



2018

29–30 October 2018
Congress Center Essen, Germany

5th Aortic Live Symposium

WHICH PATIENT IS NOT A CANDIDATE FOR OPEN ASCENDING AORTA SURGERY

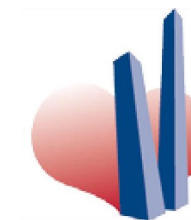


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Disclosure

FINANCIAL DISCLOSURES: NONE

ROBERTO DI BARTOLOMEO

INCIDENCE OF PROXIMAL AORTIC REPLACEMENT

Cardiac Surgery

Contemporary Results for Proximal Aortic Replacement in North America

Judson B. Williams, MD, MHS,*† Eric D. Peterson, MD, MPH,*‡ Yue Zhao, PhD,*
Sean M. O'Brien, PhD,* Nicholas D. Andersen, MD,† D. Craig Miller, MD,§ Edward P. Chen, MD,||
G. Chad Hughes, MD†

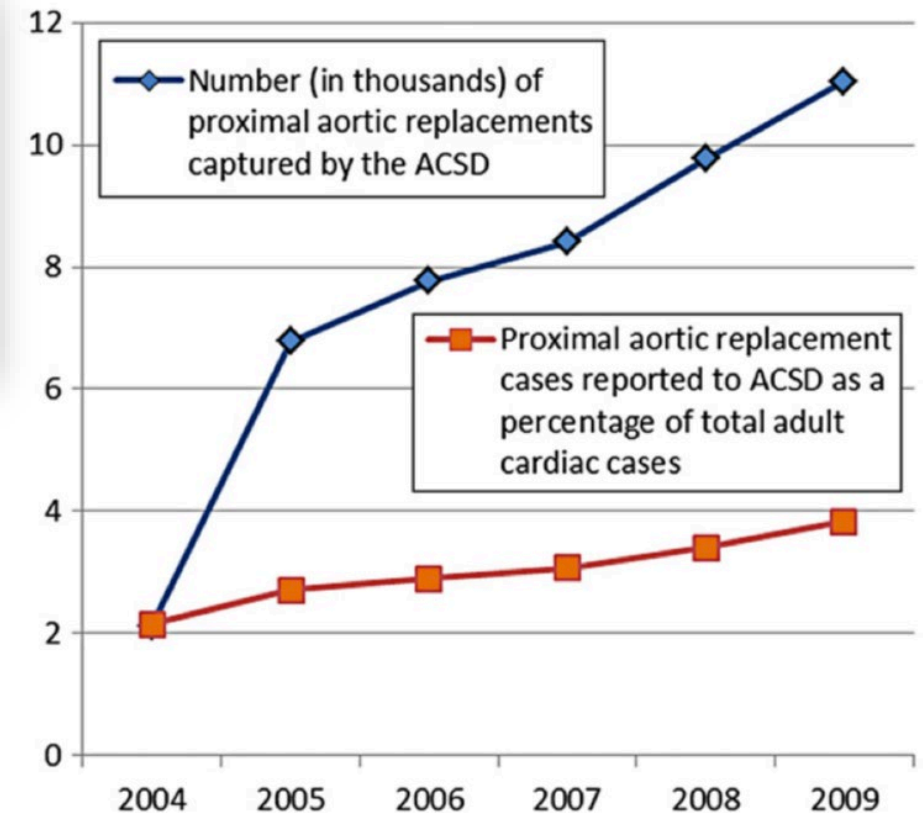
806 participating centers

FROM 2004

2,121 proximal aortic replacements

TO 2008

11,033 proximal aortic replacements



Williams et al. JACC 2012

UNDERSTANDING ASCENDING AORTA PATHOLOGY

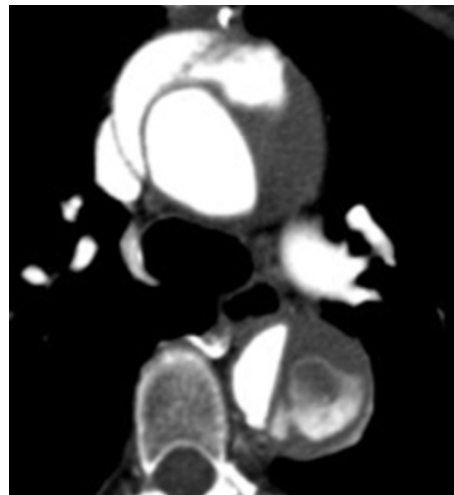
PROXIMAL AORTIC DISEASES



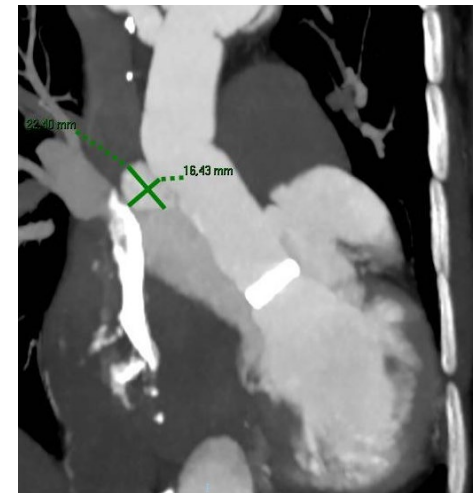
**Chronic
degenerative**



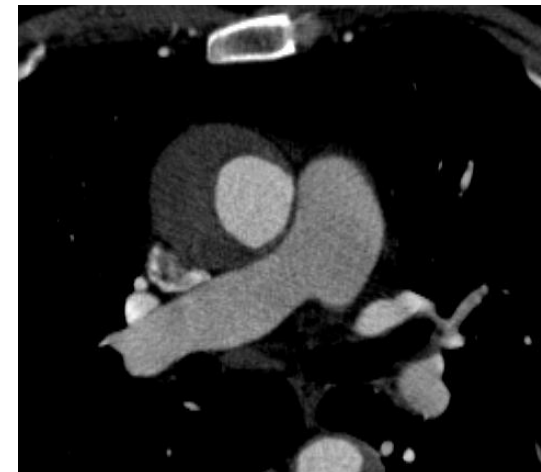
Type A Ao diss.



Chronic Ao diss.



Pseudoaneurysm



IMH

ASCENDING AORTA REPLACEMENT IS SAFE AND EFFECTIVE

Cardiac Surgery

Contemporary Results for Proximal Aortic Replacement in North America

Judson B. Williams, MD, MHS,*† Eric D. Peterson, MD, MPH,*‡ Yue Zhao, PhD,* Sean M. O'Brien, PhD,* Nicholas D. Andersen, MD,†‡ D. Craig Miller, MD,§ Edward P. Chen, MD,|| G. Chad Hughes, MD†

Durham, North Carolina; Stanford, California; and Atlanta, Georgia

Objectives The purpose of this study was to characterize operative outcomes for ascending aorta and arch replacement on a national scale and

Background Contemporary outcomes for ascending aorta replacement are limited by lack of data on operative risks and long-term effectiveness in relation to aortic size. Therefore, we assessed and compared outcomes of patients undergoing elective isolated proximal aortic replacement for this disease vs replacement during multicomponent operations.

Methods We queried the Society of Thoracic Surgeons (STS) database for patients undergoing elective proximal aortic replacement for this disease vs replacement during multicomponent operations. From January 2006 to January 2011, 1,889 patients underwent proximal aortic replacement (isolated, 212; multicomponent, 1,677) for chronic asymptomatic ascending and arch pathology. Mean age was 60 ± 14 years, and maximum proximal aortic diameter was 52 ± 10 mm (isolated) and 49 ± 10 mm (multicomponent; $p = 0.0004$). Propensity matching using 64 preoperative variables yielded 197 well-matched patient pairs.

