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Natural History of Aortic Dissection: Optimal Candidate for TEVAR

Jong-Min Song, MD, PhD

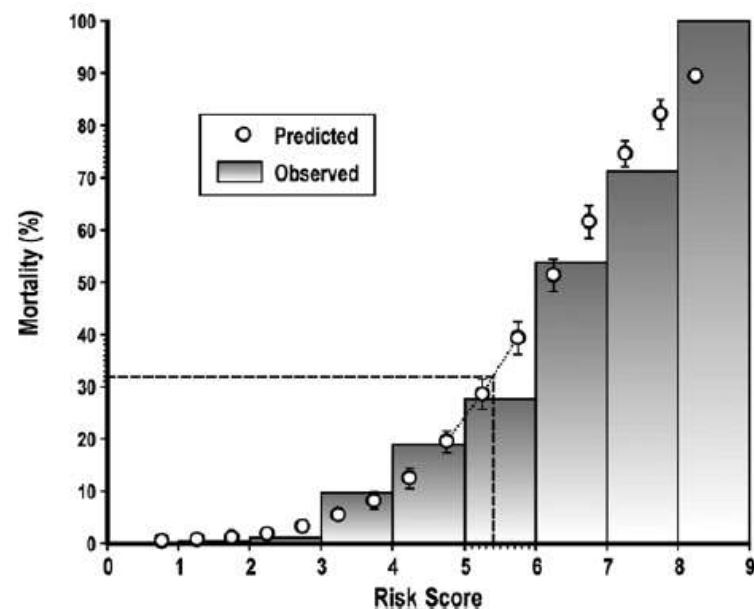
*Asan Medical Center
University of Ulsan College of Medicine*

In-Hospital Mortality in Acute Type B AD

1,034 patients with acute type B aortic dissection

Table 6. Independent Predictors of In-Hospital Mortality in Type B Aortic Dissection

Variables at Presentation	Mortality Odds Ratio (95% CI)	Parameter Coefficient	Model Score Assigned	P Value
Female	1.37 (0.67–2.81)	0.316	0.3	0.387
Age (per decade)	1.33 (1.00–1.75)	0.28	0.3	0.044
Hypotension/shock	6.43 (2.18–18.98)	1.861	1.9	0.001
Periaortic hematoma	3.06 (1.38–6.78)	1.119	1.1	0.006
Diameter ≥5.5 cm	6.04 (2.87–12.73)	1.798	1.8	<0.001
Mesenteric ischemia	9.03 (3.49–23.38)	2.201	2.2	<0.001
Acute renal failure	3.61 (1.68–7.75)	1.284	1.3	0.001
Limb ischemia	3.02 (1.05–8.68)	1.105	1.1	0.040



Tolenaar JL, (IRAD) Circulation.2014;130[suppl 1]:S45-S50

D-dimer & CRP in Acute AD

114 patients with acute aortic dissection

Table 3 Multiple logistic regression for hospital short-term mortality

Clinical variables	OR	95% CI	p Value
D-dimer ($\mu\text{g/mL}$)	3.272	1.638 to 6.535	0.001
CRP (mg/L)	2.322	1.134 to 4.757	0.021
Type of AD	0.126	0.019 to 0.853	0.034
History of smoking	0.485	0.082 to 2.886	0.427
Admission SBP (mm Hg)	1.013	0.987 to 1.039	0.332
Admission DBP (mm Hg)	0.994	0.941 to 1.049	0.817
Aortic diameter (mm)	1.109	0.964 to 1.274	0.147
Onset of symptoms to hospital admission (h)	1.154	0.629 to 2.119	0.643

AD, aortic dissection; CRP, C reactive protein; DBP, diastolic blood pressure; SBP, systolic blood pressure

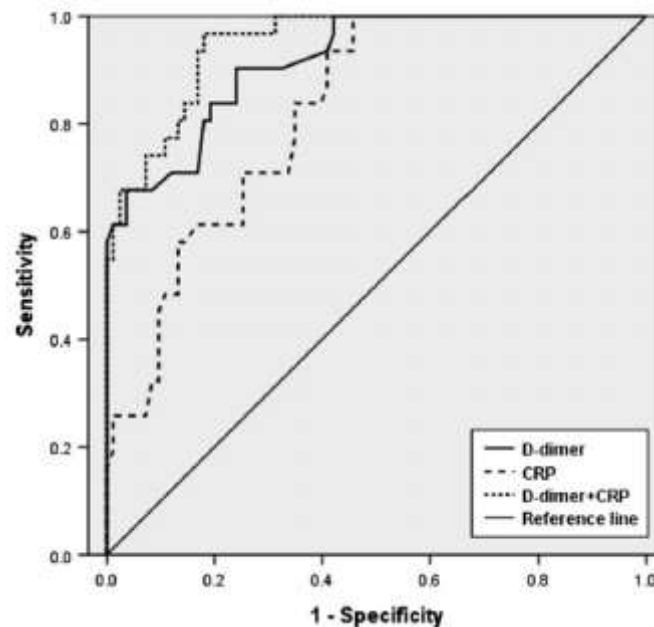


Table 4 Diagnostic value of D-dimer and C reactive protein (CRP) for hospital short-term mortality

	AUC	Cut-off value	Sensitivity (%)	Specificity (%)	95% CI	p Value
D-dimer ($\mu\text{g/mL}$)	0.917	5.67	90.3	75.9	0.85 to 0.96	<0.001
CRP (mg/L)	0.822	11.21	100	54.2	0.74 to 0.89	<0.001
D-dimer+CRP	0.948	—	81.9	96.8	0.89 to 0.98	<0.001

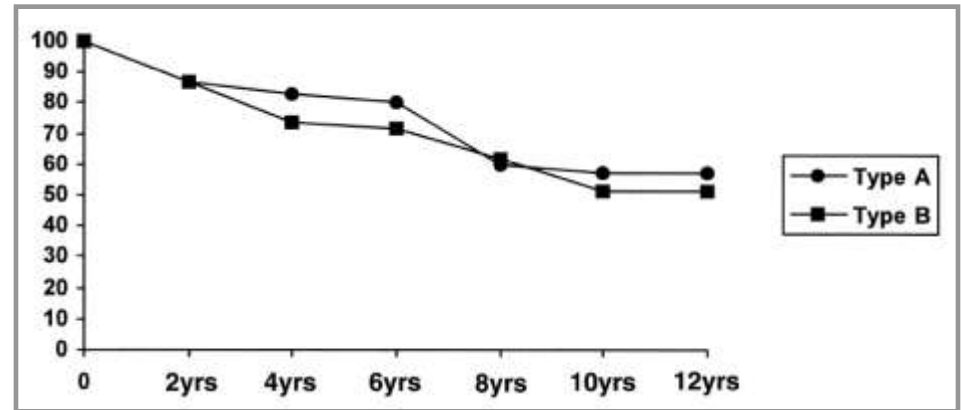
AUC: area under the curve.

Wen D, et al. Heart 2013;99:1192–1197

Long-Term Therapy & Prognosis

○ Long-term prognosis

- 5-year survival rate (among discharged patients)
 - 75 – 82%



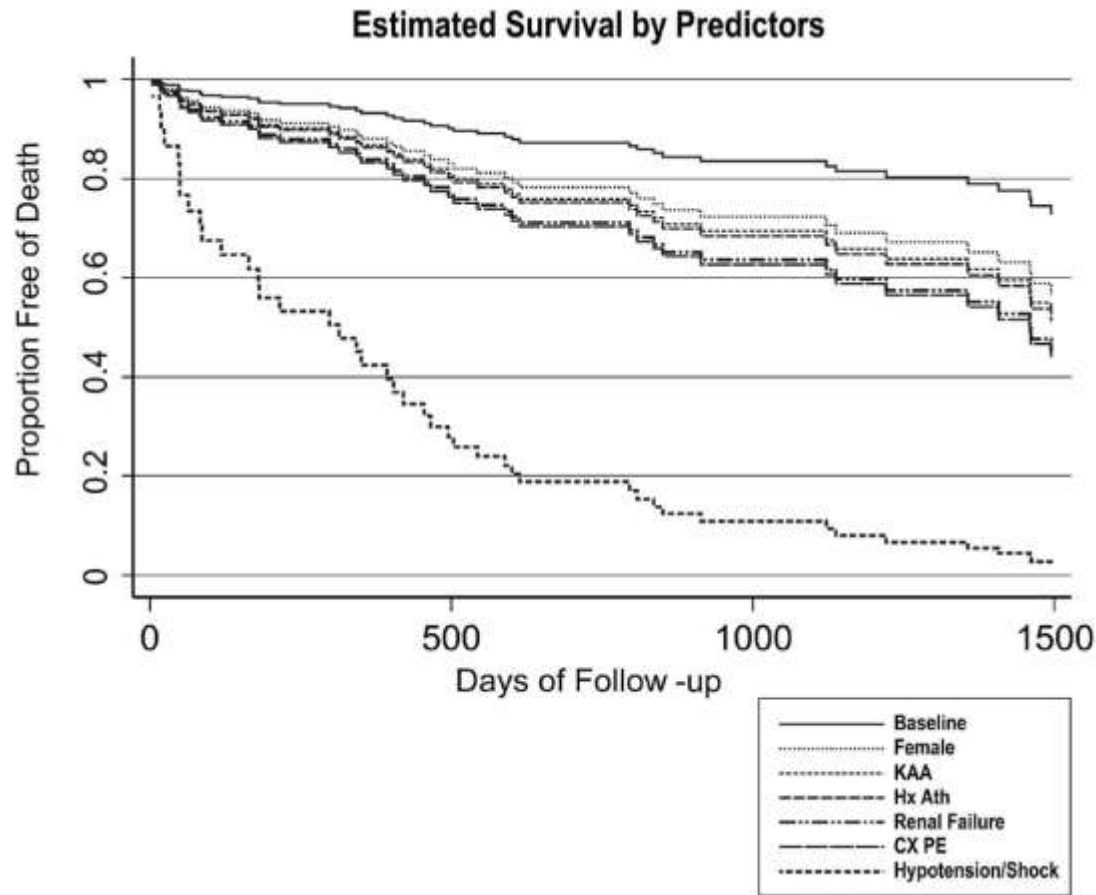
Bernard Y et al. Am J Cardiol 2001;87:1378-82

● Late complications

- Aortic regurgitation
- Recurrent dissection
- **Aneurysm formation and rupture**
 - 29% of late deaths following surgery

