



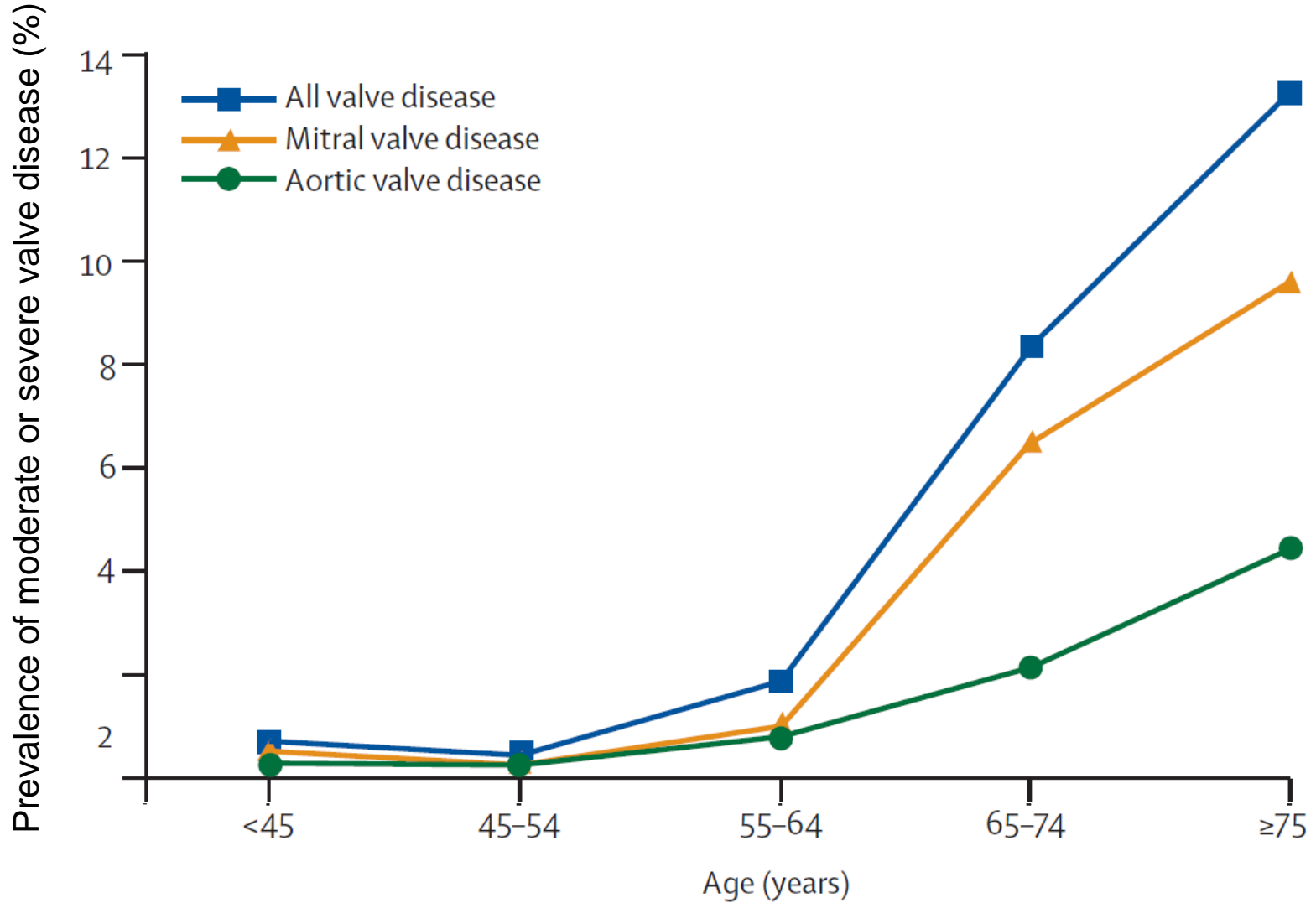
Aortic regurgitation and aneurysm – Epidemiology and guidelines

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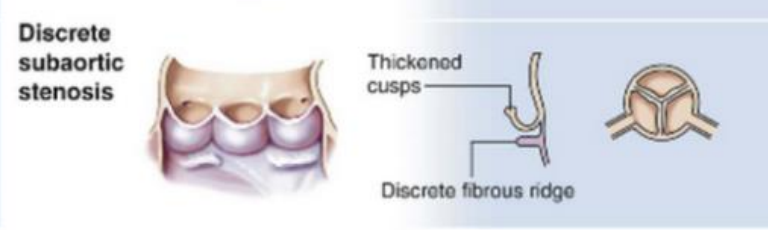
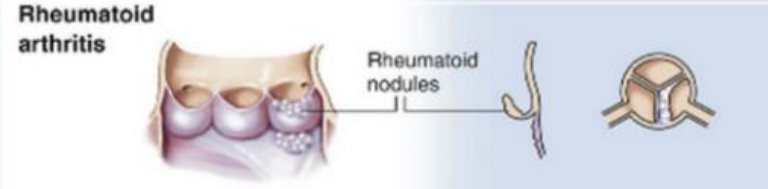
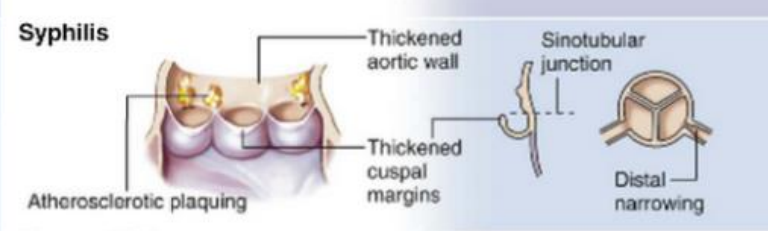
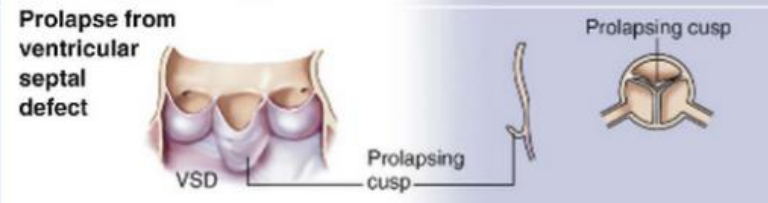
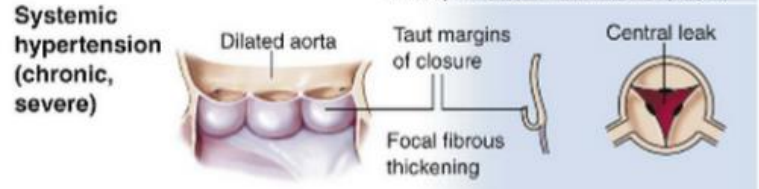
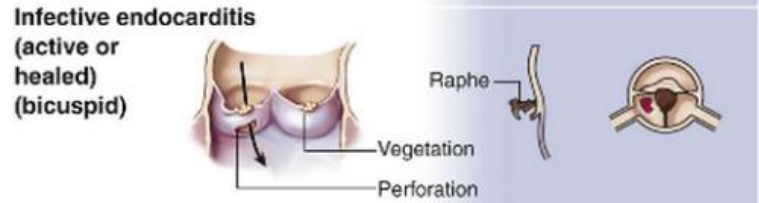
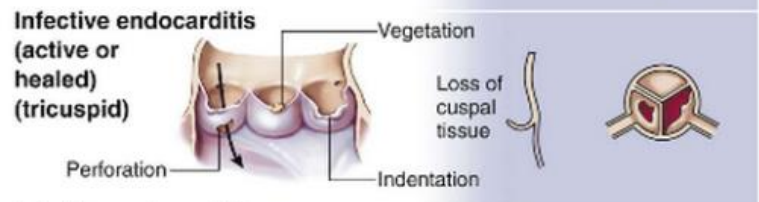
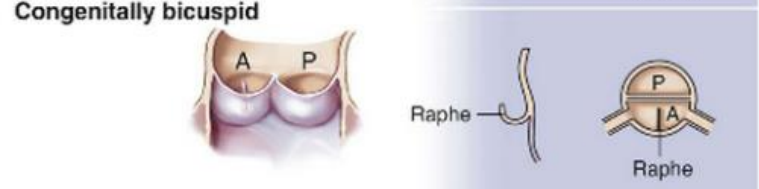
Prevalence of valvular disease





Prevalence of aortic regurgitation (Framingham Heart Study)

	Age (yr)				
	26-39	40-49	50-59	60-69	70-83
<u>MEN:</u>					
Aortic regurgitation	(n = 91)	(n = 352)	(n = 433)	(n = 359)	(n = 91)
None (%)	96.7	95.4	91.1	74.3	75.6
Trace (%)	3.3	2.9	4.7	13.0	10.0
Mild (%)	0.0	1.4	3.7	12.1	12.2
≥Moderate (%)	0.0	0.3	0.5	0.6	2.2
<u>WOMEN:</u>					
Aortic regurgitation	(n = 93)	(n = 451)	(n = 515)	(n = 390)	(n = 90)
None (%)	98.9	96.6	92.4	86.9	73.0
Trace (%)	1.1	2.7	5.5	6.3	10.1
Mild (%)	0.0	0.7	1.9	6.0	14.6
≥Moderate (%)	0.0	0.0	0.2	0.8	2.3

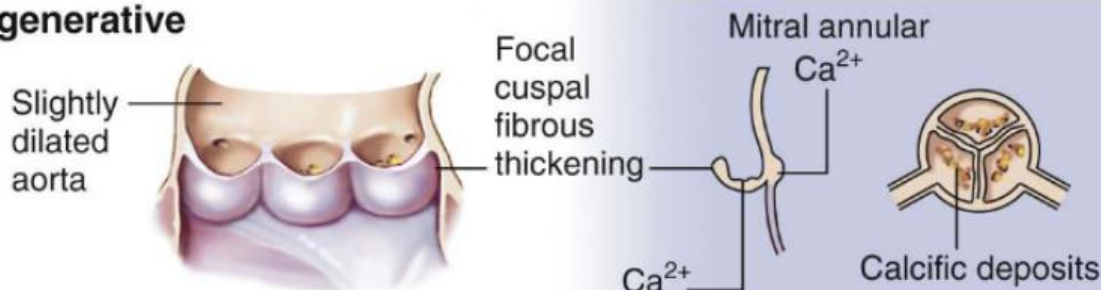


Etiology (Euro Heart Survey)

