



Unravelling the Literature on Aortic Dissection

Disclosures

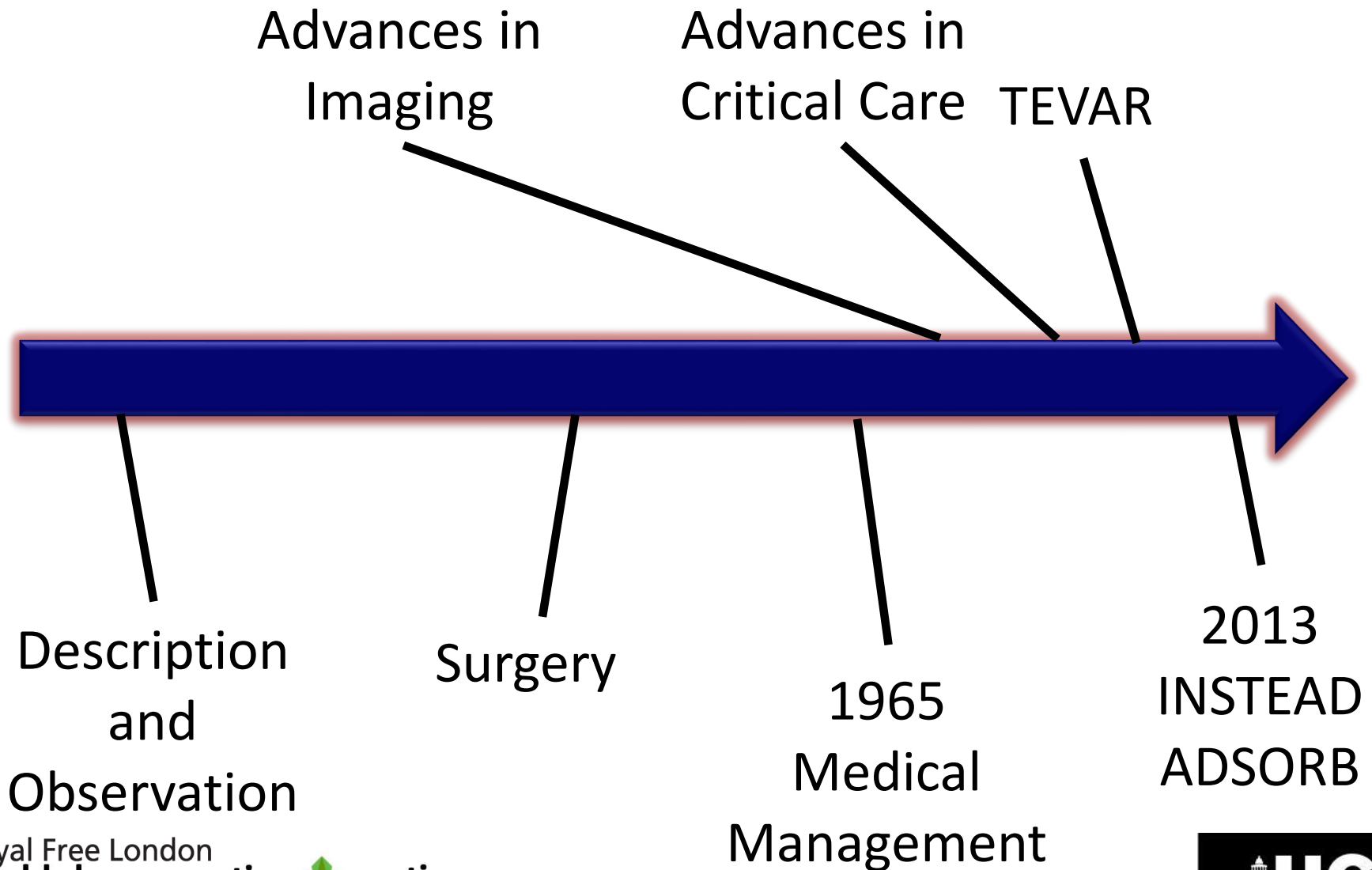
- Cook Medical Inc -- Proctorship and Consultation

*All speaking and consultation fees are donated to
the Royal Free Trust Aortic Charity (Fund 187)
www.royalfreecharity.org*

