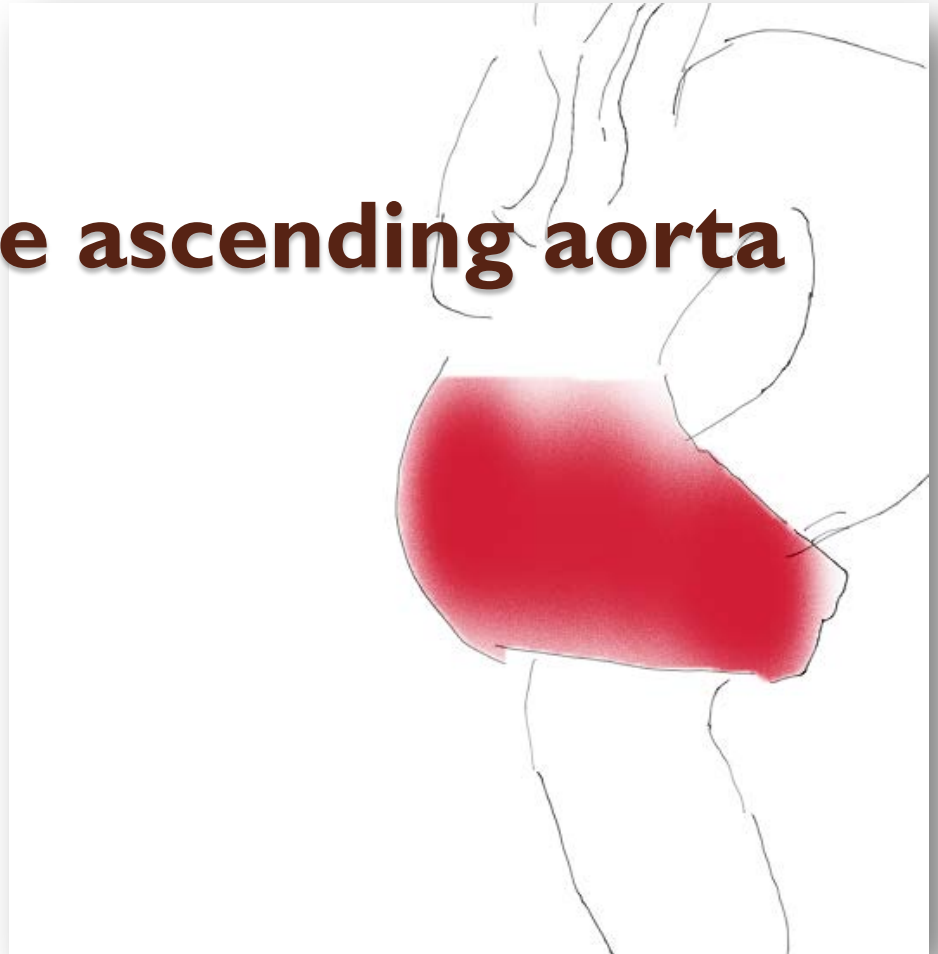


# TEVAR for the ascending aorta



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# TEVAR ASCENDING AORTA

## Indications

- Type A Dissection
- PAU
- Aneurysm
- Thrombus
- Extension of Landing Zone

**Table.** Patient's characteristics and intraoperative data

Variable <sup>a</sup>	Patients (N = 11)	
	Group I <sup>b</sup>	Group II <sup>c</sup>
Patients	7 (63.6)	4 (36.3)
Age, years	74 (69-82)	71 (67-84)
Gender		
Male	3 (27.2)	2 (18.1)
Female	4 (36.3)	2 (18.1)
Chronic renal disease	2 (18.1)	0 (0)
Cardiac disease <sup>d</sup>	5 (45.4)	4 (36.3)
Previous cardiac valve surgery <sup>e</sup>	2 (18.1)	1 (9.0)
CVD (previous TIA/CVA)	2 (18.1)	0 (0)
Hypertension	6 (54.5)	4 (36.3)
Diabetes	3 (27.2)	2 (18.1)
Smoking		
Former smoker	2 (18.1)	1 (9)
Current smoker	5 (45.4)	3 (27.2)
Never smoked	0	0
Hypercholesterolemia	4 (36.3)	2 (18.1)
Previous aortic surgery	1 (9)	1 (9)
ASA score	4.6 (4-5)	4.7 (4-5)
Aortic diameter, mm	68.1 (60-79)	
Length of aorta covered cm	10.09 (7-14)	8.75 (8-10)
Type I leak	1 (9)	0 (0)
Follow-up, months	9.1 (2-19)	12.5 (6-20)
Stroke	1 (9)	0
Death	1 (9)	0

ASA, American Society of Anesthesiologists; CVA, cerebrovascular accident; CVD, cardiovascular disease; TIA, transient ischemic attack.

<sup>a</sup>Categoric data are expressed as number (%); and continuous data are presented as mean (range).

<sup>b</sup>All aneurysm patients.

<sup>c</sup>Patients with chronic uncomplicated type A dissection, intramural hematoma, floating thrombus, or penetrating aortic ulcer.

<sup>d</sup>Includes previous myocardial infarction, coronary artery bypass grafting, or percutaneous angioplasty.

<sup>e</sup>Two patients had prosthetic aortic valve repair, and 1 patient had a conduit.

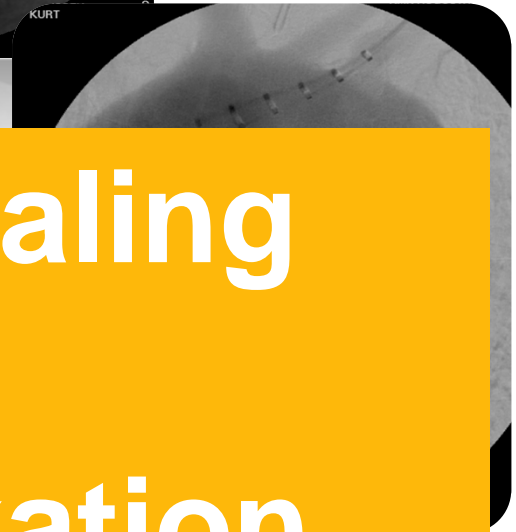
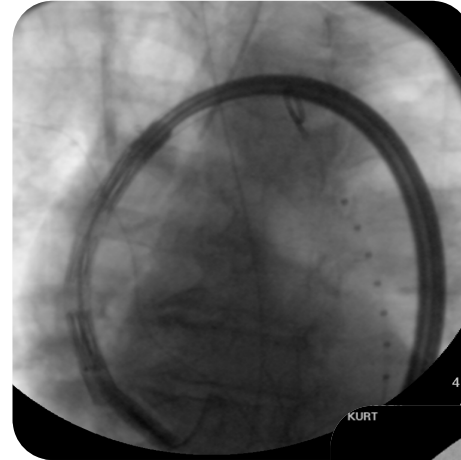
«Δύο ασθενείς μετέβησαν χωρίς να έχουν υποστεί προηγουμένως χειρουργική επέμβαση στην αορτή».

«Μεταξύ των ασθενών που υποβλήθηκαν στην επέμβαση, οι περισσότεροι είχαν προηγουμένως υποστεί καρδιακή επέμβαση ή είχαν υποστεί αγγειοπλαστική ή είχαν υποστεί αγγειοπλαστική ή είχαν υποστεί αγγειοπλαστική».

«Δύο ασθενείς είχαν υποστεί προηγουμένως αγγειοπλαστική ή είχαν υποστεί αγγειοπλαστική ή είχαν υποστεί αγγειοπλαστική».