Long-Term Therapy & Prognosis

○ Type B dissection

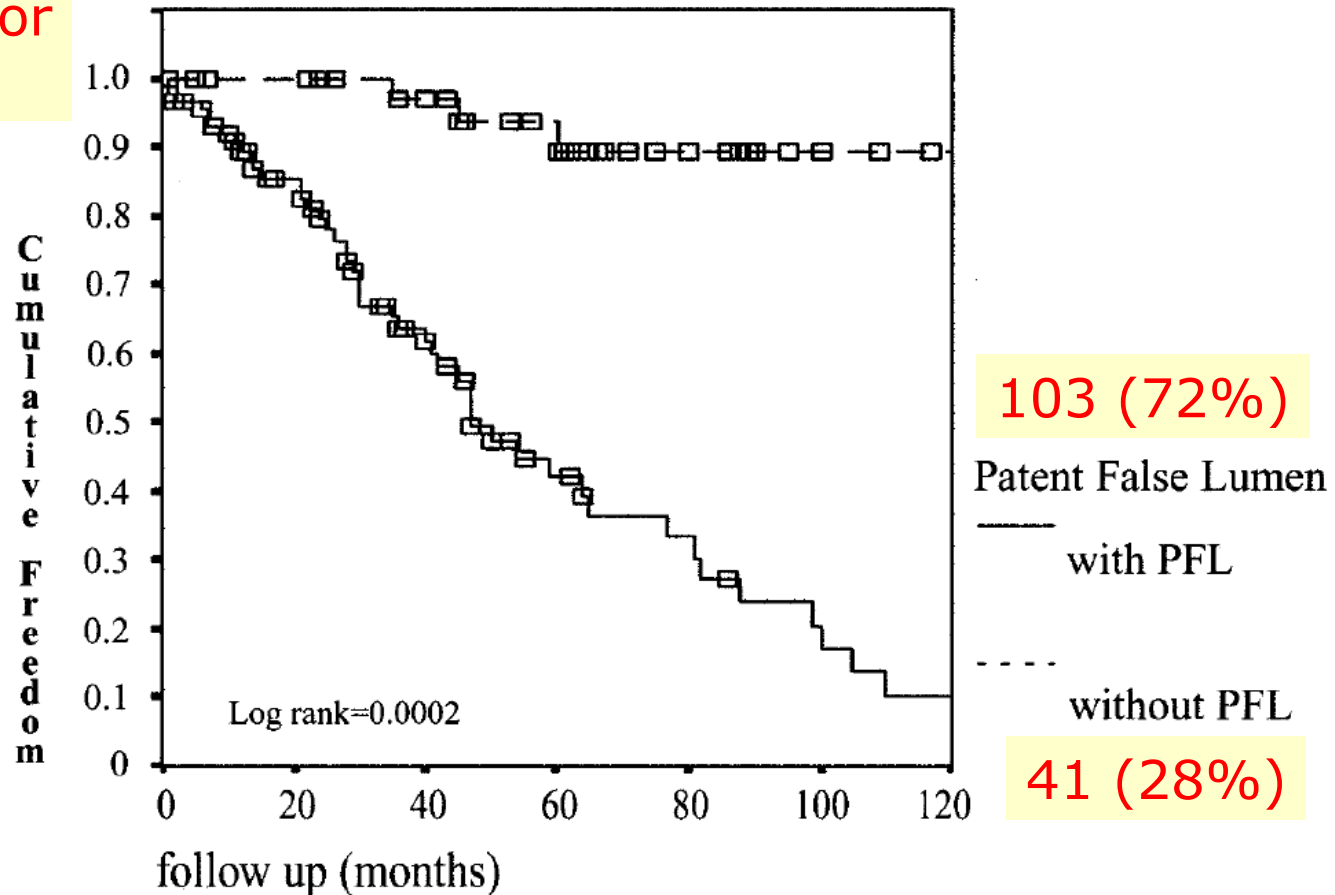


Tsai TT et al.(IRAD) Circulation 2006;114:2226-31

Late Aneurysmal Change

○ Type A dissection after surgery

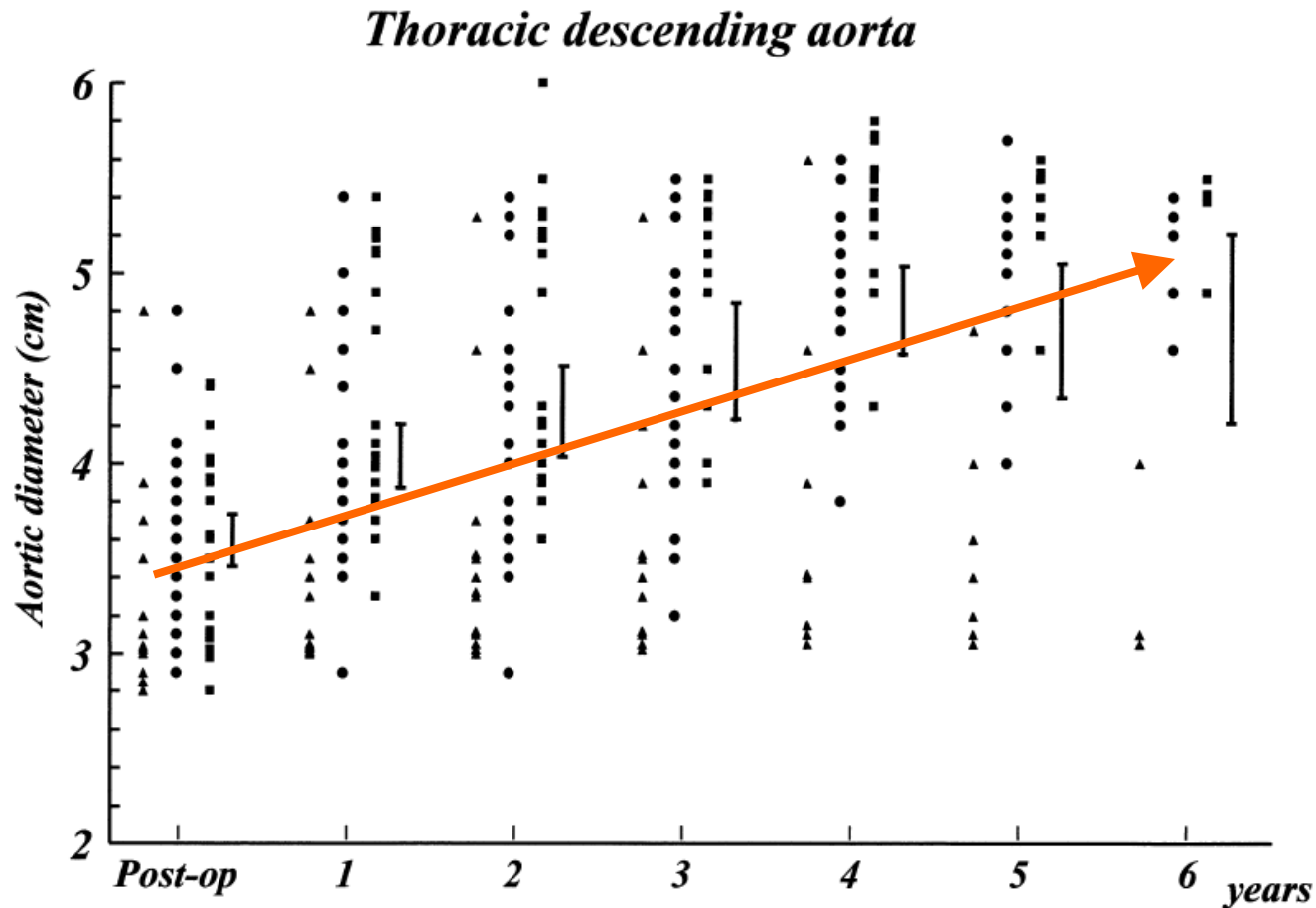
Aneurysm or Surgery



Yeh CH et al. Chest 2003; 124:989-995

Late Aneurysmal Change

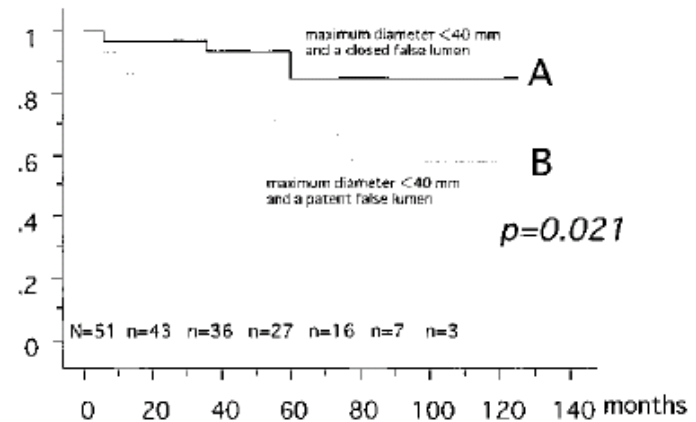
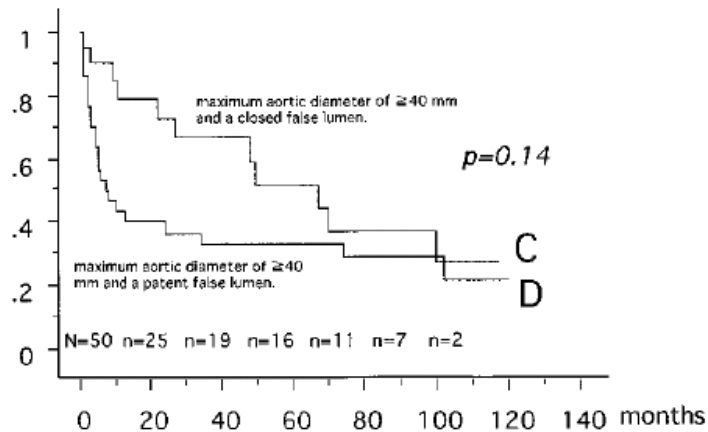
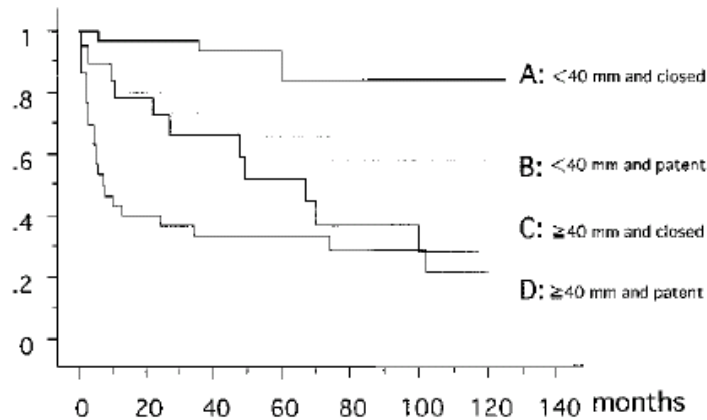
○ Type A dissection after surgery