**A patient should never be considered
cured of this disease.**

-- E. Stanley Crawford

Progression of our Understanding

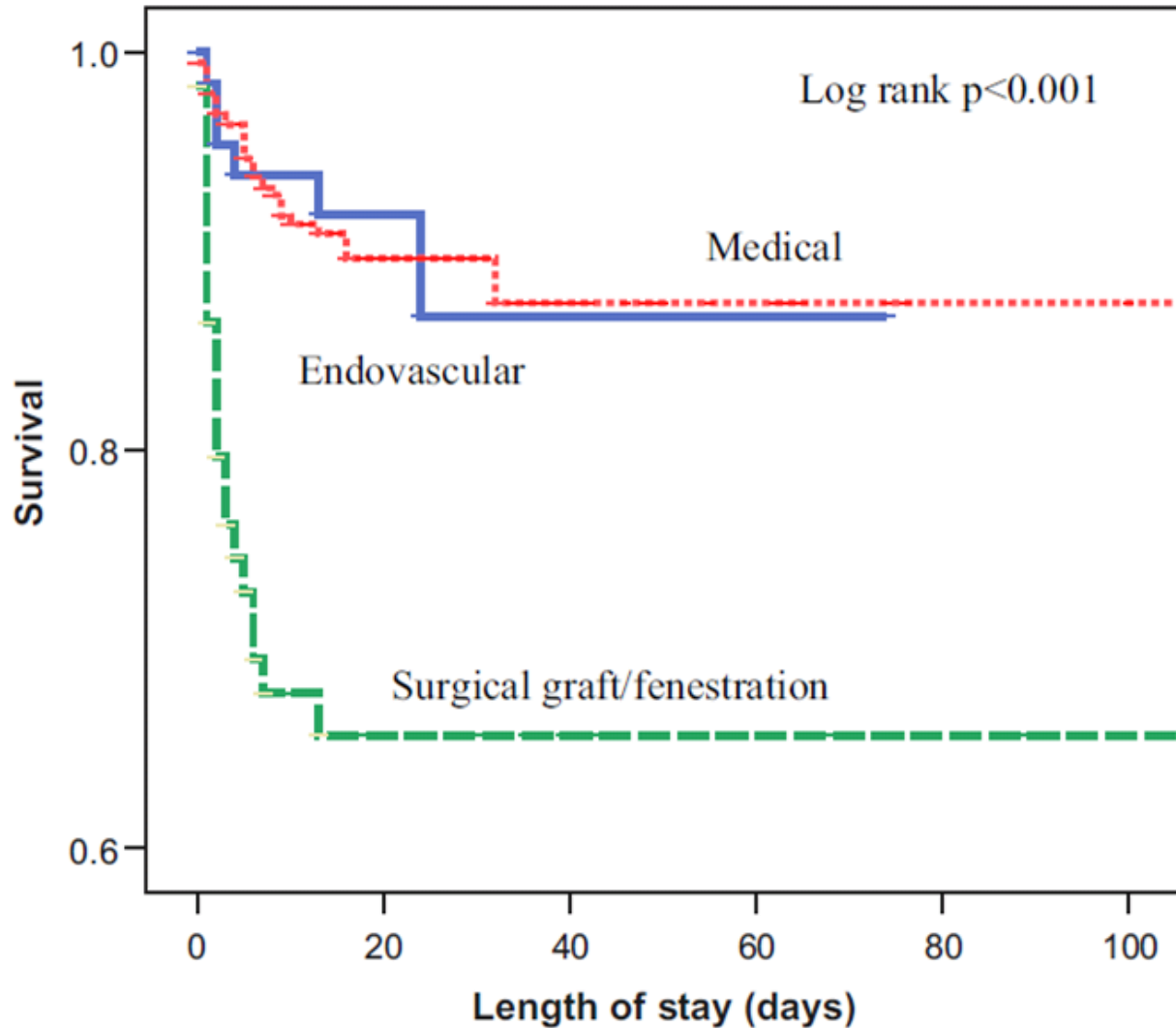




Modern Dissection

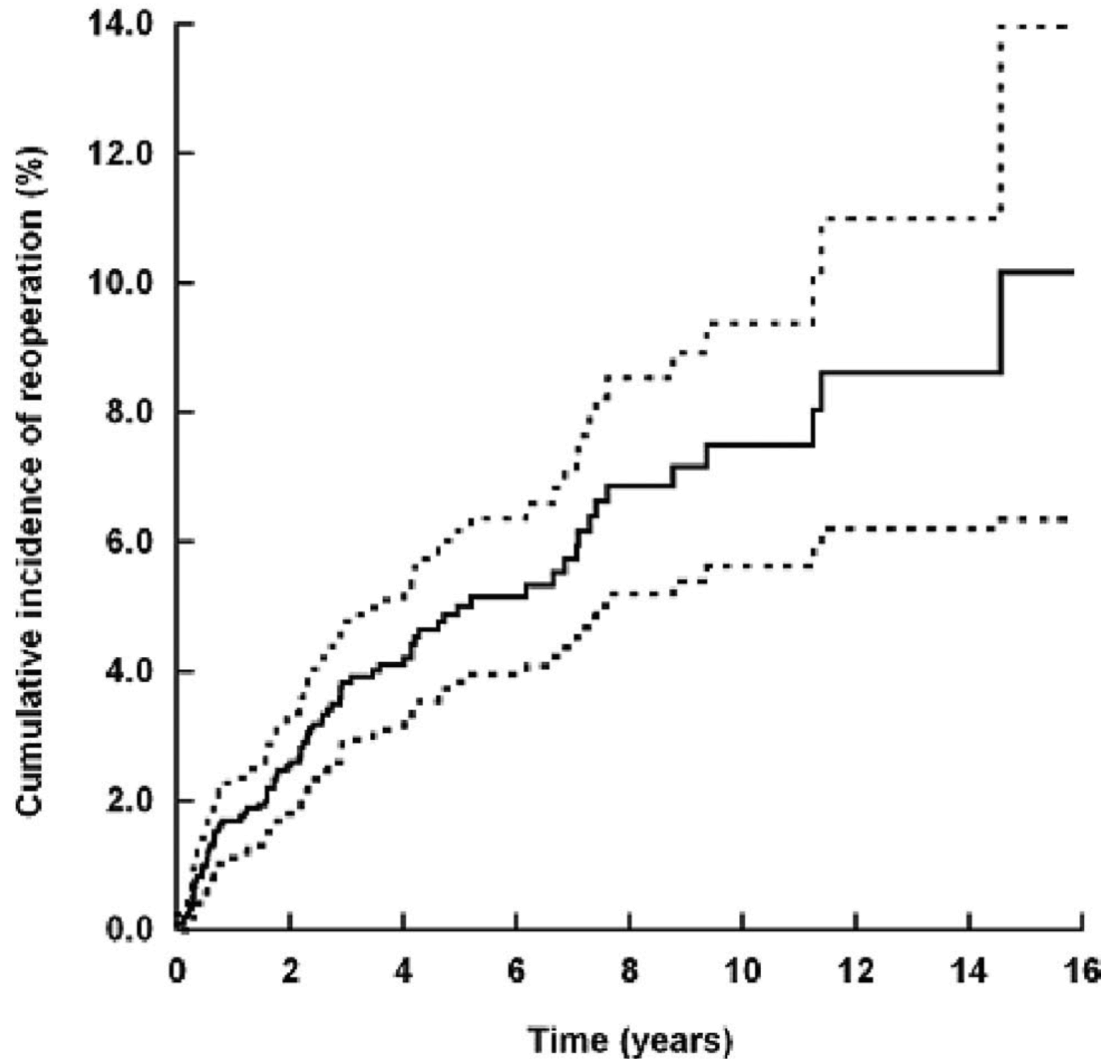
Success Depends on
How We define
Goals

Survival as a Goal of Treatment



Swedish National Health Care Data

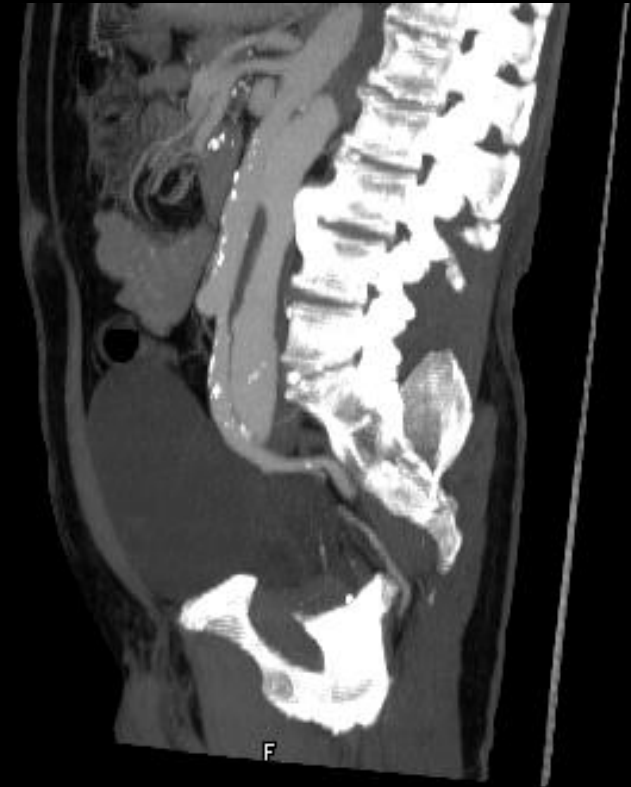
- Incidence of reoperation at 10 years was 7.8%



Suddenly... False Lumen Flow Is Important



P



Is False Lumen Flow Important?

Antegrade Thoracic Stent Grafting During Repair of Acute DeBakey I Dissection Prevents Development of Thoracoabdominal Aortic Aneurysms

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Background. Acute DeBakey I dissection repair consists of ascending aortic resection, aortic root repair or replacement, and variable aortic arch replacement. This “proximal” strategy leaves most patients with a patent residual “type B” dissection which leads to greater than 30% distal “open” reoperations for dissecting aneurysm. This report tests whether antegrade stent-grafting of the proximal descending thoracic aorta during acute DeBakey I dissection decreases future distal aortic aneurysms without an increase in surgical risk.

