

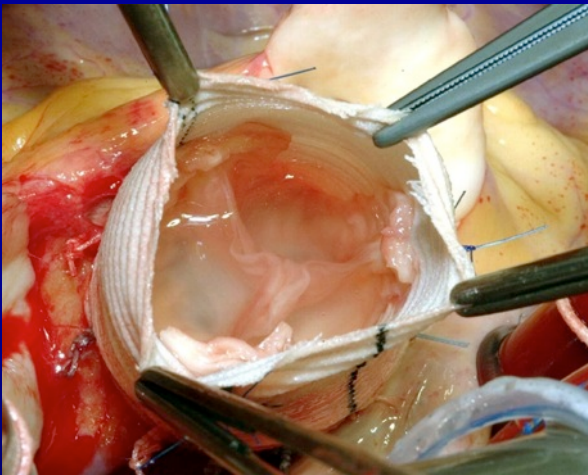
TEVAR for the Ascending Aorta

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Disclosures—Himanshu J. Patel MD

- Consultant for WL Gore, Medtronic, and Terumo

National Principal Investigator for WL Gore
Thoracic Side Branch Endograft Trial

- THE PROBLEM

“Medicine, especially surgery,
is a conservative profession;
a physician departs only reluctantly
from established techniques and lessons.
And for good reason; the stakes,
if you are wrong, are too high.”

-
- Atul Gawande
“*Desperate Measures*”
 - *The New Yorker*
 - May 5, 2003

Fundamental Decision for Operation Performed for Life Expectancy Benefit

Probability of rupture
and death

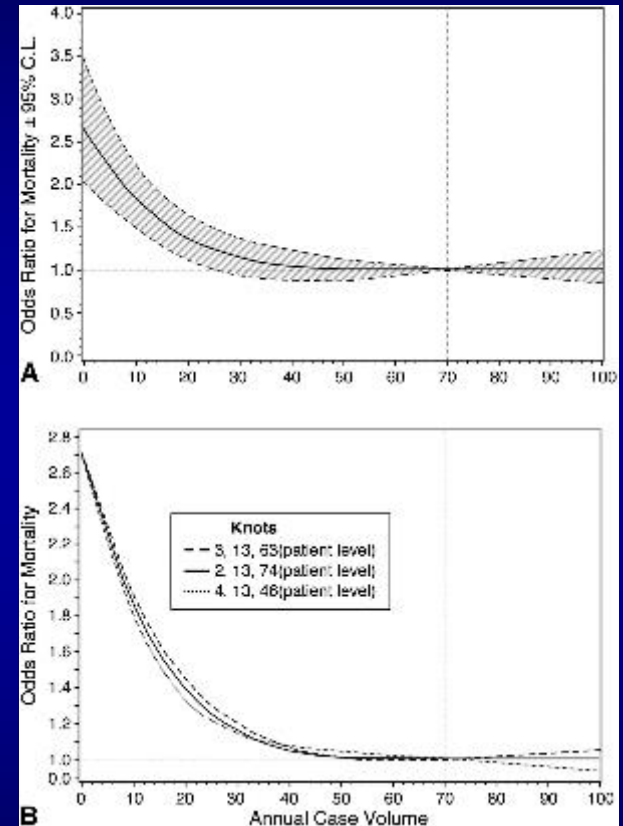


Probability of
complication from
intervention

$$P_{r/d} > P_c$$

Outcomes of Surgery Determinants

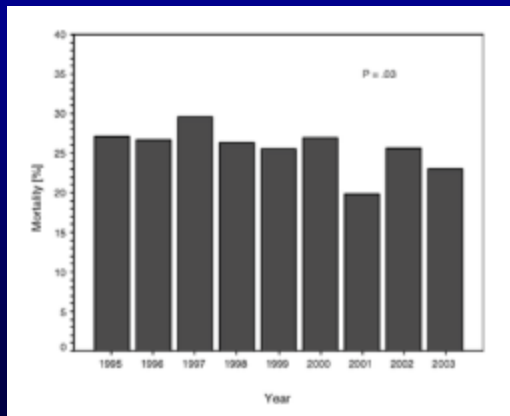
- Age
- Comorbidities
- Urgency of procedure
- Functional status
- Extent of needed operative procedure



• Hughes GC, JTCVS 2013

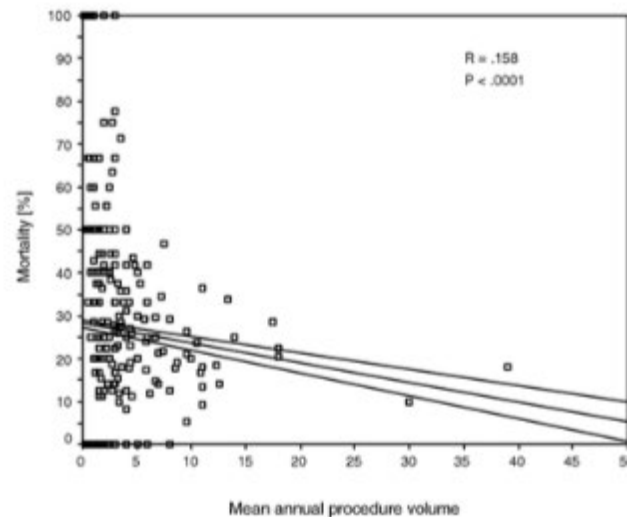
Mortality for Repair of Type A Dissection in US

- NIS administrative database study
- 1995-2003



A contemporary analysis of outcomes for operative repair of type A aortic dissection in the United States

Brian S. Knipp, MD, G. Michael Deeb, MD, Richard L. Prager, MD, Candace Y. Williams, MD, Gilbert R. Upchurch, Jr., MD, and Himanshu J. Patel, MD, *Ann Arbor, Mich*



Mortality for Repair of Type A Dissection at “Experienced” Centers of Excellence

- IRAD

Changes in operative strategy for patients enrolled in the International Registry of Acute Aortic Dissection interventional cohort program



Neil Parikh, BS,^a Santi Trimarchi, MD, PhD,^b Thomas G. Gleason, MD,^c Arnoud V. Kamman, MD,^{b,d} Marco di Eusanio, MD, PhD,^c Truls Myrmet, MD, PhD,^f Amit Korach, MD,^g Hersh Maniar, MD,^h Takeyoshi Ota, MD, PhD,ⁱ Ali Khoynzhad, MD, PhD,^j Daniel G. Montgomery, BS,^a Nimesh D. Desai, MD, PhD,^k Kim A. Eagle, MD,^{a,l} Christoph A. Nienaber, MD, PhD,^m Eric M. Isselbacher, MD,ⁿ Joseph Bavaria, MD,^k Thoralf M. Sundt, MD,ⁿ and Himanshu J. Patel, MD^d