Fattori R et al. Am J Cardiol 2000;86:868-872

Predictors of Aortic Aneurysm

101 patients with type B acute AD



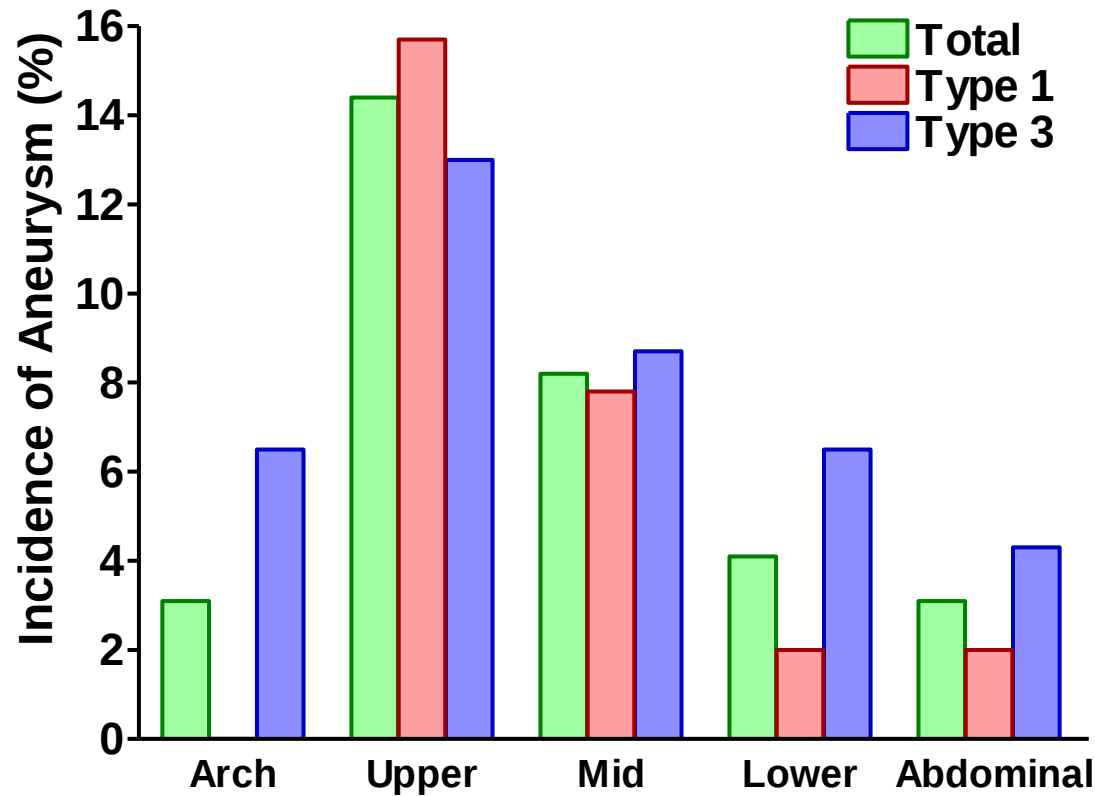
Marui A, *Circulation*. 1999;100[suppl II]:II-275-II-280

Late Aneurysmal Change

100 AD patients

51 type 1 who underwent ascending aorta surgery

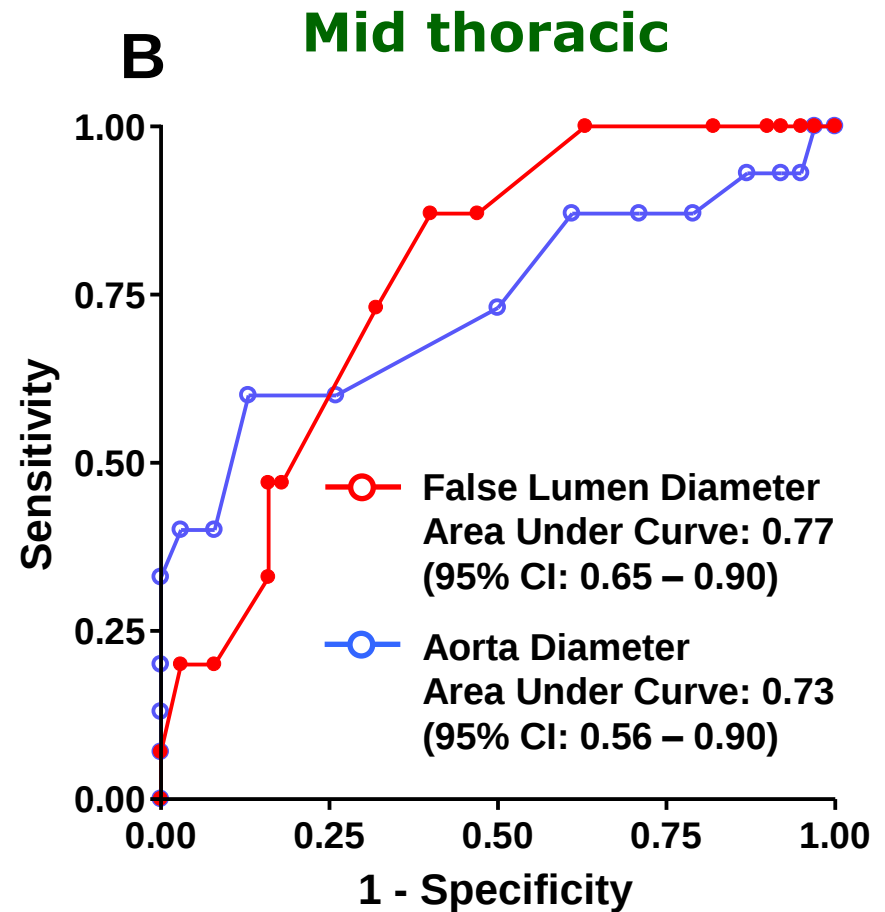
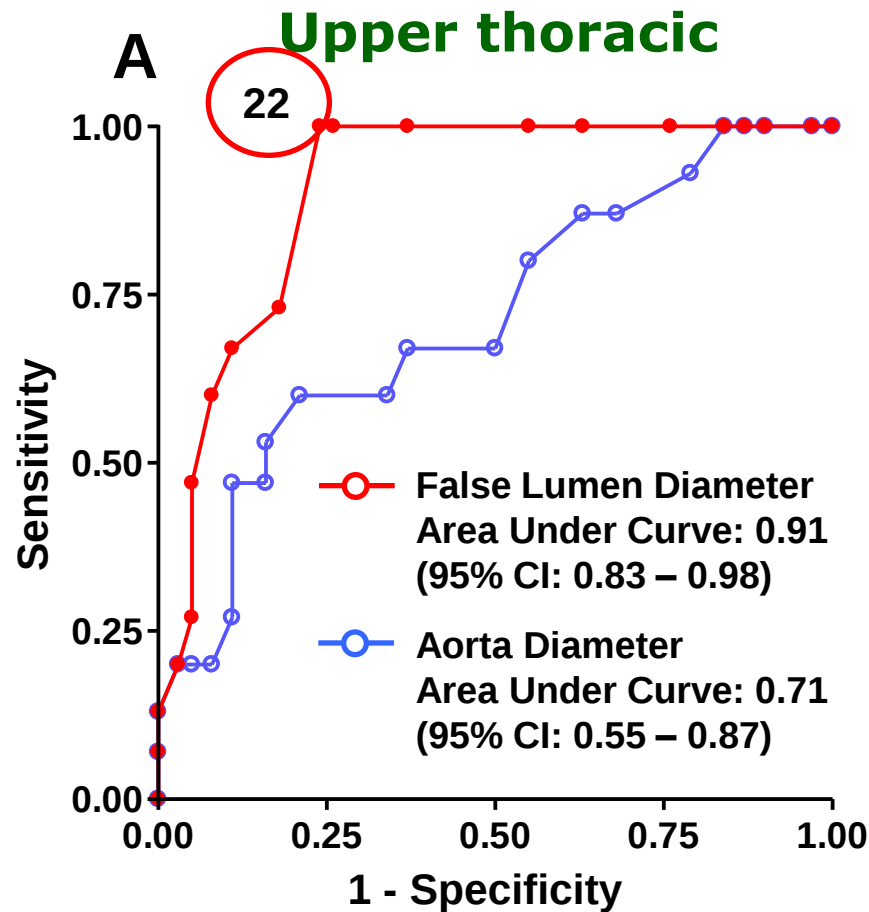
49 type 3 AD patients.