Methods. Between June 2005 and June 2008, 150 patients were treated surgically for acute type A aortic dissection at the Hospital of the University of Pennsylvania. Of these, 78 were DeBakey I dissections: 42 patients underwent standard open repair, while 36 underwent

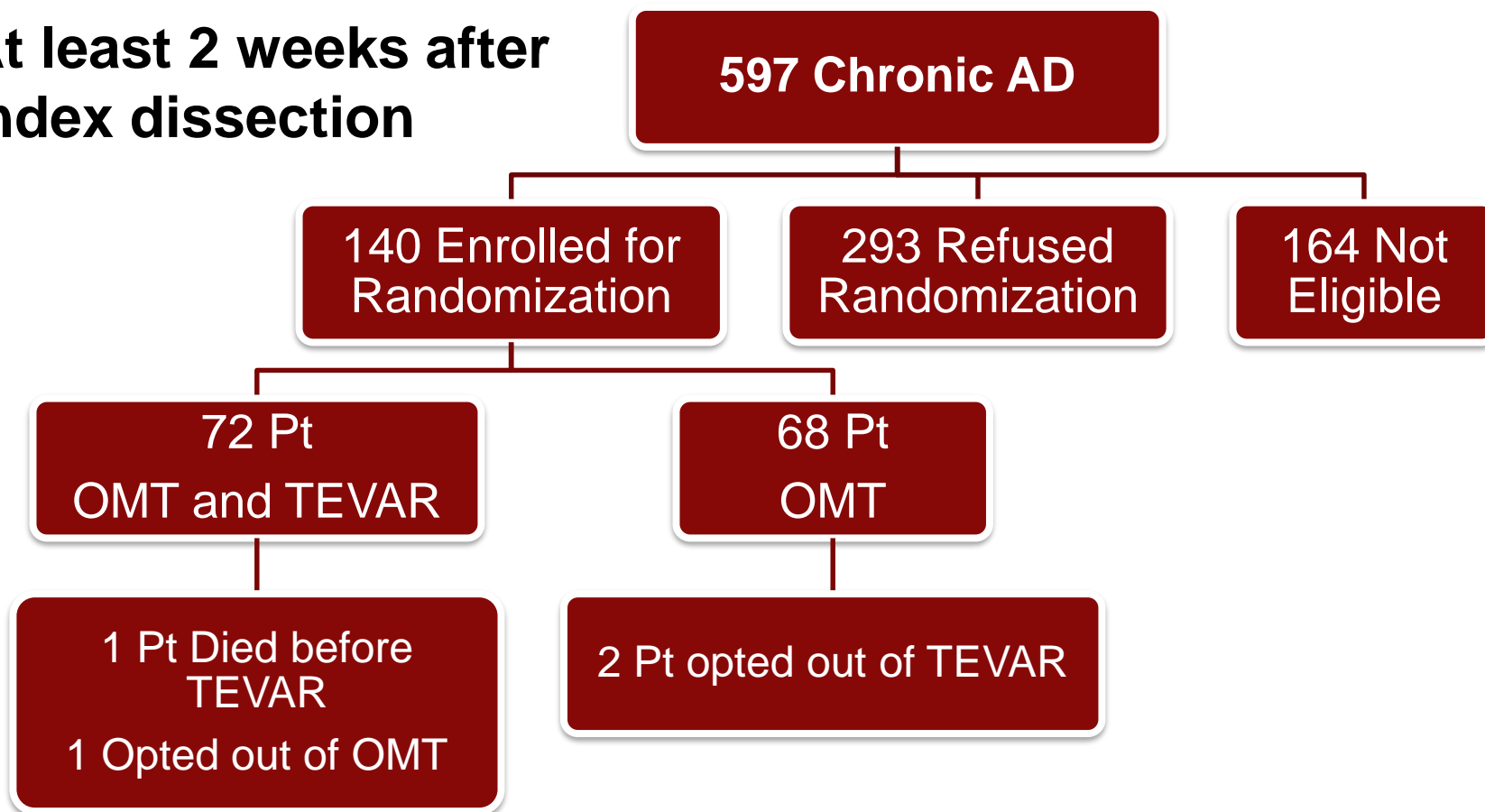
stent-grafting of the proximal descending thoracic aorta during repair. Operative time was significantly longer in the stented group; 60 ± 13 minutes versus 41 ± 18 minutes ($p < 0.0001$). Transient paraparesis was 3 of 36 (9%) in the stented versus 1 of 42 (2%) in the nonstented group ($p = \text{NS}$) with no permanent deficits. Stented thoracic false lumen obliteration was achieved in 24 of 30 (80%) with 5 of these (17%) achieving complete thoracoabdominal false lumen thrombosis. Eight of 31 (26%) stented patients underwent endovascular reintervention to achieve the desired false lumen obliteration. Open thoracoabdominal aortic aneurysm repairs were performed in 0 of 31 in the stented group and 4 of 36 (11%) in the standard group ($p = 0.083$).

Conclusions. Antegrade stent graft deployment during acute DeBakey I dissection repair is a safe method to obliterate the thoracic false lumen. Endovascular reinterventions were well-tolerated. “Elephant trunk” technique

INSTEAD Trial

Nienaber et al., Circulation 2009; 120: 2519-2528

At least 2 weeks after
index dissection



Progression of Disease: False Lumen Thrombosis

Table 5. Aortic Morphology at 5 Years

	OMT	OMT+TEVAR	<i>P</i> Value
FL thrombosis	11/50 (22.0%)	48/53 (90.6%)	<0.0001
Partial FL/no FL thrombosis	39/50 (78.0%)	5/53 (9.4%)	<0.0001
Remodeling of thoracic aorta*	5/50 (10.0%)	42/53 (79.2%)	<0.0001
Critical expansion of thoracic aorta†	33/50 (66.0%)	11/53 (20.8%)	<0.0001

FL indicates false lumen; OMT, optimal medical treatment; and TEVAR, thoracic endovascular aortic repair.

*Based on aortic morphology as assessed vs baseline.

†Occurring within long-term follow-up.

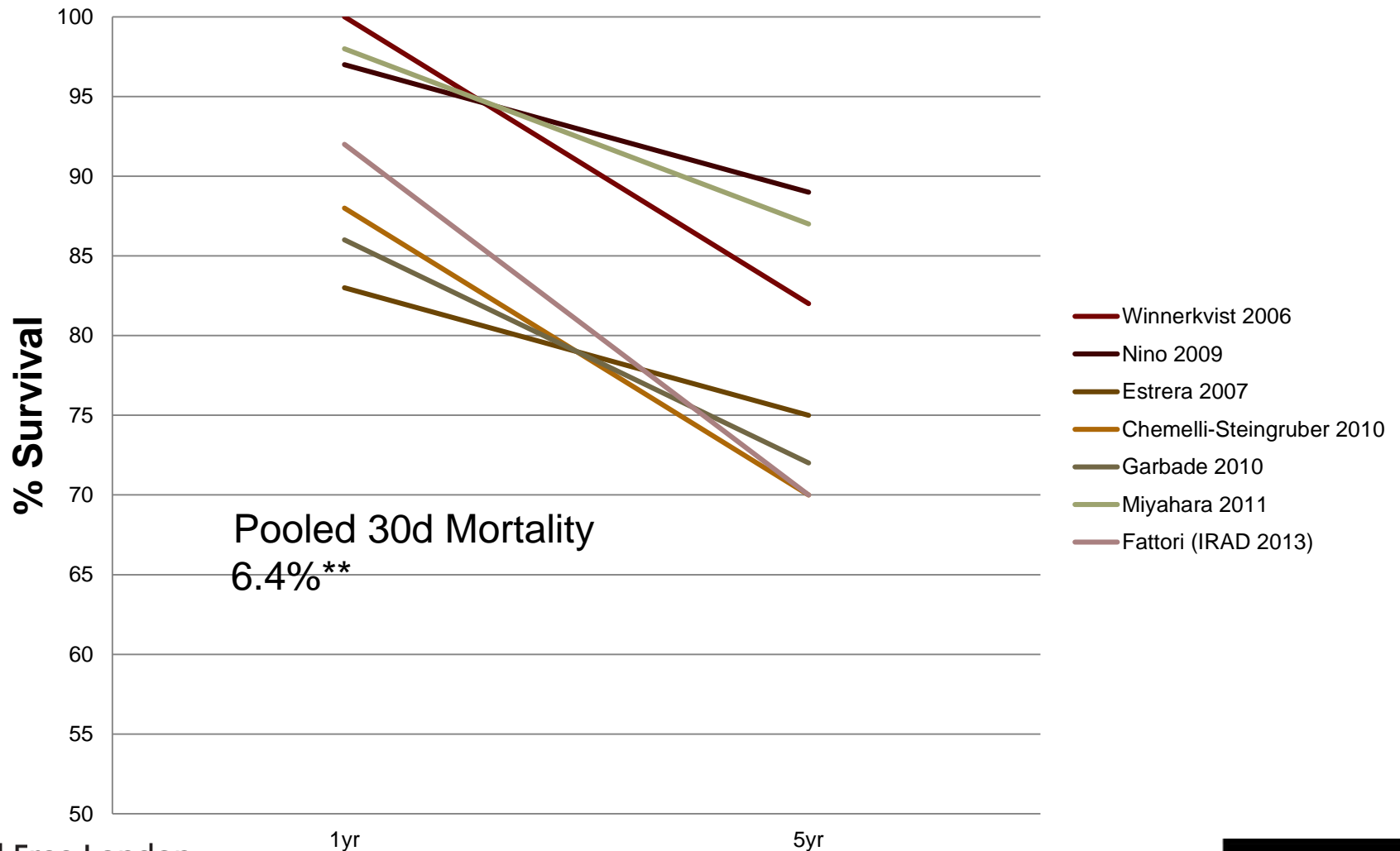
False Lumen Thrombosis in Modern Dissection Series