# TEVAR Ascending Aorta Issues

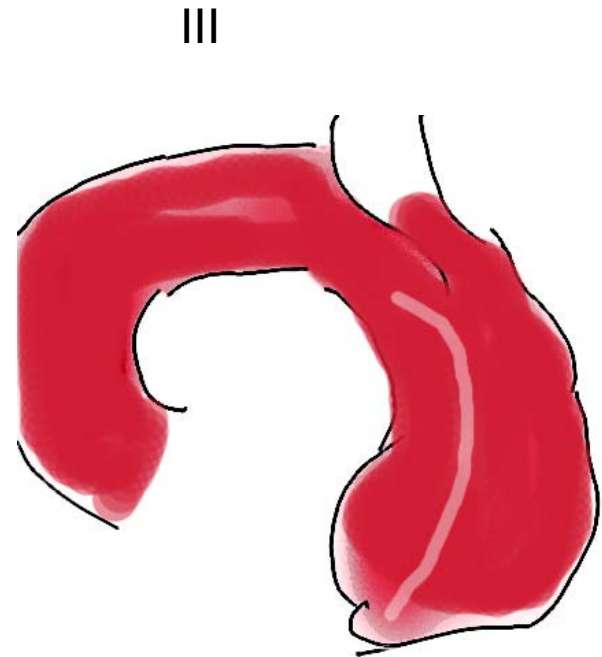
- Supraaortic branches – coronary arteries
- Curvature - Conformability
- Sufficient proximal landing zone >2cm on the inner curvature
- Large diameter
- Diameter-alterations  
Systole/Diastole
- Transvalvular Catheter-Wire-Manipulations
- Anuloaortic Ectasis



**sealing**

**fixation**

## Morphology Ascending Aorta ( n = 58 patients)

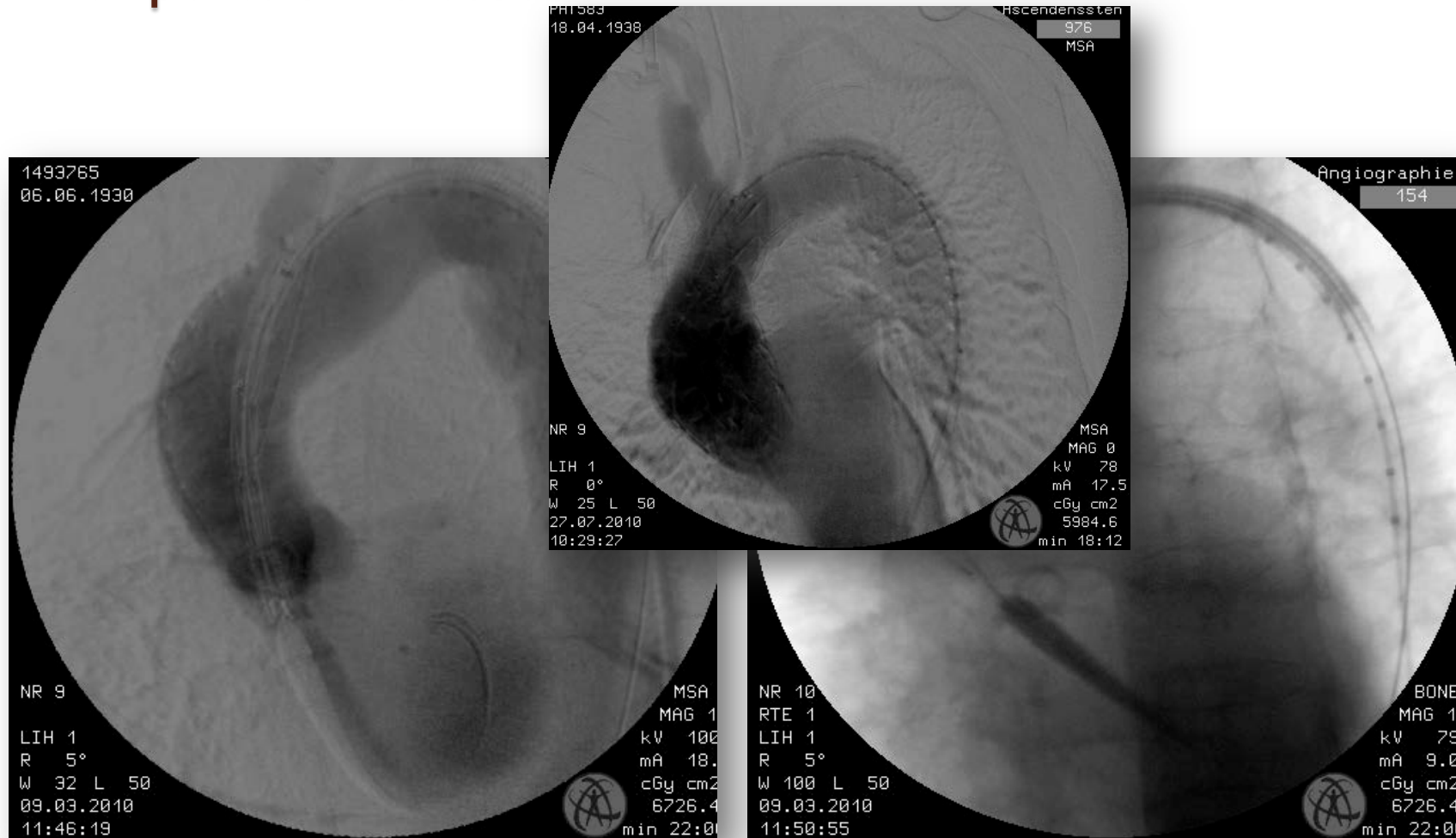


75%

25%

Type A Dissection

# Ascending Aorta – and Aortic Arch - Transvalvular Manipulation is essential



# Ascending Aorta – and Aortic Arch - Transvalvular Manipulation is essential



# TEVAR Ascending Aorta

- Transoesophageal Ultrasound
- Intraoperative Coronary- angiography
- Rapid Ventricular Pacing
- Transvalvular Manipulations