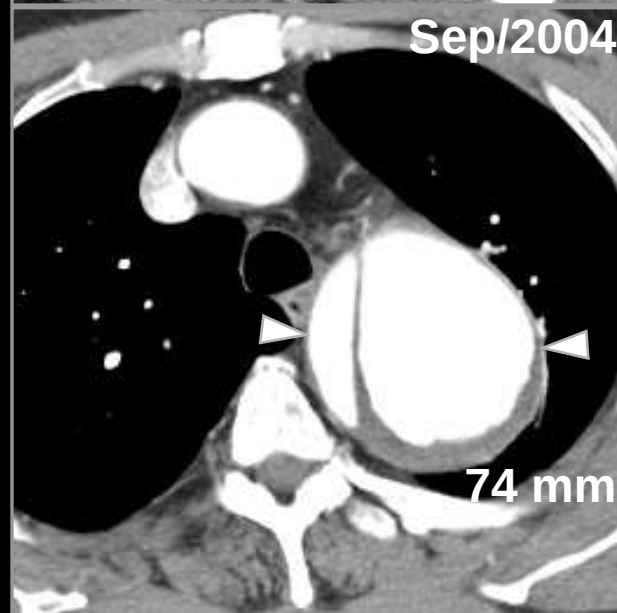
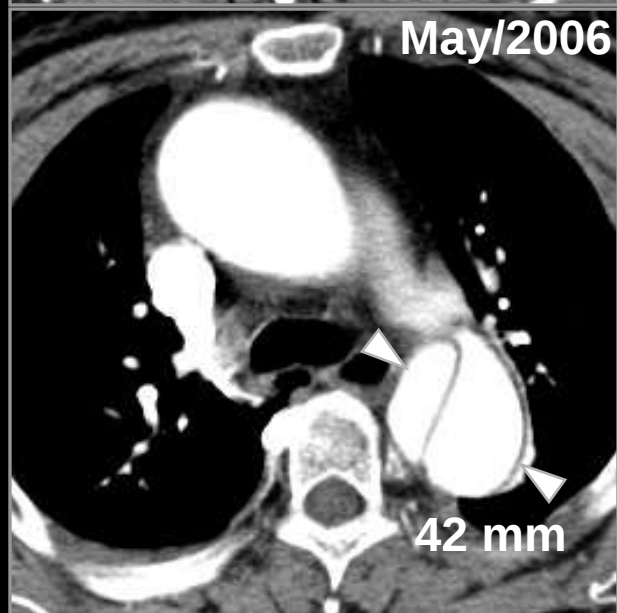
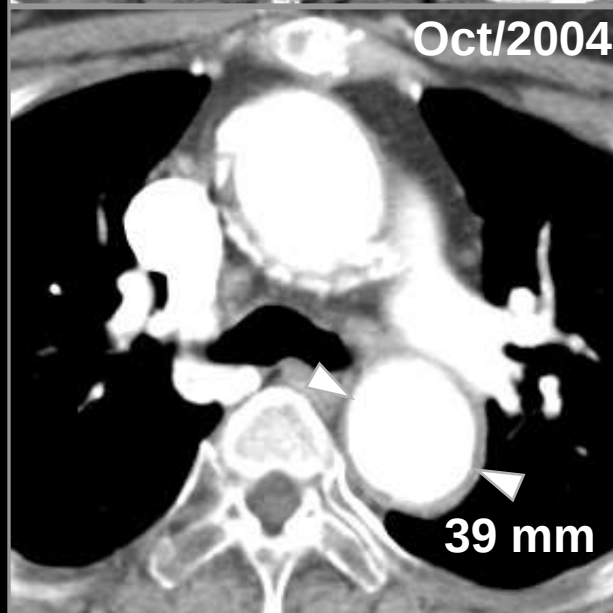
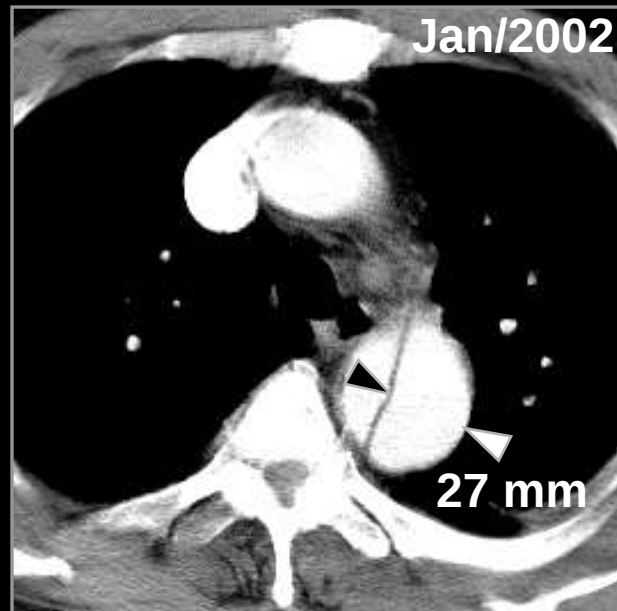
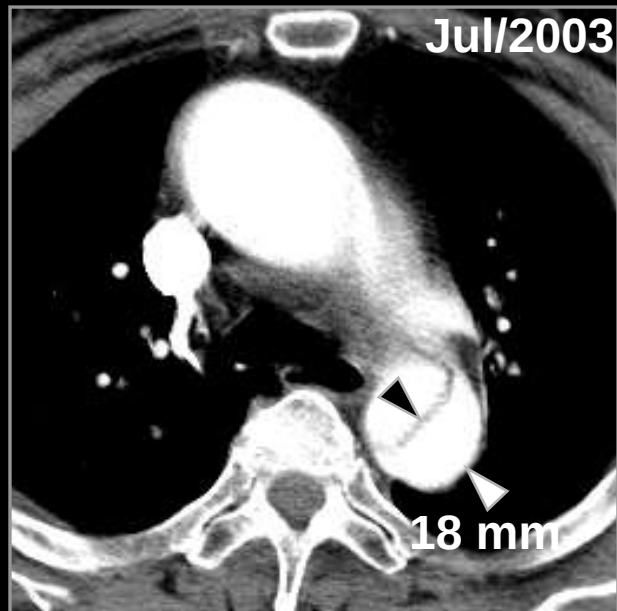
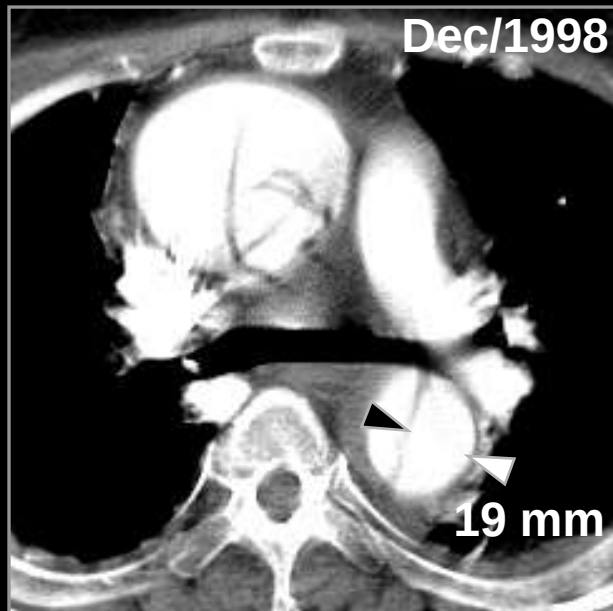
Song JM et al. J Am Coll Cardiol 2007;50:799-804

Late Aneurysmal Change

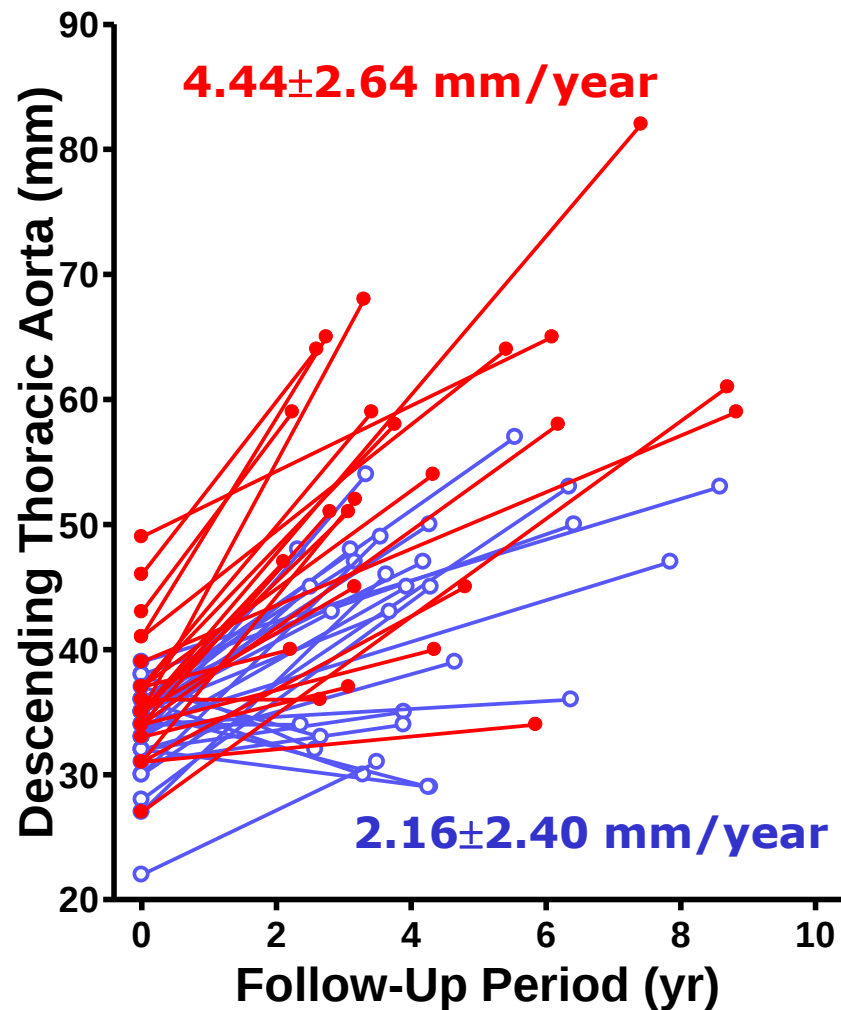
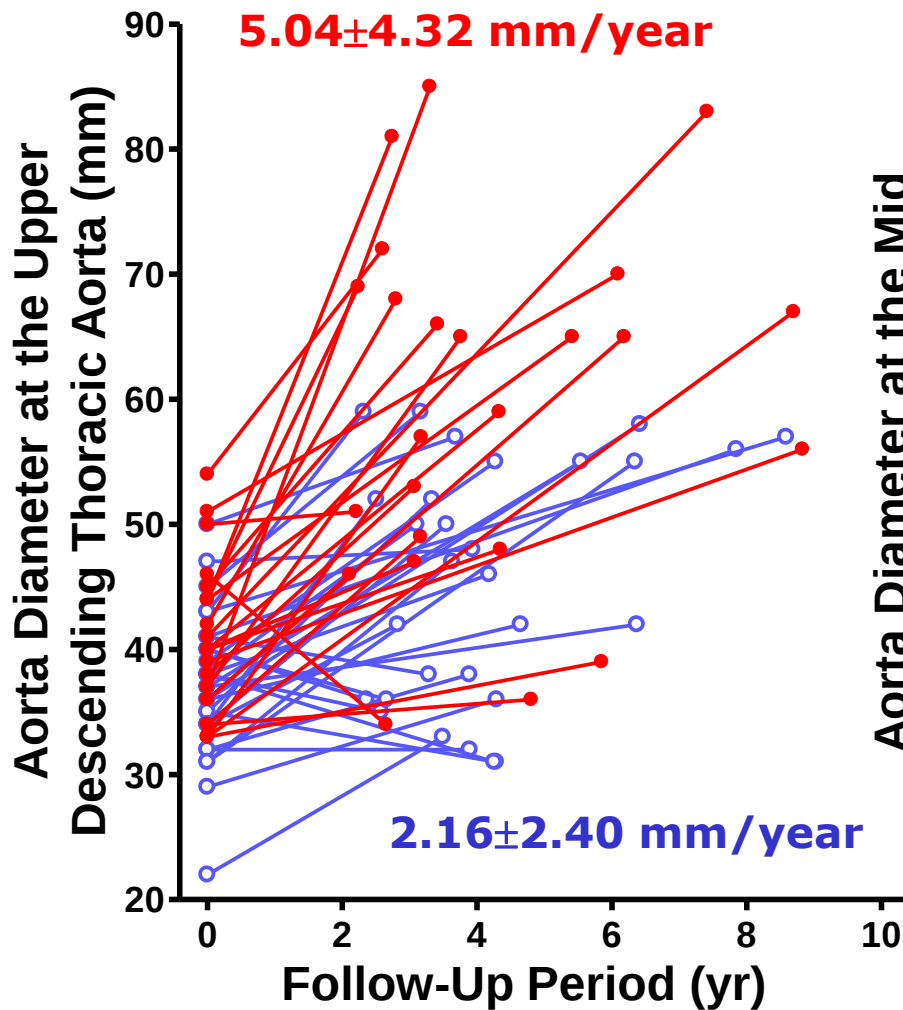
○ Early predictor for late aneurysm