Results Patients were more likely to undergo isolated replacement if they had prior cardiac operations and a larger mid-descending aortic diameter ($p < 0.0001$). Multicomponent operations were more common among

Conclusions Current outcomes for results deteriorate for patients who could potentially benefit from aortic replacement. © Ann Surg

Outcomes After Elective Proximal Aortic Replacement: A Matched Comparison of Isolated Versus Multicomponent Operations

Jay J. Idrees, MD, Eric E. Roselli, MD, Ashley M. Lowry, MS, Joshua M. Reside, BS, Hoda Javadikasgari, MD, Daniel J. Johnson, BS, Edward G. Soltesz, MD, Douglas R. Johnston, MD, Gösta B. Pettersson, MD, PhD, Eugene H. Blackstone, MD, Joseph F. Sabik, III, MD, and Lars G. Svensson, MD, PhD

Aorta Center, Department of Thoracic and Cardiovascular Surgery, Heart and Vascular Institute, and Department of Quantitative Health Sciences, Research Institute, Cleveland Clinic, Cleveland, Ohio

Despite the development of improved open and circulatory adjuncts, existing published data on ascending aortic and arch repairs in terms of morbidity and mortality (1). However, these studies suffer important limitations, including

Background. Guidelines supporting the decision to replace the aorta in patients with chronic asymptomatic proximal aortic disease are limited by lack of data on operative risks and long-term effectiveness in relation to aortic size. Therefore, we assessed and compared outcomes of patients undergoing elective isolated proximal aortic replacement for this disease vs replacement during multicomponent operations.

Methods. From January 2006 to January 2011, 1,889 patients underwent proximal aortic replacement (isolated, 212; multicomponent, 1,677) for chronic asymptomatic ascending and arch pathology. Mean age was 60 ± 14 years, and maximum proximal aortic diameter was 52 ± 10 mm (isolated) and 49 ± 10 mm (multicomponent; $p = 0.0004$). Propensity matching using 64 preoperative variables yielded 197 well-matched patient pairs.

Results. Patients were more likely to undergo isolated replacement if they had prior cardiac operations and a larger mid-descending aortic diameter ($p < 0.0001$). Multicomponent operations were more common among

those with connective tissue disorder or porcelain aorta. Among propensity-matched patients, in-hospital mortality was 1 of 197 (0.5%) in the isolated group vs 8 of 197 (4.1%) in the multicomponent group. Occurrence of stroke, renal failure, and prolonged ventilation were similar. Median postoperative stay was 7.9 vs 8.1 days ($p = 0.07$). At 30 days, 1 year, and 4 years, survival was 97%, 93%, and 87%, and freedom from reintervention was 98%, 90%, and 89%, respectively, similar between groups.

Conclusions. Elective ascending aortic replacement is safe and effective. Ascending aneurysms should be treated aggressively even when encountered in patients undergoing a multicomponent operation. An aggressive approach to replacement of the ascending aorta may be warranted given the increased risk of stroke during a subsequent reoperation.

(Ann Thorac Surg 2016;101:2185-92)

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Idrees, Annals of thoracic surgery, 2016
Williams et al. JACC 2012

Open surgery THE GOLD STANDARD

	OPERATIVE MORTALITY	STROKE
• ISOLATED:	0.5%	4.0%
• Multi-component:	2.0%	2.0%
STS	3.4%	3.2%
Bologna 2017	0.7%	1.4%
(139 ascending elective cases)		



VOLUME/OUTCOME IN NORTH AMERICA

Effects of institutional volumes on operative outcomes for aortic root replacement in North America

G. Chad Hughes, MD, Yue Zhao, PhD, J. Scott Rankin, MD, John E. Scarborough, MD, Sean O'Brien, PhD, Joseph E. Bavaria, MD, Walter G. Wolfe, MD, Jeffrey G. Gaca, MD, James S. Gammie, MD, David M. Shahian, MD, and Peter K. Smith, MD

STS Database, 741 Centers

- 2004-2007
- N= 13,358 elective cases
 - Total roots and AVR+Ascending

Quartiles: <6, 6-13, 13-30, >30 cases

Mortality: 6%, 5%, 4%, 3%

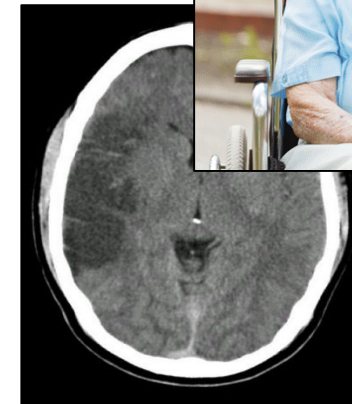
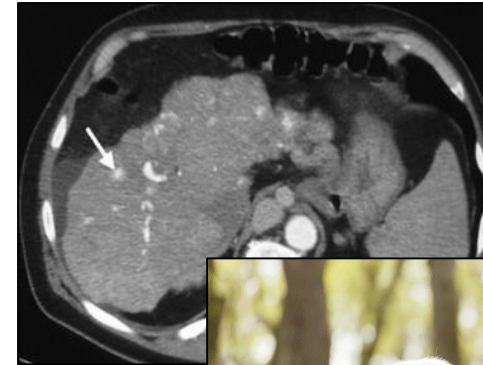
Hughes C, et al. JTCVS 2013

Does exist patients not eligible to ascending aorta replacement?

Frailty

Elderly

Comorbidities



HIGH-RISK PATIENTS FOR OPEN SURGERY

Acquired Cardiovascular Disease

Ganapathi et al

Frailty and risk in proximal aortic surgery

Asvin M. Ganapathi, MD,^a Brian R. Englum, MD,^a Jennifer M. Hanna, MD,^a Matthew A. Schechter, MD,^a Jeffrey G. Gaca, MD,^a Lynne M. Hurwitz, MD,^b and G. Chad Hughes, MD^a

Frailty:

- age > 70 years
- body mass index < 18.5 kg/m²
- anemia
- history of stroke
- hypoalbuminemia
- total psoas volume in the bottom quartile of the population