	Total False Lumen Thrombosis	Partial False Lumen Thrombosis	%
Wiedeman		25/110	30%
		4/28	100%
Hu		NR	95%
Camb		6/50	52%
Brunkwall (ADSORB) 2		43/61	70%
Nienaber (INSTEAD XL)	48/72	5/72	74%

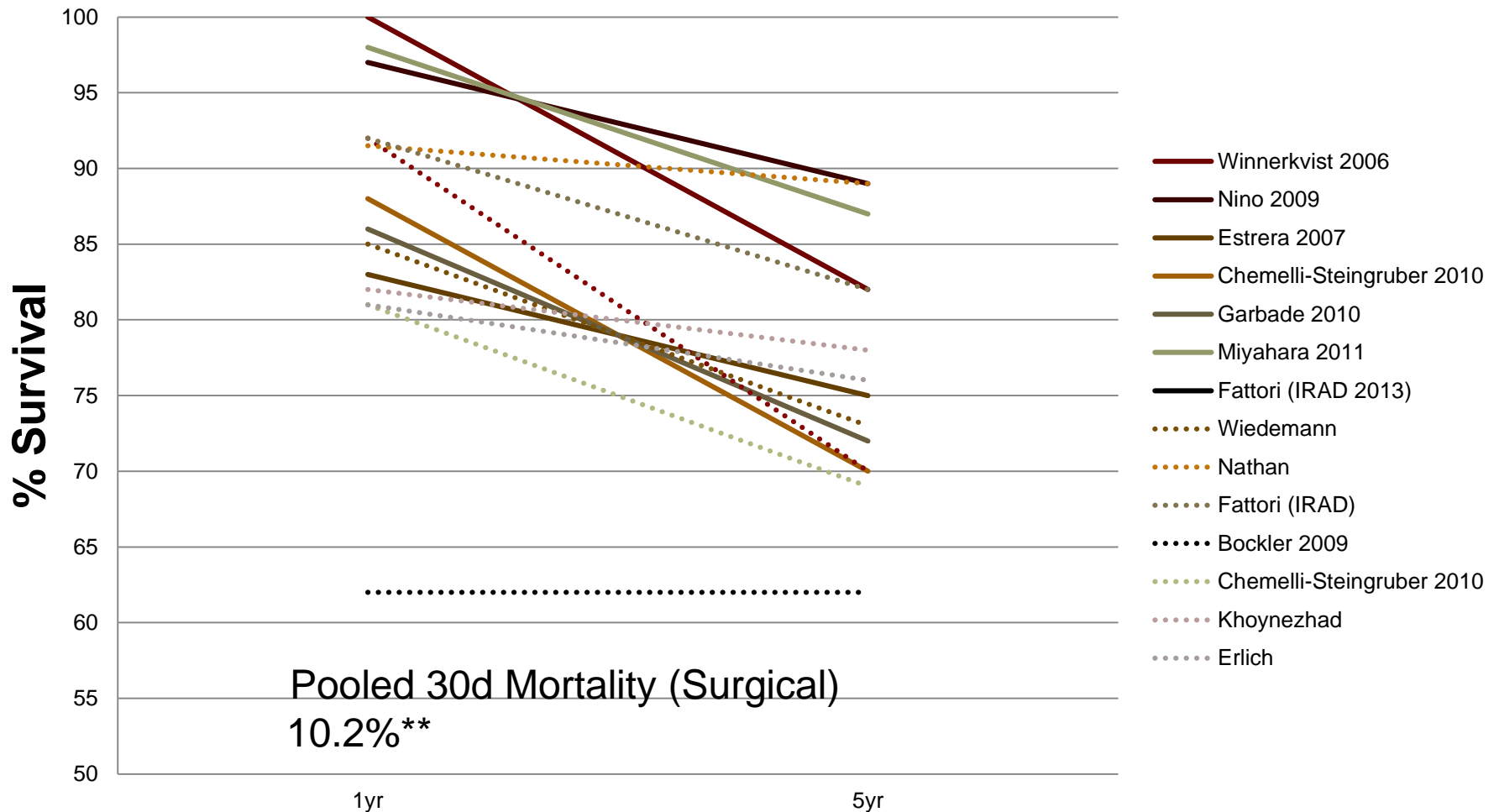
75%*
F/u 19m, 237/600pts

**Remodelling Occurs... But only reliably in
the Stented portions of the aorta**

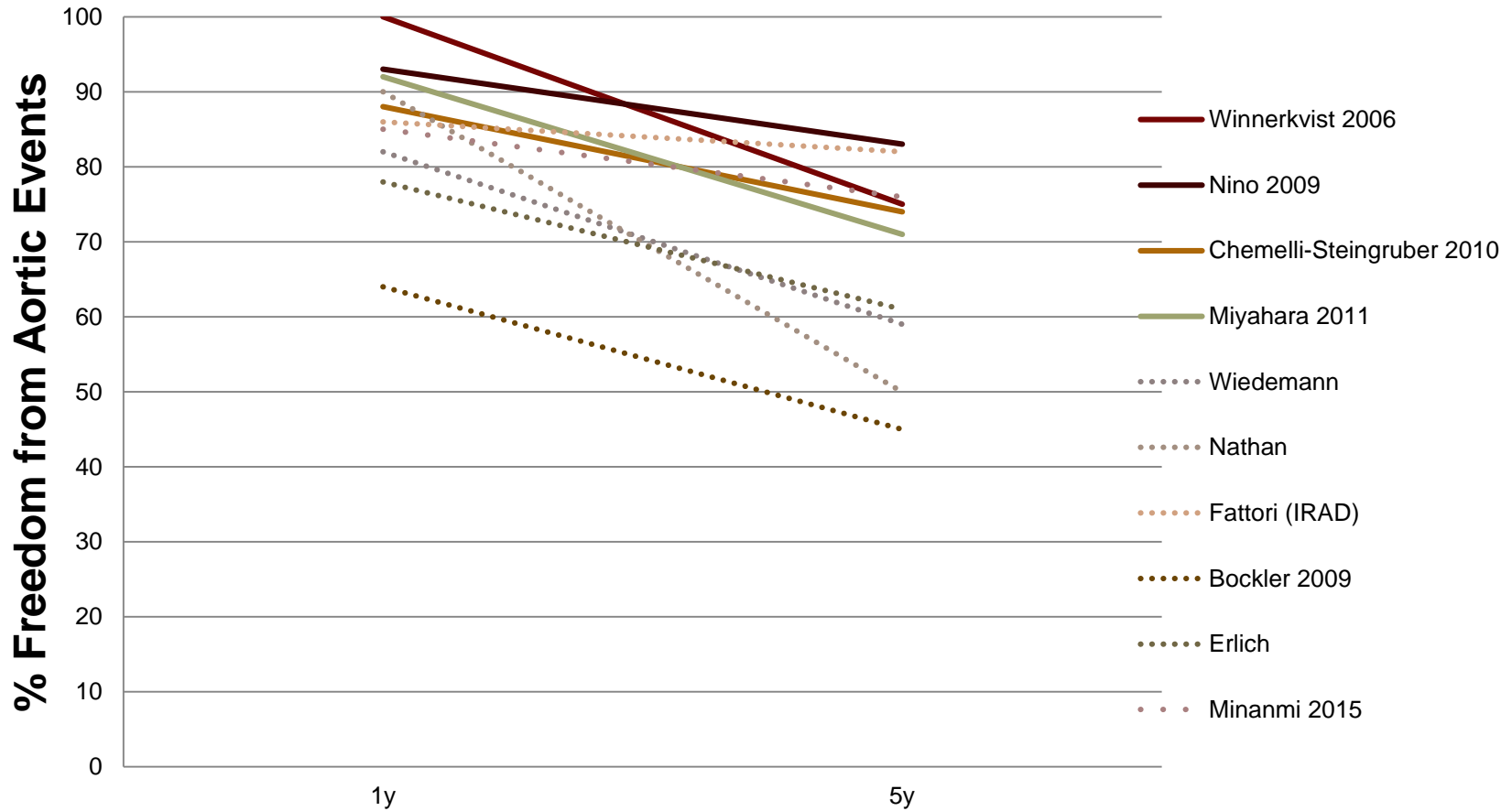
1 and 5y Survival: Medical Management



1 and 5y Survival: Medical and TEVAR



Freedom From Aortic Events: Both





Blaming Proximal Repair for Failure of Disease Regression in the Distal Aorta...



...is like Blaming your Mother if you can't cook...



Modern Dissection

Preventing Disease
Progression by

Stenting the
Whole Aorta

Embolizing the
False Lumen

Modern Dissection

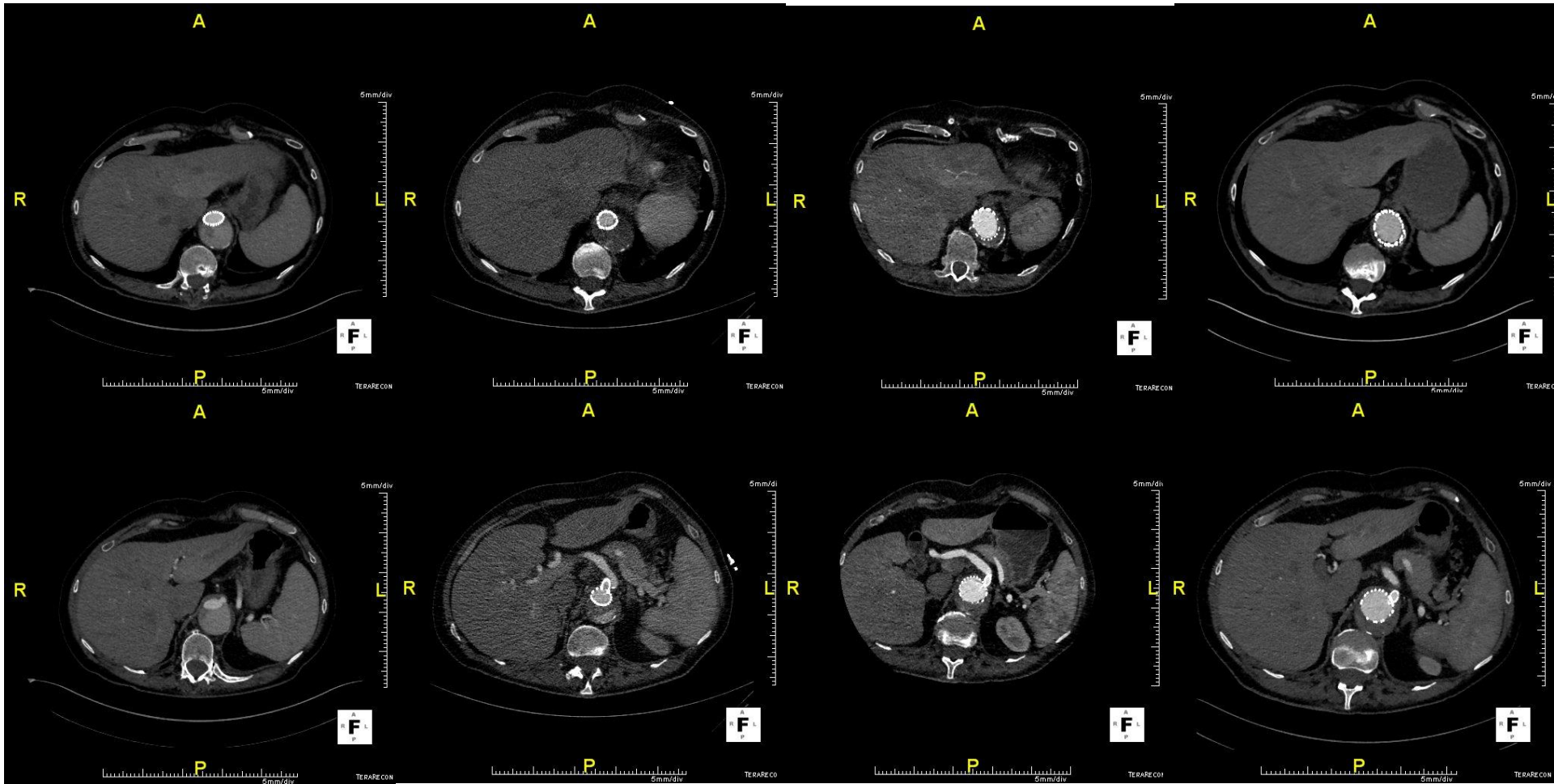
Preventing Disease
Progression by

Stenting the
Whole Aorta

Embolizing the
False Lumen



Progression of True Lumen



08/2011

02/2012

08/2012

08/2013

Using B/FEVAR in Chronic Dissection