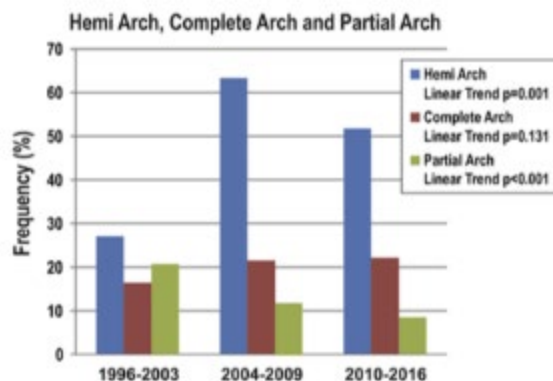
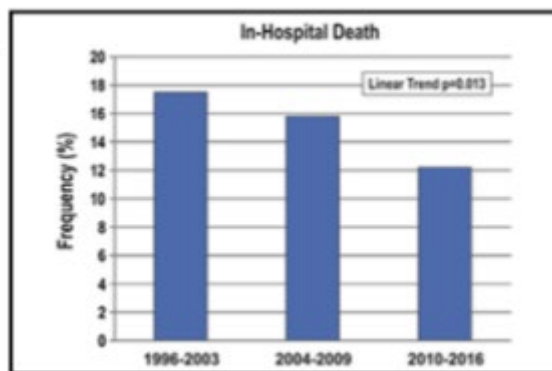


FIGURE 2. Hemiarch, complete arch, and partial arch replacement.

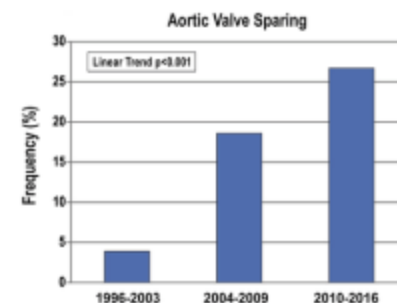


FIGURE 1. Valve-sparing techniques.

Conclusion---The Problem

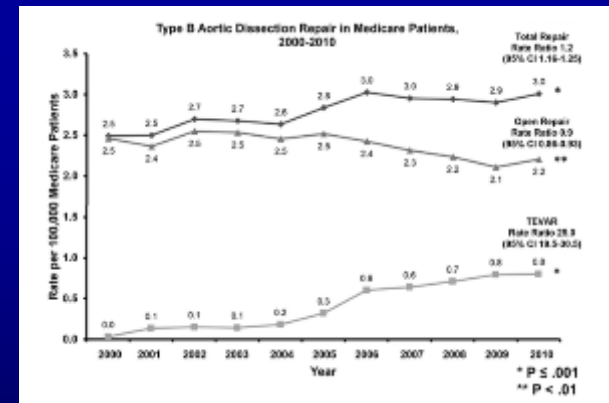
- Operative results have and will continue to improve
- Perhaps an alternative option is reasonable

The Alternative Option

- TEVAR effects for type B dissection
- Medicare claims data 2000-2010
- Increase in aortic repair by 21%
- TEVAR 27% by 2010

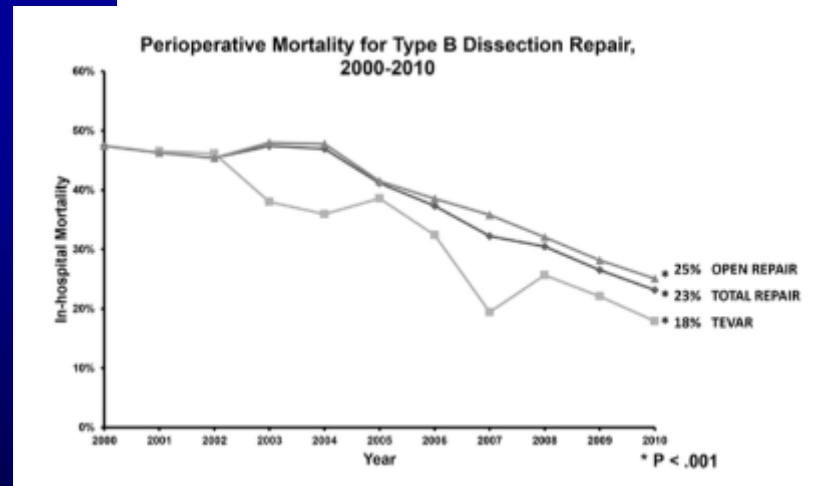
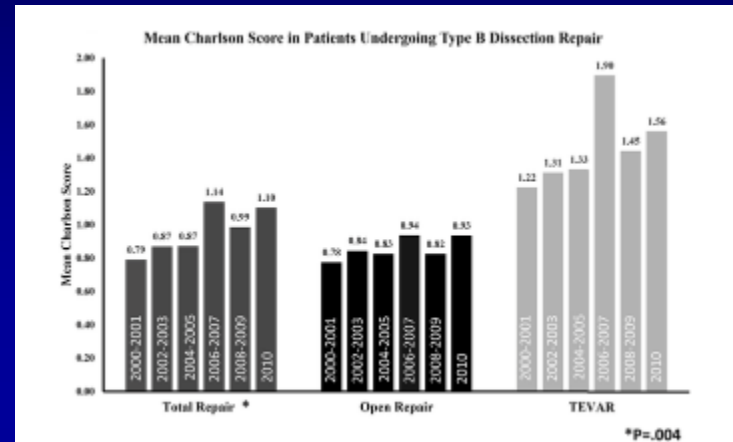
National trends in utilization, mortality, and survival after repair of type B aortic dissection in the Medicare population

Douglas W. Jones, MD,^a Philip P. Goodney, MD, MS,^{b,c} Brian W. Nolan, MD,^{b,c}
Benjamin S. Brooke, MD, PhD,^b Mark F. Fillinger, MD,^b Richard J. Powell, MD,^b and
David H. Stone, MD,^b *New York, NY; and Lebanon and Hanover, NH*



TEVAR Alternative

- TEVAR with higher rates of comorbidities
- Continued improvement in mortality rate
 - OSR 25%
 - TEVAR 18%



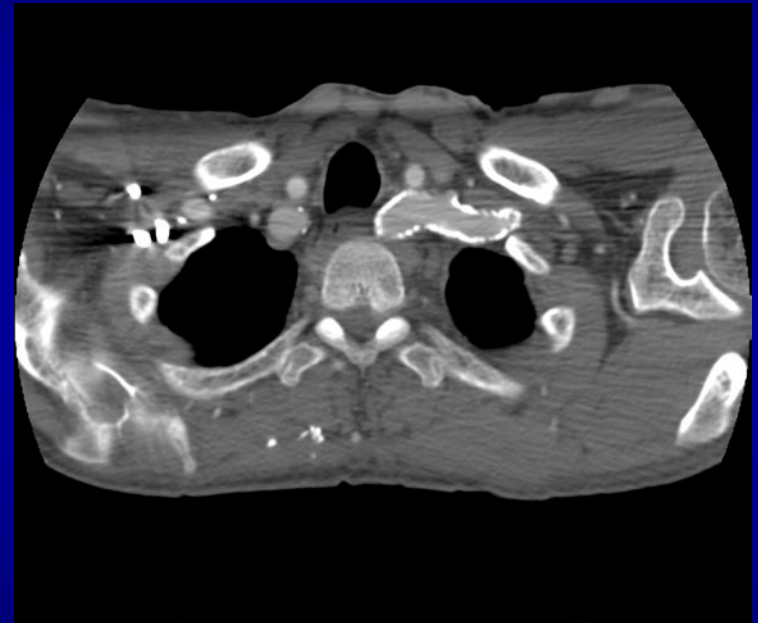
TEVAR for Ascending Aorta

- 65 year old male
- Dialysis dependent
- Suspected IVDA
- Prior Bentall procedure
- Presented in 1999 with aortocutaneous fistula



