Lessons learned from the TEVAR registries

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Challenges for TEVR: Evidence

- Limited RCT data
- Slow technological advance
- Poorly defined pathways
- Multiple pathologies
- Poor natural history data
- 'Real world' trials and registries





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Registries for TEVR

- Better evidence base for real world clinical practice
 - Allow for sub-group analysis
 - Account for different pathologies
 - Define longer term, disease specific outcomes
- Aid patient selection, management and surveillance



MOTHER Registry

Cardiovascular Surgery

Aortic Pathology Determines Midterm Outcome After Endovascular Repair of the Thoracic Aorta Report From the Medtronic Thoracic Endovascular Registry (MOTHER) Database

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Background—Endovascular repair of the thoracic aorta has become an increasingly utilized therapy. Although the shortterm mortality advantage over open surgery is well documented, late mortality and the impact of presenting pathology on long-term outcomes remain poorly reported.

Methods and Results —A database was built from 5 prospective studies and a single institutional series. Rates of perioperative adverse events were calculated, as were midterm death and reintervention rates. Multivariate analysis was performed with the use of logistic regression modeling. Kaplan-Meier survival curves were drawn for midterm outcomes. The database contained 1010 patients: 670 patients with thoracic aortic aneurysm, 195 with chronic type B aortic dissection, and 114 with acute type B aortic dissection. Lower elective mortality was observed in patients with chronic dissections (3%) compared with patients with aneurysms (5%). Multivariate analysis identified age, mode of admission, American Society of Anesthesiologists grade, and pathology as independent predictors of 30-day death (P<0.05). In the midterm, the all-cause mortality rate was 8, 4.9, and 3.2 deaths per 100 patient-years for thoracic aortic aneurysm, acute type B aortic dissection, and chronic type B aortic dissection, respectively. The rates of aortic-related death were 0.6, 1.2, and 0.4 deaths per 100 patient-years for thoracic aortic aneurysm, acute type B aortic dissection, and chronic type B aortic dissection, respectively. Conclusions - This study indicated that the midterm outcomes of endovascular repair of the thoracic aorta are defined by presenting pathology, associated comorbidities, and mode of admission. Nonaortic mortality is high in the midterm for patients with thoracic aortic aneurysm, and managing modifiable risk factors appears vital. Endovascular repair of the thoracic aorta results in excellent midterm protection from aortic-related mortality, regardless of presenting pathology. (Circulation, 2013;127:24-32.)

Key Words: acute aortic syndrome ■ aneurysm ■ aortic dissection ■ endovascular surgery ■ pathology

The advent of endovascular repair of the thoracic aorta (thoracic endovascular aortic repair [TEVAR]) has altered the management algorithm for pathologies that affect the aortic arch and descending thoracic aorta. In recent years, the number of thoracic endovascular procedures has risen.13 The increased use of TEVAR has been driven by the early mortality advantage reported when endovascular therapy is compared with open surgical treatment of the thoracic aorta.³⁴ TEVAR is now considered the first-line therapy for isolated aneurysms of the descending thoracic aorta and acute complicated type B aortic dissections. 25.8 In the abdominal aorta, the early mortality advantage associated with endovascular repair of abdominal aneurysms was lost as a result of late aortic rupture.9 It has been suggested that long-term durability may be related to individual preoperative aneurysm morphology.³⁰ There is a concern that a

similar "catch-up" phenomenon might affect procedures in the thoracic aorta. At present, midterm to long-term data regarding the fate of patients treated with thoracic endografts are sparse, and it remains difficult to define whether TEVAR offers a durable solution to prevent aortic-related death. The fate of the aorta after endovascular treatment for chronic type B aortic dissection is of particular concern, and some experts suggest that TEVAR is not a viable alternative to open surgical repair in this pathology.11

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Given the spectrum of different pathologies that affect the descending thoracic aorta, it is important to define whether the outcome of TEVAR is pathology specific to refine procedural technique and endograft design. Careful analysis of long-term

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Registry of >1000 TEVR from 6 trials and I institution

670 aneurysm

195 chronic dissection

114 acute dissection



Lessons Learnt from MOTHER

- Technical aspects of TEVR
 - Coverage of LSCA
 - Retrograde TAD
- Predicting outcomes
- Effect of complications on long term outcomes



