Academy

LEVEL 3

Reconstruction of the Aortic Valve and Root
A practical approach

Aortic regurgitation and aneurysm
Epidemiology and Guidelines

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I have no conflicts of interest

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

HOSPITAL CLINIC BARCELONA (1906-2022)

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

Why the hell we need to know about epidemiology?

1. HV diseases, in general, only produce symptoms when disease is already advanced
2. Poor definition of the natural history of HV disease, with some exceptions
3. No known medical treatment that significantly alters evolution or prognosis
4. The real implications for wider health policies and broad strategies

Modified from Bernard Prendergast

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

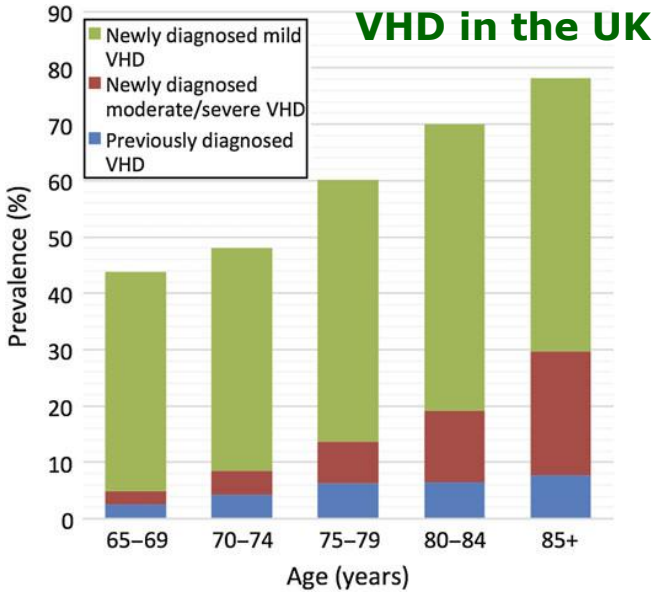
Does any study showed, at least, the current prevalence of AR and AAA?

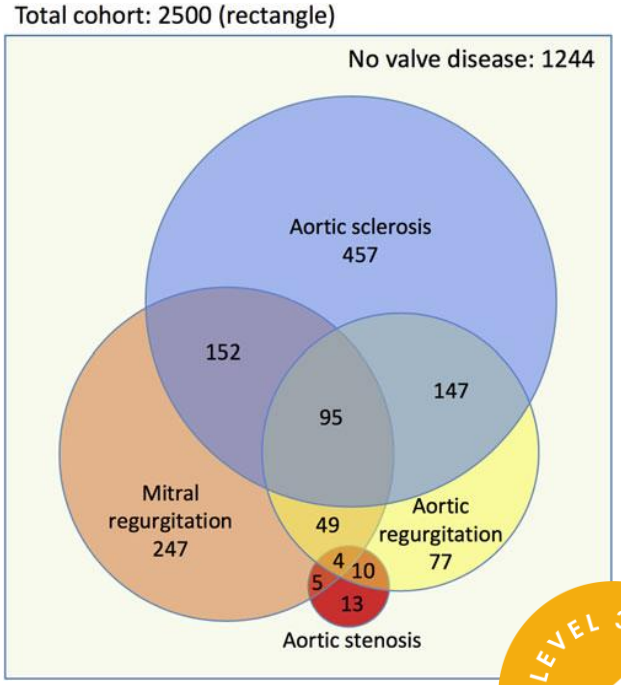
Scarce studies and of small size
Prevalence in asymptomatic patients?? No idea
Relative low use of stethoscope by GPs (50%) **and cardiologists…**
No routine screening is advised anywhere

Low awareness of Valvular Heart Disease in the western population:
- Germany 28%
- <5% UK, Ireland, Norway,…

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

Screening in 2500 subjects with TTE (73 y.o, 50% female)