TEVAR for Ascending Aorta

- Lost to followup
- Re-presented now in 2003
- Expired shortly after admission during evaluation

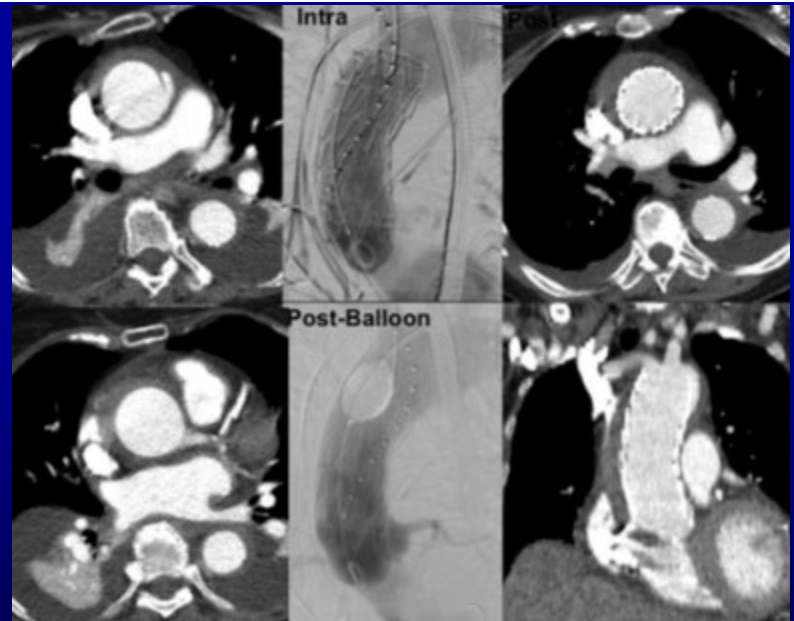


Experience with Ascending TEVAR

Endovascular stent grafting for ascending aorta repair in high-risk patients

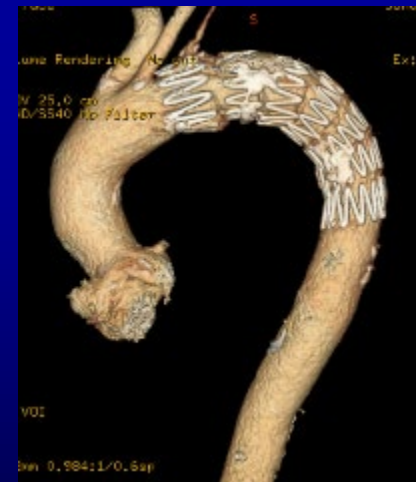
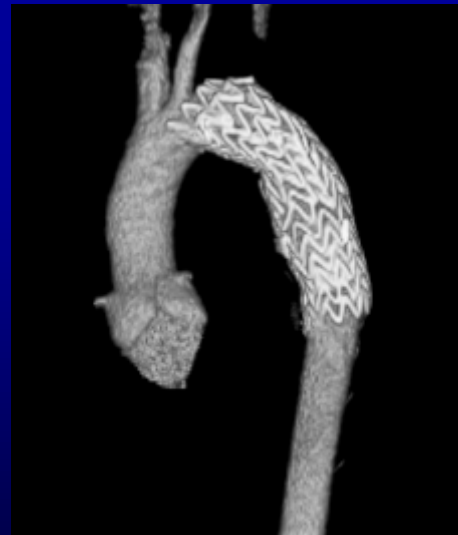
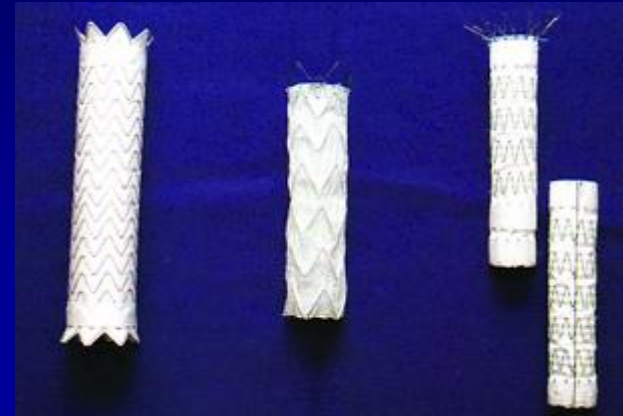
Eric E. Roselli, MD, Jahanzaib Idrees, MD, Roy K. Greenberg, MD, Douglas R. Johnston, MD, and Bruce W. Lytle, MD

- 22 patients
- 9 with type A
- 86% 30-day survival
- 80% at 1 year



The Challenge of Ascending TEVAR

- Notice the difference



The Anatomical Challenge of Ascending TEVAR

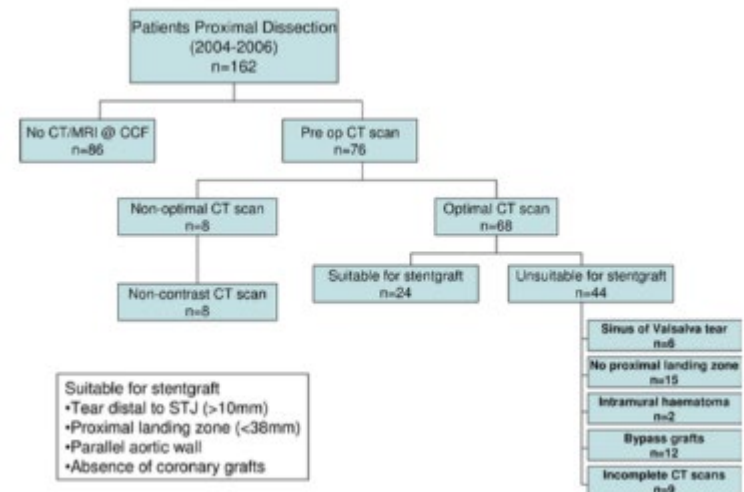
- 162 patients
- 77% suitable for review with centerline analysis
- Only 32% treatable by current paradigm

Table III. Criteria for suitability of an endovascular intervention

- Proximal landing zone (sinotubular junction ≤ 38 mm)
- Fenestration distal to sinotubular junction
- Minimum distance between intimal fenestration and sinotubular junction ≥ 10 mm
- Absence of coronary bypass grafts originating from ascending aorta