RESEARCH ARTICLE

Contemporary Management Strategies for Chronic Type B Aortic Dissections: A Systematic Review

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Reoperation after B/FEVAR for Dissection

	Kitagawa 2013 ^a [53]	Kitagawa 2013 ^b [53]	Oikonomou 2014 [54]
B/FEVAR	15	15	31
ST Stroke	0	0	0
ST SCI	0	0	4 (12.9)
ST ARF	0	0	1 (3.2)
ST retro diss	NR	NR	NR
ST malperfusion	0	0	0
ST cardiac complications	NR	NR	1 (3.2)
ST rupture	0	0	0
FU Rupture	0	0	0
FU Malperfusion	0	0	2 (6.5)
FU Endoleak	10 (66.7)	0	12 (38.7)
FU cardiac compl	NR	NR	NR
Stent collapse/migration	NR	NR	NR
Reoperation	8 (53.3)	0	7 (22.6)
ST mortality	0	0	2 (9.7)
1-year survival	85.0	100.0	76.4
2-year survival	85.0	100.0	NR
3-year survival	85.0	75.0	NR

Reoperation in
15/61

25%

ARF = acute renal failure; B/FEVAR = branched and fenestrated thoracic endovascular aortic repair;

FU = follow-up; MI = myocardial infarction; SCI = spinal cord ischemia; ST = short term

^a Extensive dissection cohort (Type I/III)