574 patients underwent proximal aortic surgery



148 (25.7%) were defined as frail

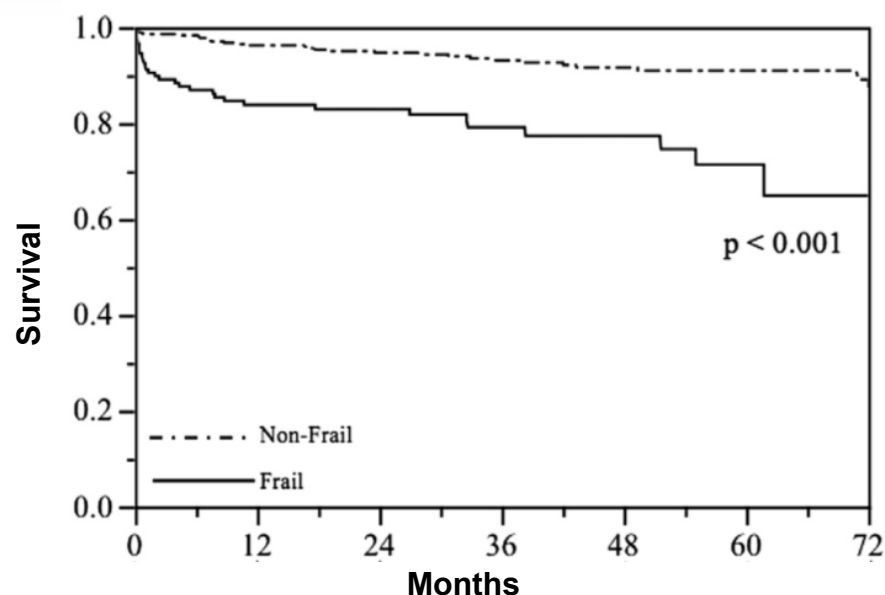
HIGH-RISK PATIENTS FOR OPEN SURGERY

Acquired Cardiovascular Disease

Ganapathi et al

Frailty and risk in proximal aortic surgery

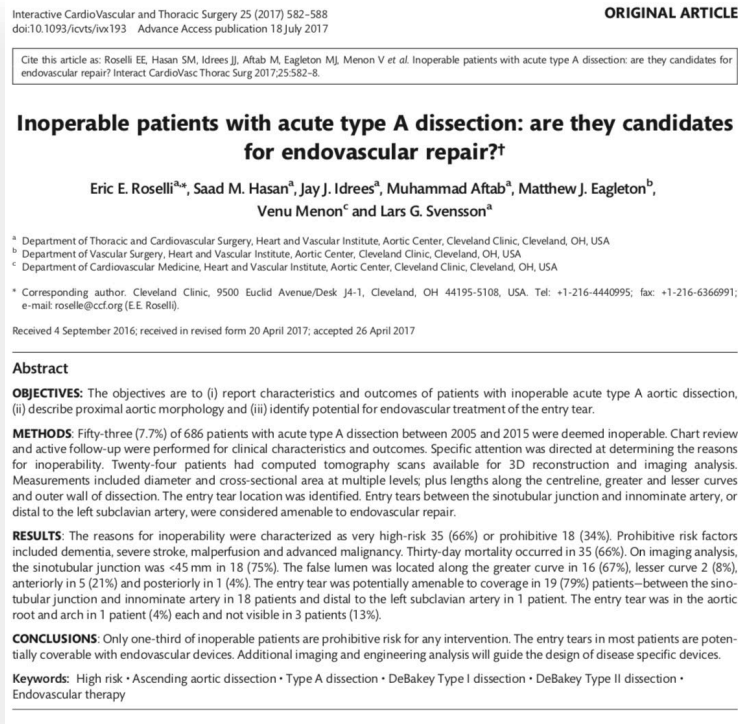
Asvin M. Ganapathi, MD,^a Brian R. Englum, MD,^a Jennifer M. Hanna, MD,^a Matthew A. Sc
Jeffrey G. Gaca, MD,^a Lynne M. Hurwitz, MD,^b and G. Chad Hughes, MD^a



Outcome	Overall (n = 574)	Frail (n = 148)	Not frail (n = 426)	P Value
Length of stay >14 d	47 (8.2)	23 (15.5)	24 (5.6)	<.01*
Discharge to location other than home	39 (6.7)	25 (16.9)	14 (3.2)	<.01*
Readmission within 30 d	54 (9.4)	15 (10.1)	39 (9.2)	.72
Composite 30-d major morbidity	111 (19.3)	42 (28.4)	69 (16.2)	<.01*
Composite 30-d major morbidity and mortality	120 (20.9)	47 (31.8)	73 (17.1)	<.01*
30-d Mortality	19 (3.3)	13 (8.8)	6 (1.4)	<.01*
1-y Mortality†	38/482 (7.8)	23/127 (18.1)	15/355 (4.2)	<.01*

HIGH-RISK PATIENTS FOR OPEN SURGERY

Type A dissection: Patient not candidate for open surgery



METHODS: 53 (7.7%) of 686 patients with acute type A dissection between 2005 and 2015 were deemed **inoperable**.

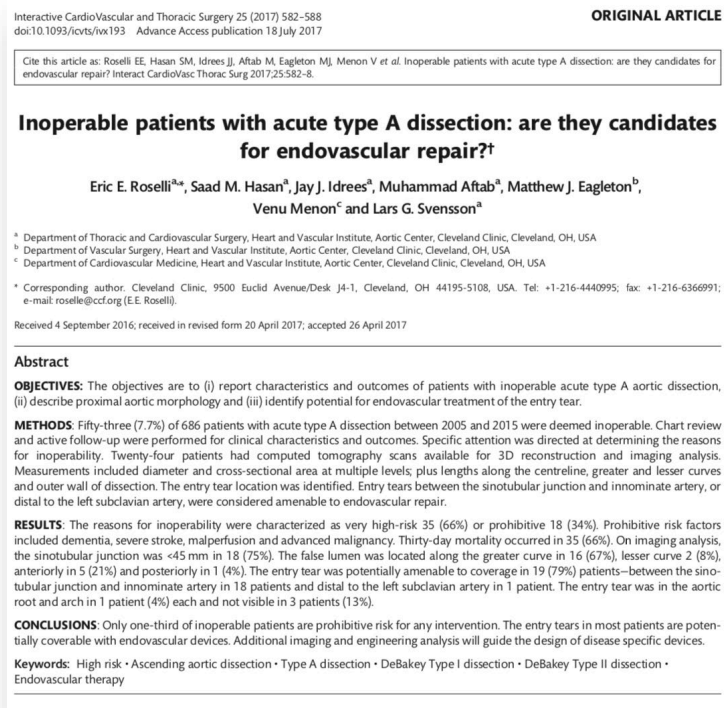
Age: mean 78 years (62% > 80y/o)

REASONS FOR INOPERABILITY:

- High-risk (66%)
- Prohibitive (34%)

HIGH-RISK PATIENTS FOR OPEN SURGERY

Type A dissection: Patient not candidate for open surgery



53/686 patients (7.7%) with acute type A

Characteristics	Number	%
Prior cardiac surgery	20/53	37.7
Coronary artery disease	25/52	48.1
Congestive heart failure	16/52	30.8
Chronic kidney disease	12/52	23.1
COPD	13/52	25.0
Malignancy	15/52	28.8
Dementia	9/53	17.0

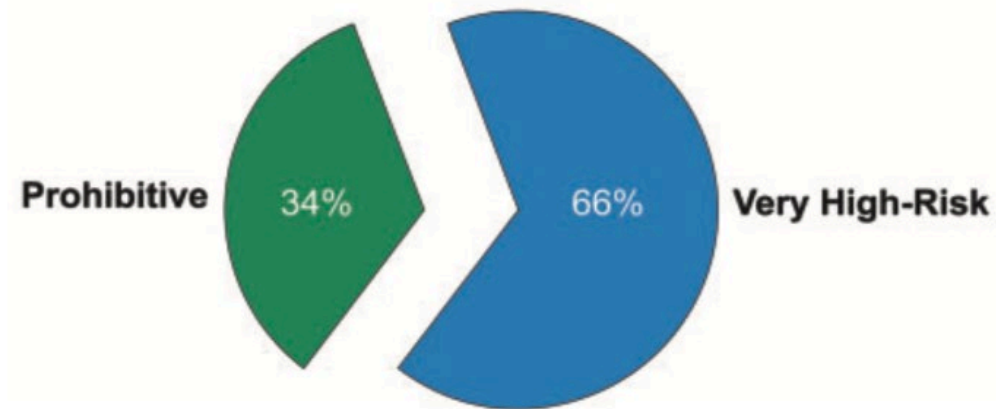
Roselli EE ICVTS 2017

INOPERABLE PATIENTS: DEFINITIONS

Reasons for Inoperability:

1. **High-risk:** frailty in combination with older age and prior cardiac surgery
2. **Prohibitive risk:** late stage dementia or malignancy

Prohibitive		Very High-Risk	
Dementia	6 (11%)	↑Age	28 (53%)
Advanced Malignancy	5 (9%)	Redo	19 (36%)
Severe Malperfusion	4 (8%)	Frail	16 (30%)
Severe Stroke	3 (6%)	CHF	12 (23%)
Total	18	COPD	9 (17%)
		Hostile Chest	3 (6%)
		Jehovah's Witness	2 (4%)
		Total	35