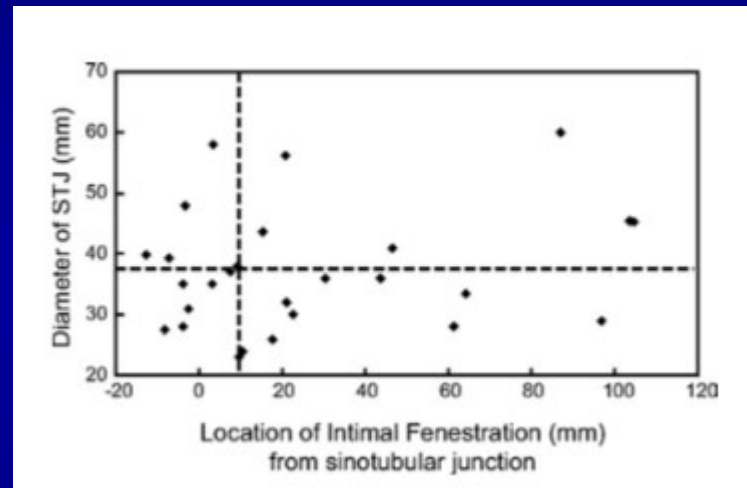
Computed tomography-based anatomic characterization of proximal aortic dissection with consideration for endovascular candidacy

Michael C. Moon, MD,^a Roy K. Greenberg, MD,^{a,b} Jose P. Morales, MD,^b Zenia Martin, MD,^b Qingheng Lu, MD,^b Joseph F. Dowdall, MD,^b and Adrian V. Hernandez, MD, PhD,^c Cleveland, Ohio



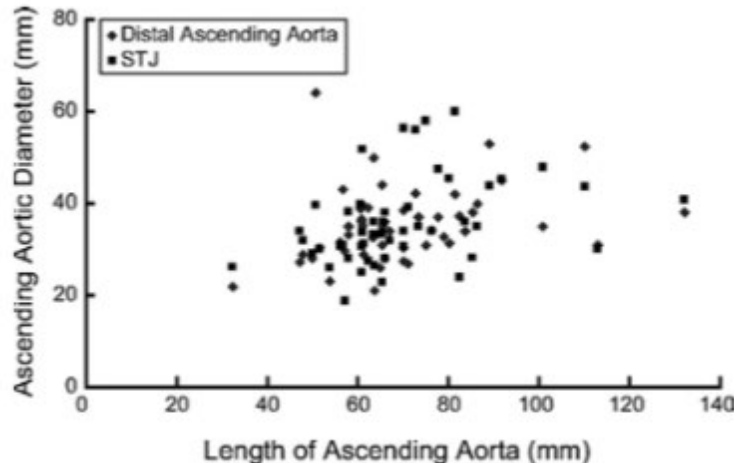
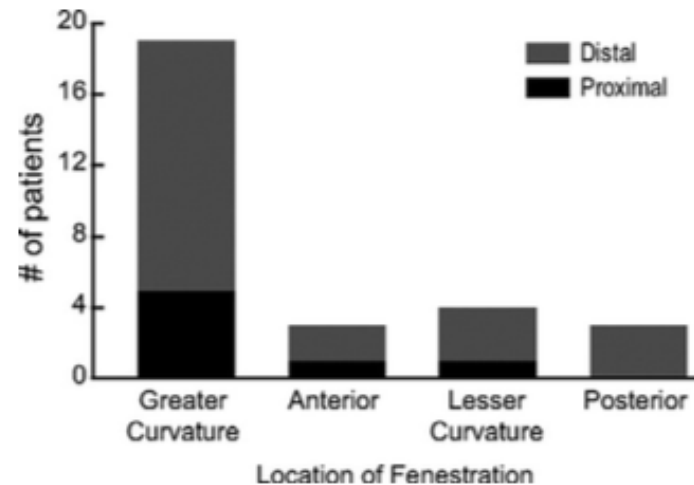
The Anatomical Challenge of Ascending TEVAR

- The root and the entry tear
- Intimal tear itself identified in 41%
- Of these 75% had tears originating distal to the root



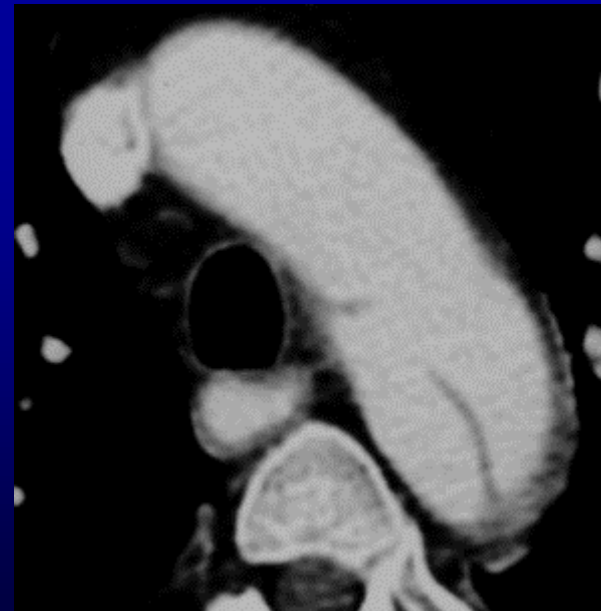
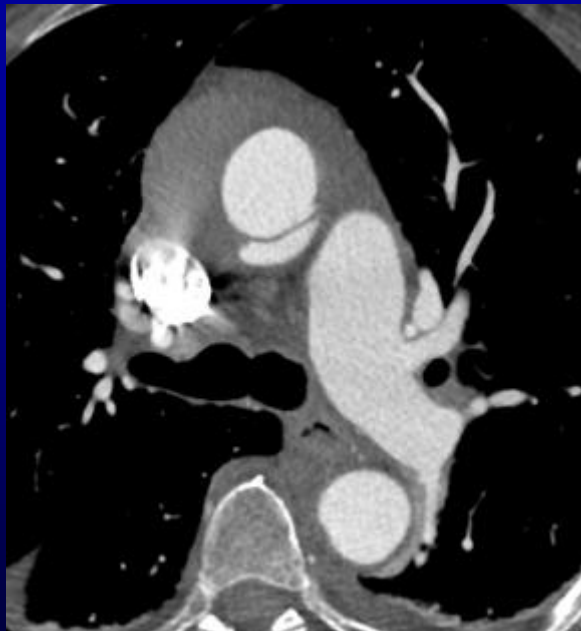
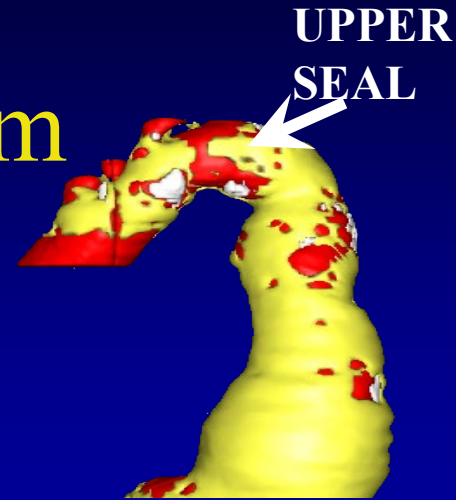
The Anatomical Challenge of Ascending TEVAR