^b Focal dissection cohort (without visceral involvement)

doi:10.1371/journal.pone.0154930.t003



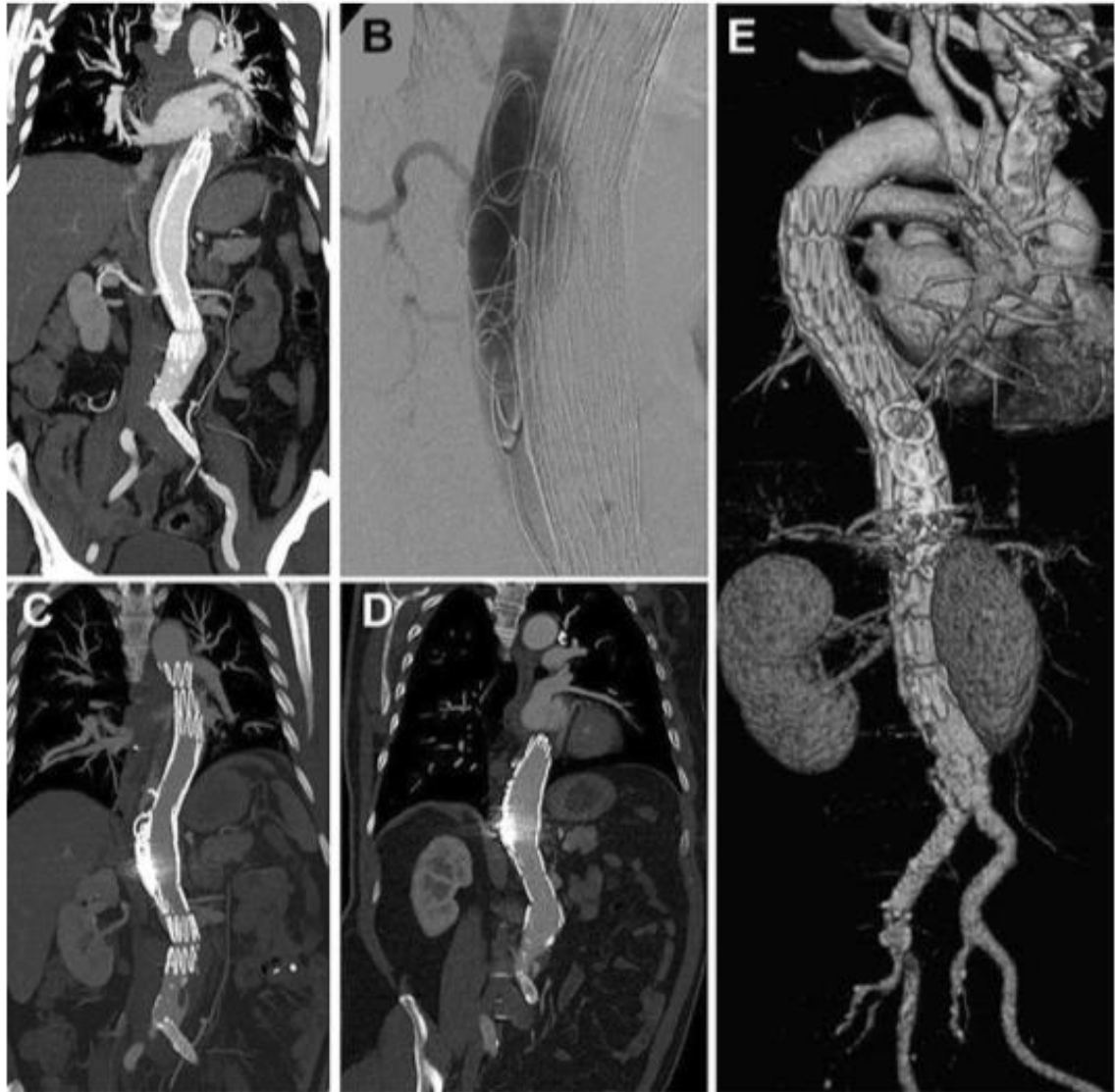
Modern Dissection

Preventing Disease
Progression by

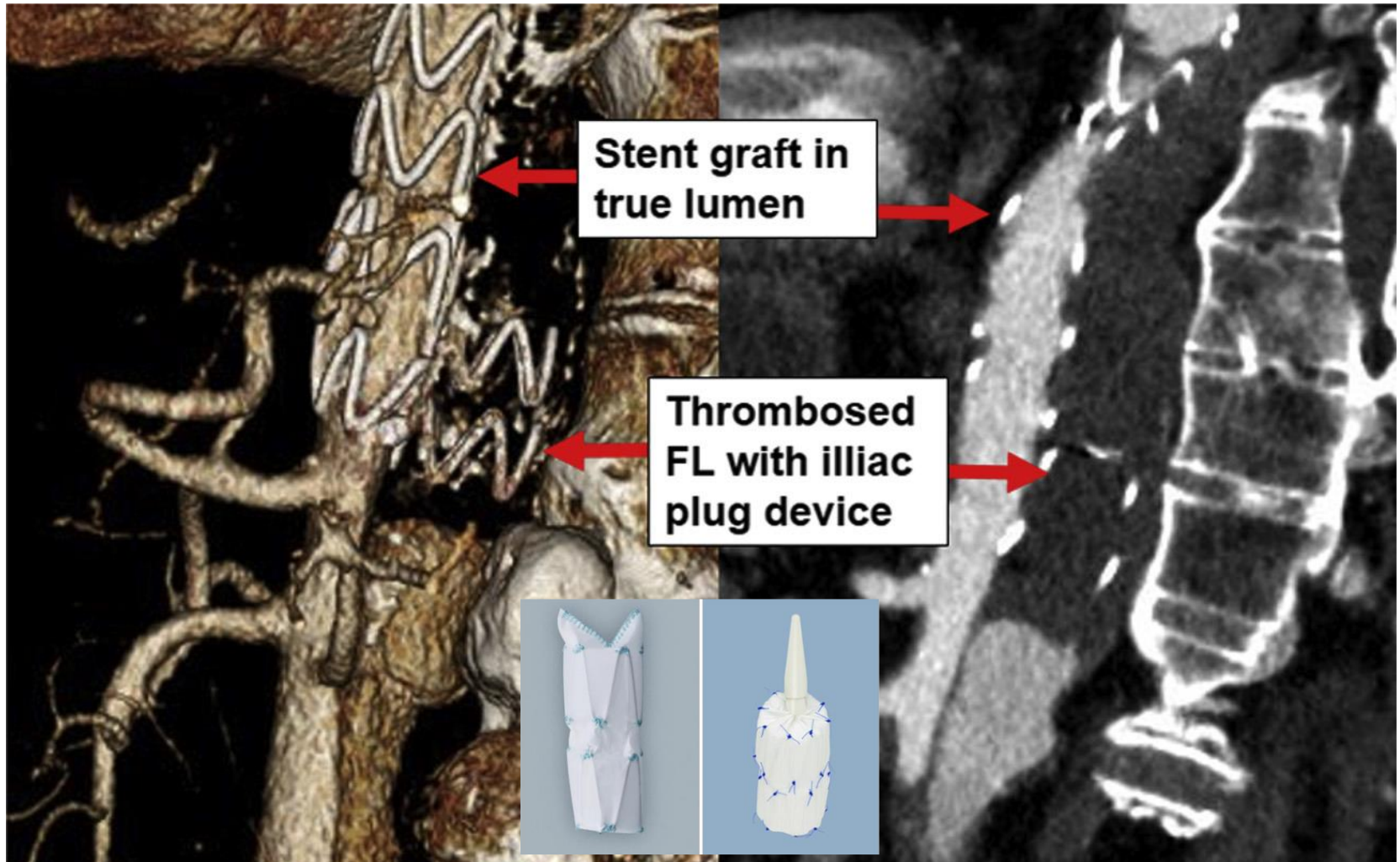
Stenting the
Whole Aorta

Embolizing the
False Lumen

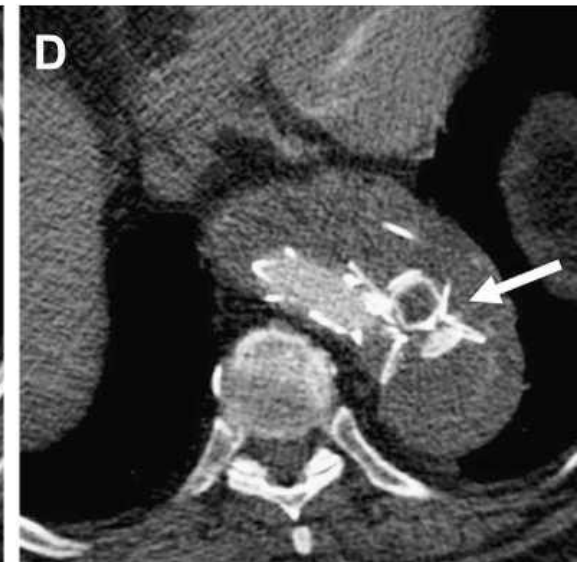
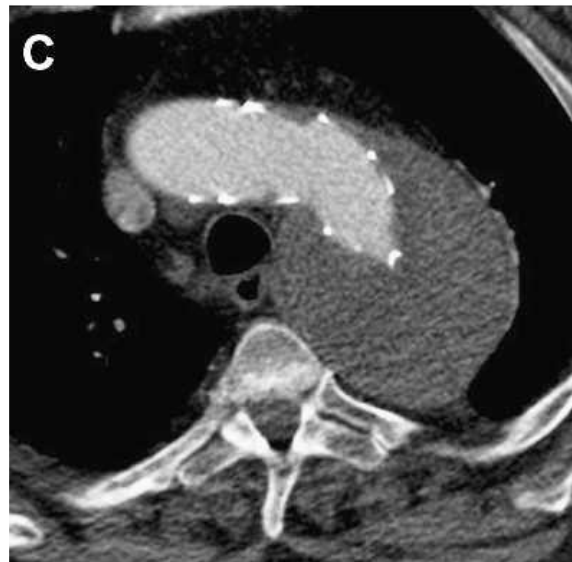
Coil Embolization



Placement of Plugs/Occluders



Custom Occlusion Device



Collected Experience: Embolization

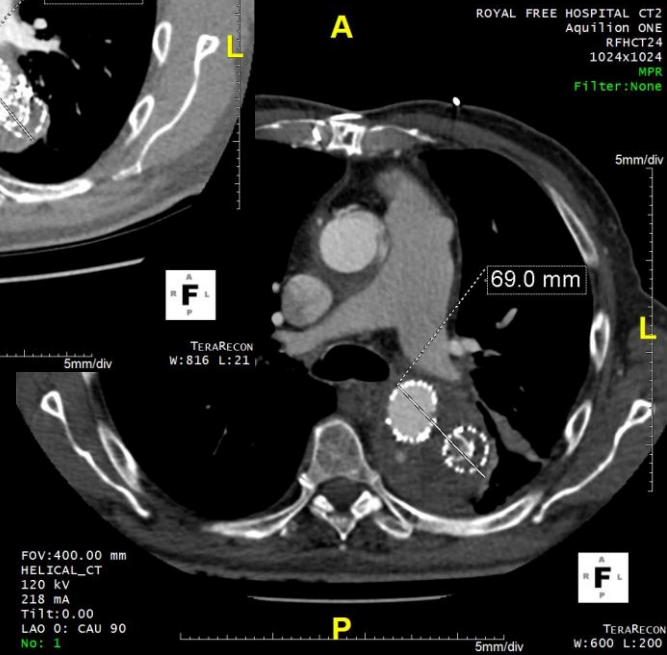