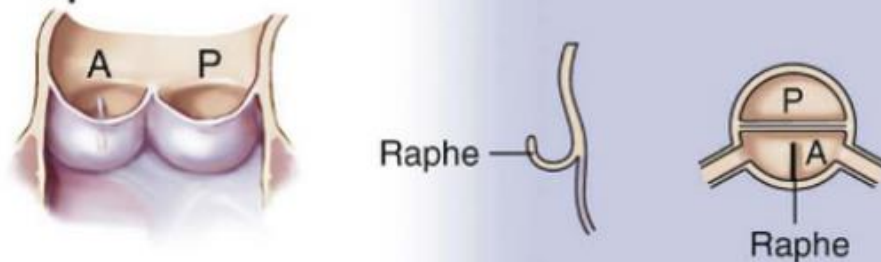
Table 3 Etiology of single native left-sided valve disease

	Aortic stenosis <i>n</i> =1197	Aortic regurgitation <i>n</i> =369	Mitral stenosis <i>n</i> =336
Degenerative (%)	81.9	50.3	12.5
Rheumatic (%)	11.2	15.2	85.4
Endocarditis (%)	0.8	7.5	0.6
Inflammatory (%)	0.1	4.1	0
Congenital (%)	5.4	15.2	0.6
Ischaemic (%)	0	0	0
Other (%)	0.6	7.7	0.9