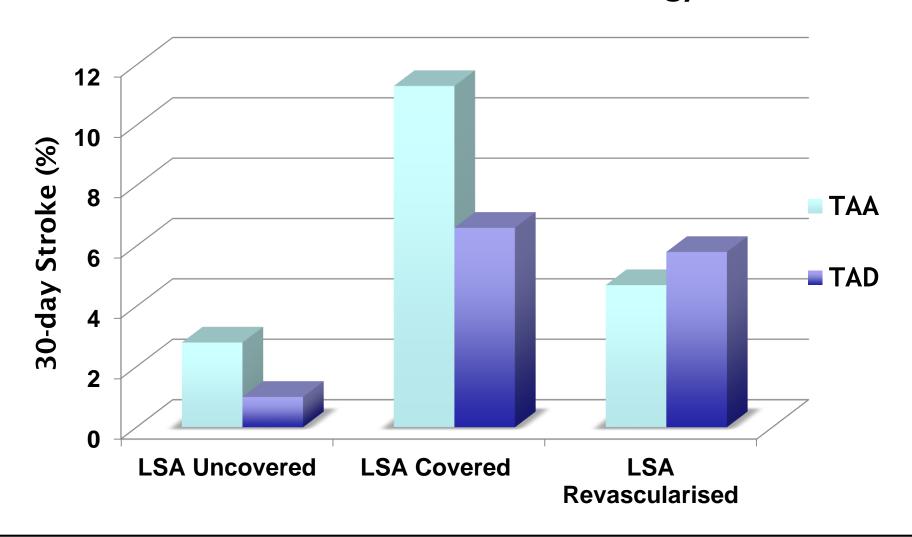


Left Subclavian Bypass

	Not Covered (n=537)	Covered Not Covered revascularised (n=322) (n=143)		P - value	
Death (%)	31 (5.8)	22 (6.8)	10 (7)	0.769	
Stroke (%)	12 (2.2)	29 (9)	7 (4.9)	0.000	
SCI (%)	7 (5)	I3 (4)	2 (1.4)	0.155	