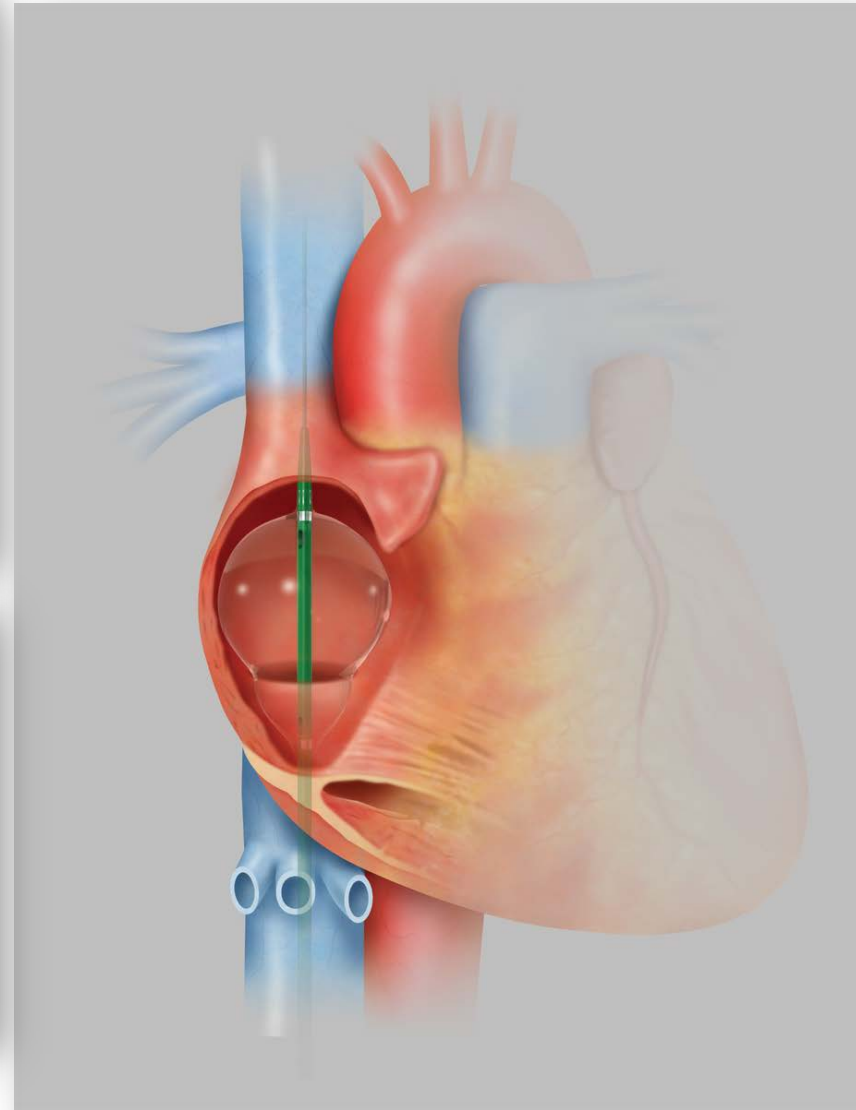
# Intraoperative Adjuncts



## Partial Right Atrial Inflow Occlusion for TEVAR

A novel technique for inducing controlled hypotension to facilitate endograft deployment during thoracic endovascular aortic repair.

BY W. ANTHONY LEE, MD

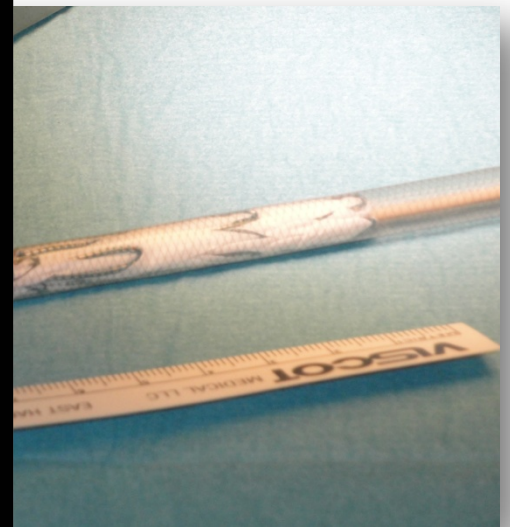




## Graft Sizing

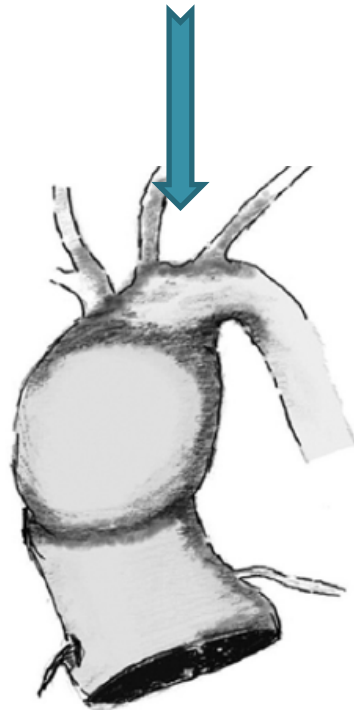
Trimming of the graft to appropriate length (6/12)