Song JM et al. J Am Coll Cardiol 2007;50:799–804



Song JM et al. J Am Coll Cardiol 2007;50:799-804

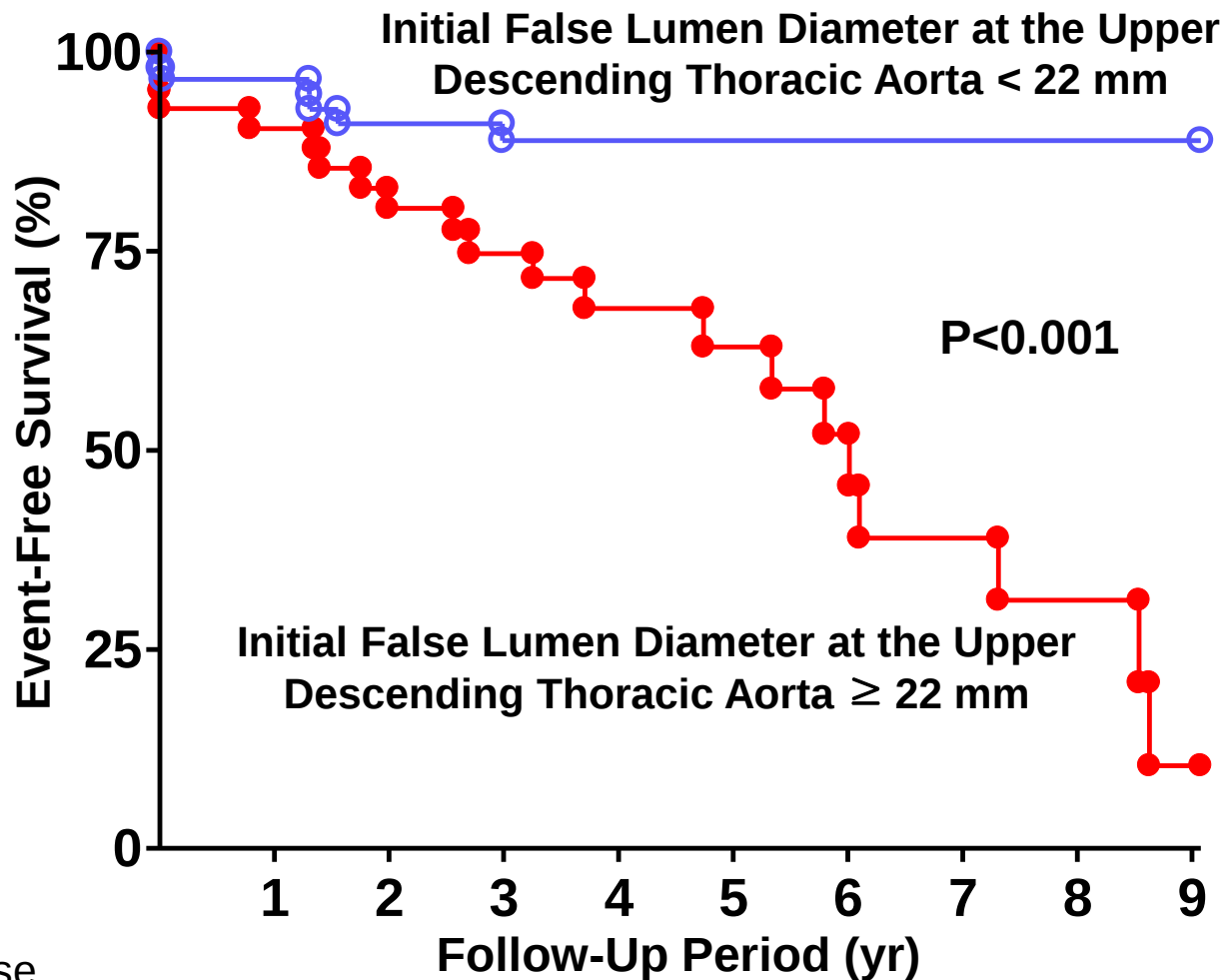


Initial False Lumen Diameter at the Upper Descending Thoracic Aorta

● —● ≥ 22 mm

○ —○ < 22 mm

Song JM et al. J Am Coll Cardiol 2007;50:799–804



Initial False
Lumen Diameter

< 22 mm 58

≥ 22 mm 42

Patients at Risk

Song JM et al. J Am Coll Cardiol 2007;50:799-804

Prognosis in AD with Patent FL

184 patients with acute aortic dissection

108 surgically treated type A

76 medically treated type B

Table 3. Predictors of Total Mortality and Dissection-Related Events: Results of Multivariate Cox Models

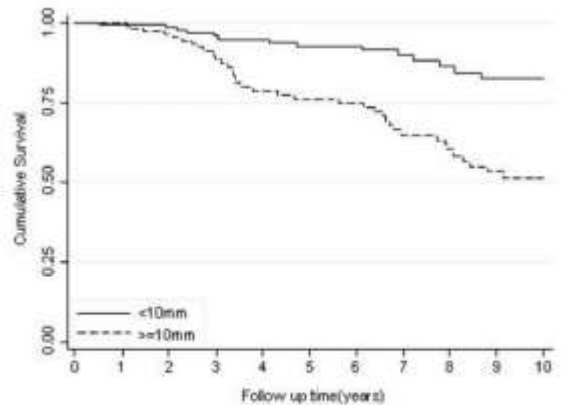
Variable	Total Mortality		Dissection-Related Event	
	Adjusted HR (95% CI)	P	Adjusted HR (95% CI)	P
Age (for 1-y increase)	1.02 (0.99–1.05)	0.17	—	—
Type B (vs type A)	—	—	1.47 (0.84–2.56)	0.18
Marfan syndrome (vs rest)	3.66 (1.65–8.13)	0.001	1.79 (0.89–3.58)	0.1
Baseline maximum descending aorta diameter (for each 5-mm increase)	1.36 (1.08–1.7)	0.008	1.32 (1.1–1.59)	0.003
Entry tear diameter (for 1-mm increase)	1.1 (1.04–1.16)	0.001	1.13 (1.08–1.2)	<0.001
Proximal entry tear (vs rest)	—	—	1.84 (1.06–3.19)	0.03

HR indicates hazard ratio.

Evangelista A., Circulation. 2012;125:3133-3141

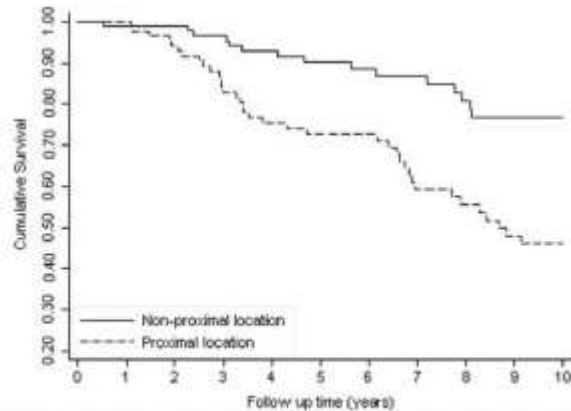
Prognosis in AD with Patent FL

A

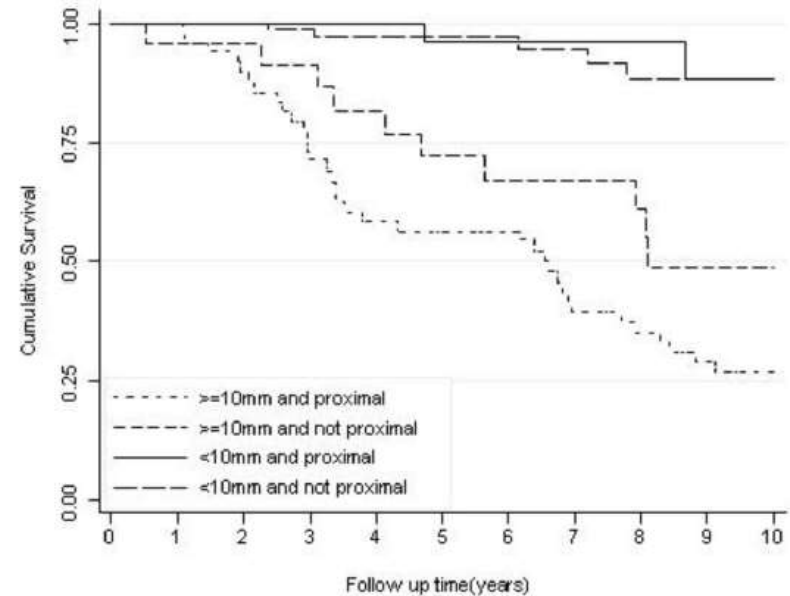


	0	1	2	3	4	5	6	7	8	9	10
< 10mm	112	112	101	89	83	72	61	49	40	38	34
≥ 10mm	72	71	64	53	45	41	39	31	27	21	20

