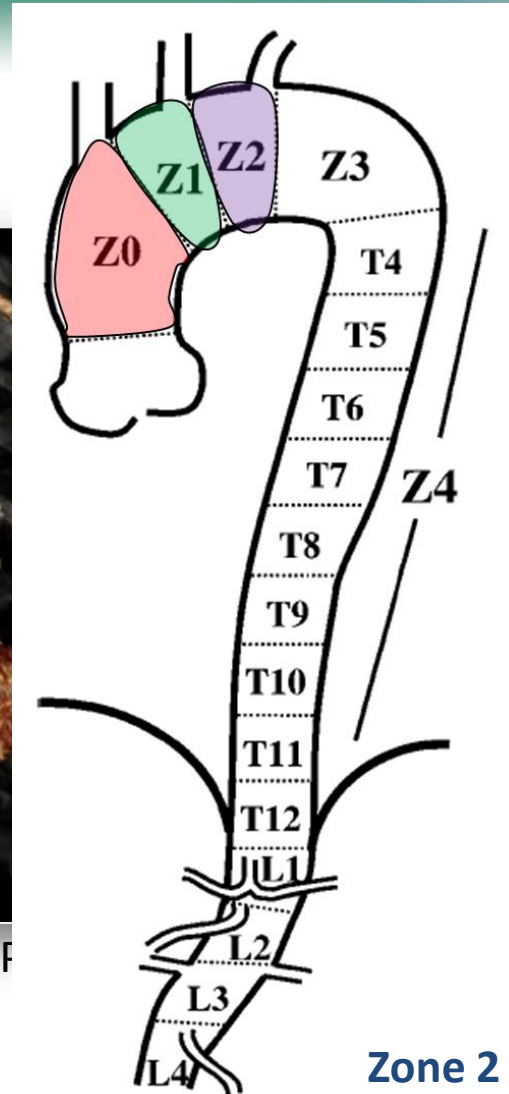
Total debranching

Zone 0

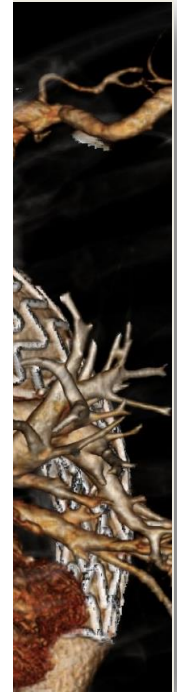


Car - Car - Subcl Bypass

Zone 1



Zone 2



BP

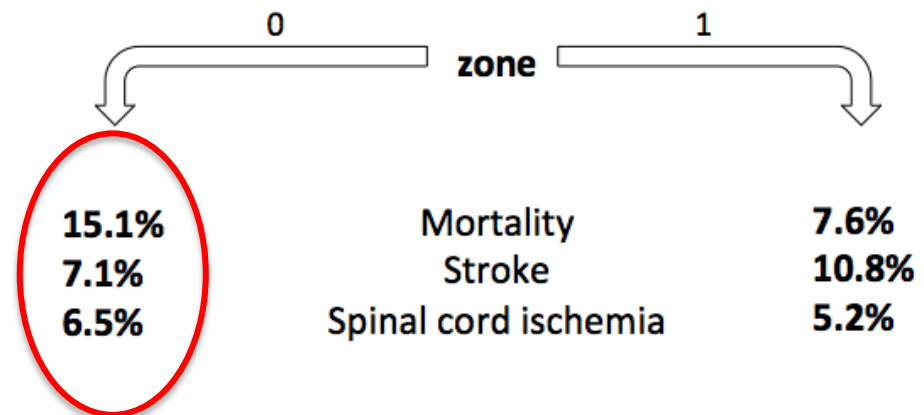
HYBRID ARCH REPAIR

Systematic review of clinical outcomes in hybrid procedures for aortic arch dissections and other arch diseases

Piergiorgio Cao, MD, FRCS,^a Paola De Rango, MD, PhD,^b Martin Czerny, MD,^c Arturo Evangelista, MD,^d Rossella Fattori, MD,^e Christoph Nienaber, MD,^f Hervé Rousseau, MD,^g and Marc Schepens, MD^h

50 publications - 1886 patients

Outcome	%
Perioperative mortality	2.0 - 23.7
Stroke	0.8 - 18.8
Spinal cord ischemia	1.0 - 14.3