Off Label



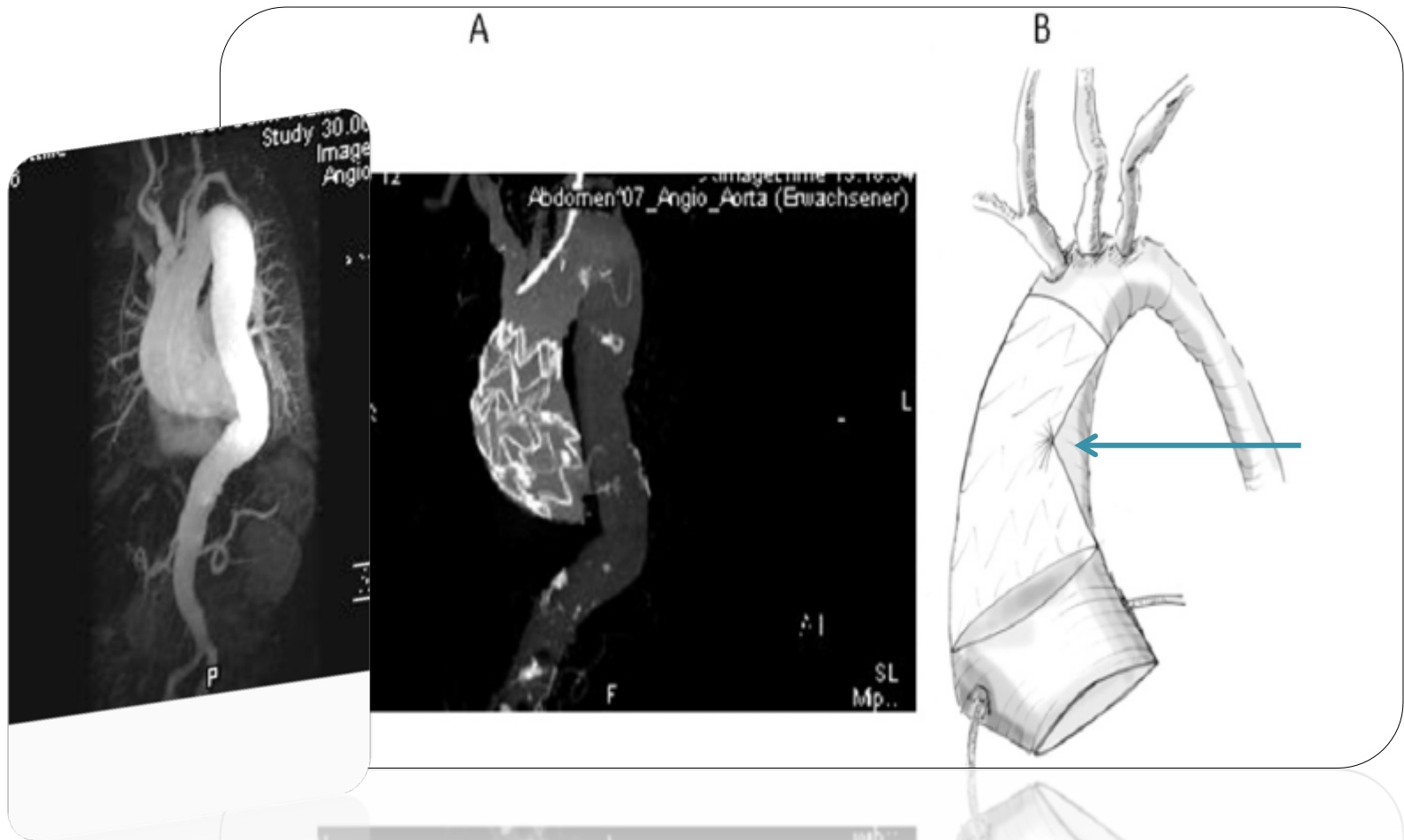
# Ascending Aneurysms

- Previous Ascending repair = ideal case

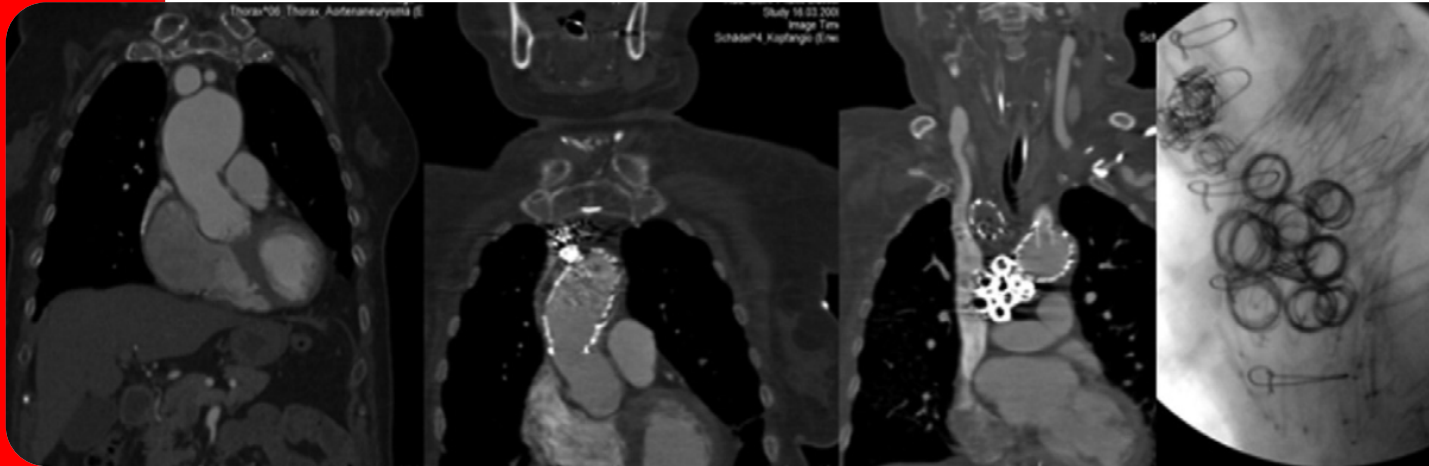


Tubular landing zone

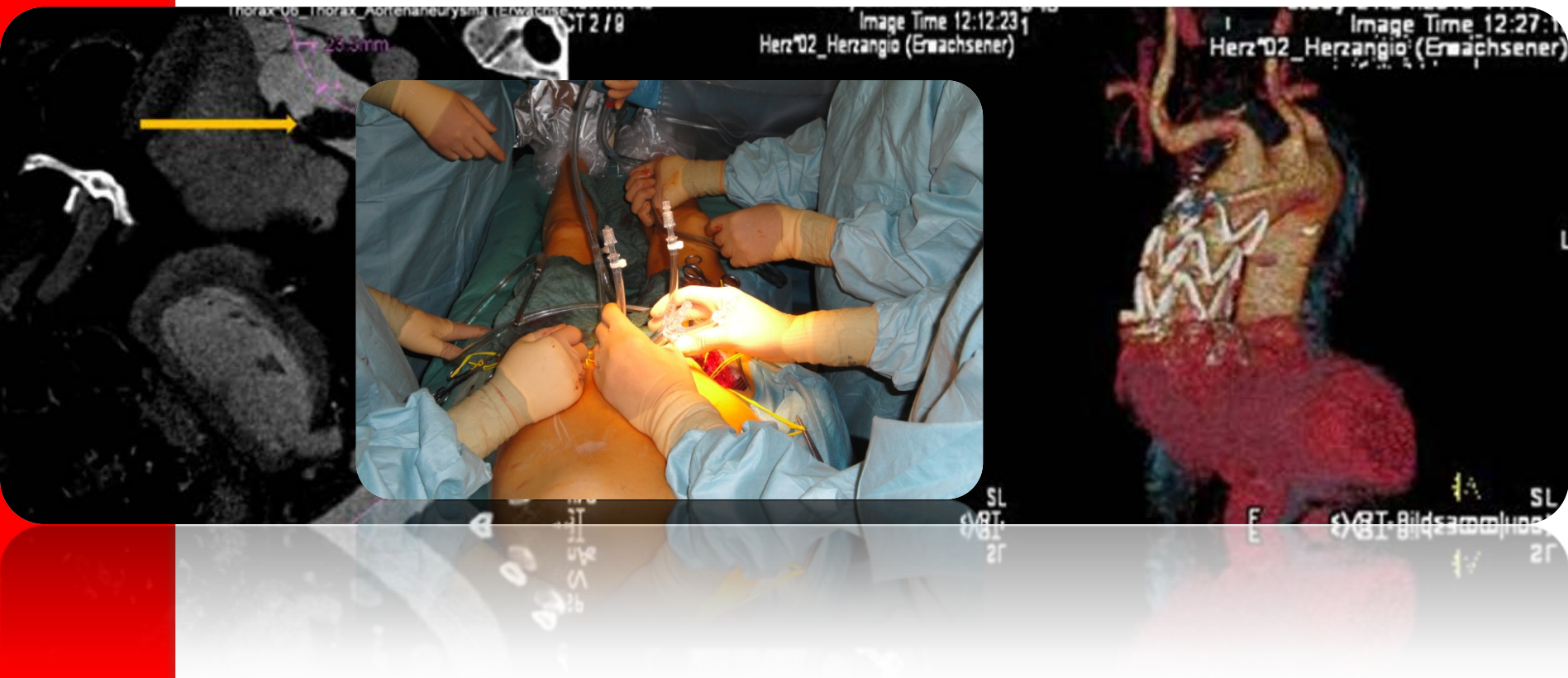




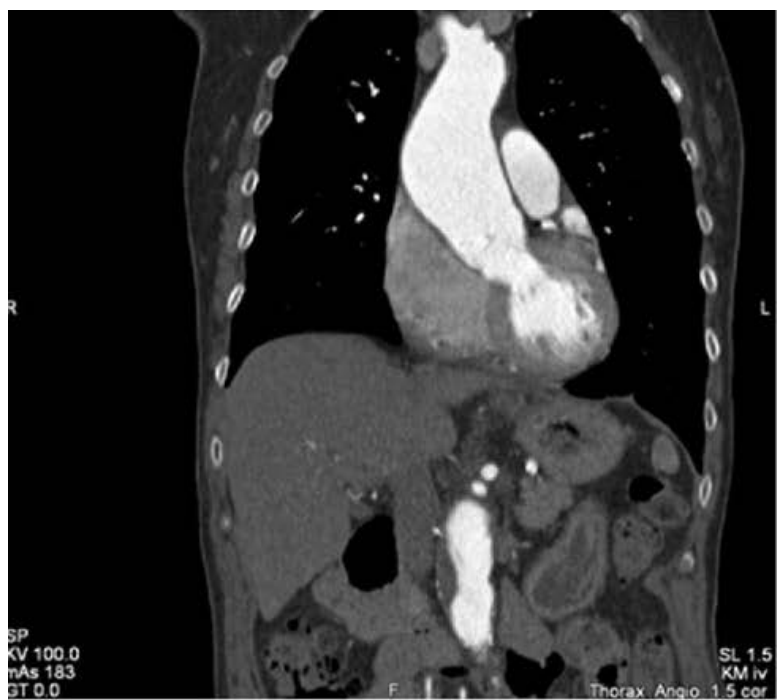
# Management of Type II Endoleak



# Embolizing ascending aortic thrombus

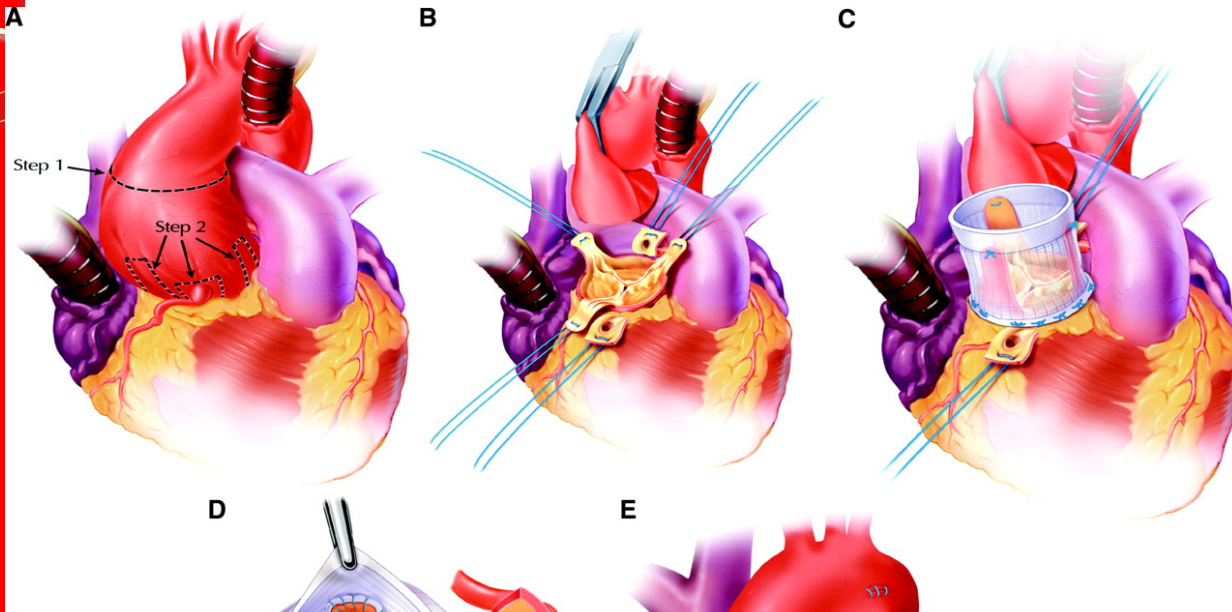