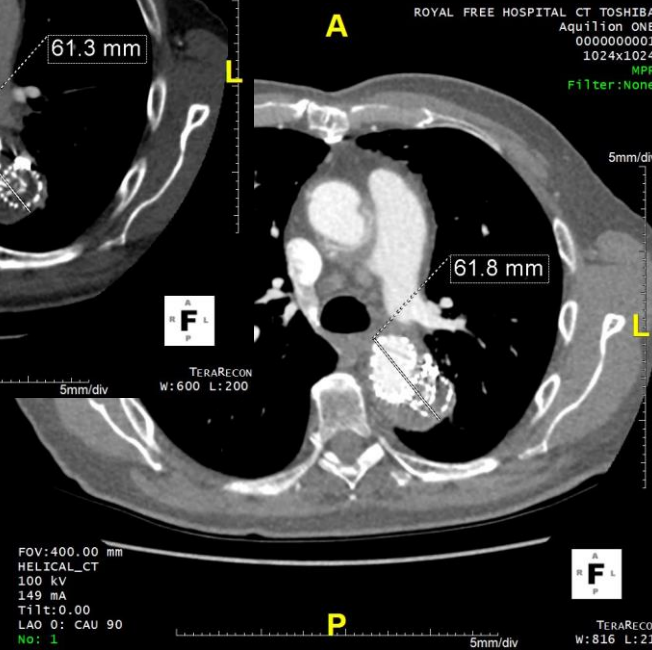
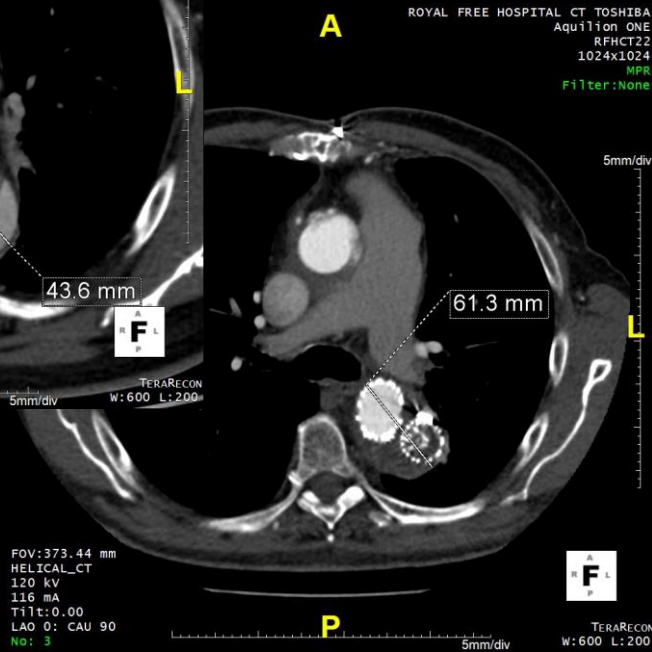
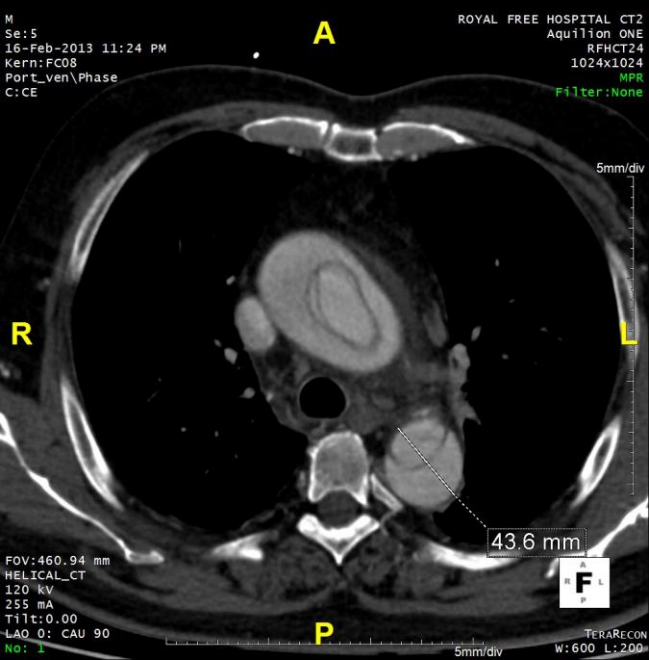
Author	Journal/Year	Embolic Agent	N
Hussain	Annals 2015	Coils and glue	1
Hofferberth	JEVT 2012	Coils, glue and occlusion balloons	10
Idrees	JVS 2015	Occluders and other things	21
Kolbel	JEVT 2016	Coils	2
Kolbel	JEVT 2013	Candyplug	1
Mendes	JEVT 2015	Amplatzer	1
Ogawa	JEVT 2016	Candyplug	1
Hager	JVS 2008	Coils and covered stents	1
Smith	EVT 2009	Coils	1
Riga	JVIR 2009	Coils and Onyx	1
Norberto	JVS 2011	Coils	5