Significant **higher mortality risk for zone 0**
(OR, 2.8; 95% CI, 1.17-6.7; **P = .021**)

Aortic arch debranching and thoracic endovascular repair

JVS 2014

Paola De Rango, MD, PhD,^b Piergiorgio Cao, MD, FRCS,^a Ciro Ferrer, MD,^a Gioele Simonte, MD,^b Carlo Coscarella, MD,^a Enrico Cieri, MD, PhD,^b Gabriele Pogany, MD,^a and Fabio Verzini, MD, PhD,^b
Rome and Perugia, Italy

104 pts

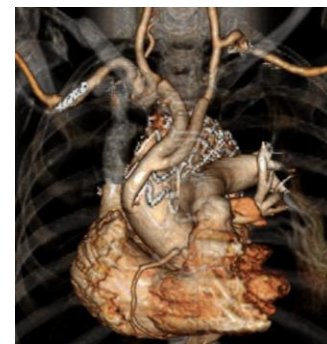
Perioperative outcomes	N	(%)
Mortality	6	5.8
Stroke	4	3.8
Spinal cord ischemia	3	2.9
Retrograde Type A dissection - 2/4 in landing zone 0	4	3.8

Multivariate analysis:

30-day mortality:

Total arch debranching:

OR 9.6; 95% CI 1.54-59.90; P=.015



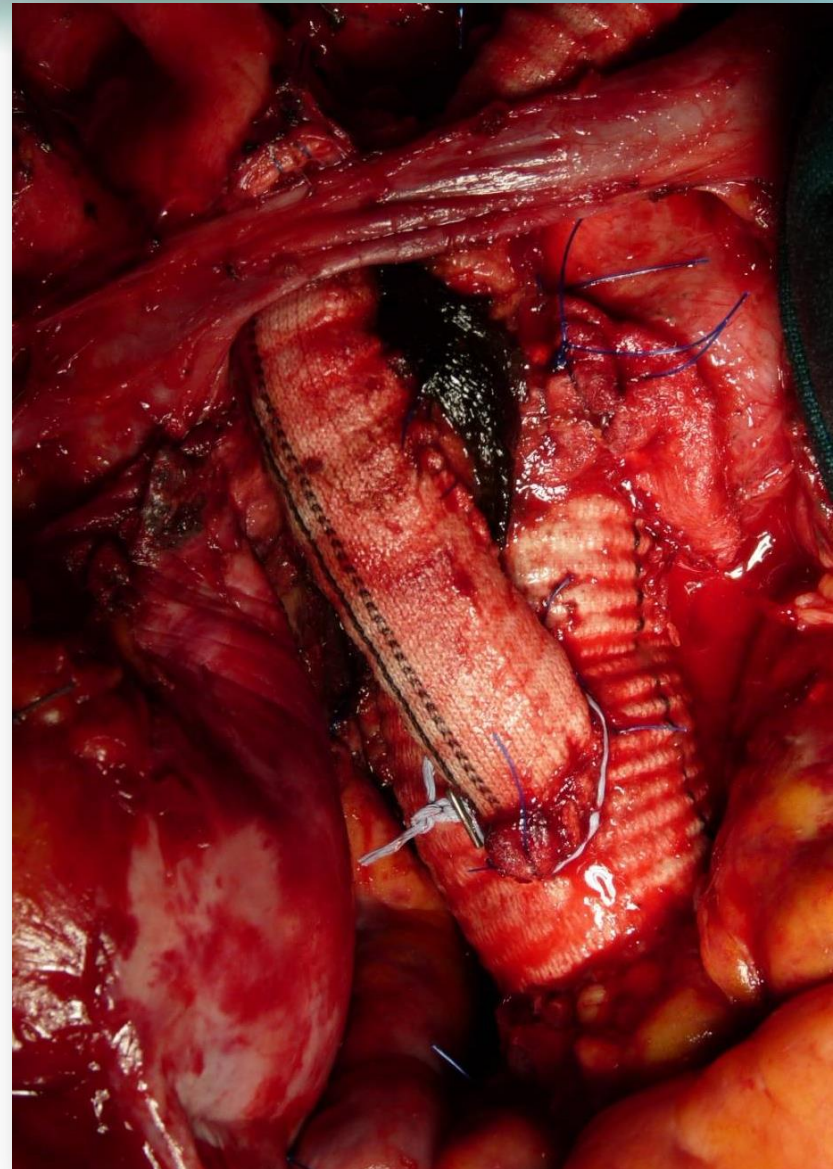
Intraoperative complications

RETROGRADE DISSECTION

**Intraoperative Type A
dissection during total
debranching for post Type B
dissection aneurysm
(hypertensive crisis)**

**Ascending aorta
replacement**