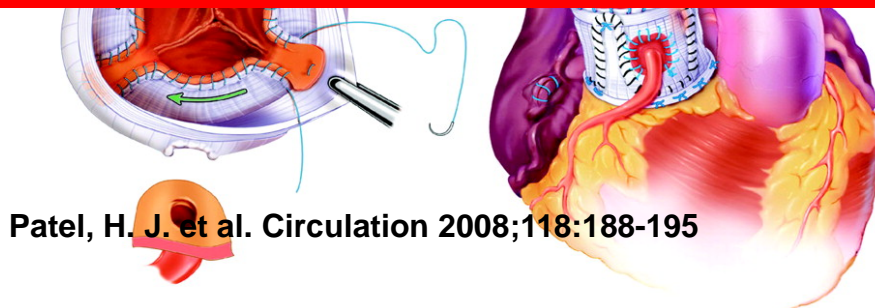


# Type A Dissection

Valve-sparing aortic root reconstruction (modified David procedure)



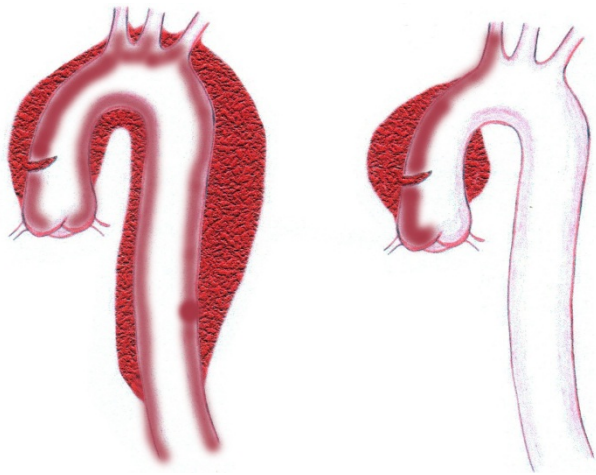
Morbidity / Mortality : 28%



Patel, H. J. et al. Circulation 2008;118:188-195



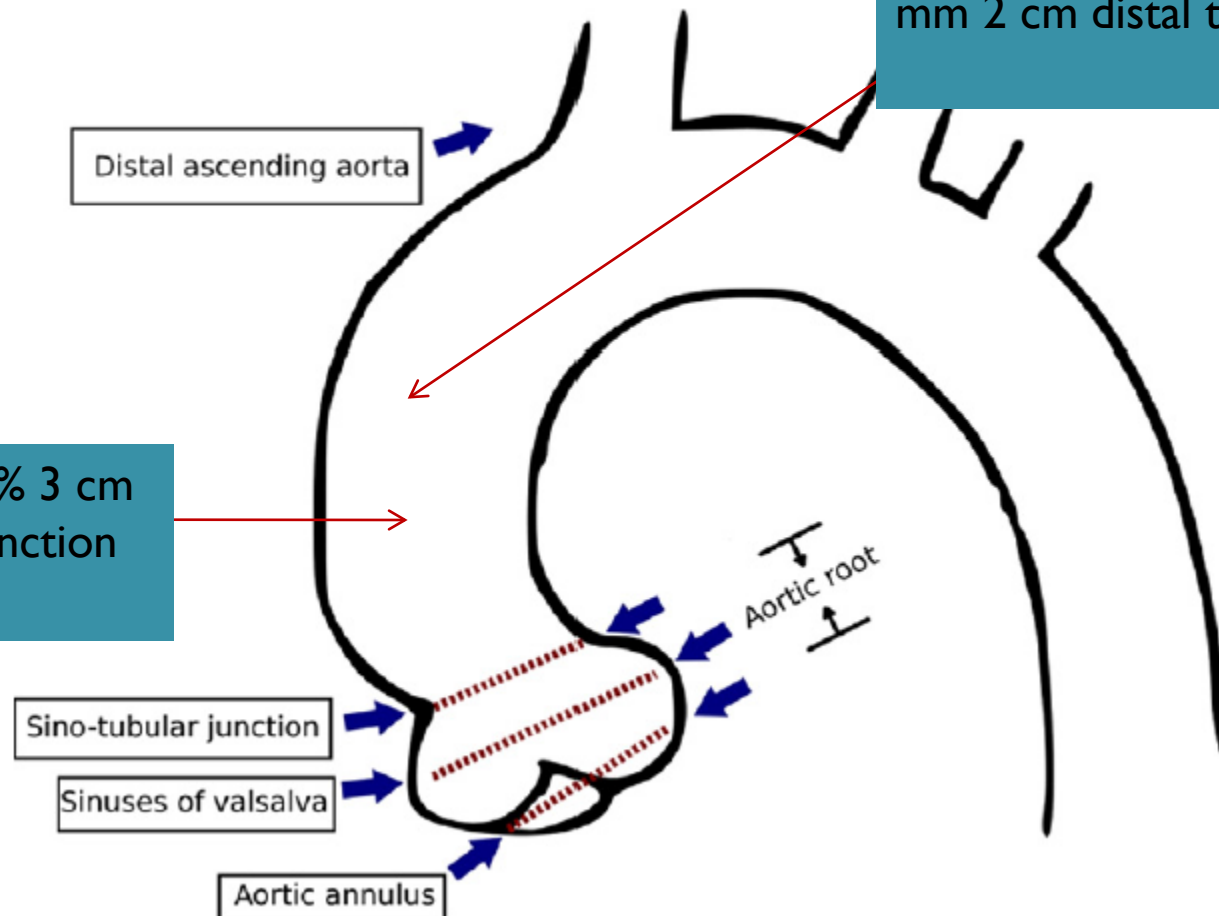
# Type A Dissection – Indication for TEVAR ?