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INOPERABLE ACUTE TYPE A PATIENTS: OUTCOMES

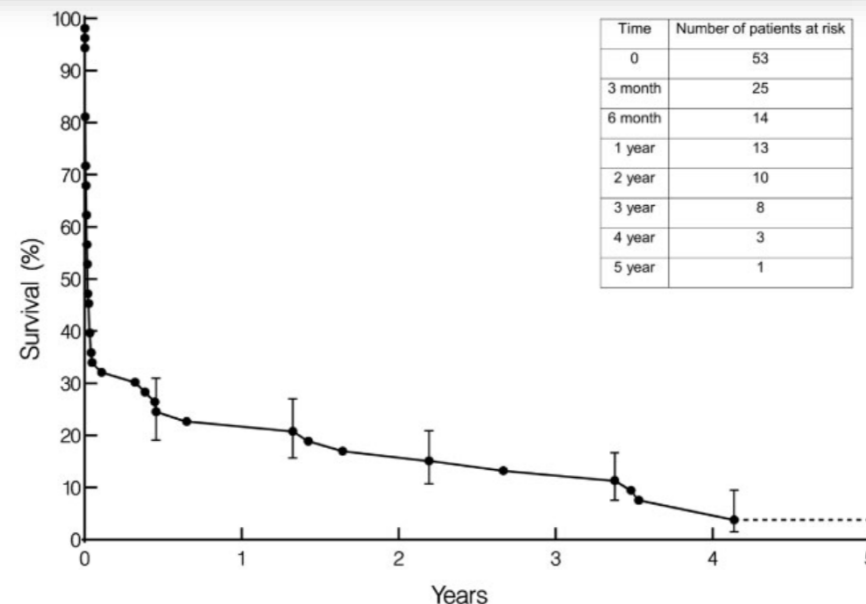
Inoperable patients with acute type A dissection: are they candidates for endovascular repair?[†]

Eric E. Roselli^{a,*}, Saad M. Hasan^a, Jay J. Idrees^a, Muhammad Aftab^a, Matthew J. Eagleton^b,
Venu Menon^c and Lars G. Svensson^a

30-days mortality: 35/53 (66%)

Survival after onset of symptoms:

- At 1 year was 23 %
- At 4 years was 7.5%



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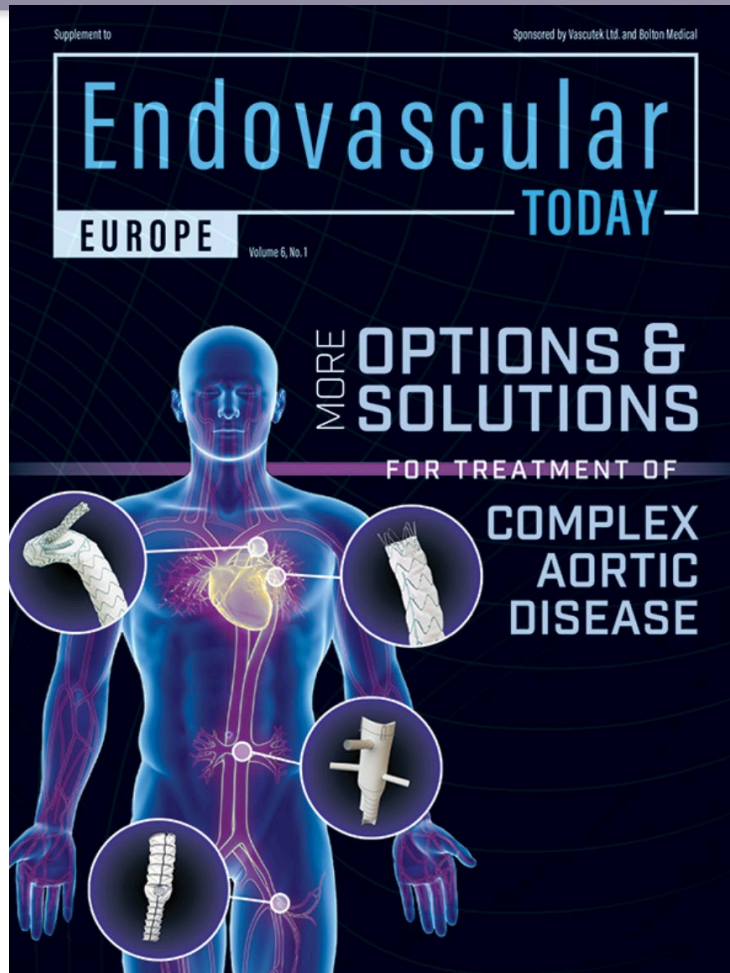
ASCENDING AORTIC DISEASE

Exist an alternative options to surgery in high risk?

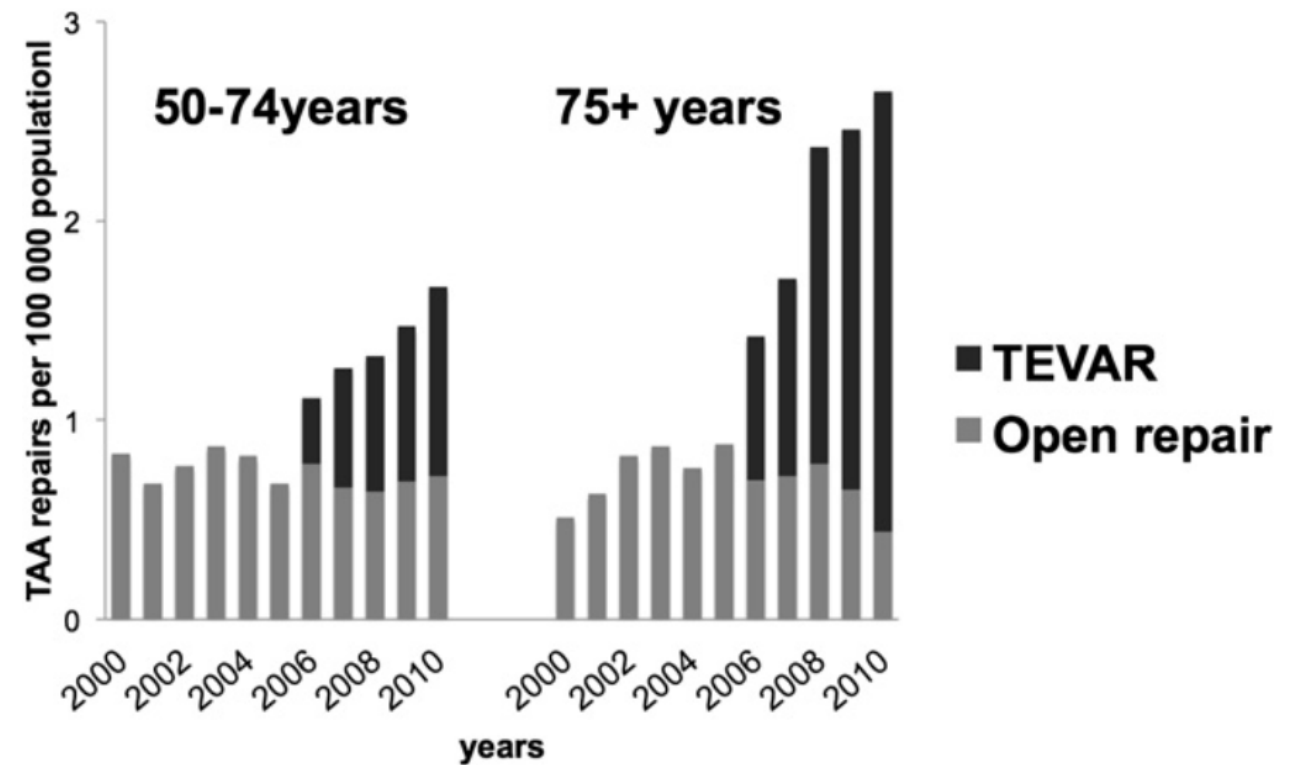
- Medical therapy
 - Palliative
- Endovascular repair
 - Is it possible?
 - When is possible?