Total debranching

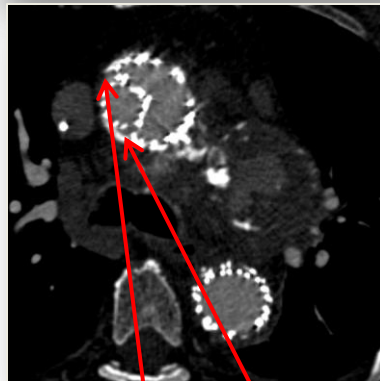


Different approaches for landing zone 0

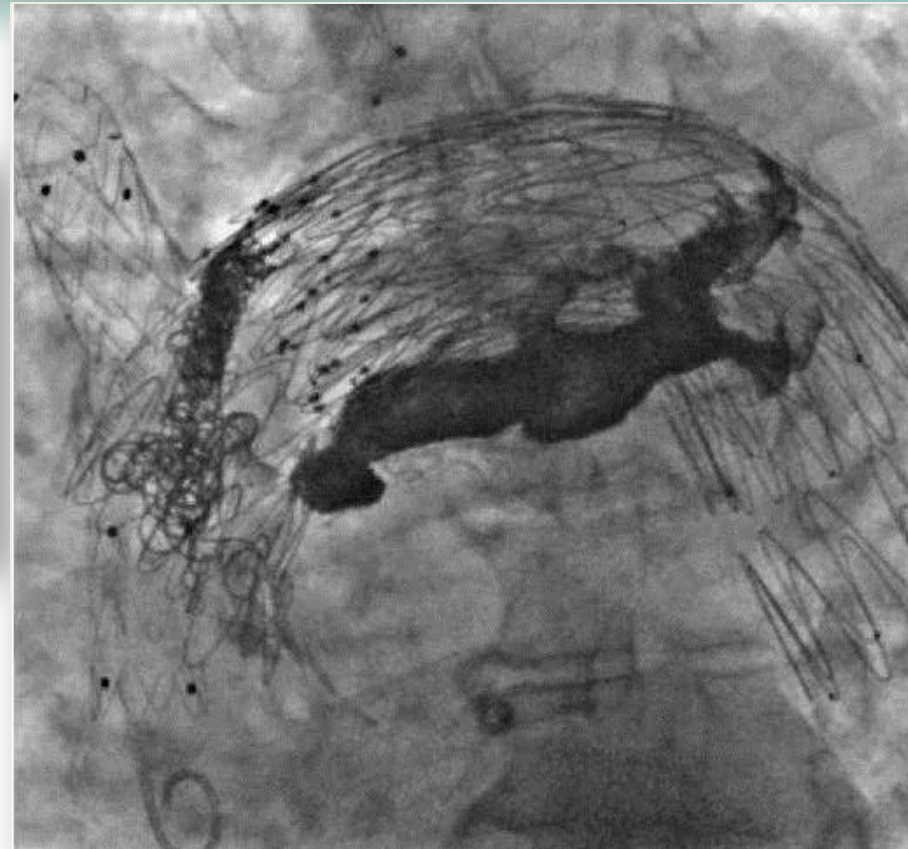
SINGLE CHIMNEY



Endoleak



Proximal gutters



Chimney technique
often requires
adjunctive procedures

Different approaches for landing zone 0

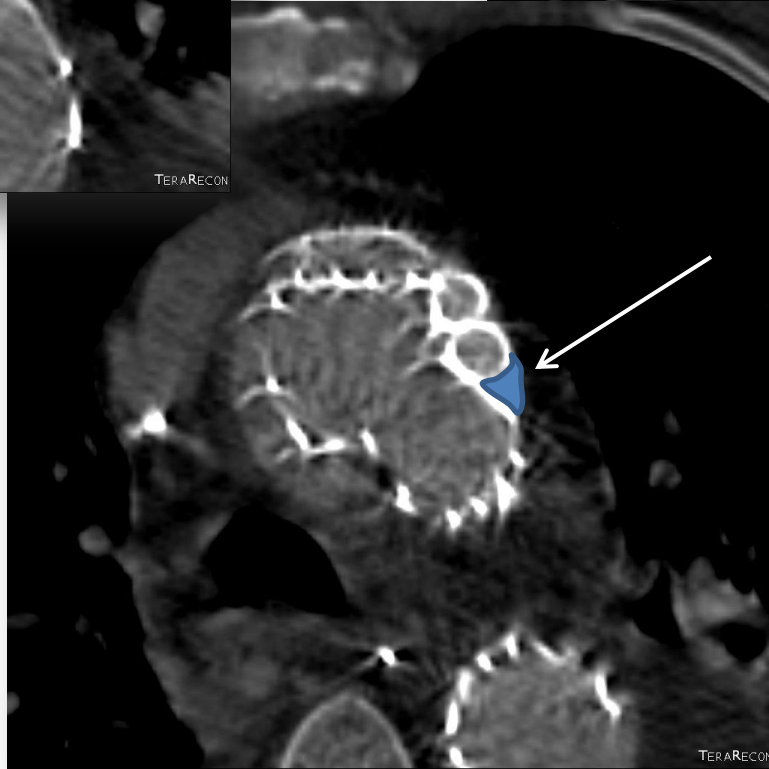
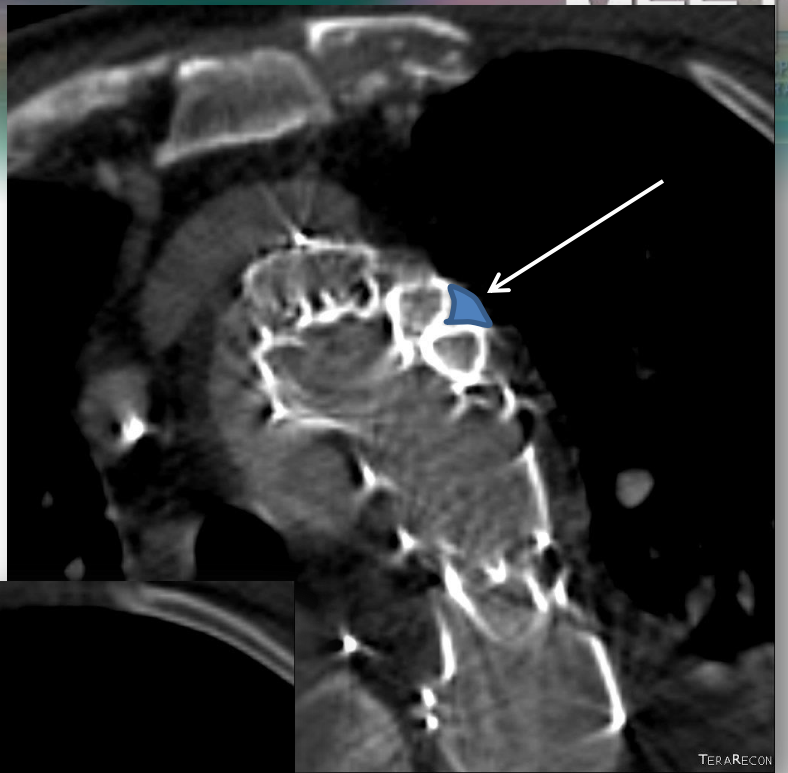
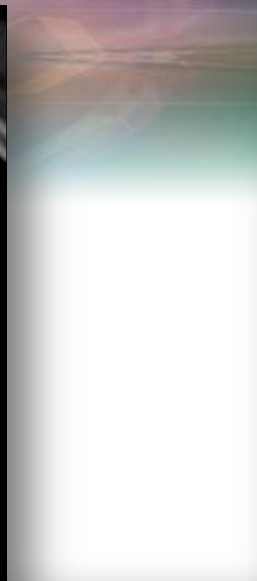
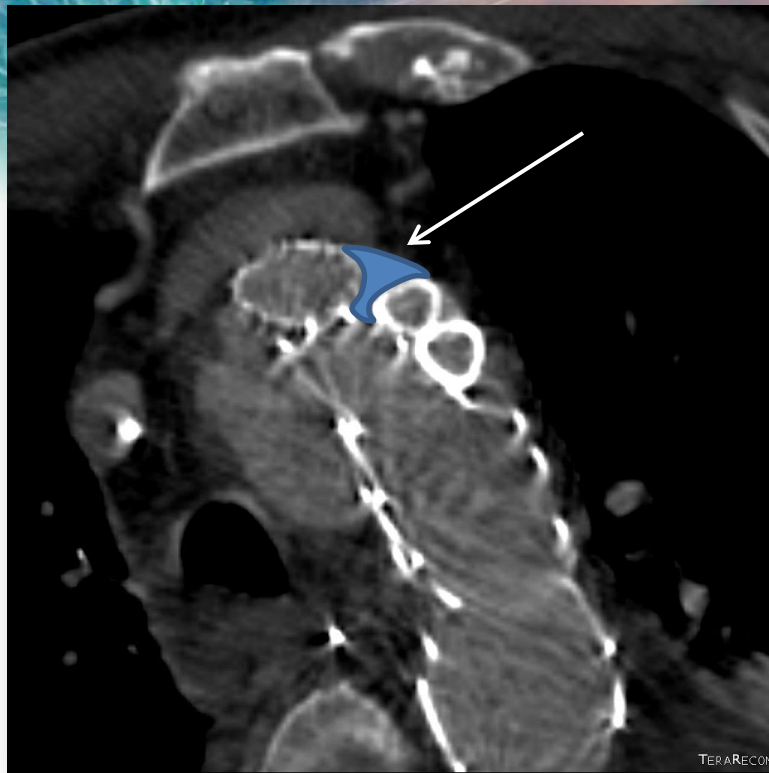
TRIPLE CHIMNEY