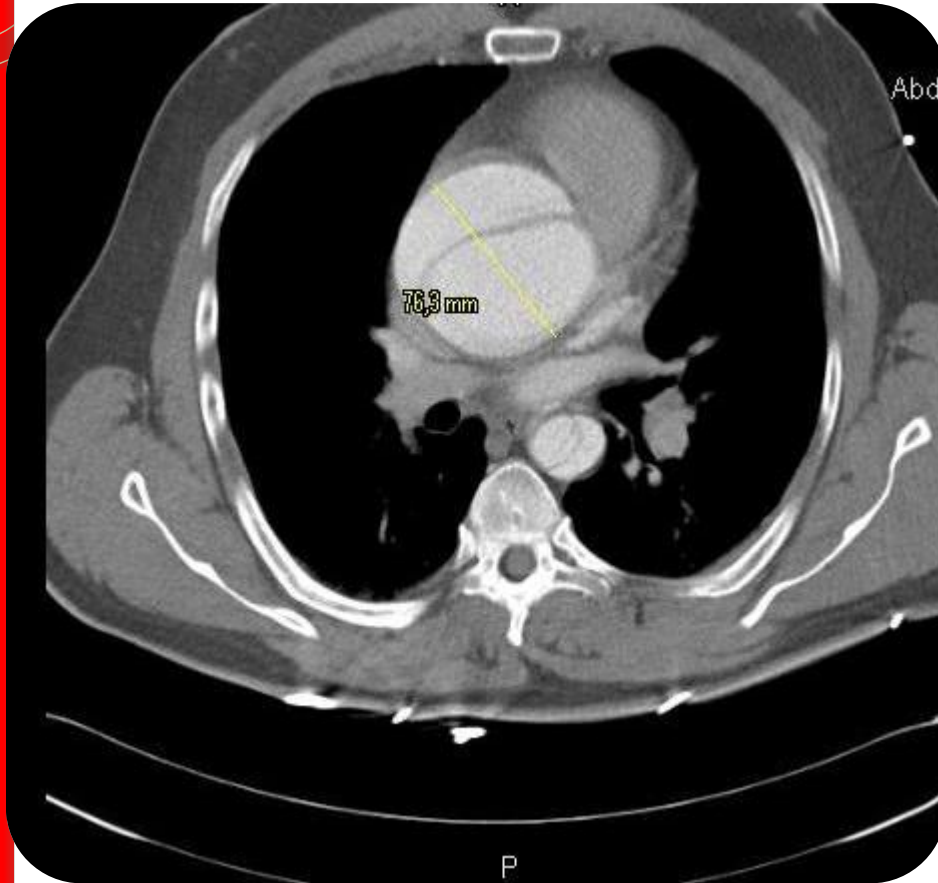
# Location of Intimal Tear in Type A Dissection ( n = 59 )

Maximal average Diameter 45 mm 2 cm distal to S-t Junction

Intimal Tear in 75 % 3 cm distal to the S-t junction

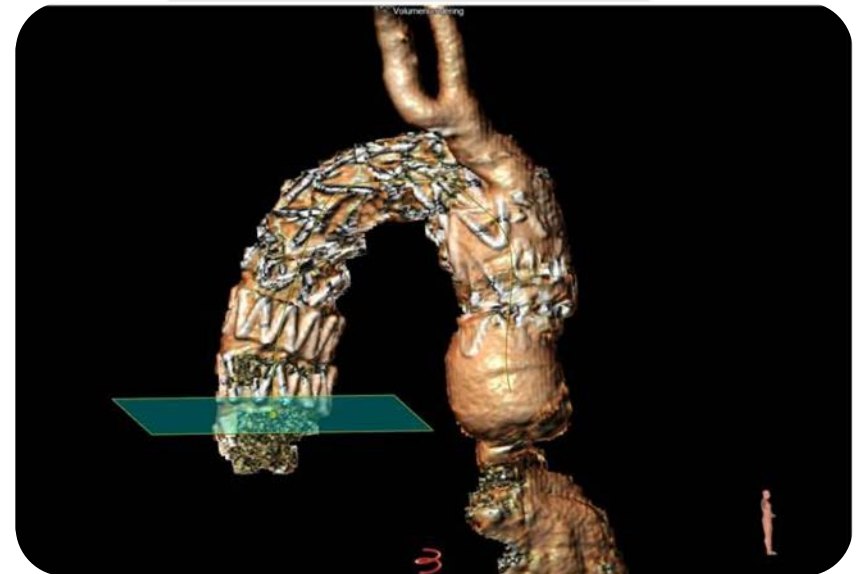
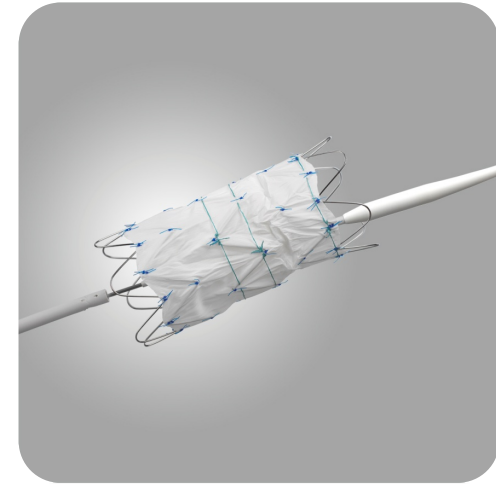