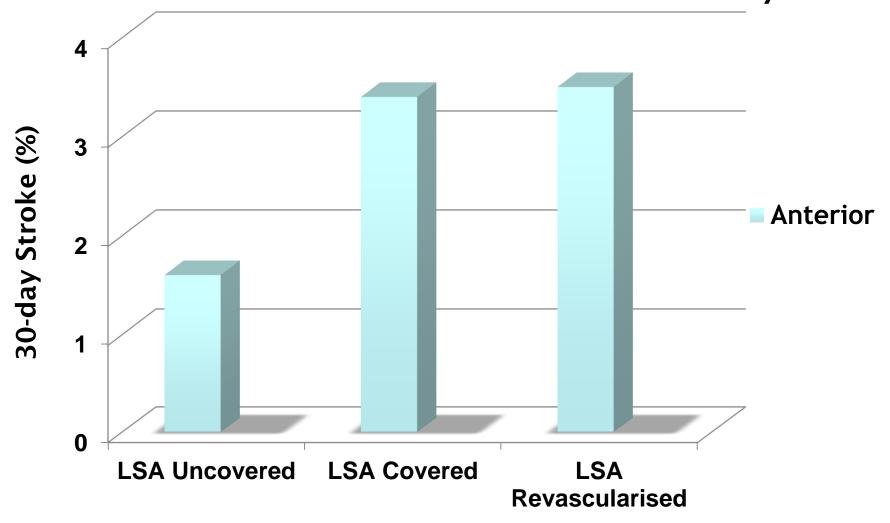


LSCA: Effect of Pathology



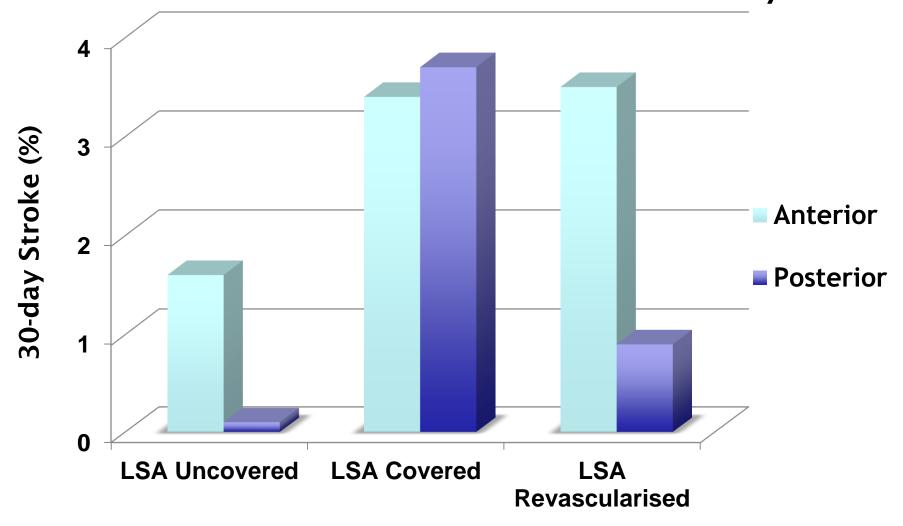


LSCA: Anterior or Posterior Territory





LSCA: Anterior or Posterior Territory





Retrograde Type A Dissection

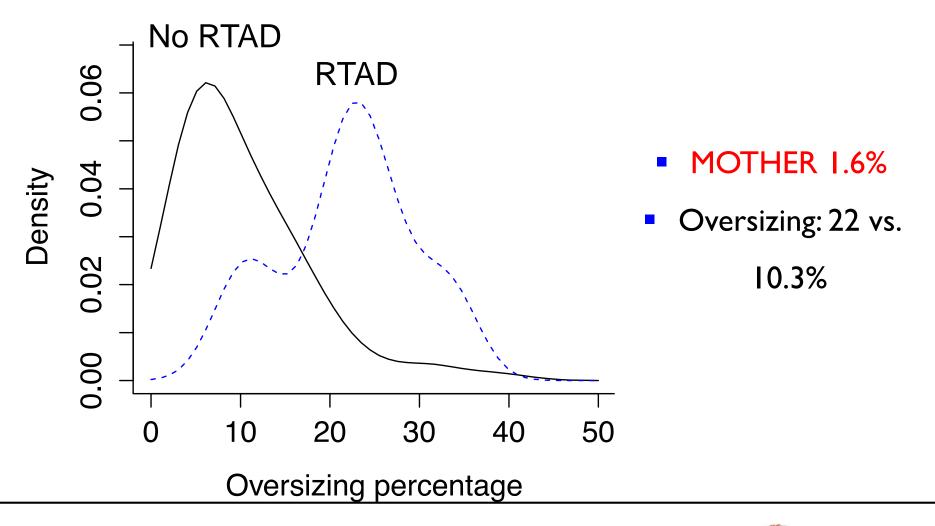
- Aneurysm: 0.9%
- Acute dissection 8.4%
- Chronic dissection 3%



Canaud et al; Annals Surg 2014



RTAD: Endograft Oversizing





Predicting Risk: Aneurysm

Elective	TAA (n- 625)
Death (%)	33 (5%)
Stroke (%)	34 (5%)
Paraplegia (%)	30 (5%)



Early Outcomes for TAA: Odds Ratios

	Age	Emergency	Number of devices	Smoker	Previous Stroke	LSA bypass
Death (%)	1.07	4.17	1.28			
Paraplegia (%)		4.41	1.3	2.14		
Stroke (%)	2.43		1.63		2.89	3.30

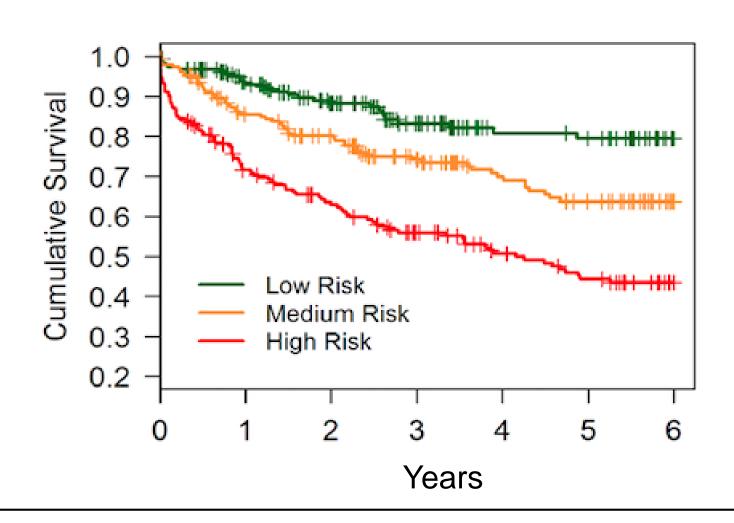


Long Term Mortality: TAA

Variable	Hazard Ratio			
Age	1.035			
Renal insufficiency	1.664			
CVA	1.473			
Number of devices	1.183			
TAA max diameter	1.015			

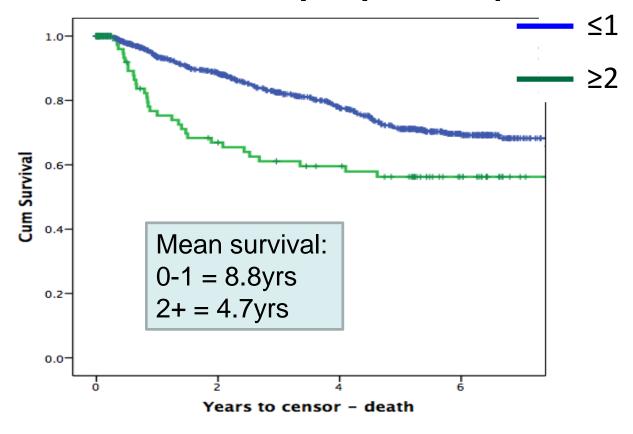


All Cause Mortality By Risk





All Cause Mortality By Complication



	0	1	2	3	4	5	6	7
0-1	984	741	630	491	400	315	168	43
2+	113	55	47	40	37	32	17	2



Conclusions

- Registries can guide real world clinical practice
- Potential to stratify risk and individualise management decisions
- Complications predict poor long term outcomes
- Optimise patients pre-procedure, and perioperative intensive care to prevent complications