Post traumatic
arch dissection

Proximal type I endoleak
after total chimney





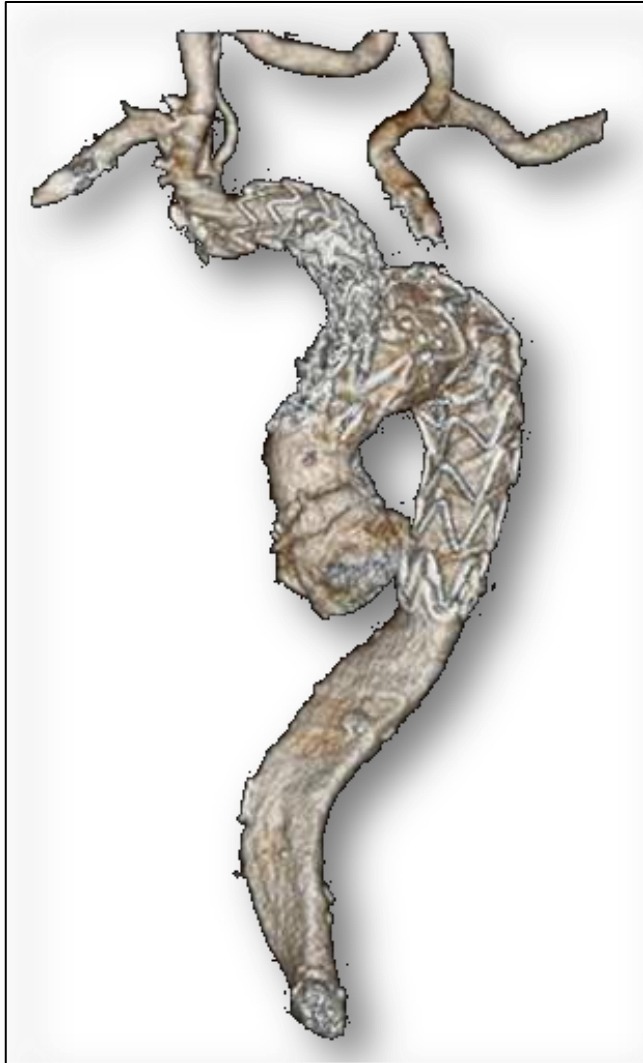
Embolization



CT post

Different approaches for landing zone 0

BRANCHED ENDOGRAFT



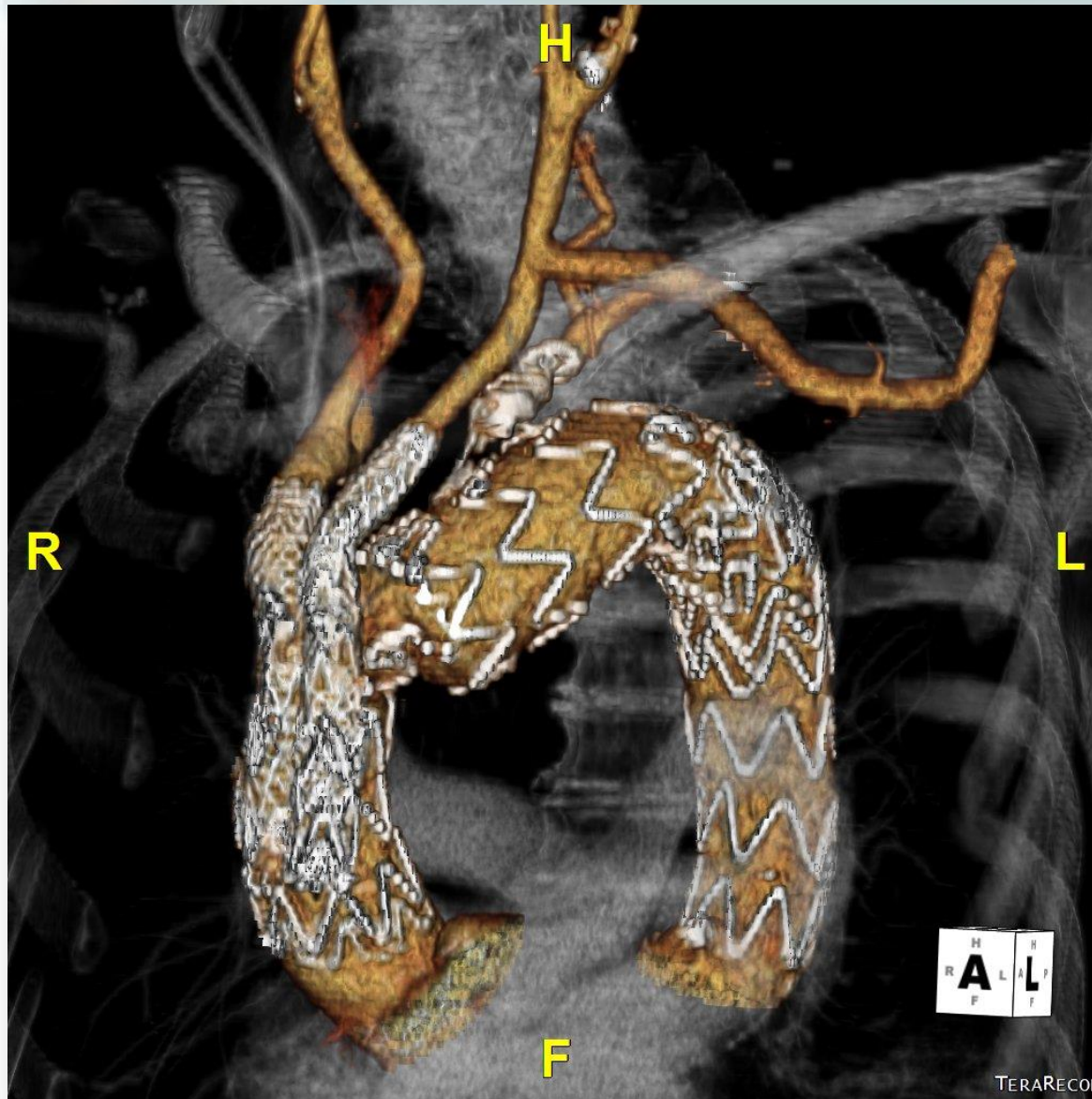
Different approaches for landing zone 0

BRANCHED ENDOGRAFT



Different approaches for landing zone 0

BRANCHED ENDOGRAFT



- ✓ Hybrid approach in TAAA presents only theoretical advantages if compared with open surgery
- ✓ Visceral debranching should be applied only when endovascular advanced technologies are not available

CONCLUSION

SUPRA-AORTIC DEBRANCHING

- ✓ Hybrid arch procedures present a persistent high risk of perioperative mortality, mostly in landing zone 0
- ✓ Retrograde dissection may complicate total surgical debranching, especially in dissected aorta
- ✓ Chimney technique is subject to a high rate of gutters' endoleak and should be reserved for emergencies
- ✓ Branched endograft, requiring only partial debranching, may reduce invasiveness in zone 0