HIGH-RISK PATIENTS FOR OPEN SURGERY



TEVAR



von Allmen et al. Eur J Vasc Endovasc Surg. 2013

ASCENDING AORTA STENT GRAFTING

Acute aortic dissections 45% of all ascending stentgrafting series

International experience with endovascular therapy of the ascending aorta with a dedicated endograft

Nikolaos Tsilimparis, MD, PhD,^a E. Sebastian Debus, MD, PhD,^a Gustavo S. Oderich, MD,^b Stephan Haulon, MD,^c Kim Allan Terp, MD,^d Blayne Roeder,^c Christian Detter, MD, PhD,^a and Tilo Kölbel, MD, PhD,^a *Hamburg Germany; Rochester, Minn; Lille, France; Aarhus, Denmark; and Bloomington, Ind*

Anatomic feasibility of an endovascular valve-carrying conduit for the treatment of type A aortic dissection

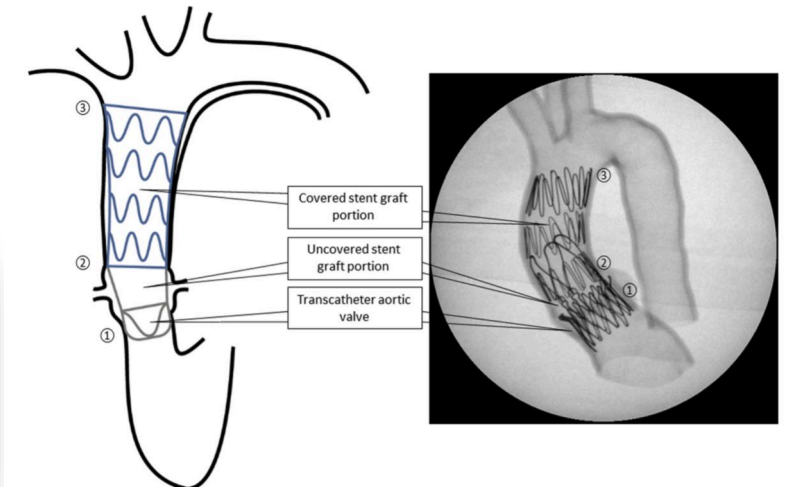
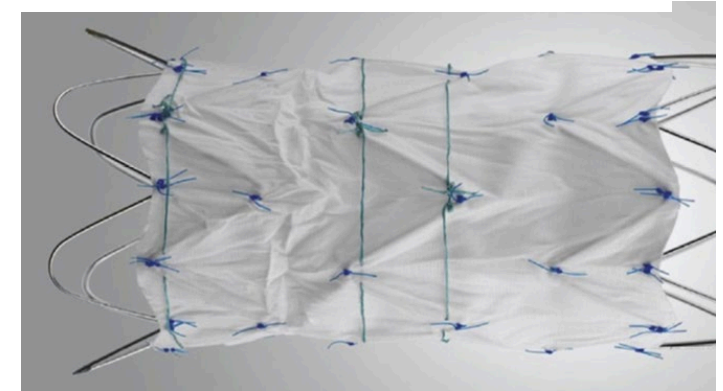
Maximilian Kreibich, MD,^{a,b,c} Tobias Soekeland, MS,^{a,b} Friedhelm Beyersdorf, MD,^{a,b} Joseph E. Bavaria, MD,^c Holger Schröfel, MD,^{a,b} Martin Czerny, MD, MBA,^{a,b} and Bartosz Rylski, MD^{a,b}

Endovascular Stenting of the Ascending Aorta for Type A Aortic Dissections in Patients at High Risk for Open Surgery

S. Ronchey^a, E. Serrao^a, V. Alberti^a, S. Fazzini^a, S. Trimarchi^b, J.L. Tolenaar^b, N. Mangialardi^{a,*}

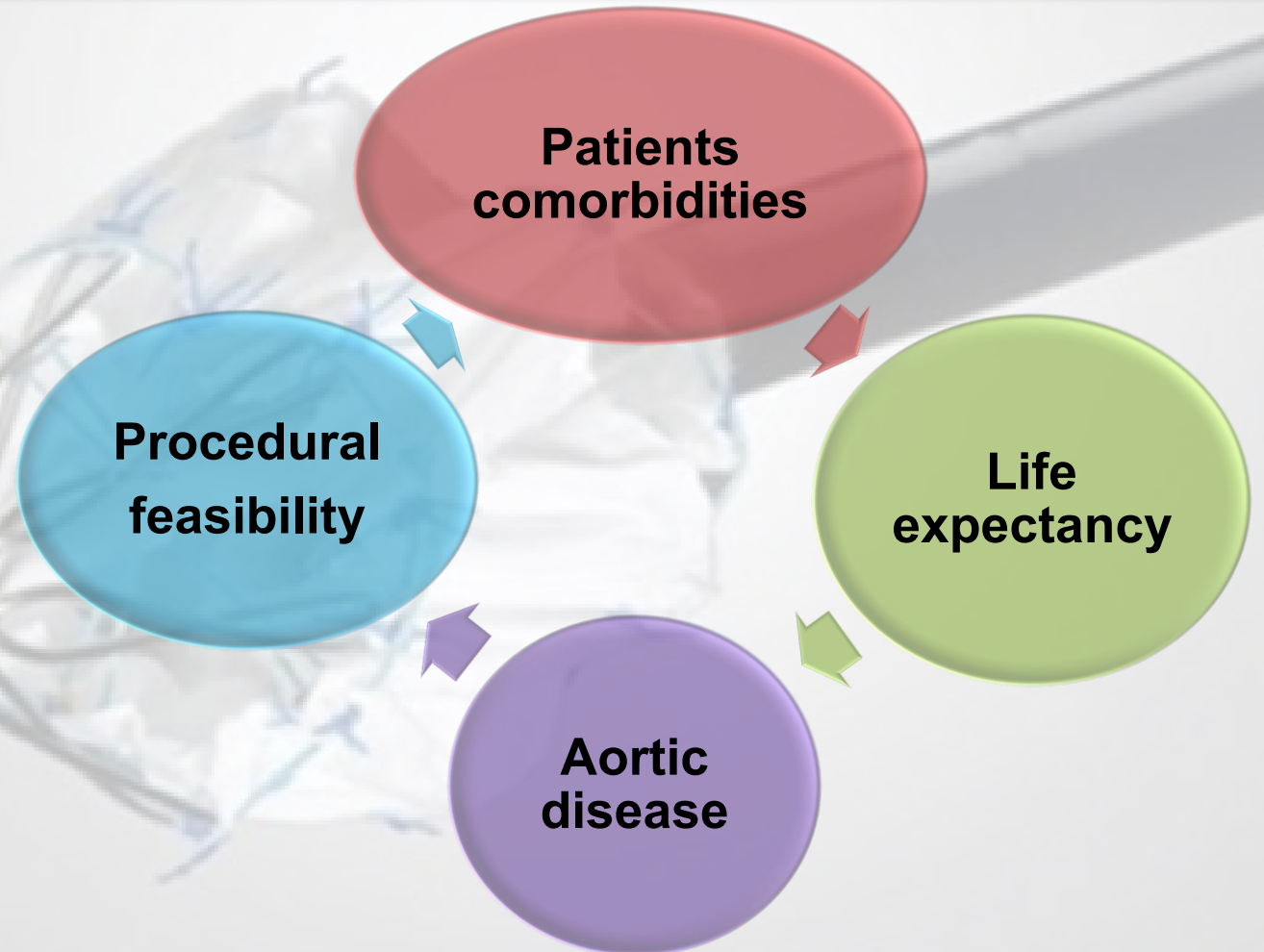
^aDepartment of Vascular Surgery, San Filippo Neri Hospital, Via Martinotti 20, 00135 Rome, Italy

^bThoracic Aortic Research Center, Policlinico San Donato IRCCS, Milan, Italy



CHALLENGES FOR ASCENDING TEVAR

**Risks and Benefits
should be evaluated
in the single patient**



CHALLENGES FOR ASCENDING TEVAR: PATIENT RELATED

SURGERY



- Age
- Comorbidities
- Frailty
- Previous open surgery
- Experience of the Center

Alternative treatment options



CHALLENGES FOR ASCENDING TEVAR: PROCEDURE RELATED

1.