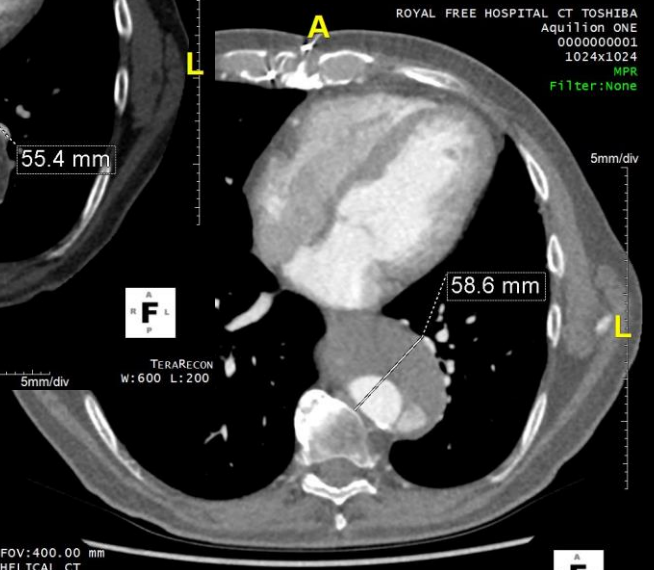
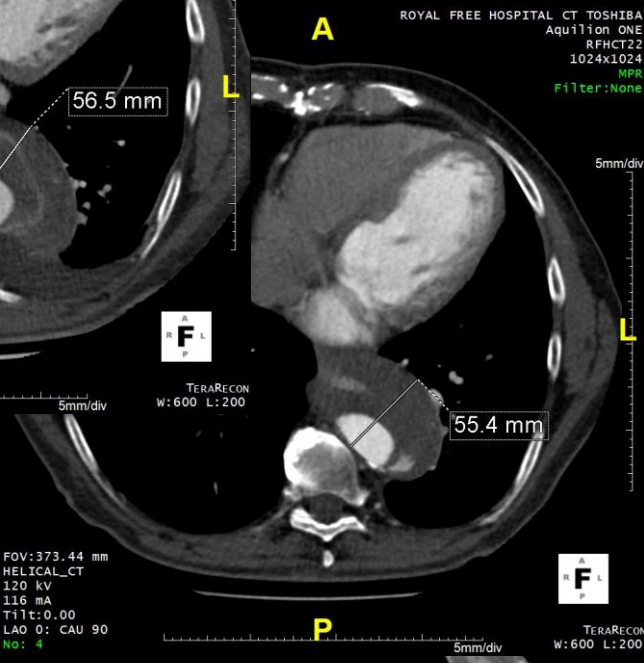
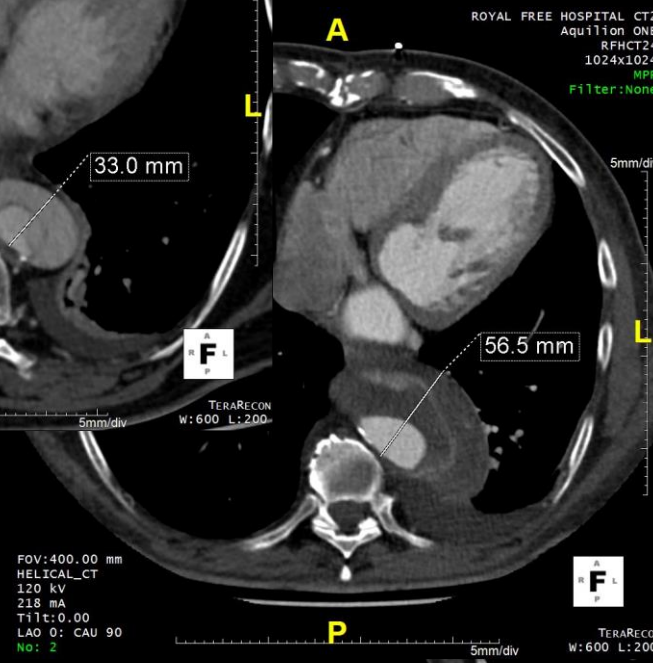
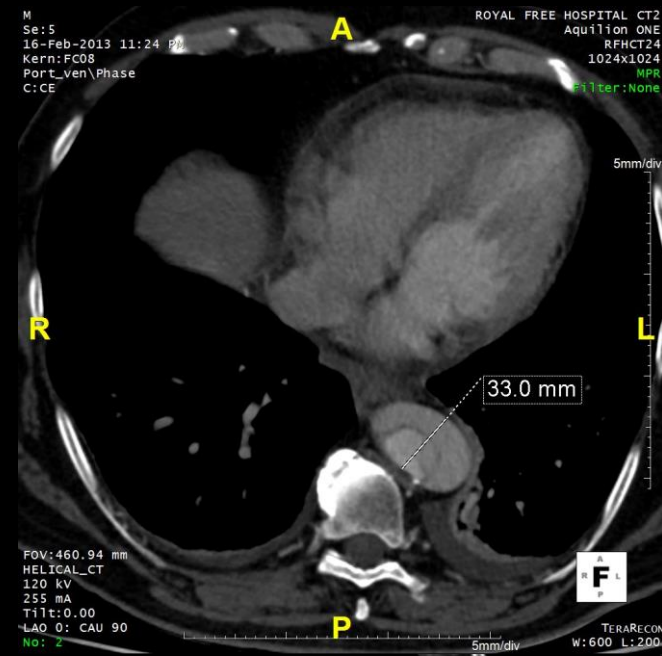
Collected Experience: Embolization

Author	Journal/Year	Embolic Agent	N	F/U (months)
Hussain	Annals 2015	Coils and glue	1	NR
Hofferberth	JEVT 2012	Coils, glue etc	10	63
Idrees	JVS 2015	Occluders and other things	21	25
Kolbel	JEVT 2016	Coils	2	NR
Kolbel	JEVT 2013	Candyplug	1	3
Mendes	JEVT 2015	Amplatzer	1	18
Ogawa	JEVT 2016	Candyblug	1	14
Hager	JVS 2008	Coils and covered stents	1	NR
Smith	EVT 2009	Coils	1	9
Riga	JVIR 2009	Coils and Onyx	1	24
Norberto	JVS 2011	Coils	5	11

Collected Experience: Embolization

Author	Journal/Year	Embolic Agent	N	F/U (m)	Complete Thrombosis	Sac Size same or greater	Sac Size Smaller
Hofferberth	JEVT 2012	Coils, glue etc	10	63		90%	10%
Idrees	JVS 2015	Occluders etc	21	25	60%		62% (5mm)
Norberto	JVS 2011	Coils	5	11		60%	40%





**Remodelling Occurs... But only reliably in
the Stented portions of the aorta**



Conclusions

- Dissections are tough
- The Goals of Treatment have changed
- Progression of Disease continues to be an issue, and current techniques may not completely remove the risk of aortic reintervention

**A patient should never be considered
cured of this disease.**

-- E. Stanley Crawford



world class expertise  aortic care