B



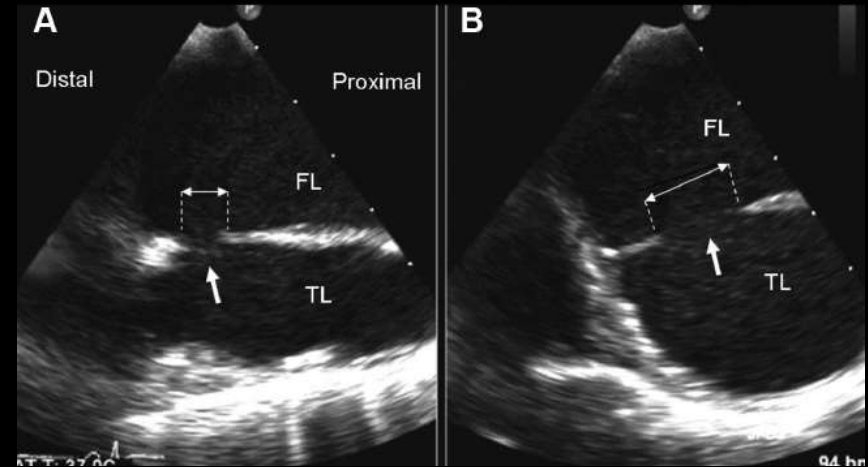
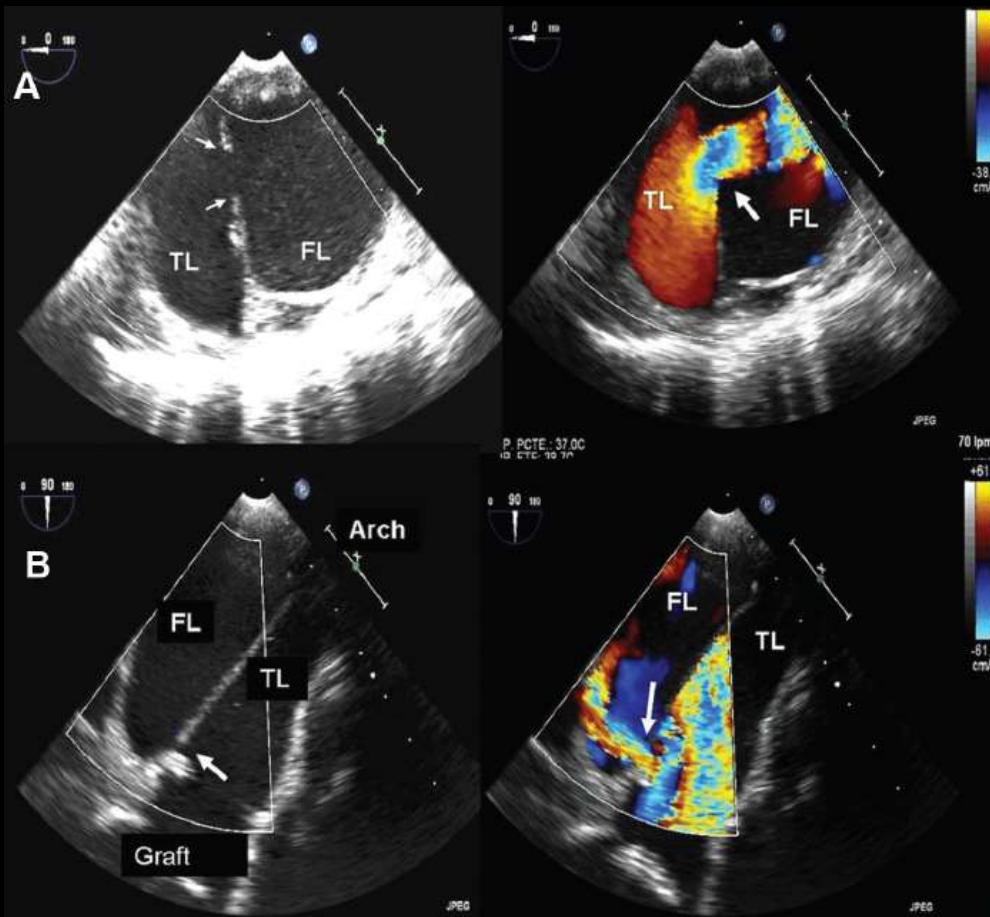
	0	1	2	3	4	5	6	7	8	9	10
Proximal	87	87	78	65	57	51	47	34	29	24	22
Non-proximal	97	96	87	77	71	62	53	46	38	35	32



	0	1	2	3	4	5	6	7	8	9	10
≥10mm prox	49	49	43	34	28	27	27	19	17	13	12
≥10mm not prox	23	22	21	19	17	14	12	12	10	8	8
<10mm prox	38	38	35	31	29	24	20	15	12	11	10
<10mm not prox	74	74	66	58	54	48	41	34	28	27	24

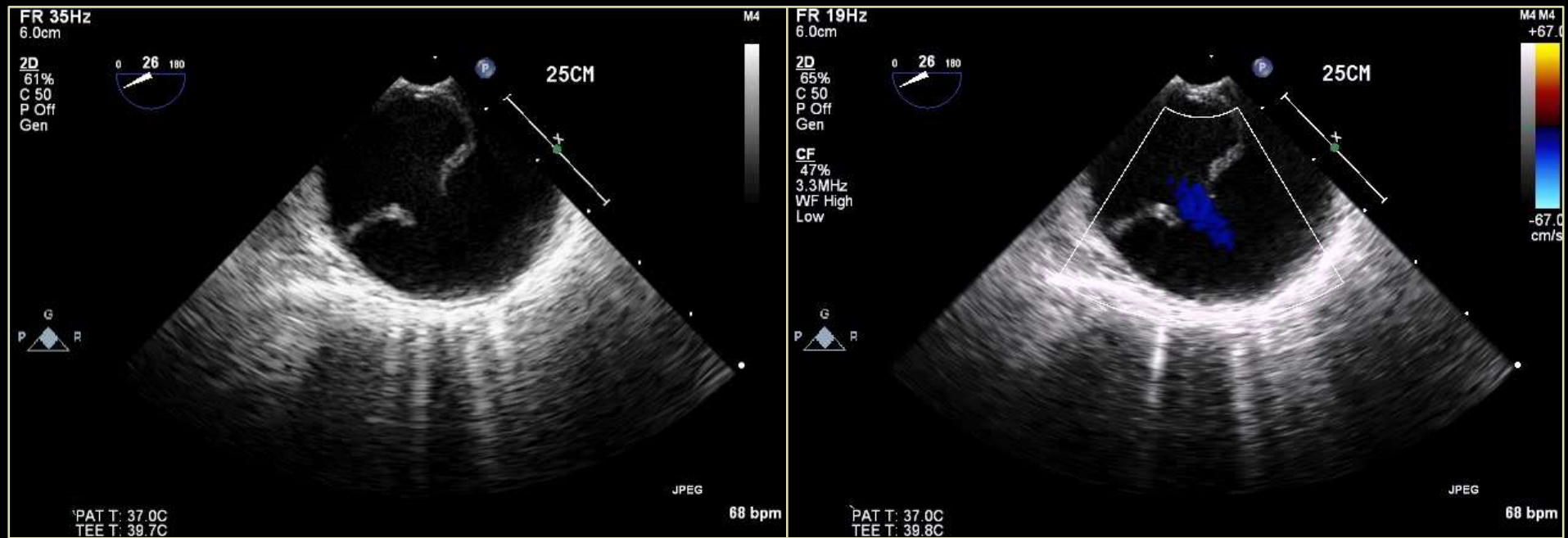
Evangelista A., Circulation. 2012;125:3133-3141

Tear Size in Aortic Dissection



Evangelista A., Circulation. 2012;125:3133-3141

Tear Size in Aortic Dissection



Tear Size in Aortic Dissection



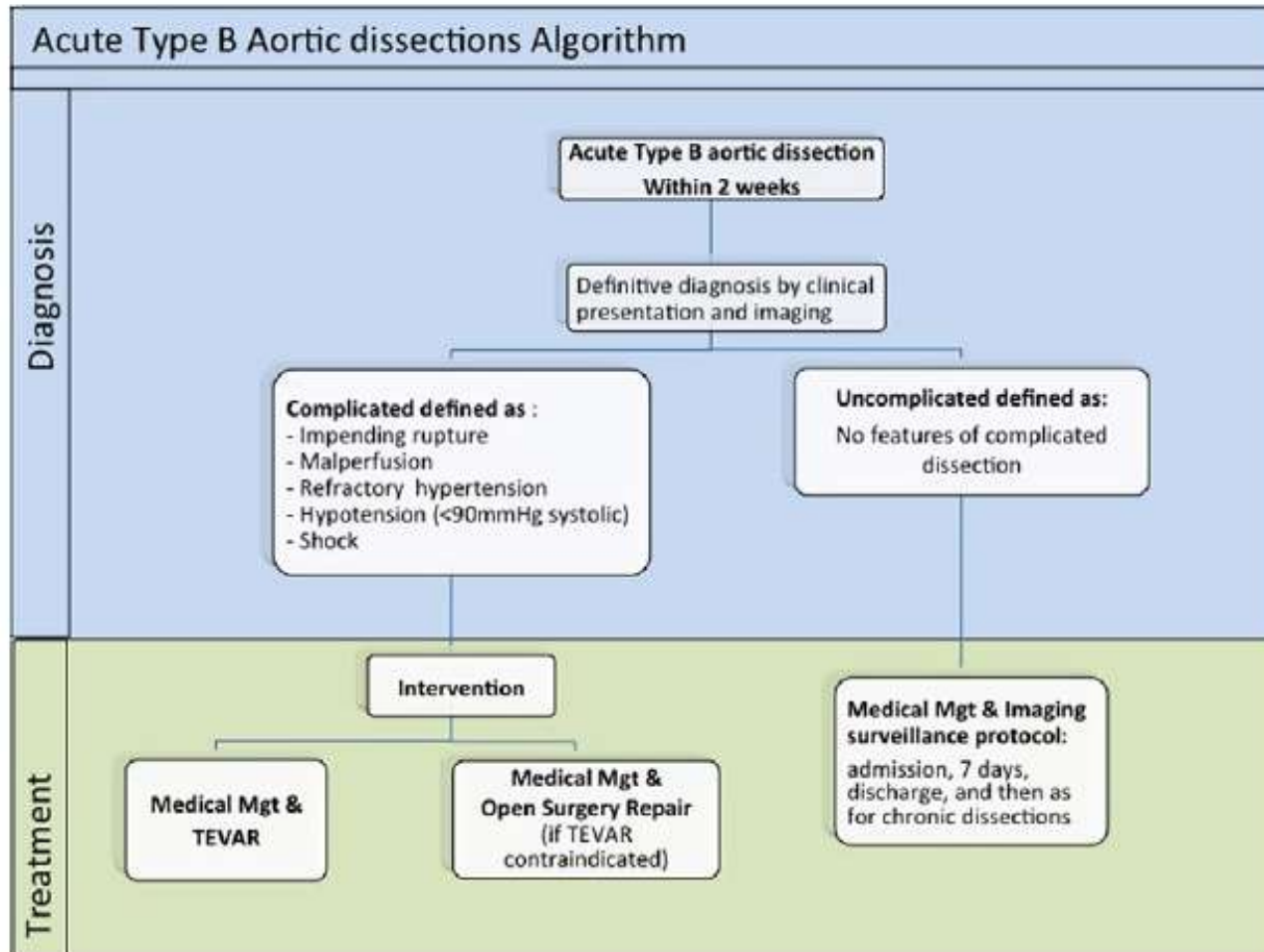
Acute Type B Dissection

○Poor prognostic factors

- Initial large false lumen (> 22 mm)
- Initial large aorta diameter (> 40 or 55 mm)
- Large (> 10 mm) & proximal intimal tear
- Patent or partially thrombosed false lumen
- Periaortic hematoma