- Length problem
- average 70.5 mm



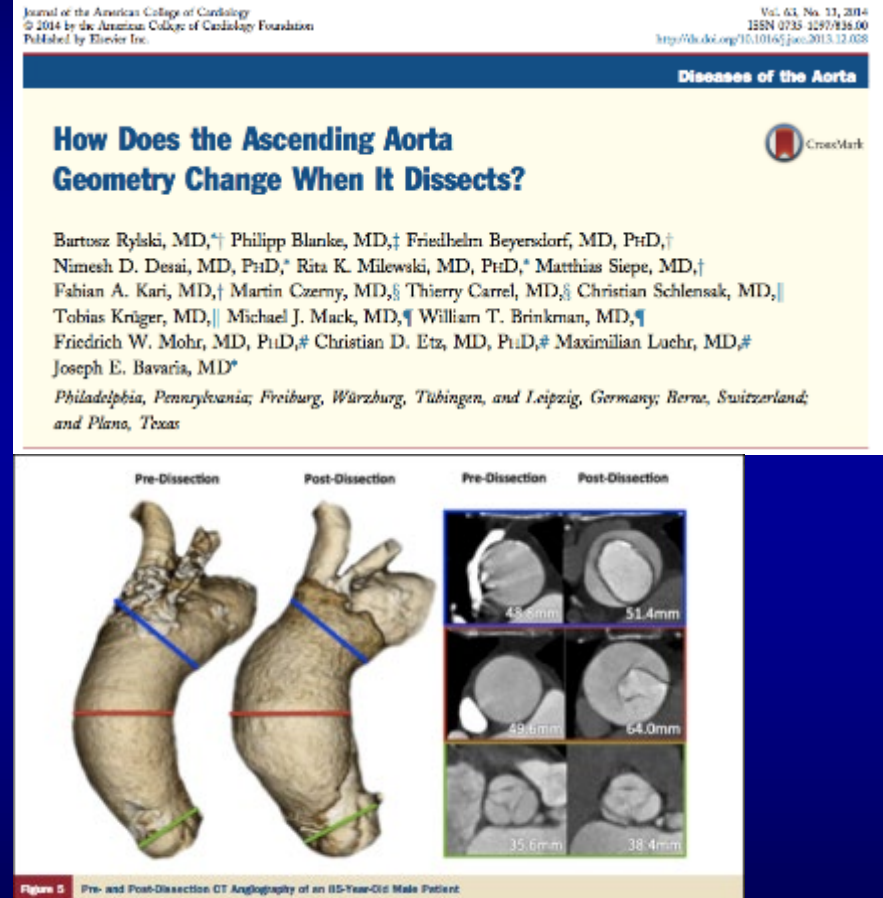
The Sizing Problem

- Differences between type A and type B dissection treatment



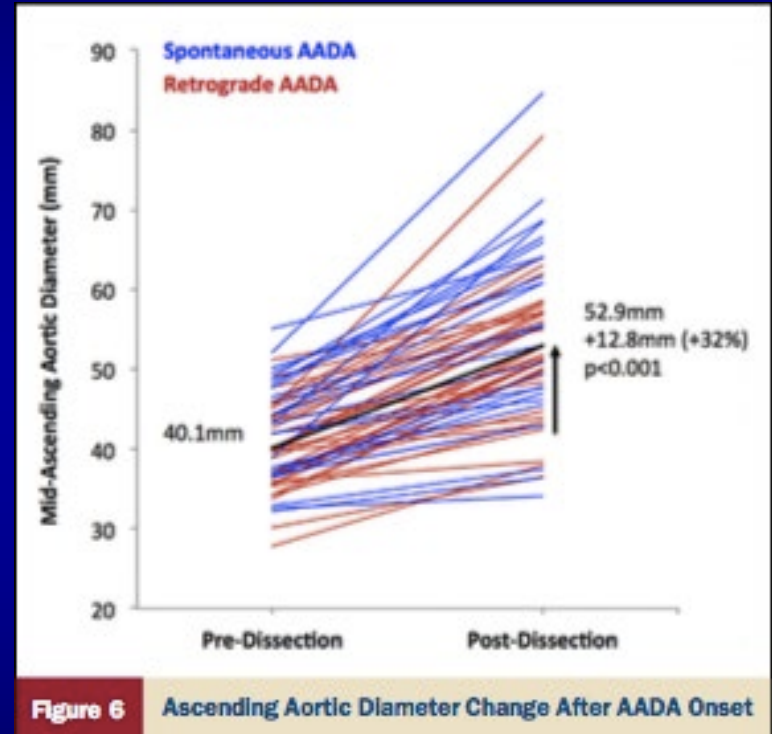
The Sizing Problem

- 63 patients (non Marfan non bicuspid) type A with CT within 2 years and at time of type A



The Sizing Problem

- Average increase greatest in ascending aorta
 - 32% ascending
 - 10% descending
- Increase in tortuosity by centerline analysis



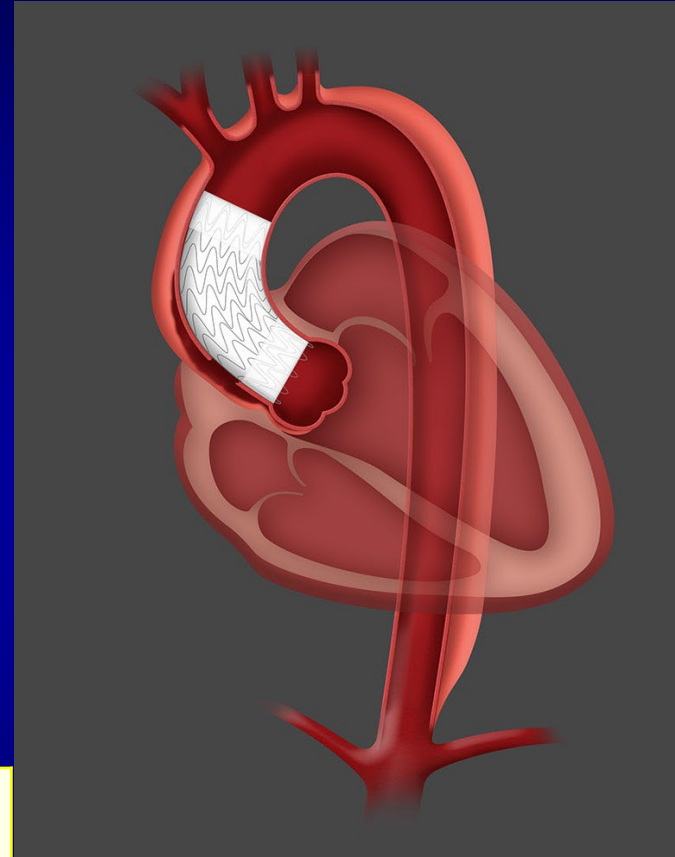
Summary of Difficulties

- No suitable landing zone
- Unclear sizing methods
- Not amenable to conventional stent graft length and design—need modified version and potentially new paradigm

Onward to an FDA Clinical Trial

- WL Gore Type A Early Feasibility Study
- Study population: DeBakey Type I/II Dissection
- Approved for up to 10 patients
 - 7/10 patients enrolled
- 6 investigational sites:

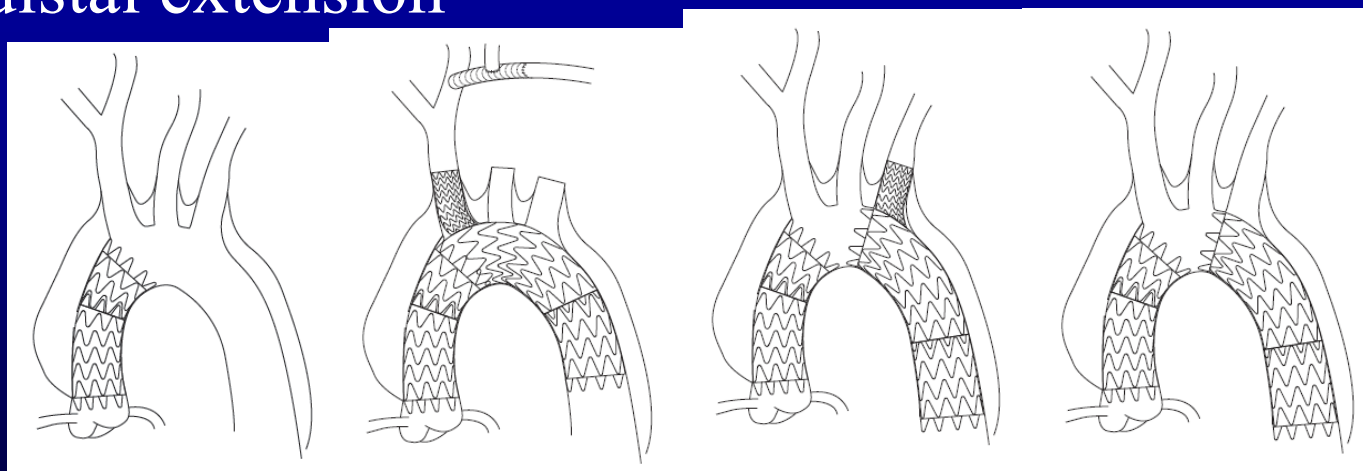
Houston Methodist Hospital	University of Michigan Hospital
St. Luke's Health Baylor	Cleveland Clinic
Memorial Hermann Heart & Vascular Institute	Hospital of the University of Pennsylvania



- Gore Investigational Device

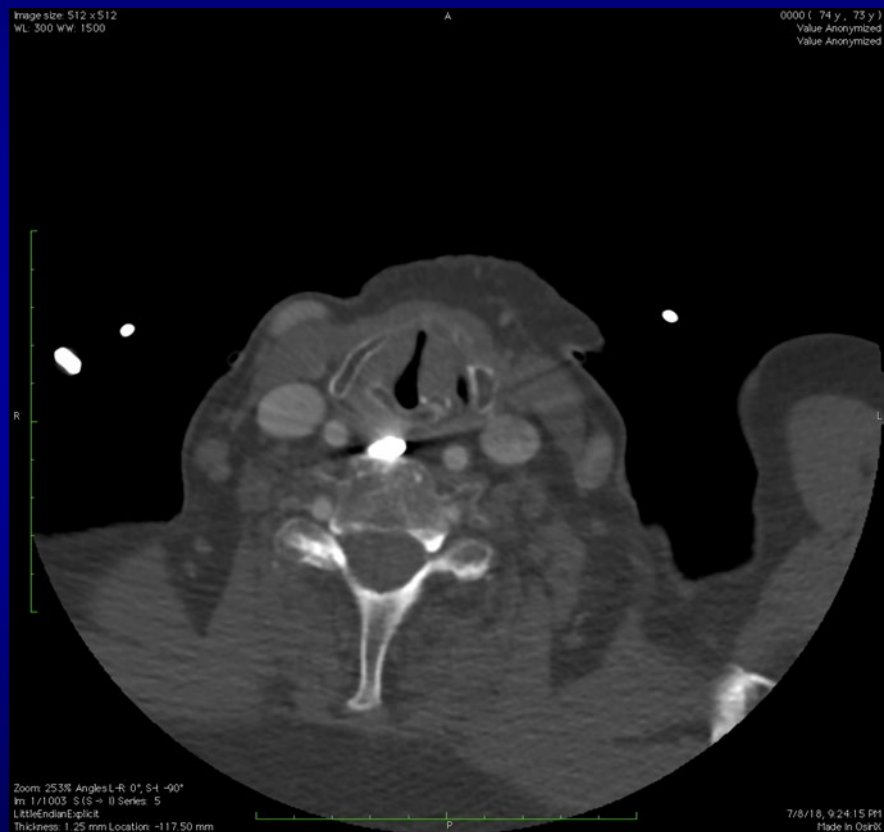
Gore Type A EFS Original Study Device

- Extender cuff from Thoracic Branch Endoprosthesis
- Modified version now for ascending Ao
- Remaining TBE system available for distal extension



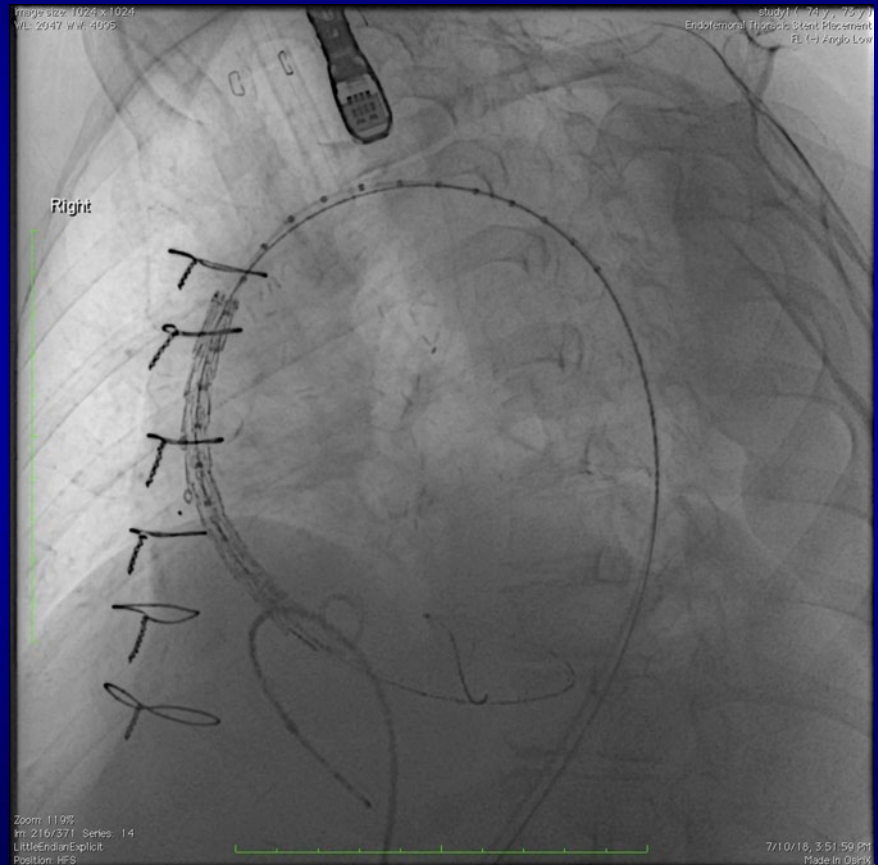
First University of Michigan Procedure

- 71 year old female
- Prior CABG
- Frail with poor ambulation
- Severe COPD
- TEE no AI, normal LVEF
- CT entry tear in arch