# Type A Dissections - Limitations



# TYPE A Dissection and PAU

- COOK 42 mm Ascending Graft
- Chimney Grafts

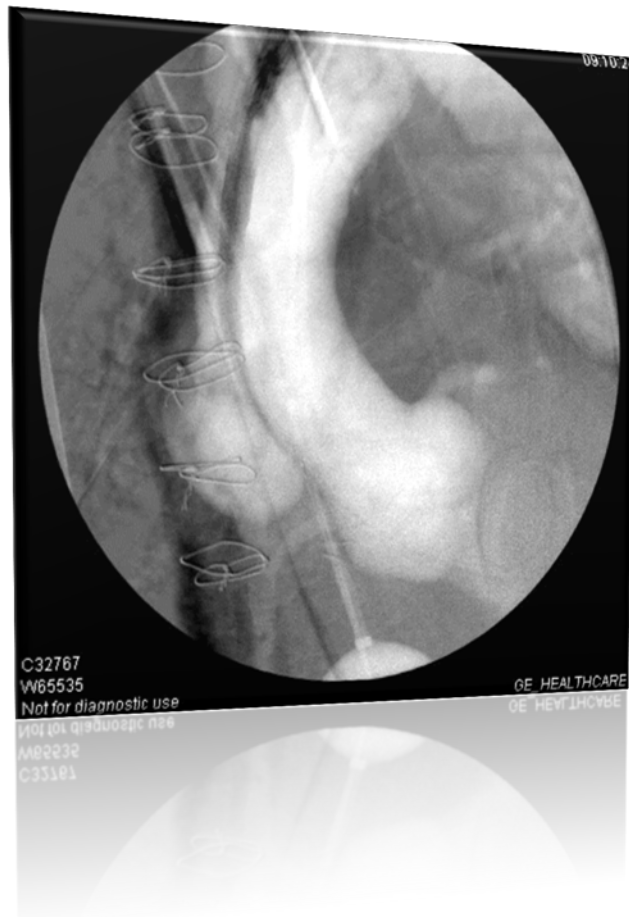


# The Importance of Dedicated grafts I

- 84 years
- Previous CABG
- Mitral Valve repair



# Dedicated Grafts required II





# Dedicated grafts required III

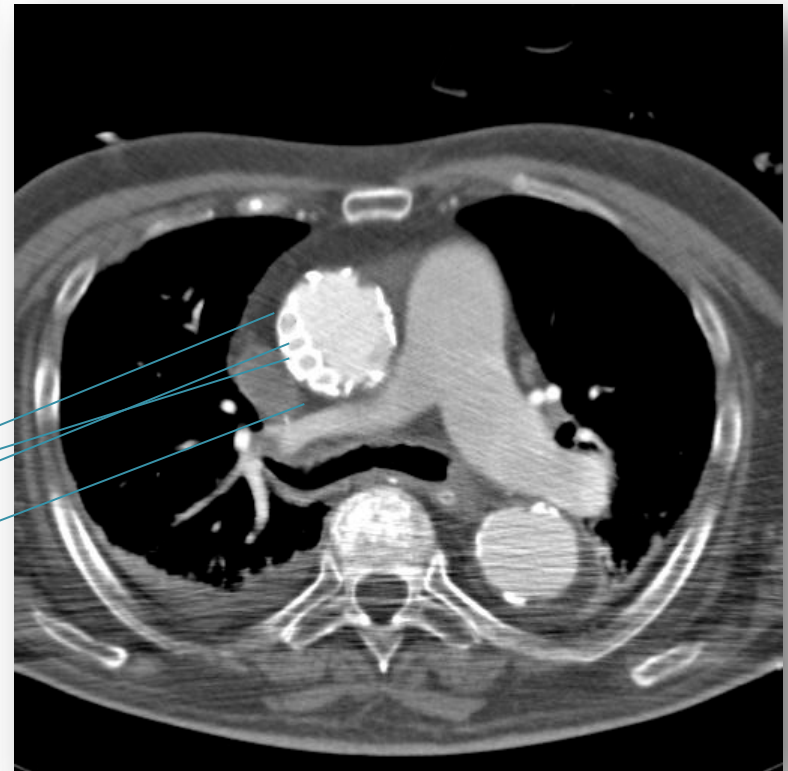
- COOK 46 mm  
Ascending graft





# Extension of Landing Zone

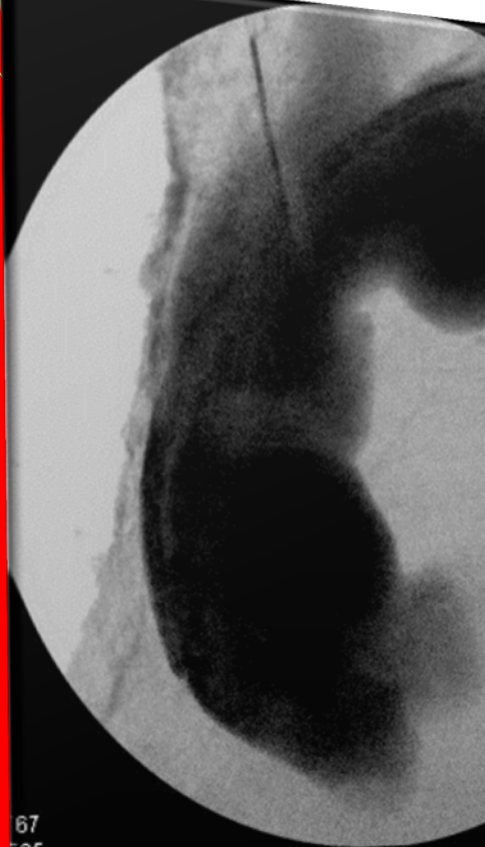
4 Barrel = Total Endo Debranching



# Bail OUT - Total „ Endo debranching „



# Sandwich - Total Arch Endo Debranching



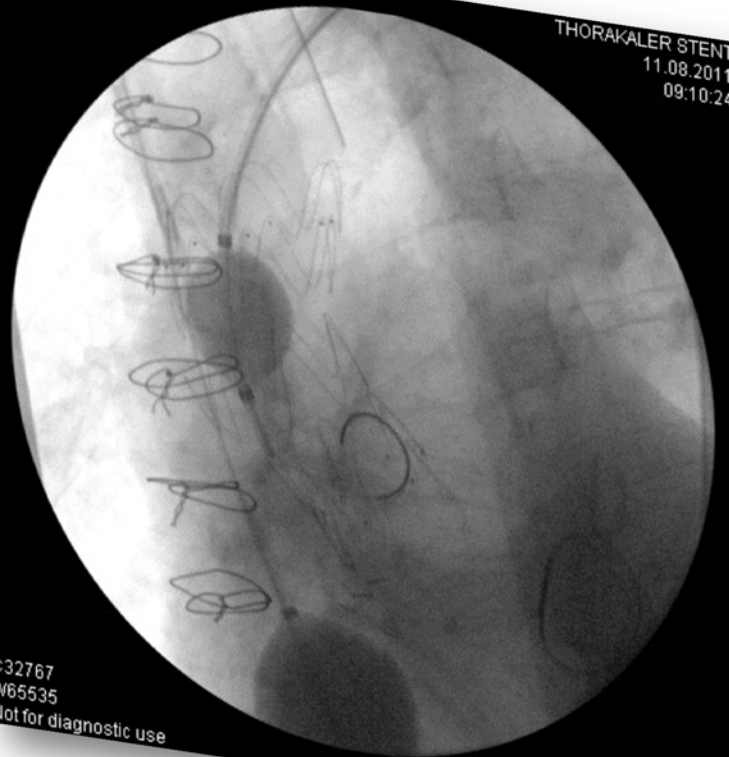
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W65535  
Not for diagnostic use

GE HEALTHCARE  
GE HEALTHCARE



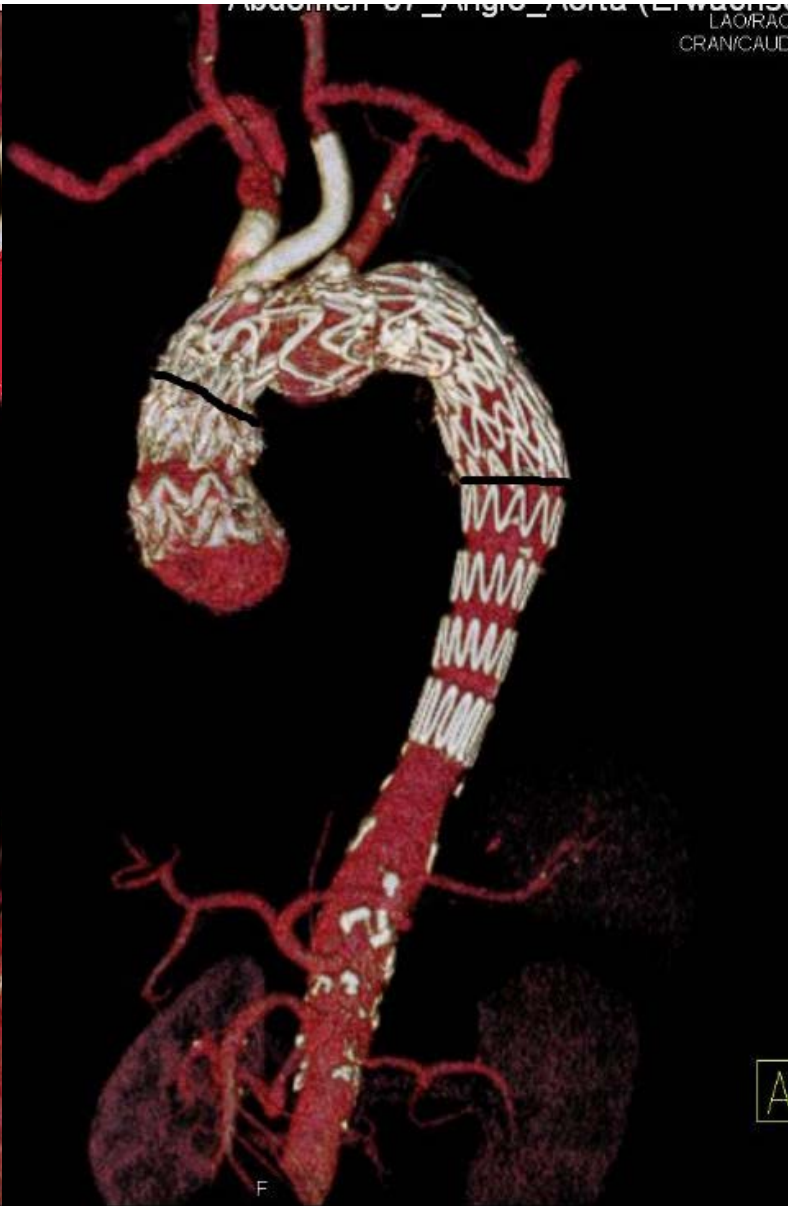
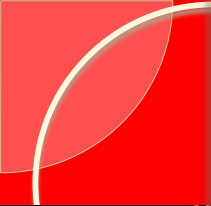
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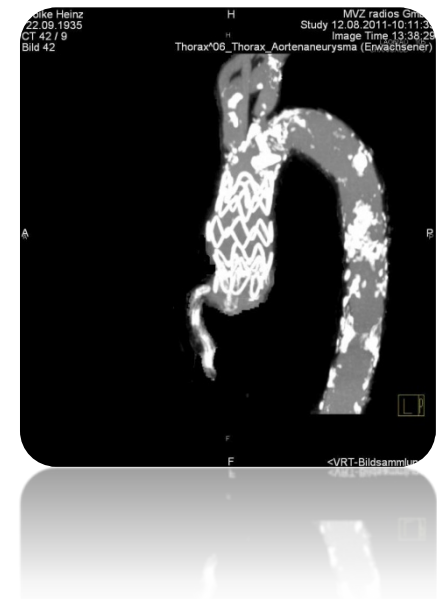
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# Results