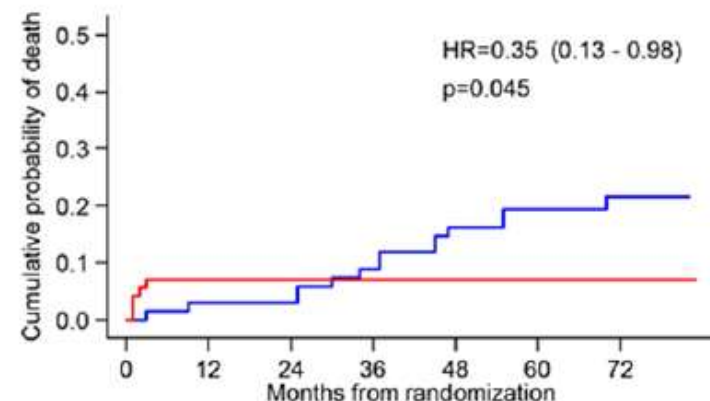
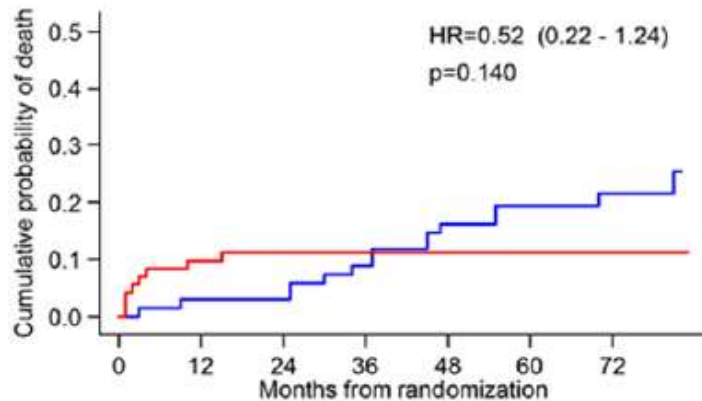
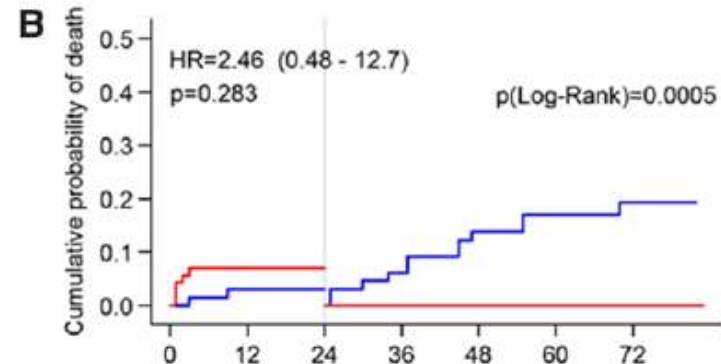
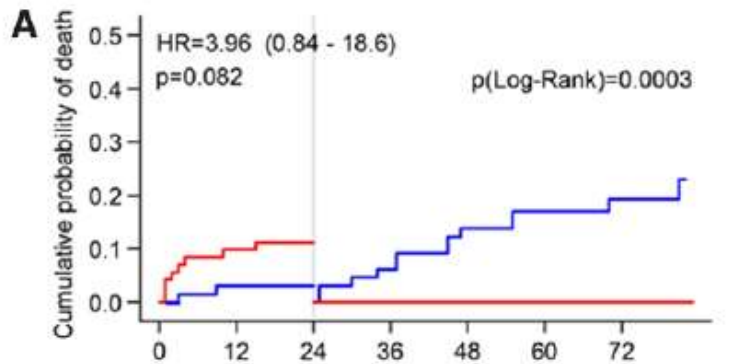
- Hypotension/shock, Syncope
- Ischemia of major organs
- High D-dimer & CRP

Treatment Algorithm of Type B AD



Fattori R, et al. J Am Coll Cardiol 2013;61:1661–78

INSTEAD-XL



68 66 66 62 57 50 32 OMT
72 65 64 63 59 55 32 OMT + TEVAR
Patients at risk

68 66 66 62 57 50 32 OMT
72 65 64 63 59 55 32 OMT + TEVAR
Patients at risk

Nienaber CA, Circ Cardiovasc Interv. 2013;6:407-416

Thank you for your attention.



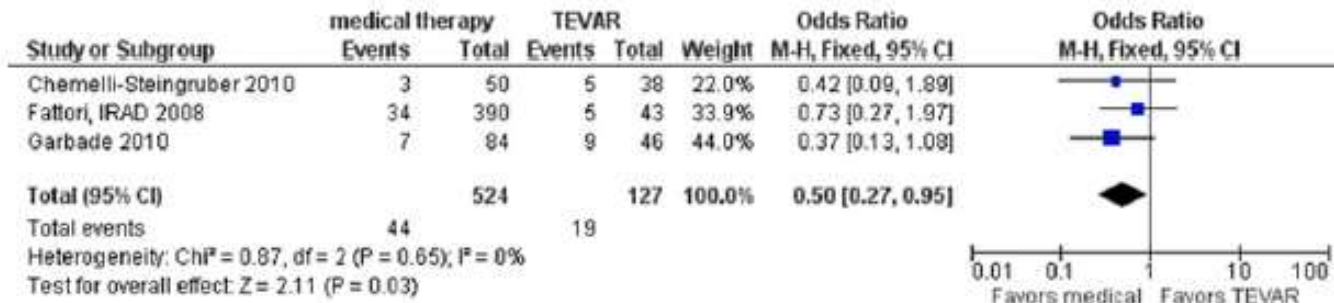
ASAN
Medical Center



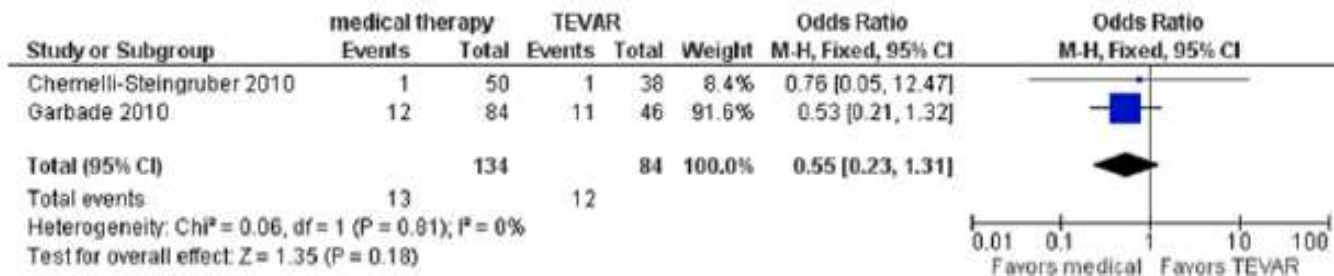
UNIVERSITY OF ULSAN
COLLEGE OF MEDICINE

Medical Therapy vs. TEVAR

A Medical therapy vs. TEVAR for acute type B dissections: early mortality



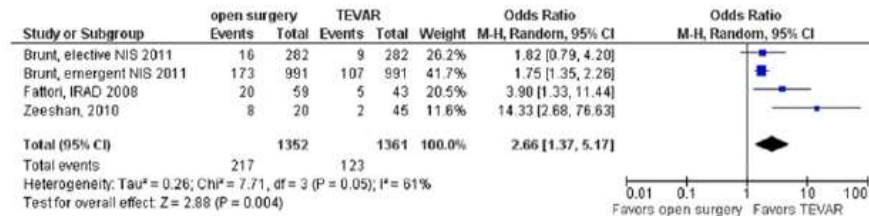
B Medical therapy vs. TEVAR for acute type B dissections: early neurologic complications



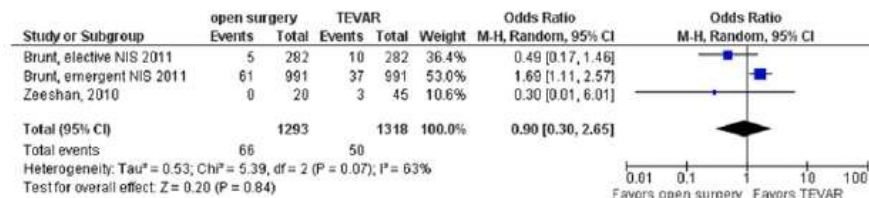
Fattori R, et al. J Am Coll Cardiol 2013;61:1661–78

Open Surgery vs. TEVAR

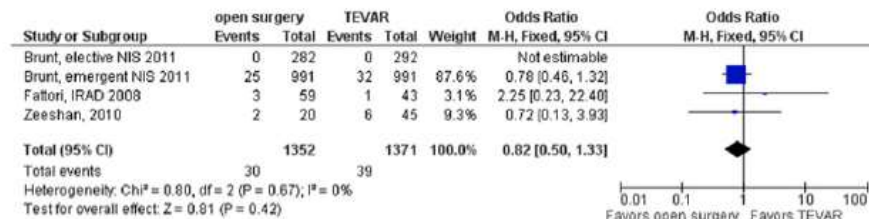
A Open surgery vs. TEVAR for acute type B dissections: early mortality