Degenerative

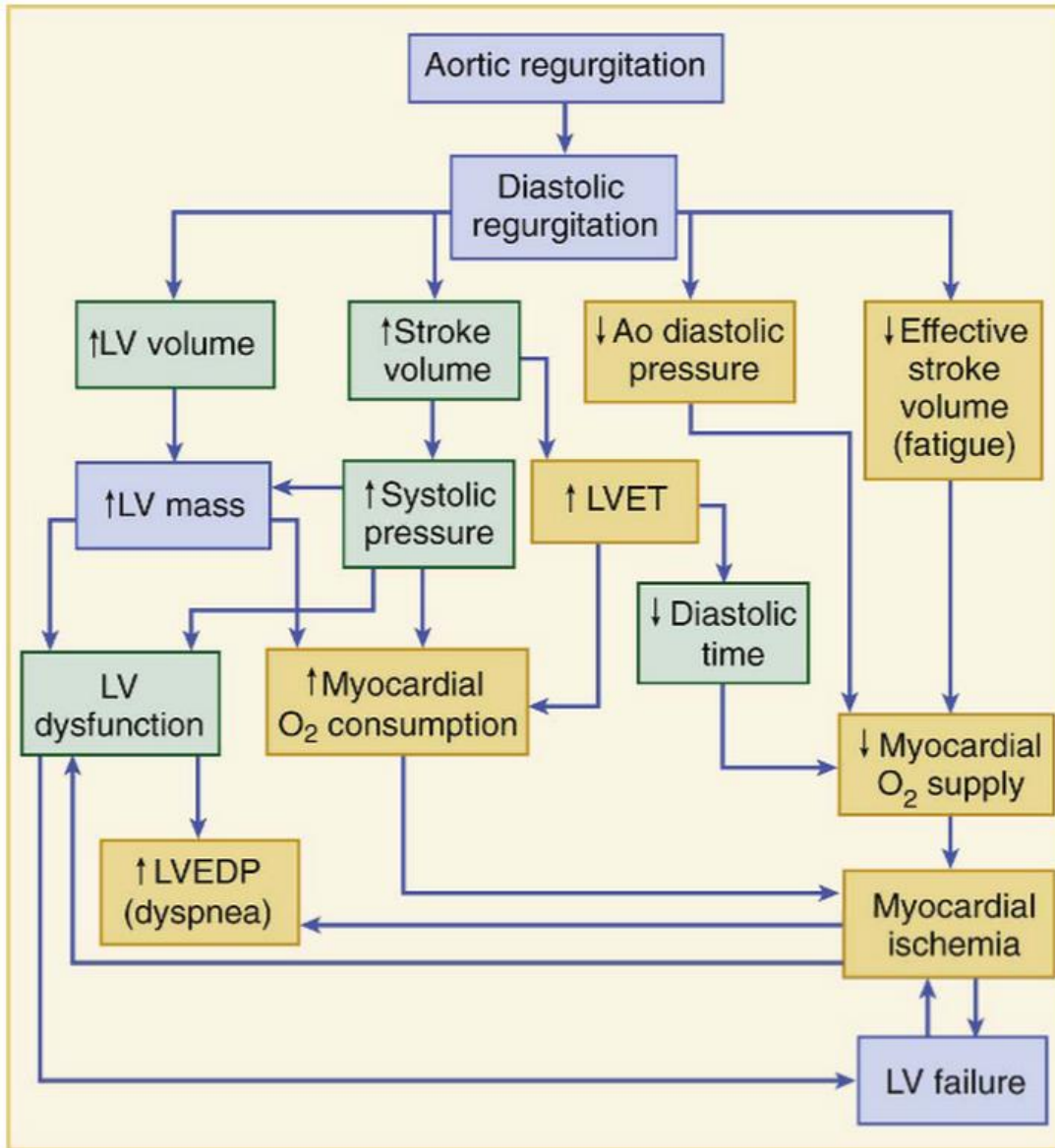


Congenitally bicuspid





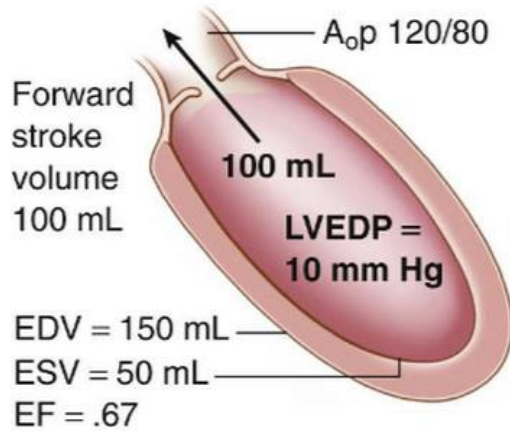
Pathophysiology



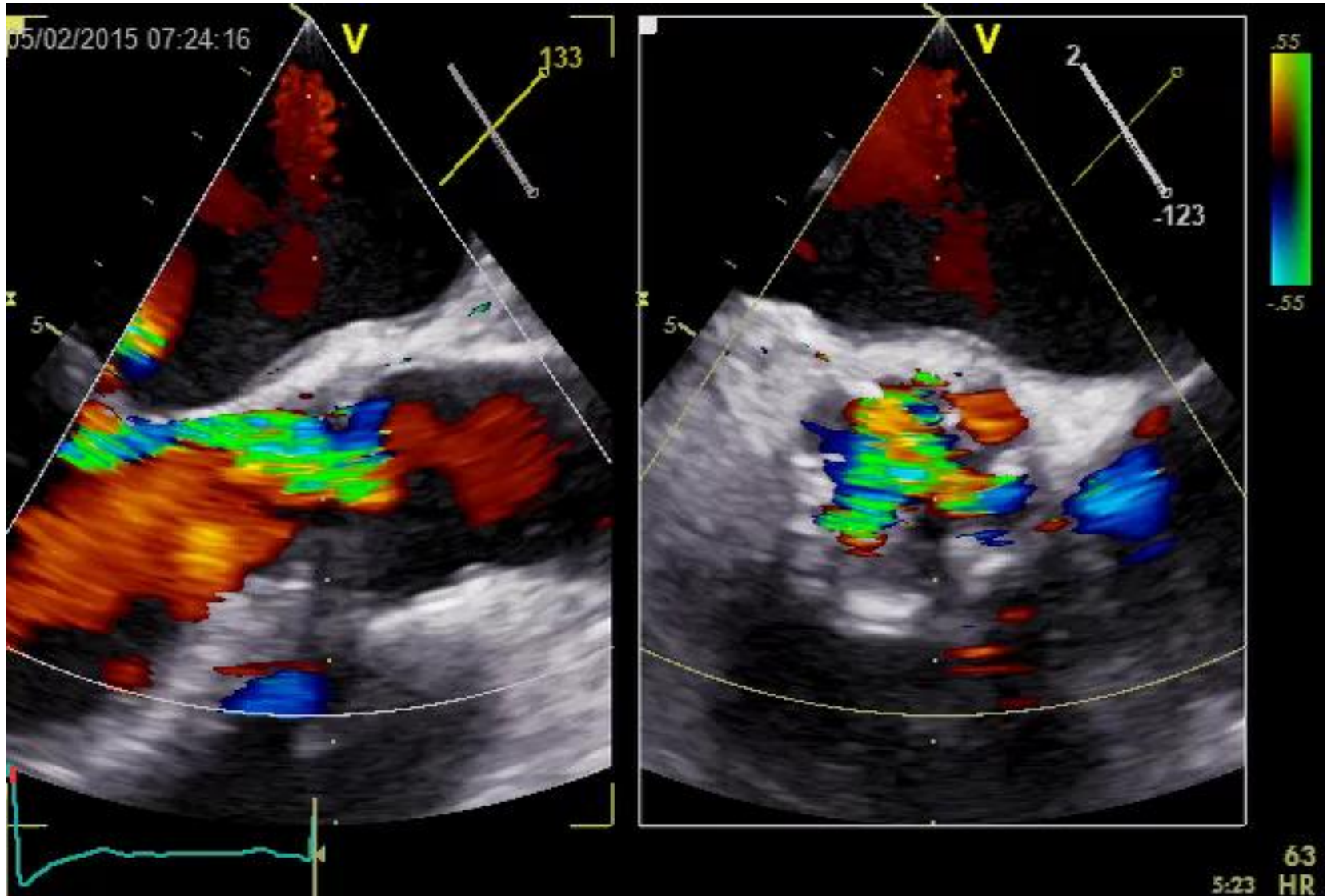


Hemodynamics

normal



Severe aortic regurgitation

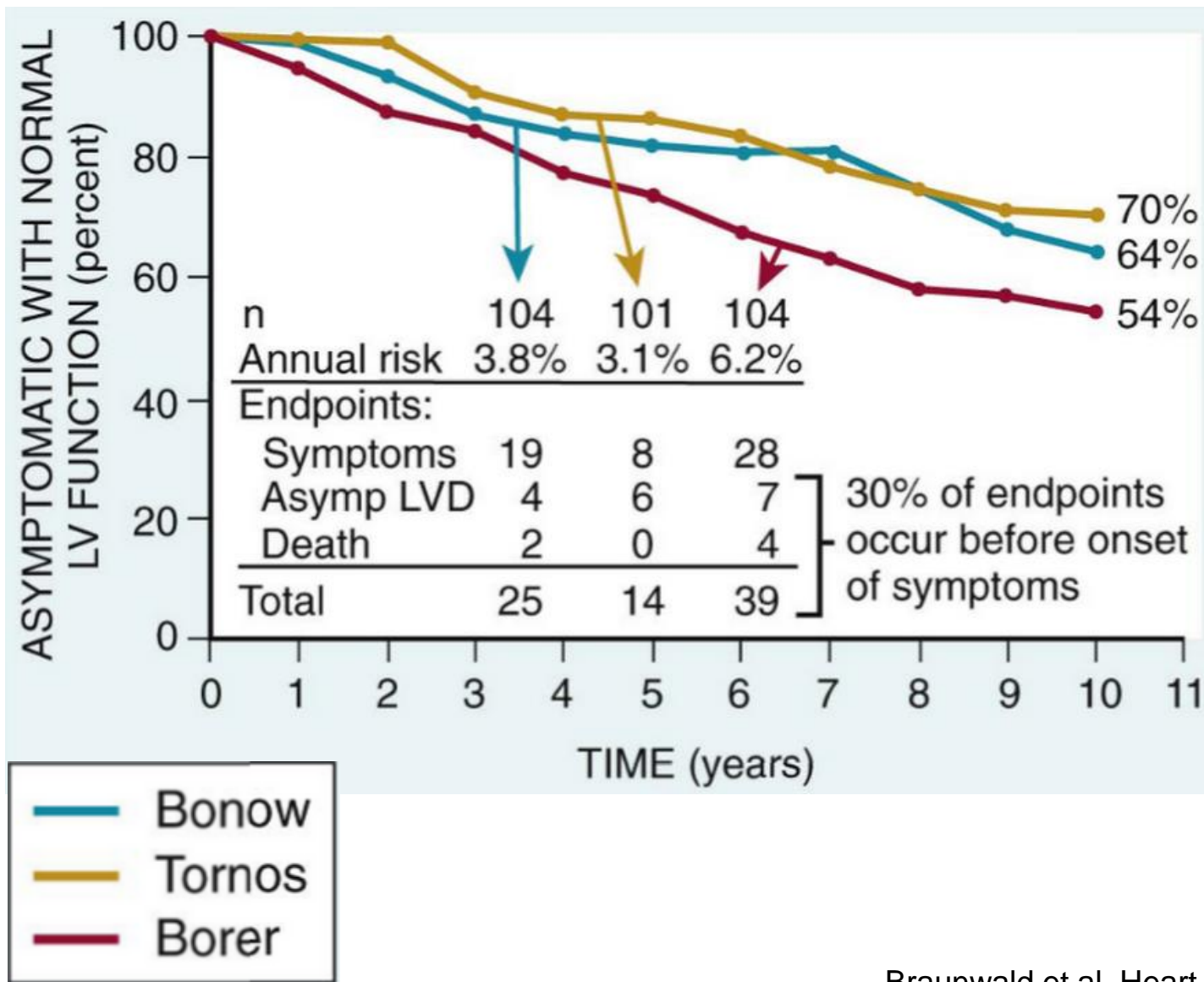




When to operate?