Partial ASG Component Deployment

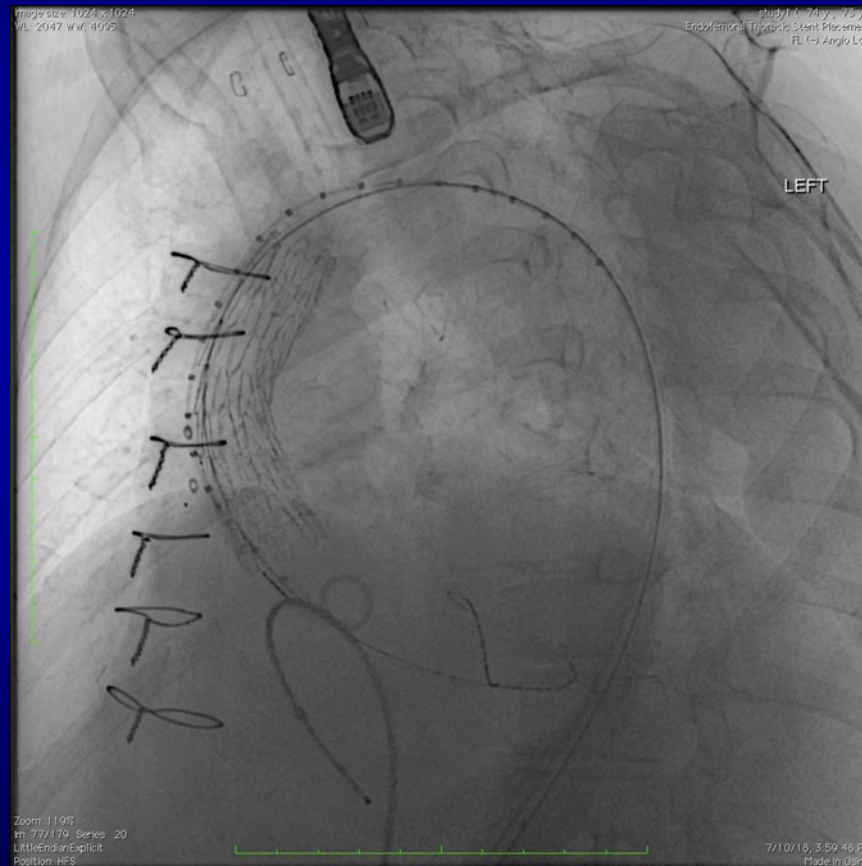
- Cervical debranching first
- Size??
 - Total aortic diameter
- Deploy the TBE or the ASG component first
- What will happen to the aortic valve



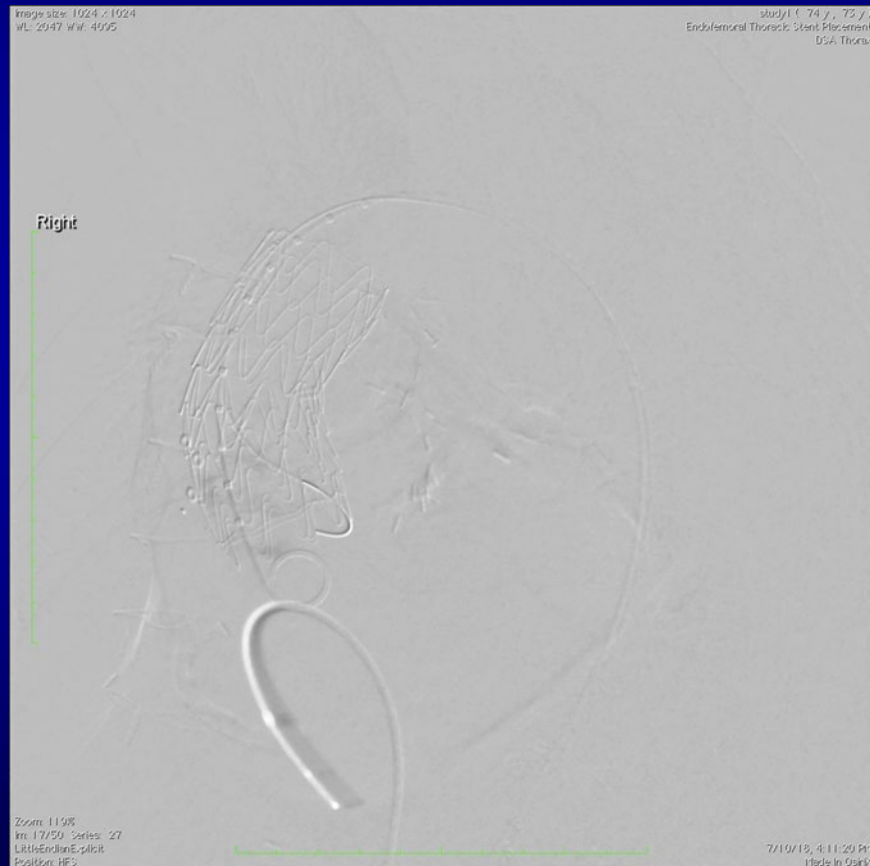
Angiogram and Adjustment of Lesser Curvature Length