B Open surgery vs. TEVAR for acute type B dissections: early stroke

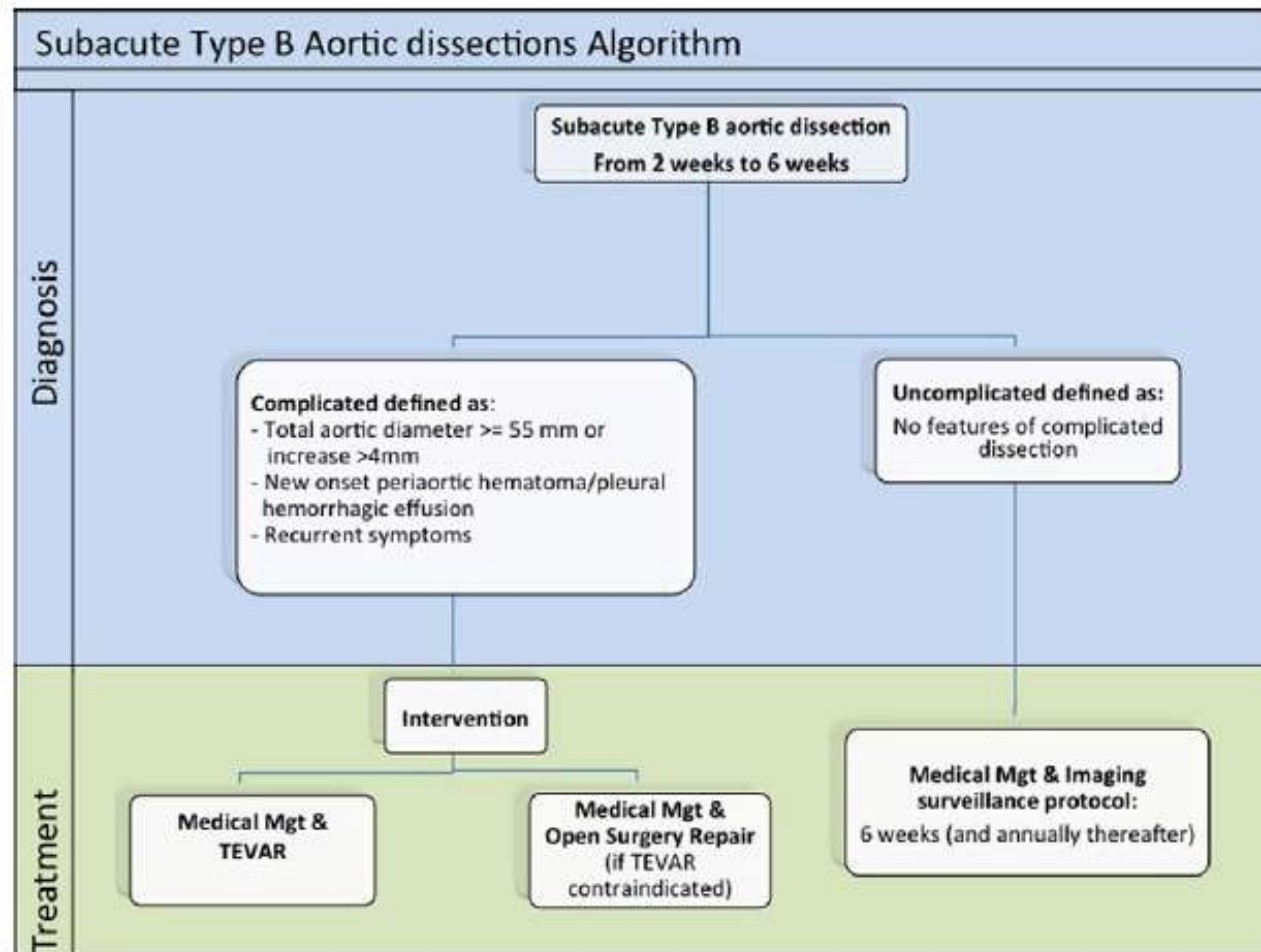


C Open surgery vs. TEVAR for acute type B dissections: early spinal cord ischemia



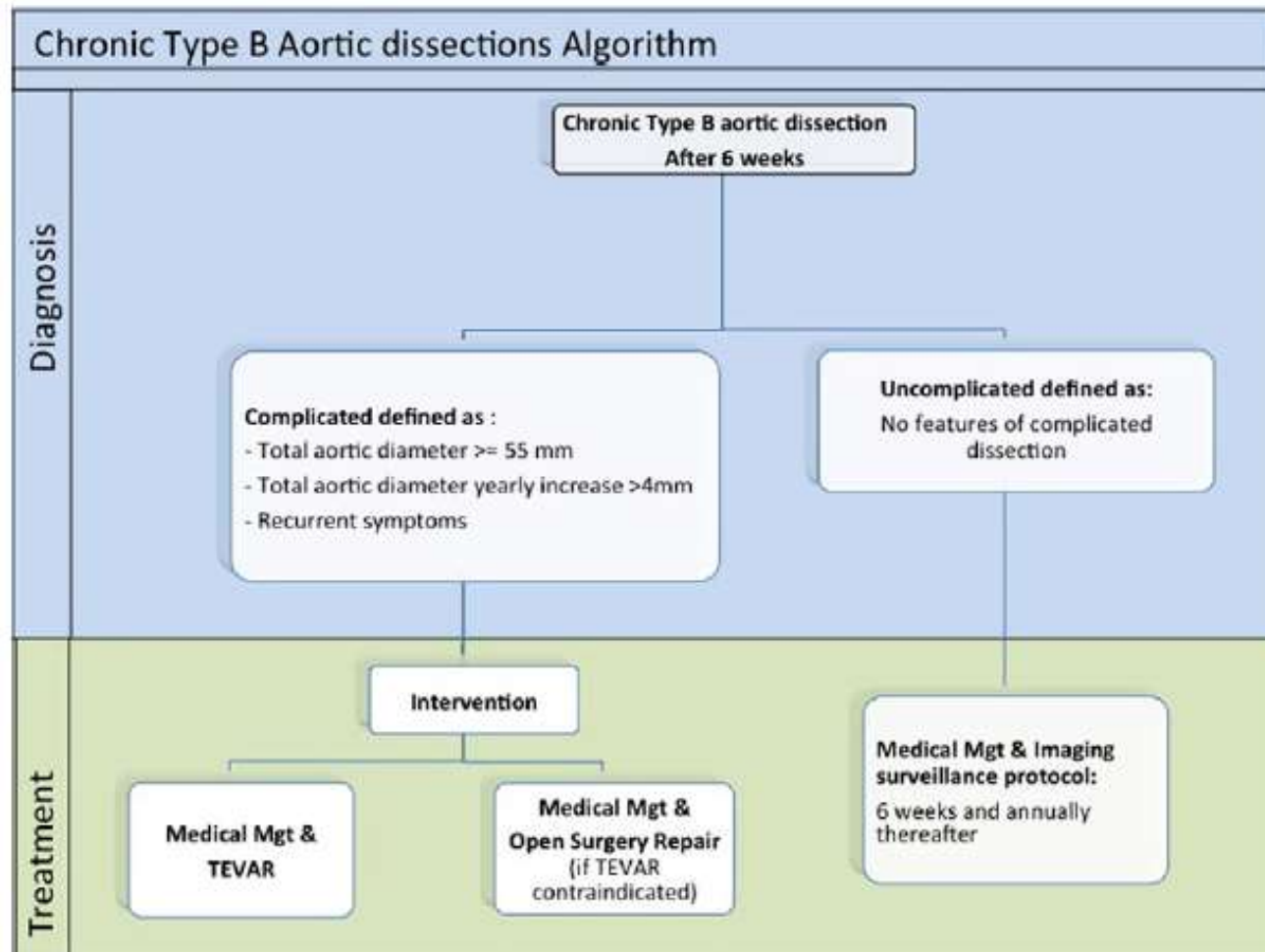
*Fattori R, et al.
J Am Coll Cardiol 2013;61:1661-78*

Treatment Algorithm of Type B AD



Fattori R, et al. J Am Coll Cardiol 2013;61:1661–78

Treatment Algorithm of Type B AD



Fattori R, et al. J Am Coll Cardiol 2013;61:1661–78

INSTEAD-XL

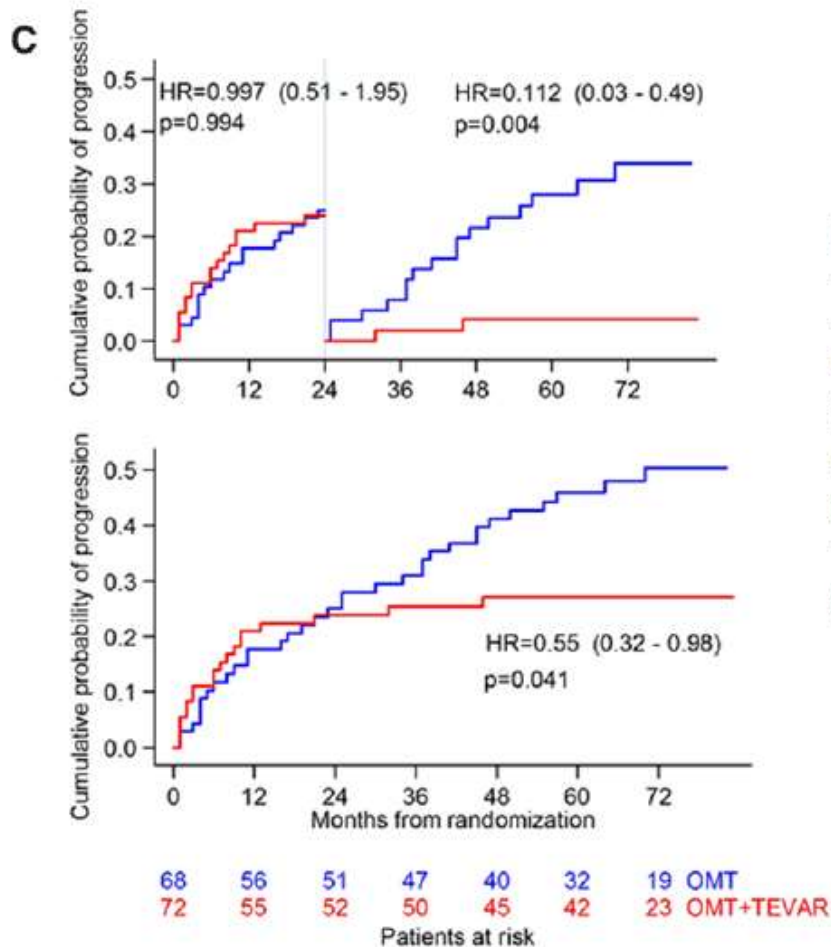


Table 5. Aortic Morphology at 5 Years

	OMT	OMT+TEVAR	P 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.

Nienaber CA, Circ Cardiovasc Interv. 2013;6:407-416