Patient related

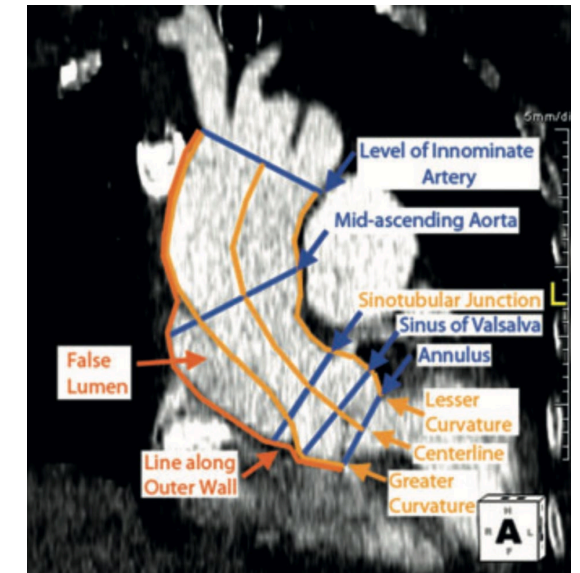
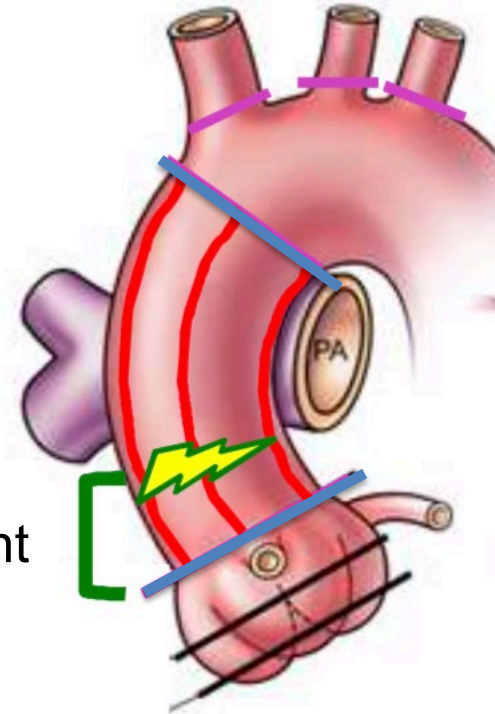
Anatomy, Morphology, Pathology

1I.

Procedure related

Stentgraft

- Highly conformable, Elastic
- Strong fixation in hostile environment
 - Radial force
 - Active fixation
- Flush edge vs root component
- Curved shape
- Branch for distal and proximal seal



Roselli EE ICVTS 2017

ASCENDING AORTA STENT GRAFTING

CLEVELAND EXPERIENCE

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

PHILADELPHIA EXPERIENCE

Endovascular repair of the ascending aorta in patients at high risk for open repair

Prashanth Vallabhajosyula, MD, MS, Jean-Paul Gottret, MD, Joseph E. Bavaria, MD, Nimesh D. Desai, MD, PhD, and Wilson Y. Szeto, MD

2006 – 2014

<5% of the overall surgical population

2007 – 2013

N= 22 patients

- acute Type A dissection (n=9)
- intramural hematoma (n=2)
- pseudoaneurysm (n=9)
- chronic dissection (n=2)
- aorta-cardiac fistula (n=2)

N= 6 patients (16-90 years)

- acute Type A dissection (n=2)
- pseudoaneurysm (n=4)

Endovascular Repair of Type A Aortic Dissection: Current Experience and Technical Considerations



Joshua D. Horton, BS,^{*} Tilo Kölbel, MD, PhD,[†] Stephan Haulon, MD, PhD,[‡] Ali Khoynzhad, MD, PhD,[§] Richard M. Green, MD,^{||} Michael A. Borger, MD, PhD,^{||} and Firas F. Mussa, MD, MS^{||}

Dissection of the ascending aorta, type A aortic dissection (TAAD), represents a surgical emergency with high morbidity and mortality. Current open surgical techniques, although state-of-the-art procedures and having improved outcomes for patients with TAAD over the last decades, confer significant risk of complications and death. Recently, endovascular techniques for repair of both the abdominal and thoracic aorta have gained acceptance within the vascular and cardiovascular surgical communities as a useful tool in select pathologies and patient populations. As development of endovascular technology proceeds ever closer to the aortic valve, thoracic endovascular repair for TAAD deserves special investigation. A comprehensive literature search for studies reporting outcomes of endovascular repair in the ascending aorta was performed. In this review, we compile the worldwide experience of thoracic endovascular repair for TAAD as well as imaging studies for patient selection and the use of hybrid (open plus endovascular) techniques. The authors discuss the remaining challenges that preclude its broader adoption in this role, namely patient selection and device specificity.

Semin Thoracic Surg 28:312–317 © 2016 Elsevier Inc. All rights reserved.

Keywords: type A aortic dissection, TEVAR, endovascular, ascending aorta

INTRODUCTION

Type A aortic dissection (TAAD) remains a challenging surgical emergency. Given the complexity of the regional anatomy, operative steps are technically difficult and complication prone. Although some experienced centers report improvement in early outcomes (as low as <10%^{1–3}), the early mortality from centers of varying experience remains near 20% in the IRAD database, whereas in medically managed patients the early death rate is around 50%-60%.³ In 2000, the first successful endovascular

repair of an ascending aortic dissection was reported.⁴ Since then, widespread effort to develop technology capable of overcoming the anatomical and physiological barriers to this type of intervention has been underway. As endovascular technology migrates closer to the aortic valve, management of TAAD with thoracic endovascular aortic repair (TEVAR) should receive special scrutiny. The aim of this review is to summarize the worldwide experience to date and to discuss technical aspects relevant to adoption of endovascular repair of TAAD.



Clotting of the false lumen on aortic centerline imaging one year after TEVAR for TAAD.

Central Message

Endovascular repair of type A aortic dissection is slowly gaining acceptance as the sole or adjunctive approach to a fatal condition.

Perspective Statement

Management of ascending aortic pathology represents the last frontier for endovascular therapy. As patient selection and device design continue to evolve, the adoption and refinement of such technology by cardiovascular surgeons is becoming critical.

See Editorial Commentary pages 318-319.

Endovascular Repair of Type A Dissection: Just Because We Can, Does That Mean We Should?



Leonard N. Girardi, MD

In this issue of *Seminars in Thoracic and Cardiovascular Surgery*, Horton et al,¹ present a review of the current literature available on endovascular repair of type A aortic dissection. After an exhaustive search they identified 116 patients who best represented the experience of a talented and highly selected group of endovascular surgeons. They collated the outcomes for this very high-risk procedure and attempted to identify patient and technical factors that contribute to success (or failure). They also outline some of the early and late complications seen following these procedures and attempt a comparison of expected outcomes for open repair in similar situations.

Just the numbers. For clarity, both chronic and acute type A dissections were included in this report. Acute type A dissections comprised 63% of the 116 cases examined, however, none of the data was stratified according to dissection acuity. Those performing these procedures have clearly demonstrated the feasibility of introducing a stent graft into the ascending aorta. Successful deployment occurred in 94.7% of cases through a combination of transfemoral, transapical, and transaxillary access. Overall, 30-day mortality was a very impressive 6.7% but the more appropriate parameter “operative mortality” that includes in-hospital death was not reported. Permanent neurologic deficits occurred in 7.8% of patients. The incidence of transient neurologic dysfunction and spinal cord injury was also not reported. Surprisingly, despite this patient population being mostly ultra high risk or inoperable, there was no need for hemodialysis after ascending aortic thoracic endovascular aortic repair (TEVAR). The need for reintervention ranged from 0%-66.7% and the mean follow-up time in the 9 studies examined varied widely from 8.9-37 months.

tortuosity of this region of the aorta and the length differential between the greater and lesser curvature make choosing an appropriate stent graft quite challenging. Although a few of the cases were performed with a standard 10 cm thoracic stent graft, the rather stout morphology of this area mandated that most of the patients were treated with multiple, short cuff extensions borrowed from both TEVAR and EVAR systems. The mean distance between the entry tear and the top of the coronary ostia and the extreme hemodynamics near the root contribute heavily to the need for precise deployment, a challenging task through a transfemoral approach. Although, the experience with TAVR has shown that a transapical approach carries certain risks not usually seen with less invasive access, the shortest distance to the landing zones is clearly through this approach. Picking an appropriate stent diameter is yet another major issue as the diameter of the landing zones can fluctuate up to 8% during systole and diastole.² Finally, the significant aortic insufficiency often seen with type A dissection may lead to left ventricular distention during deployment when



Leonard N. Girardi, MD

Central Message

Patients at very high-risk for open repair of type A dissection may be candidates for endovascular repair.