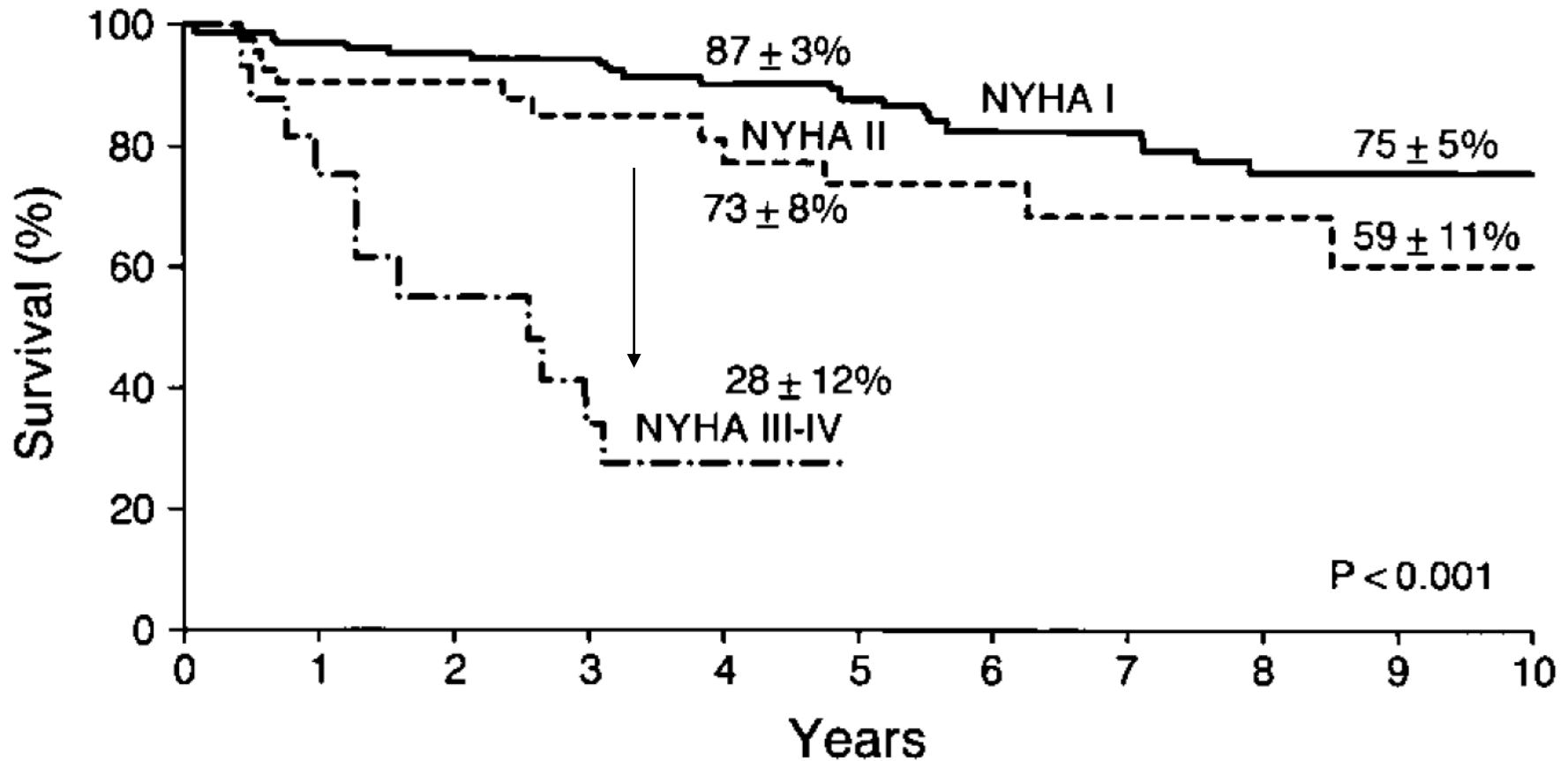
Prognosis in asymptomatic patients





Prognosis – depends on symptoms

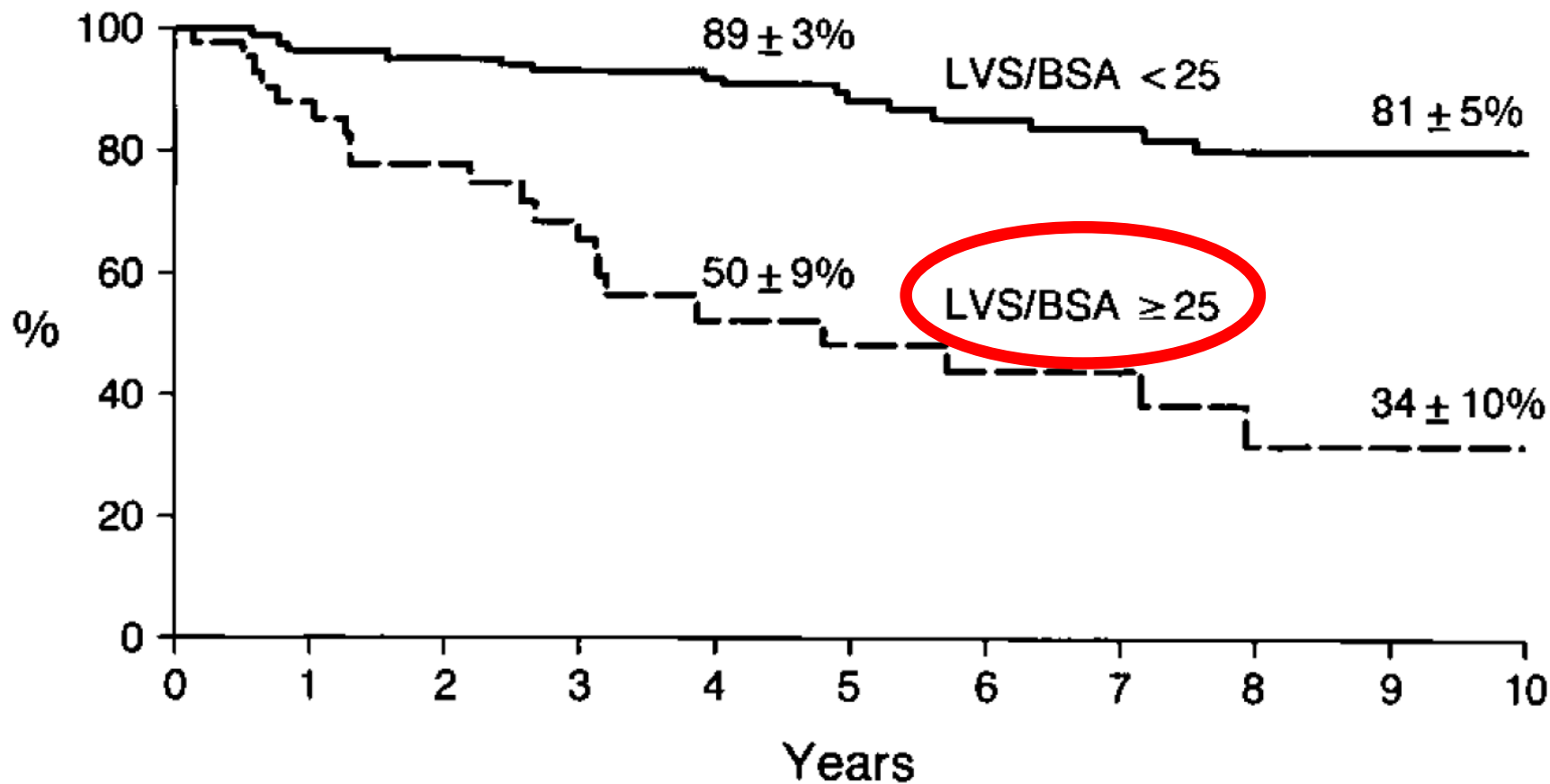
n=246 patients, conservative management





... and on LVESV

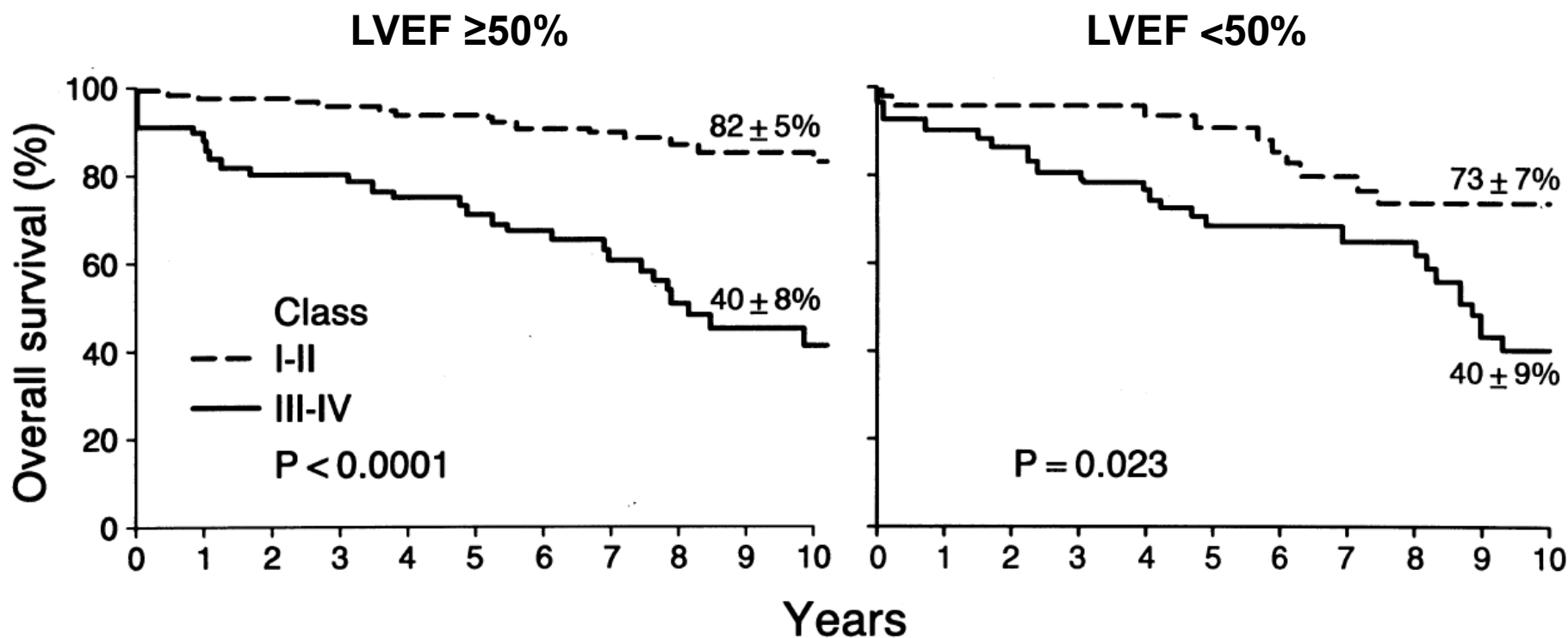
n=246 patients, conservative management





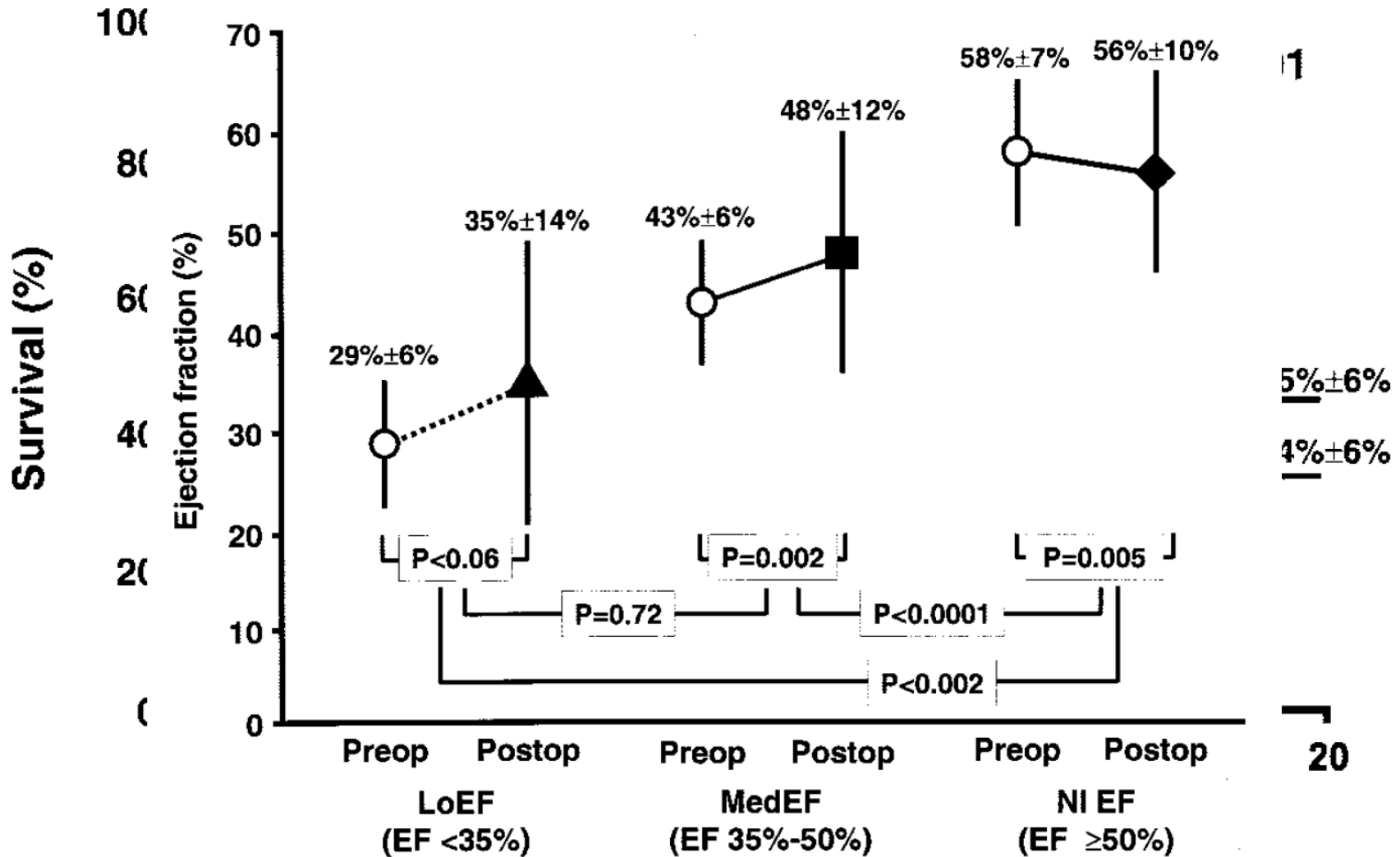
Prognosis – depends on **symptoms** (following AVR)