Complete ASG Deployment

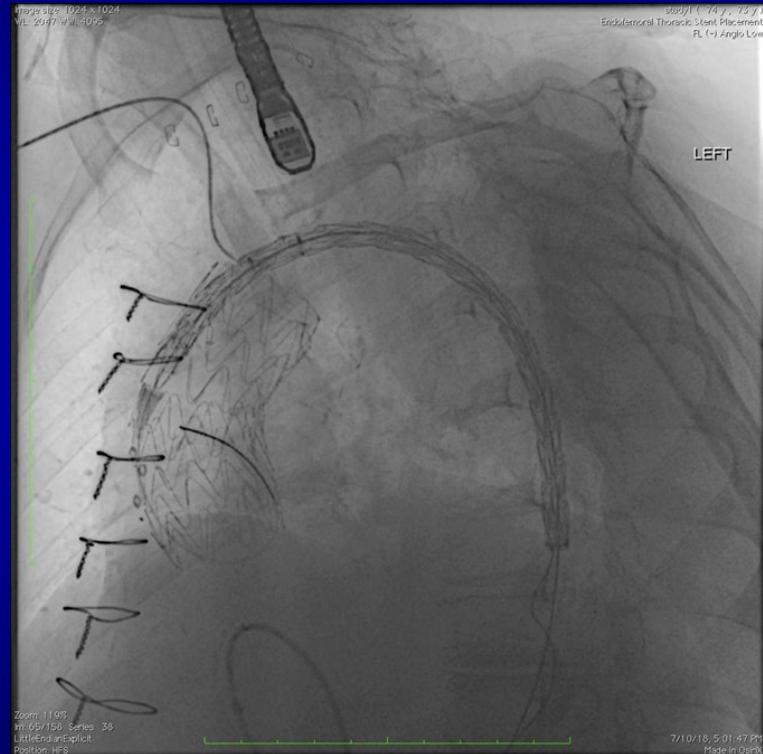


Angiogram after ASG Deployment



Deployment of TBE Component

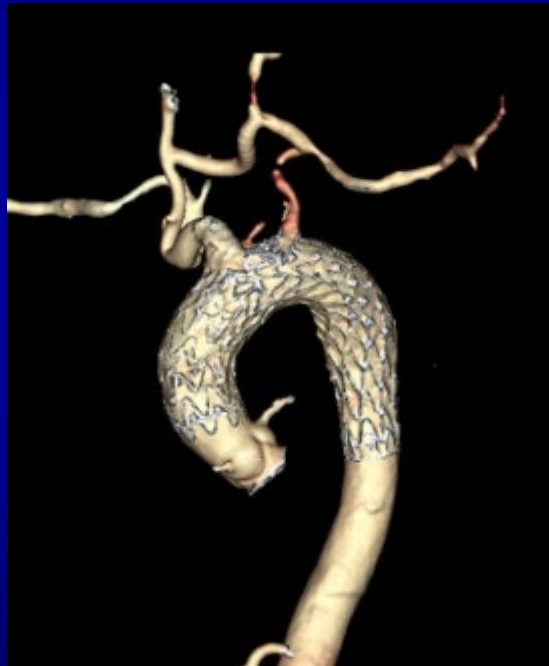
- Size to total aortic diameter
- Concern of type III endoleak with limited overlap and subsequent balloon aortoplasty
- Deployment of single side branch endograft



Completion Angiogram



CT scan at 7 days



A Patient Came to Clinic....

- 80 year old female with past history of rheumatoid arthritis and lupus (prednisone, methotrexate for 20 years), hypertension and EVAR who presents with NYHA Class III from severe AS.
- STS Risk Score 7% mortality, 26% morbidity

Aortogram

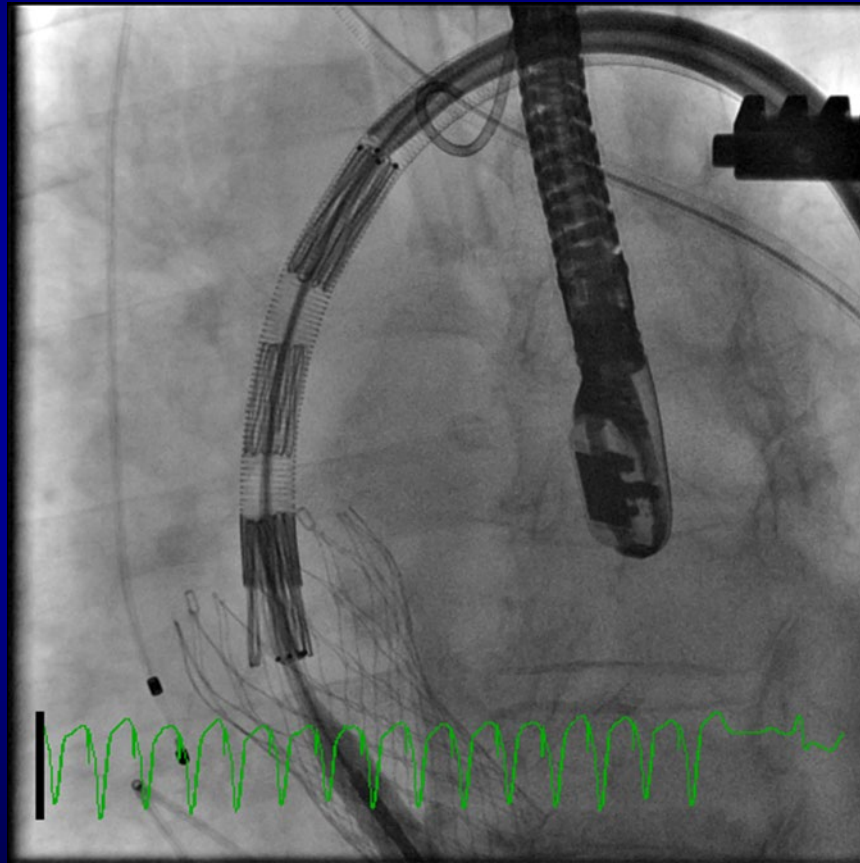


Stent Graft

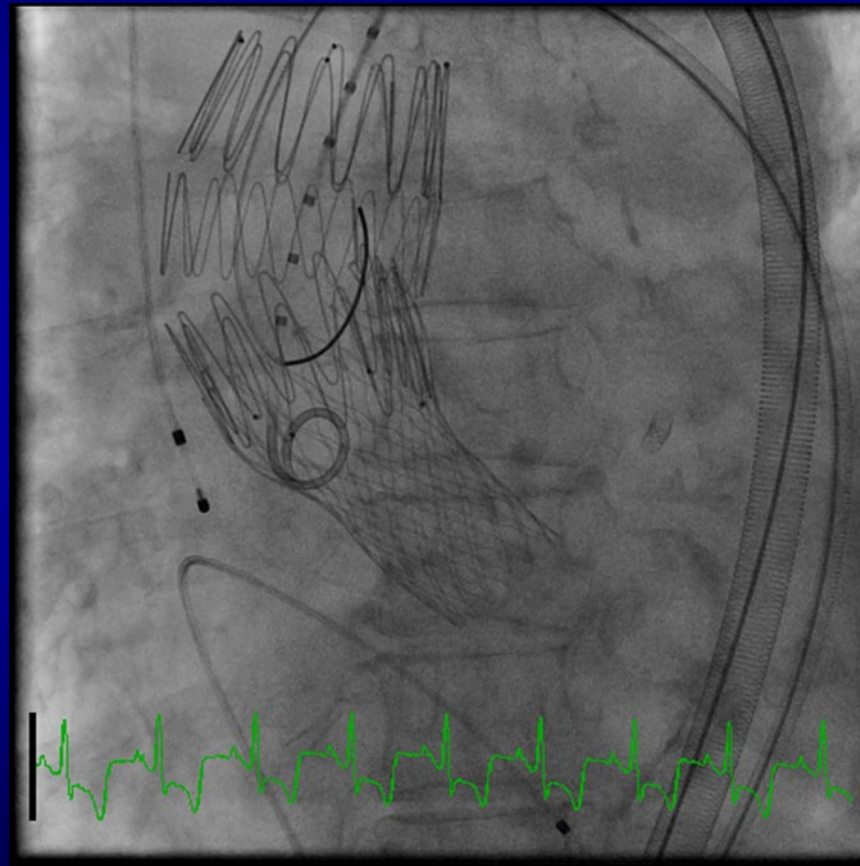
Cook TX2 Distal Extension Piece



Thoracic Endograft Deployment



Aortography



Conclusion

- Endovascular repair of type A dissection is coming
- There are no brave surgeons but only brave patients