See related article on pages 312-317.

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VASCULAR SECTION

ORIGINAL ARTICLES

J CARDIOVASC SURG 2014;55:359-65

*Long-term outcome
after acute type A aortic dissection:
does an age limit still exist?*

L. DI MARCO, D. PACINI, A. LEONE, F. D. PETRIDIS, L. BISSONI, R. DI BARTOLOMEO, G. MARINELLI

**At 92 years old he underwent Bentall
procedure for acute aortic syndrome**

Now is 93 years and doing fine!!



G. Napolitano
Italian President since 2015

In **1954 DeBakey** himself wrote that:
“**treatment of aortic dissections** has
been almost entirely symptomatic and
unsatisfactory, and the few previous
efforts to attack the problem
surgically have all **proved
unsuccessful**”

EDITORIAL COMMENTARY

Anatomic feasibility of stenting type A aortic dissection: Paving the way for the future

Davide Pacini, MD, PhD, Giacomo Murana, MD, and Luca Di Marco, MD, PhD

From the Cardiac Surgery Unit, Cardio-Thoraco-Vascular Department, S. Orsola Hospital, University of Bologna, Bologna, Italy.

Disclosures: Authors have nothing to disclose with regard to commercial support.

Received for publication June 4, 2018; revisions received June 4, 2018; accepted for publication June 5, 2018.

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J Thorac Cardiovasc Surg 2018; ■: 1-2

0022-5223/36.00

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<https://doi.org/10.1016/j.jtcvs.2018.06.007>



Potential endovascular devices to consider for treating acute type A aortic dissection.

Central Message

The new endovascular treatments are progressively involving the ascending aorta.

See Article page XXX.

The first successful surgical repair of a type A aortic dissection was reported by DeBakey and colleagues¹ in 1954. Previously only palliative surgical solutions had been described. DeBakey himself wrote that “treatment has been almost entirely symptomatic and unsatisfactory, and the few previous efforts to attack the problem surgically have all proved unsuccessful.”¹

Just few years later, DeBakey and colleagues² reported a series of 72 patients with dissecting aneurysm of the aorta treated with aortic resection that resulted in a respectable 26% operative mortality. The key was to tailor the surgical procedure depending on the location and extent of the lesion, according to the anatomic variability of the thoracic and thoracoabdominal aorta. Afterwards, such a remarkable approach was translated in 2 simple classifications—familiar to all of us—that paved the way for the modern surgical approach.^{2,3}

In the current endovascular era, the possibility to treat acute type A aortic dissection with stent grafts repeats the previous historical scenario in which preoperative anatomic considerations became mainstream for the success of the procedure.

of all patients, the study revealed an entry tear in a coverable zone of the ascending aorta with sufficient proximal and distal LZ. Of course, the new valve-carrying conduit had to face the great variability of aortic dissection represented by the distorted anatomy of the thoracic aorta, the characteristics of the entry tears, the presence of coronary arteries, and the extreme fragility of the aortic wall.

Indeed, the authors were conscious of these limitations. Therefore, according to the location of the primary entry tear and condition of the patient, they propose it as a temporary treatment solution (eg, in case of malperfusion and entry in the aortic arch or the descending aorta) or a (semi-)

Pacini et al. JTCVS 2018

Ascending aorta stent grafting: initial experience in Bologna

Case Report on Cardiac Surgery

Page 1 of 6

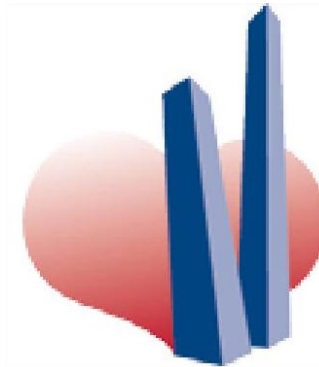
Endovascular repair of ascending aorta pseudoaneurysm

Luca Di Marco¹, Luigi Lovato², Giacomo Murana¹, Ciro Amodio¹, Francesco Buia², Roberto Di Bartolomeo¹, Davide Pacini¹

¹Cardiac Surgery Unit, ²Radiology Unit, Cardio-Thoracic-Vascular Department, S. Orsola Hospital, University of Bologna, Bologna, Italy

Correspondence to: Luca Di Marco, MD, PhD. Sant'Orsola Hospital, Bologna University, via Massarenti 9, 40138 Bologna, Italy.

Email: ludima08@libero.it.



Patient's Medical History:

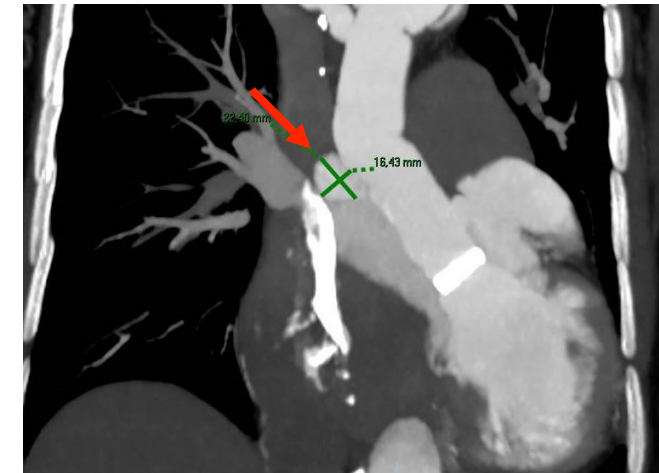
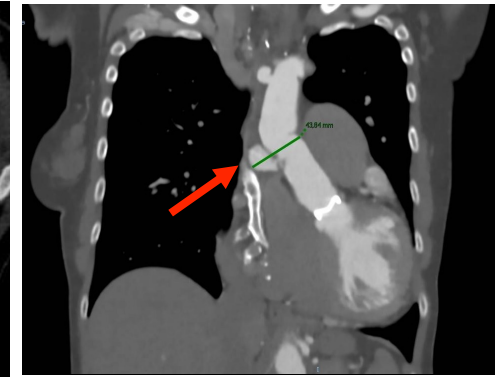
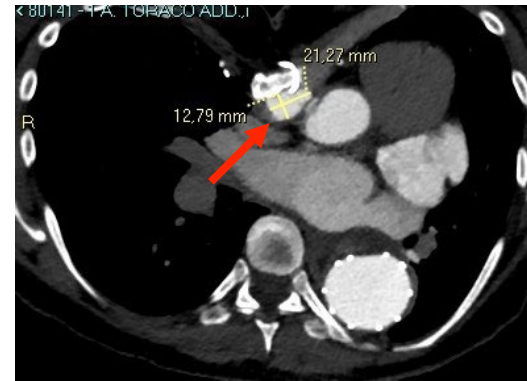
- 48-year-old female patient with Marfan syndrome
- 1999 type A Aortic Dissection treated with Bentall procedure (ATS 23mm aortic prosthesis)
- 2007 Aortic Arch replacement with Frozen Elephant Trunk technique using the E-vita open prosthesis for residual AD (our first case)
- From 2007 yearly CT-scan FU