n=161 patients NYHA I-II, n=128 patients NYHA III-IV, AVR



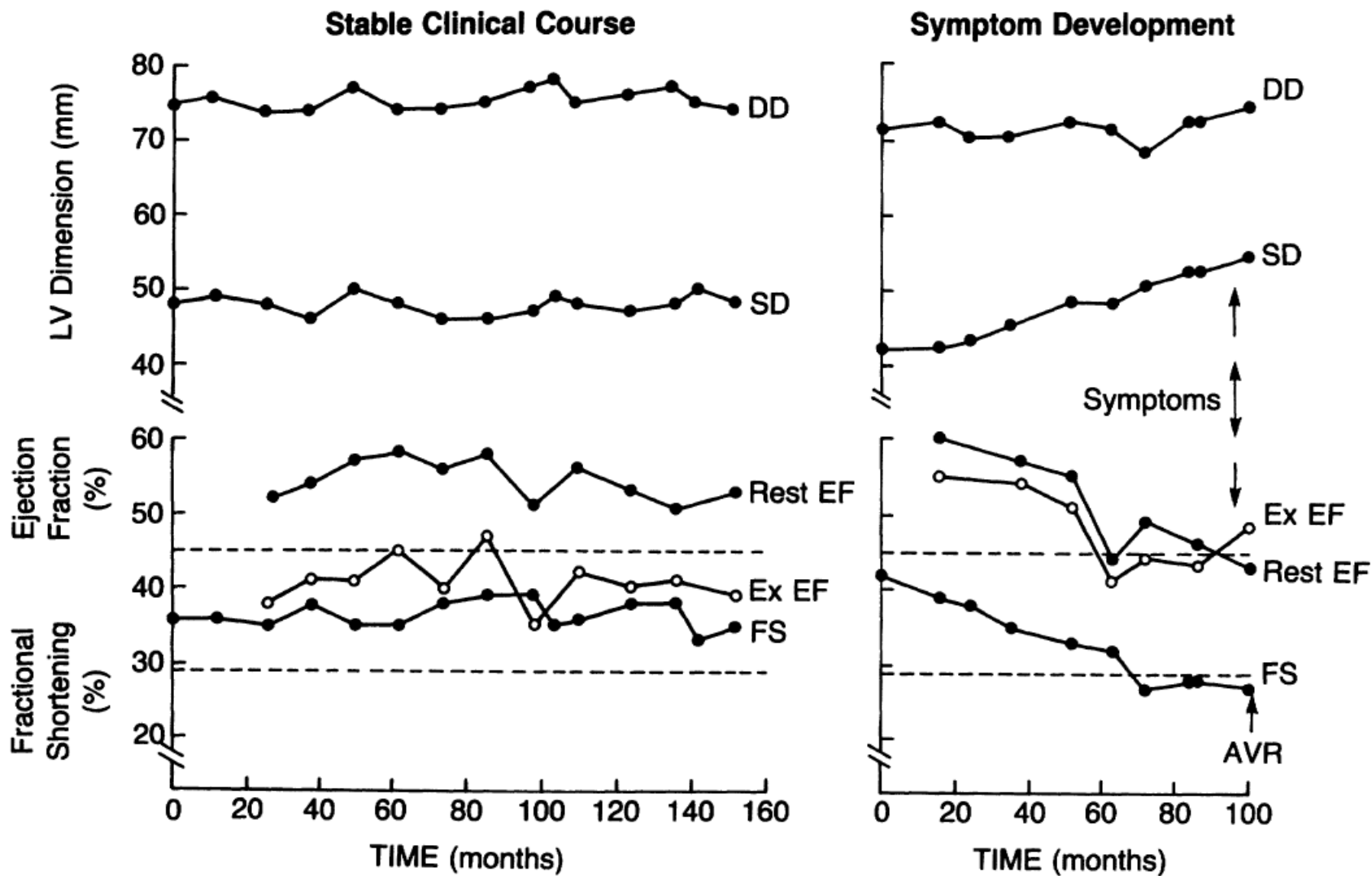


EF determines survival post AVR





Systolic dilatation and dysfunction precedes symptoms

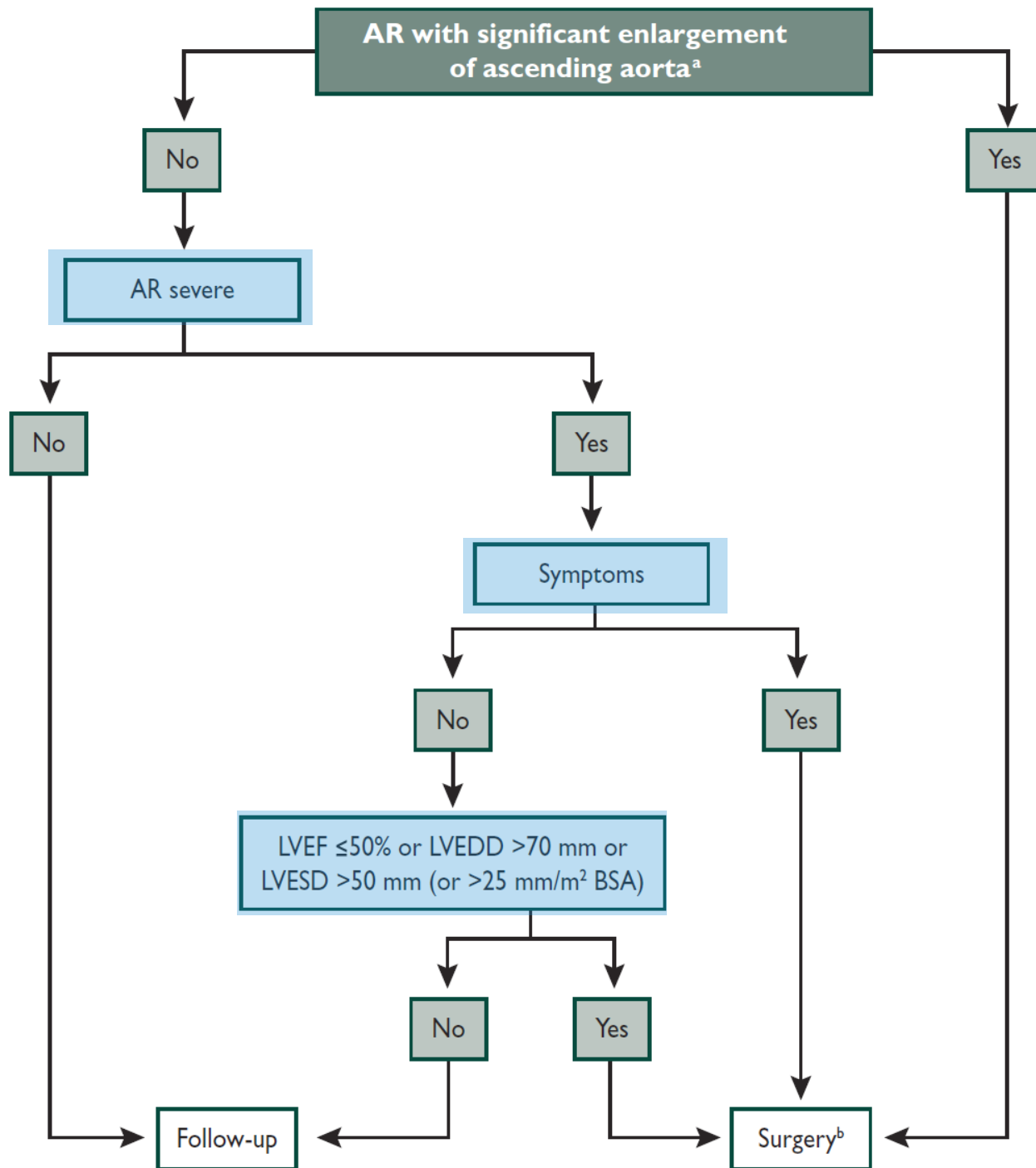




ESC Guidelines aortic regurgitation

A. Indications for surgery in severe aortic regurgitation		
Surgery is indicated in symptomatic patients.	I	B
Surgery is indicated in asymptomatic patients with resting LVEF $\leq 50\%$.	I	B
Surgery is indicated in patients undergoing CABG or surgery of ascending aorta, or on another valve.	I	C
Surgery should be considered in asymptomatic patients with resting EF $> 50\%$ with severe LV dilatation: LVEDD > 70 mm, or LVESD > 50 mm or LVESD > 25 mm/m ² BSA. ^d	IIa	C

Flow chart

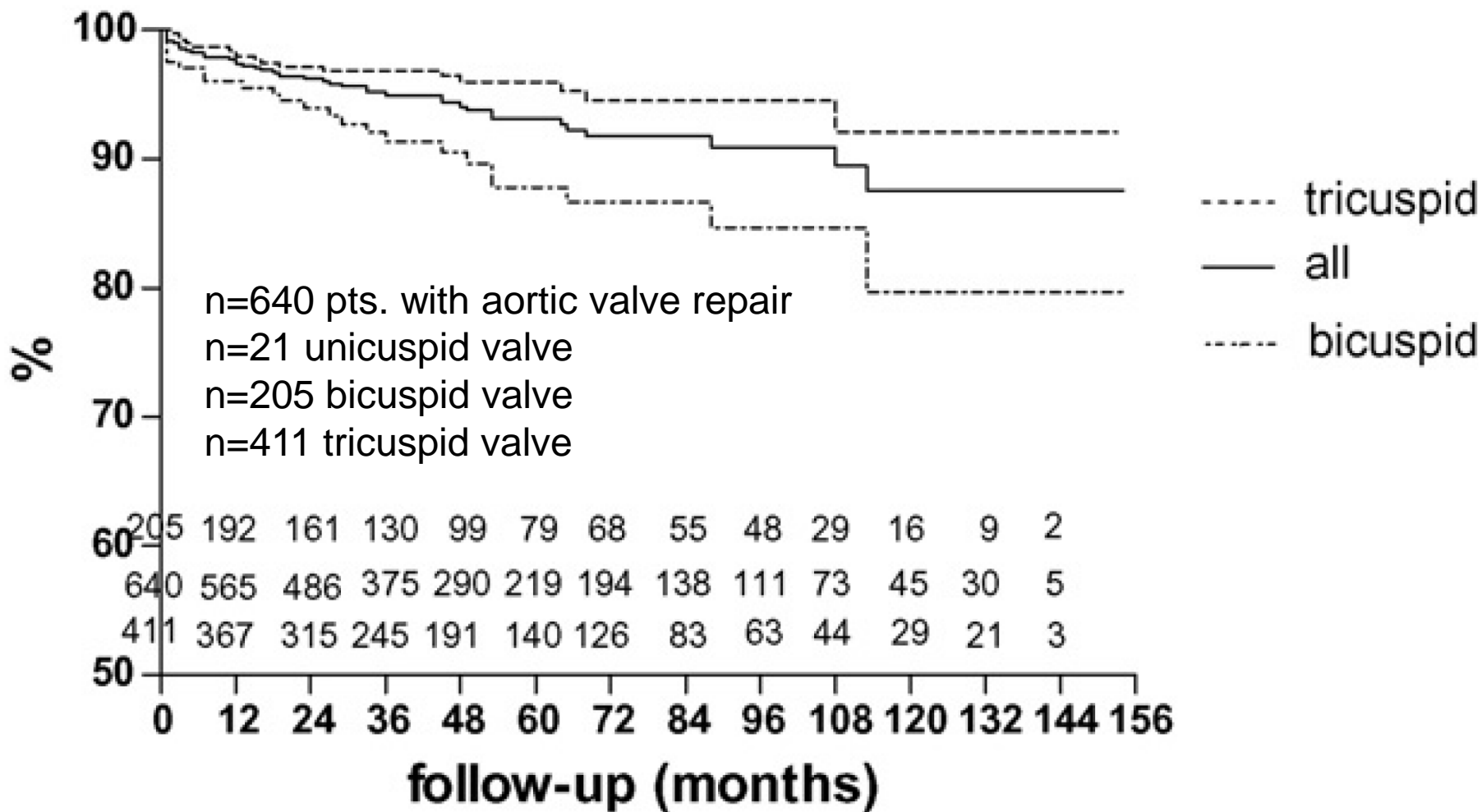




How to operate?