- Genuine Ascending aortic Pathology
- Zone 0 landing site close to sinu-tubular junction



## Endovascular management of ascending aortic pathology

Ralf R. Kolvenbach, MD, PhD,<sup>a</sup> Ron Karmeli, MD,<sup>b</sup> Lazlo S. Pinter, MD,<sup>a</sup> Yuefeng Zhu, MD,<sup>a</sup> Fan Lin, MD,<sup>a</sup> Sergei Wassiljew, MD,<sup>a</sup> and Markus Meyer-Gaessner, MD,<sup>a</sup> *Düsseldorf, Germany, and Haifa, Israel*

**Background:** Endovascular treatment of the ascending aorta is particularly challenging because of the anatomic features of this aortic segment. Only patients without connective tissue disorders, clinically relevant aortic regurgitation or stenosis, or concomitant coronary artery disease can be considered for an endovascular procedure. We report our results in a series of patients with aneurysms or intramural hematoma, penetrating ulcers, or floating thrombus who were scheduled for stent grafting.

**Methods:** Only patients with ascending aortic pathology who were unfit for open surgery were treated with an endograft. When preoperative computed tomography imaging showed severe calcification of the aortic arch or thrombus lining, temporary clamping of the carotid arteries before wire and catheter introduction was performed. An extracorporeal bypass from the right groin to both carotid arteries with a roller pump was established and maintained during the procedure. The endograft was placed across the aortic valve into the left ventricle and deployed in a retrograde fashion. At the end of the procedure, ventriculography and, if necessary, coronary angiography was performed to rule out any damage to the left ventricle or the valve apparatus.

**Results:** Eleven patients were scheduled for stent graft exclusion of ascending aortic pathology. In five cases because of discrepancies in length measurements and sizing, the thoracic endograft was cut to length intraoperatively after partial deployment on the operating table and reloaded to avoid covering of the innominate artery. The mean length of the ascending aorta covered was longer in aneurysm patients than in those with dissection. An 81-year-old patient presented with a type Ia leak. The distal landing zone in one patient was enlarged by debranching. One patient died after wire perforation of the left ventricle, and one patient sustained a cerebral stroke. Combined morbidity and mortality was 18%, and the technical success rate was 91%.

**Conclusions:** Stent grafting of the ascending aorta is technically feasible but should be reserved for selected high-risk patients only, preferably in centers where vascular specialists cooperate closely with interventional cardiologists. Cardiac surgery with cardiopulmonary bypass is still the gold standard to treat ascending aortic aneurysms. Stent graft exclusion of more advanced and complex ascending aortic pathology should be performed only in centers with the necessary experience in transvalvular cardiac procedures. (J Vasc Surg 2011;53:1431-8.)

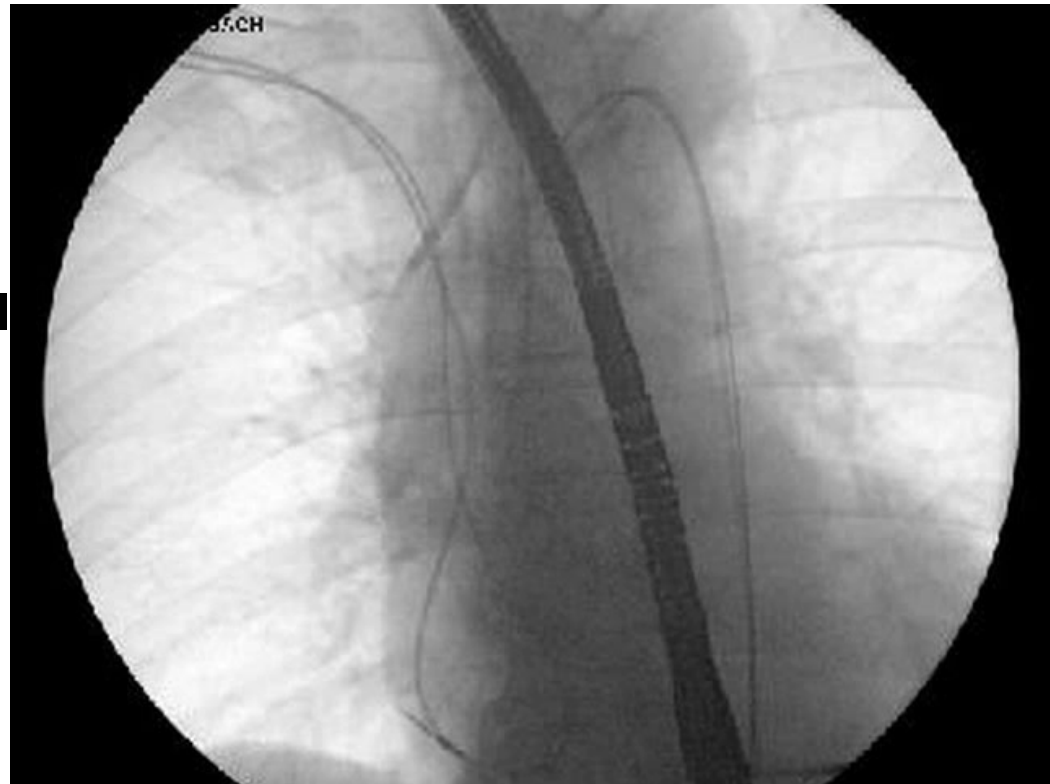
# Results

- Patients: 21
- Mortality: 2
- Stroke 1
- Type I Leak: 1
- Technical Success 19/21

- Aneurysms: 7
- Pau: 2
- Dissection: 1
- Thrombus: 2
- Zone O Landing Zone: 9

# Results

- Patients: 21
- Mortality: 2
- Stroke 1
- Type I Leak: 1
- Technical Success 19/21



- Thrombus: 2
- Zone O Landing Zone: 9



# The Future ?