Indications for endovascular treatment

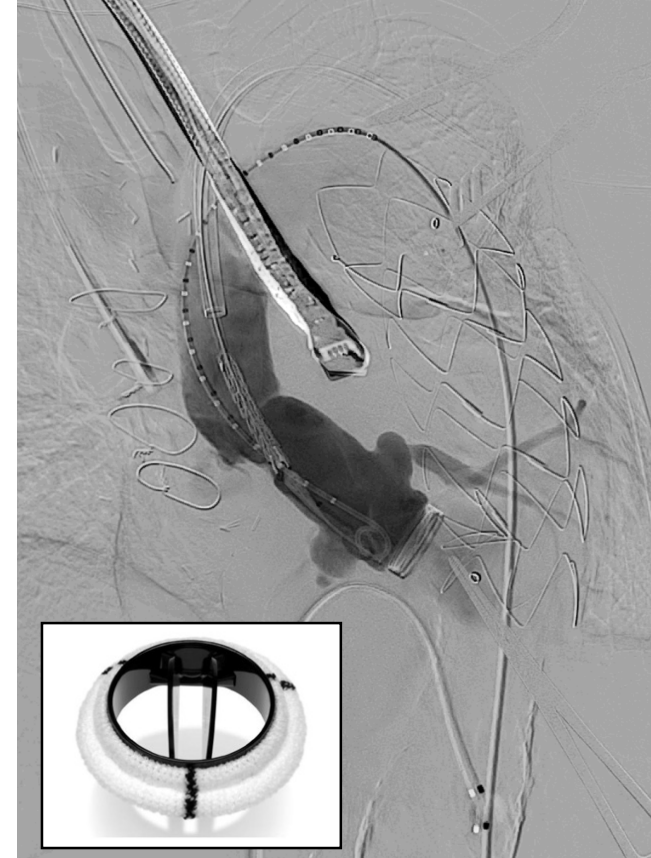
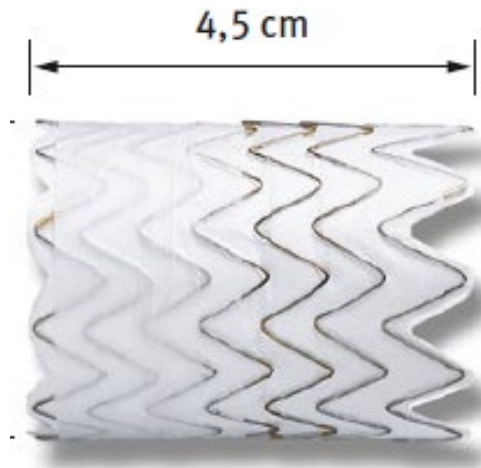
Ascending Aortic Pseudo-Aneurysm at the surgical anastomosis site between composite valve graft and E-Vita prosthesis

- ✓ **3 mm dimensional increase in 1 year**
- ✓ **To avoid the 3rd surgical procedure**
- ✓ **Pectus Excavatum and close Sternal contact of the Pseudo-Aneurysm**



Procedural issue

- **Materials:** Two Proximal 4.5 cm -Abdominal Cuffs (GORE PLA360400) released under rapid ventricular pacing (HR: 120 bpm; ABP: 40 mmHg)
 - **Surgical Access:** Left subclavian artery

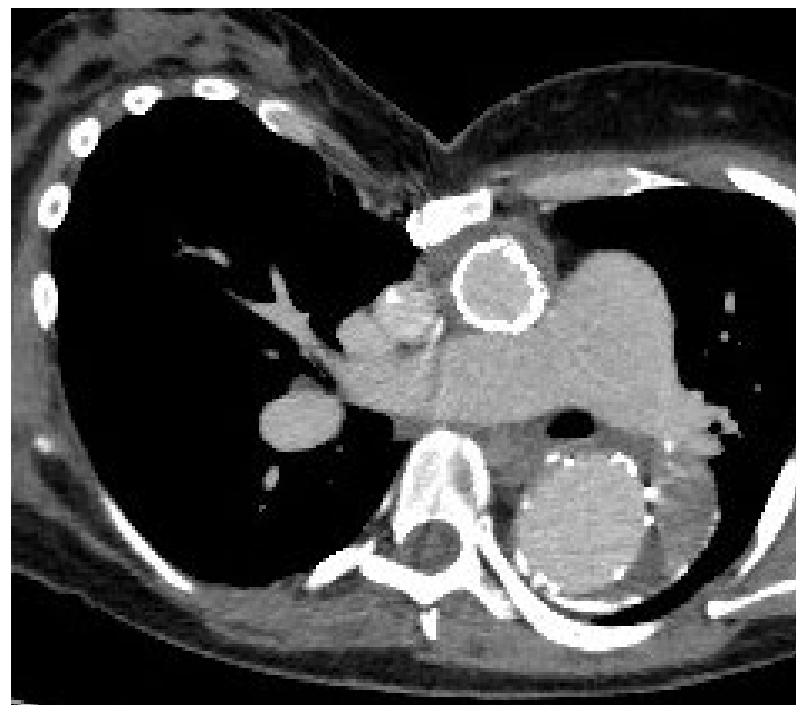
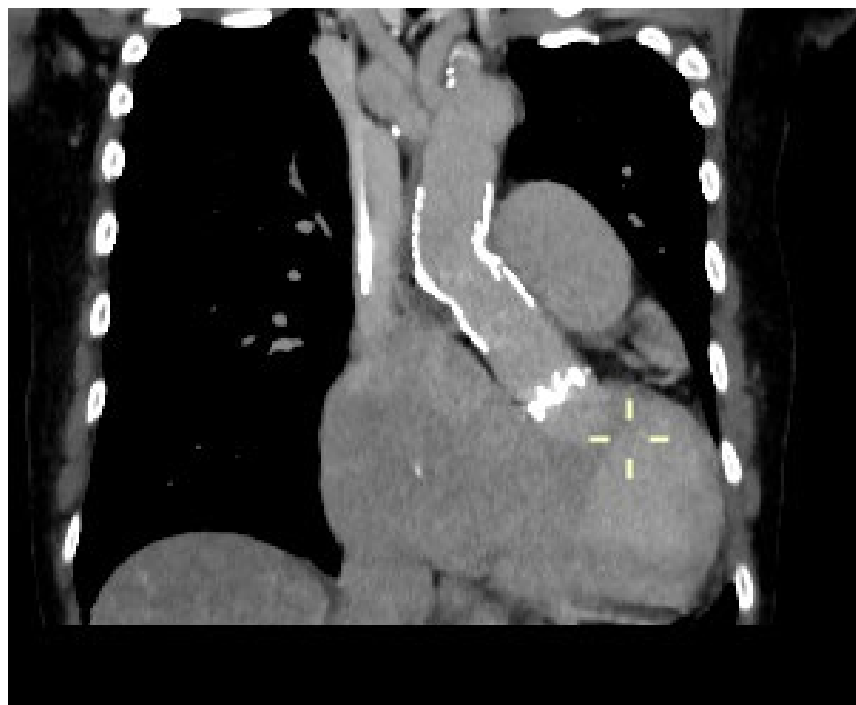


Ascending aorta stent grafting: initial experience in Bologna



Ascending aorta stent grafting: initial experience in Bologna

Angio-CT at discharge

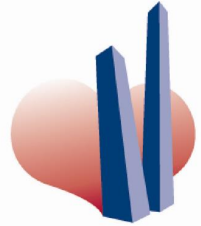


FINAL CONSIDERATIONS

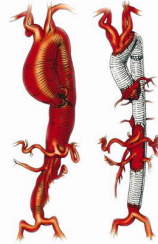
- I. Open surgery remains the gold standard treatment for ascending aorta disease even in high-risk patients**
- II. Lesions of the ascending thoracic aorta in patients with a history of open surgical aortic repair, multiple comorbidities, or advanced age, represent extremely challenging cases associated with high mortality and morbidity**
- III. The growth of endovascular skills and devices for the ascending aorta is relatively slow due to the limited use of this technology in patients without a reasonable surgical option**

THANK YOU

TENTH POSTGRADUATE
COURSE



Surgery of The Thoracic Aorta



11th - 12th NOVEMBER
2019

BOLOGNA - ITALY

Course Director
Roberto Di Bartolomeo

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X COURSE

11-12 November 2019
Bologna, Italy

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...SAVE THE DATE!