Following AV repair: freedom of all valve-related complications





Aortic aneurysm



Normal size aortic root

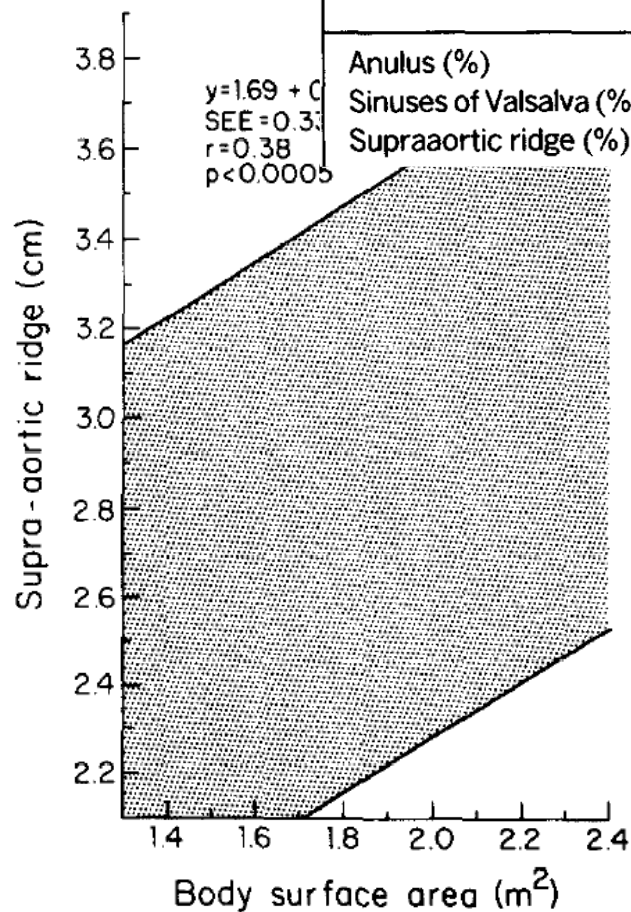
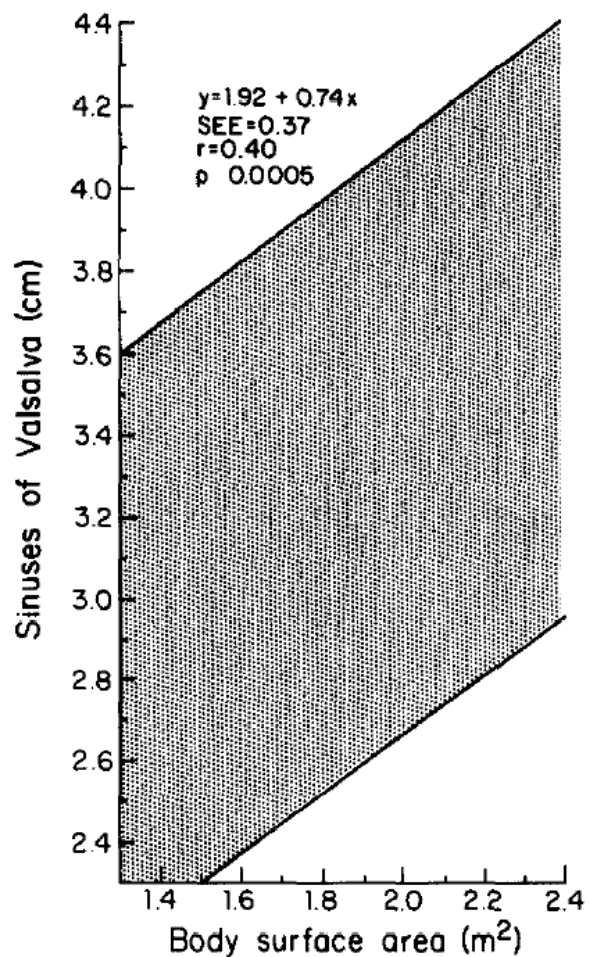


TABLE IV Sex-Specific Criteria for Upper Normal Limits of Aortic Root Dimensions in Adults*

	Men		Women	
	Absolute (cm)	Indexed (cm/m ²)	Absolute (cm)	Indexed (cm/m ²)
Anulus (%)	3.1 (97)	1.6 (100)	2.6 (97)	1.6 (100)
Sinuses of Valsalva (%)	4.0 (99)	2.1 (99)	3.6 (96)	2.1 (97)
Supraaortic ridge (%)	3.6 (97)	1.9 (98)	3.2 (100)	1.9 (97)



Risk of rupture of thoracic aortic aneurysms

Table 5. Risk of Complications by Aortic Diameter and Body Surface Area With Aortic Size Index Given Within Chart

	Aortic Size (cm)									
	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
BSA										
1.30	2.69	3.08	3.46	3.85	4.23	4.62	5.00	5.38	5.77	6.15
1.40	2.50	2.86	3.21	3.57	3.93	4.29	4.64	5.00	5.36	5.71
1.50	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00	5.33
1.60	2.19	2.50	2.80	3.13	3.44	3.75	4.06	4.38	4.69	5.00
1.70	2.05	2.35	2.65	2.94	3.24	3.53	3.82	4.12	4.41	4.71
1.80	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17	4.44
1.90	1.84	2.11	2.37	2.63	2.89	3.16	3.42	3.68	3.95	4.22
2.00	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00
2.10	1.67	1.90	2.14	2.38	2.62	2.86	3.10	3.33	3.57	3.80
2.20	1.59	1.82	2.05	2.27	2.50	2.72	2.95	3.18	3.41	3.64
2.30	1.52	1.74	1.96	2.17	2.39	2.61	2.83	3.04	3.26	3.48
2.40	1.46	1.67	1.88	2.08	2.29	2.50	2.71	2.92	3.13	3.33
2.50	1.40	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00	3.20

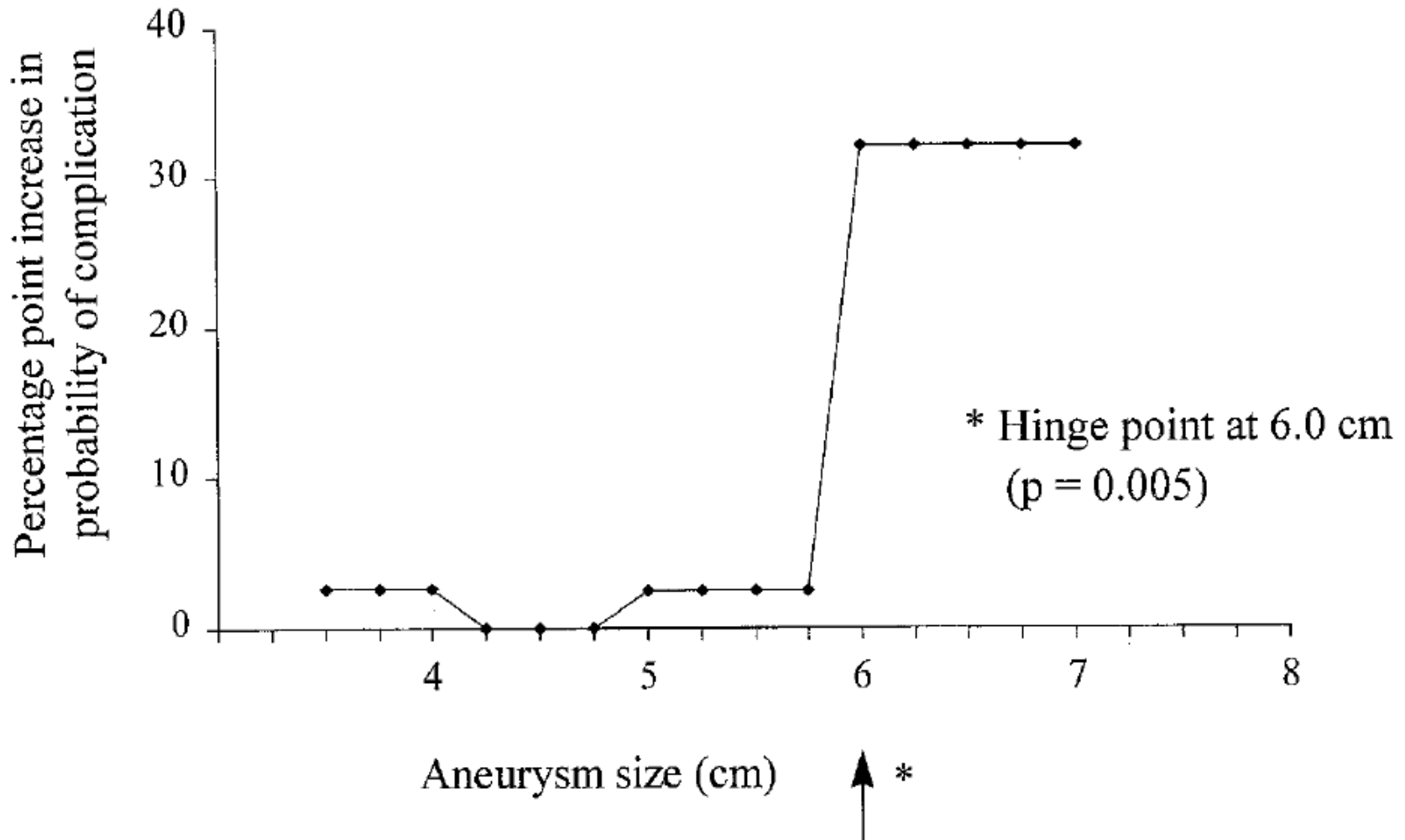
□ = low risk (~1% per yr); □ = moderate risk (~8% per yr); □ = severe risk (~20% per yr).

White area indicates low risk, light gray area indicates moderate risk, and dark gray area indicates severe risk.

BSA = body surface area.

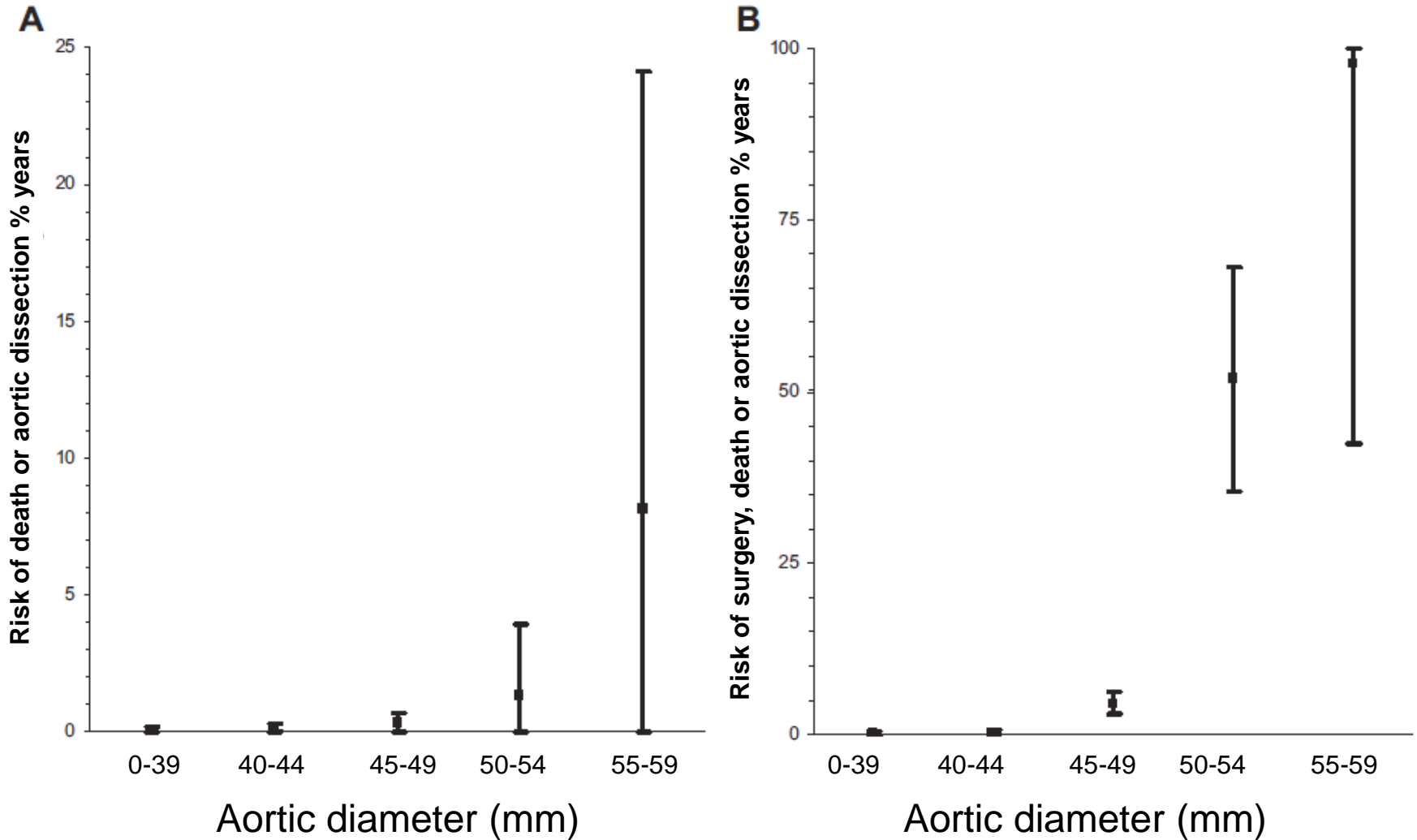


Risk of rupture



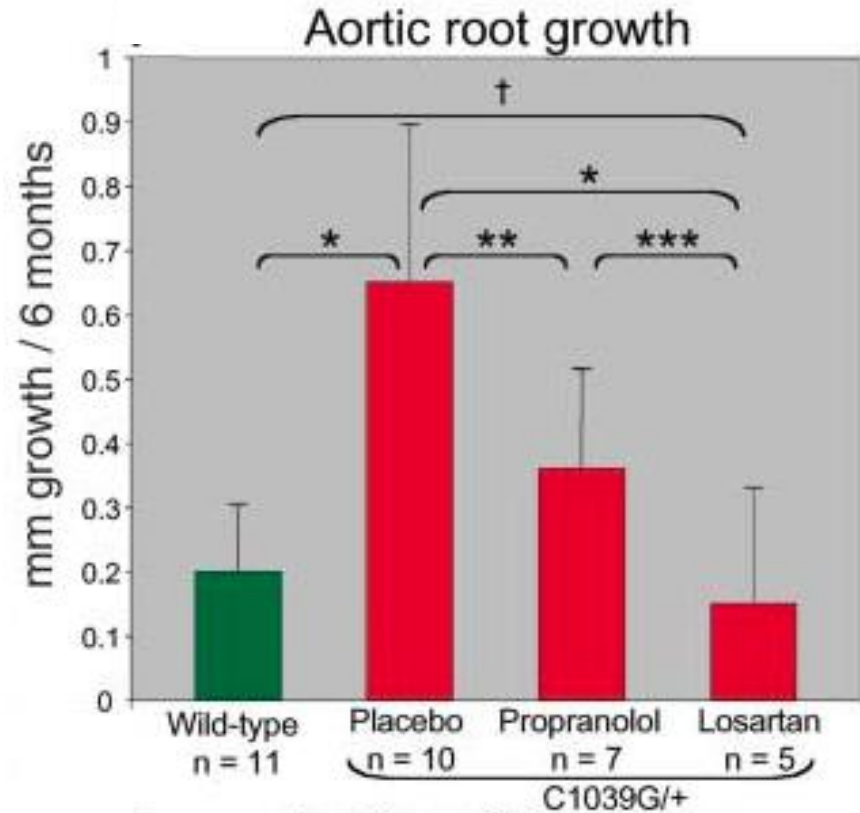
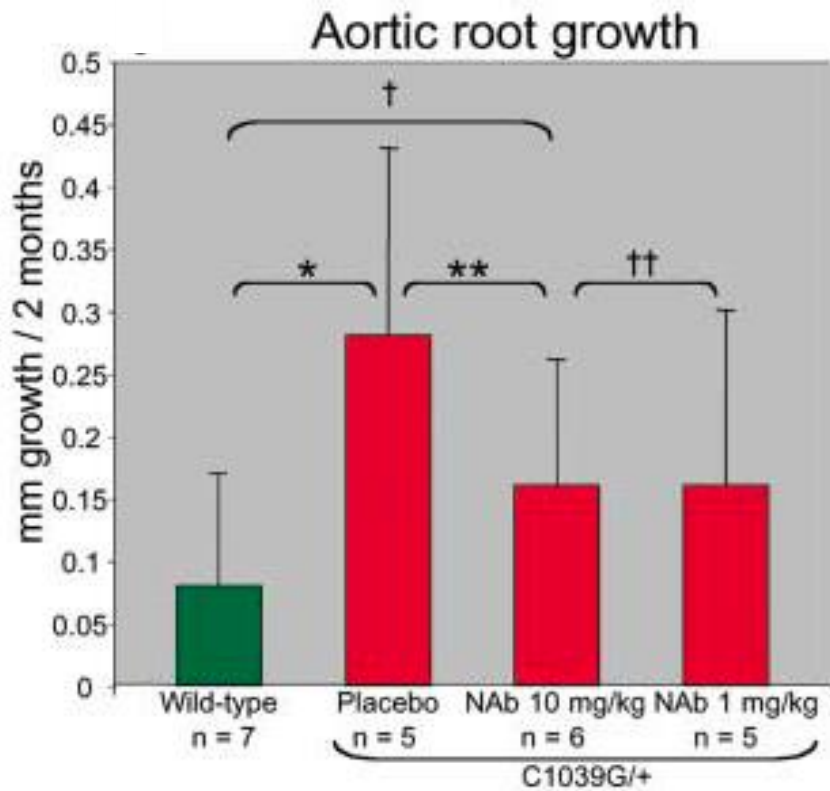


Subpopulation: Marfan



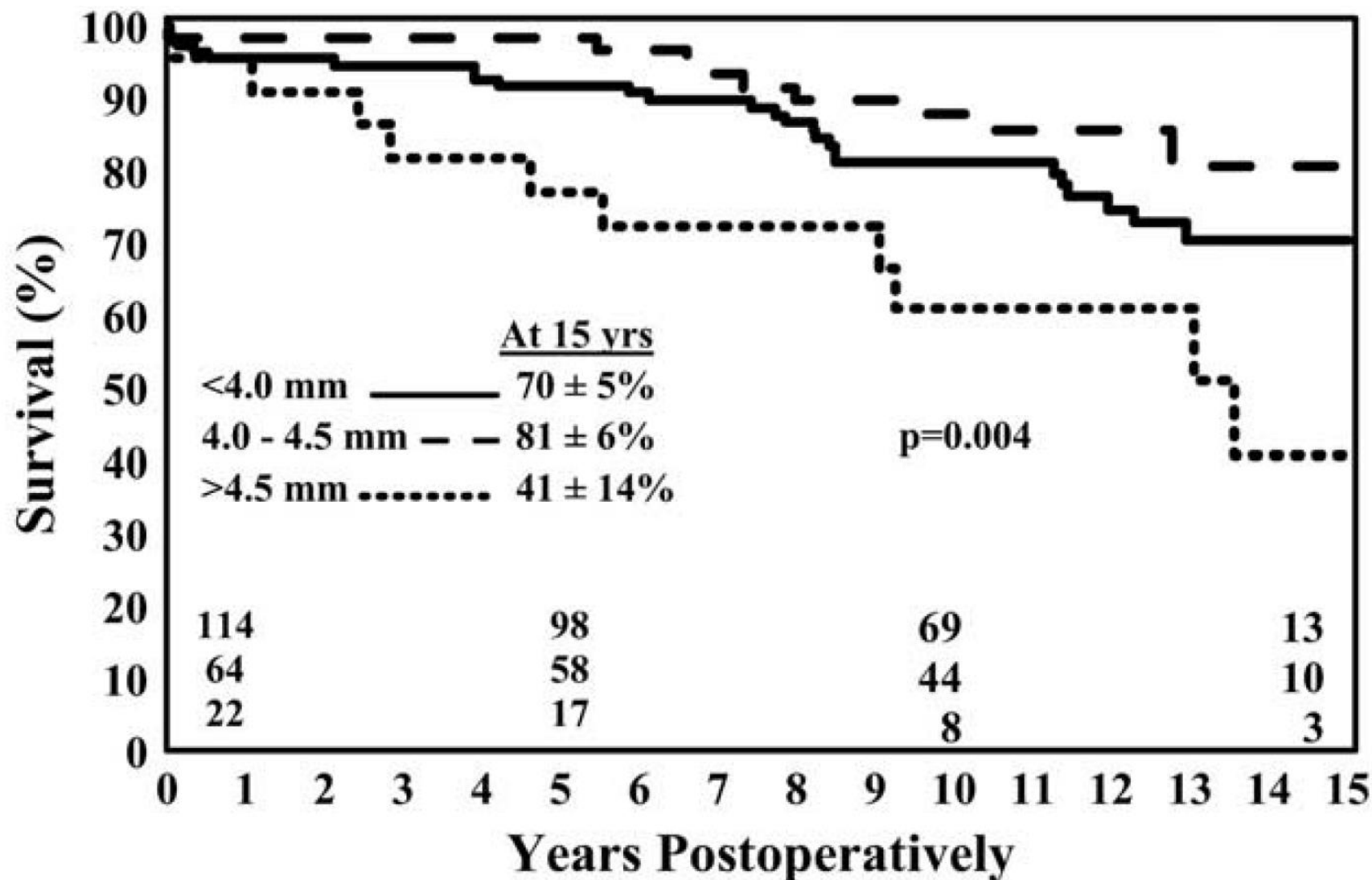


TGF β and AT1-receptor signaling





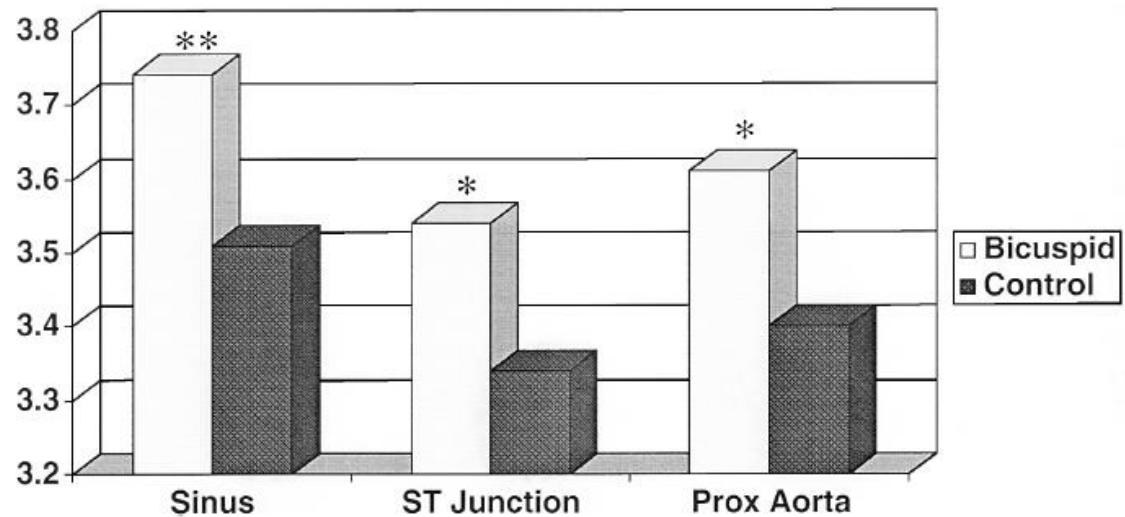
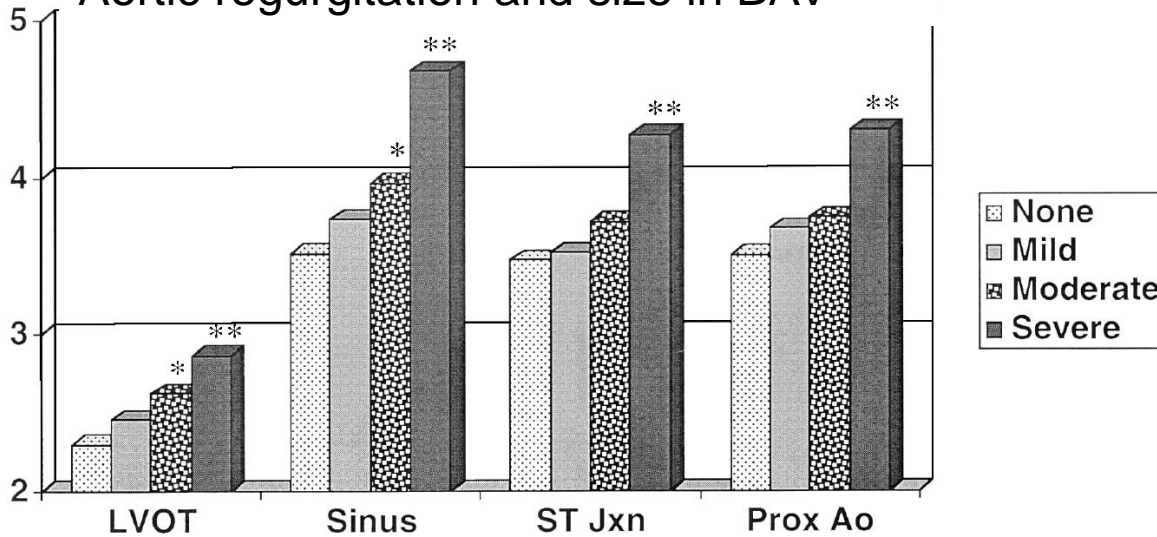
Concomitant TAA in operated **BAV**





BAV predicts aortic dilatation

Aortic regurgitation and size in BAV





ESC Guidelines aortic aneurysm

B. Indications for surgery in aortic root disease (whatever the severity of AR)

Surgery is indicated in patients who have aortic root disease with maximal ascending aortic diameter^e ≥ 50 mm for patients with Marfan syndrome.

I

C

Surgery should be considered in patients who have aortic root disease with maximal ascending aortic diameter:
 ≥ 45 mm for patients with Marfan syndrome with risk factors^f
 ≥ 50 mm for patients with bicuspid valve with risk factors^g
 ≥ 55 mm for other patients

IIa

C

* risk factors: >2 mm/year progression, family history



Genetic predisposition

Recommendations	Class ^a	Level ^b
It is recommended to investigate first-degree relatives (siblings and parents) of a subject with TAAD to identify a familial form in which relatives all have a 50% chance of carrying the family mutation/disease.	I	C
Once a familial form of TAAD is highly suspected, it is recommended to refer the patient to a geneticist for family investigation and molecular testing.	I	C
Variability of age of onset warrants screening every 5 years of 'healthy' at-risk relatives until diagnosis (clinical or molecular) is established or ruled out.	I	C
In familial non-syndromic TAAD, screening for aneurysm should be considered, not only in the thoracic aorta, but also throughout the arterial tree (including cerebral arteries).	IIa	C



Subpopulation: Bicuspid valve (BAV)

Recommendations	Class ^a	Level ^b	Recommendations	Class ^a	Level ^b
Patients with known BAV should undergo an initial TTE to assess the diameters of the aortic root and ascending aorta.	I	C	In cases of BAV, surgery of the ascending aorta is indicated in case of: <ul style="list-style-type: none"> aortic root or ascending aortic diameter >55 mm. aortic root or ascending aortic diameter >50 mm in the presence of other risk factors.^c aortic root or ascending aortic diameter >45 mm when surgical aortic valve replacement is scheduled. 	I	C
Cardiac MRI or CT is indicated in patients with BAV when the morphology of the aortic root and the ascending aorta cannot be accurately assessed by TTE.	I	C			
Serial measurement of the aortic root and ascending aorta is indicated in every patient with BAV, with an interval depending on aortic size, increase in size and family history	I	C			
In the case of a diameter of the aortic root or the ascending aorta >45 mm or an increase >3 mm/year measured by echocardiography, annual measurement of aortic diameter is indicated.	I	C			
In the case of aortic diameter >50 mm or an increase >3 mm/year measured by echocardiography, confirmation of the measurement is indicated, using another imaging modality (CT or MRI).	I	C			
			Beta-blockers may be considered in patients with BAV and dilated aortic root >40 mm.	IIb	C
			Because of familial occurrence, screening of first-degree relatives should be considered.	IIa	C



Robert Stadler, St.-Paul-St.Louis, Paris



Thank you



Priv.-Doz. Dr. Dr. med. Stephan H. Schirmer

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