D'Arcy JL et al. Eur Heart J. 2016; 37, 3515–3522

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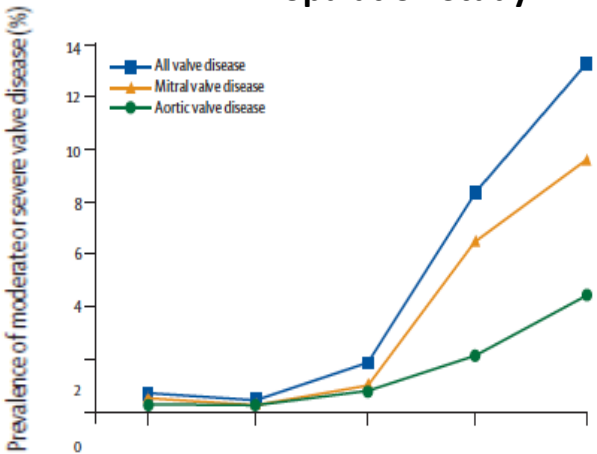
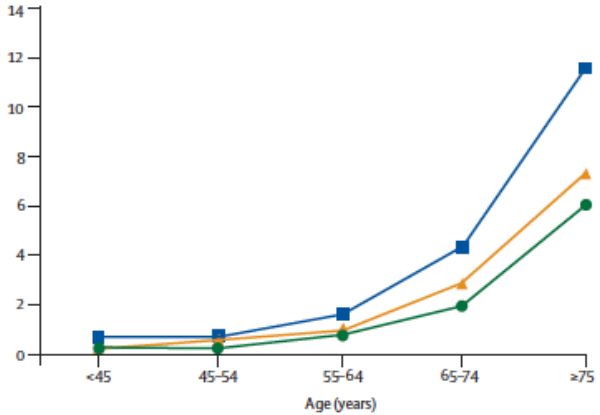
The burden of Heart Valve Disease

Population Study



n= 11911
Prevalence VHD 2,5%

Community Study



n= 16501
Prevalence VHD 1,8%

Nkomo et al. Lancet 2006;368:1005-11.

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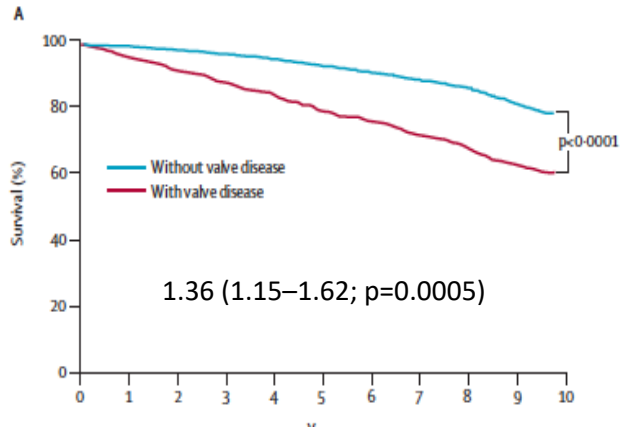
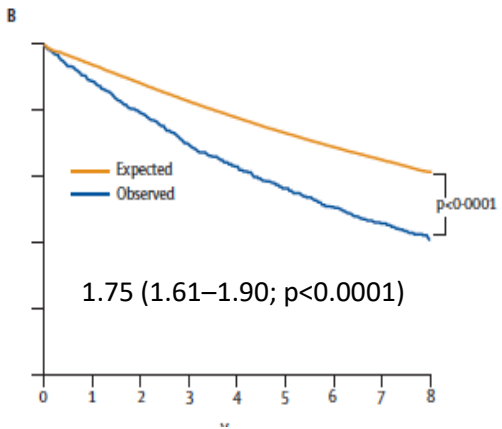
The burden of Heart Valve Disease: Adjusted mortality risk (**survival**)

Population Study



1.36 (1.15–1.62; p=0.0005)

Community Study



1.75 (1.61–1.90; p<0.0001)

Nkomo et al. Lancet 2006;368:1005-11.

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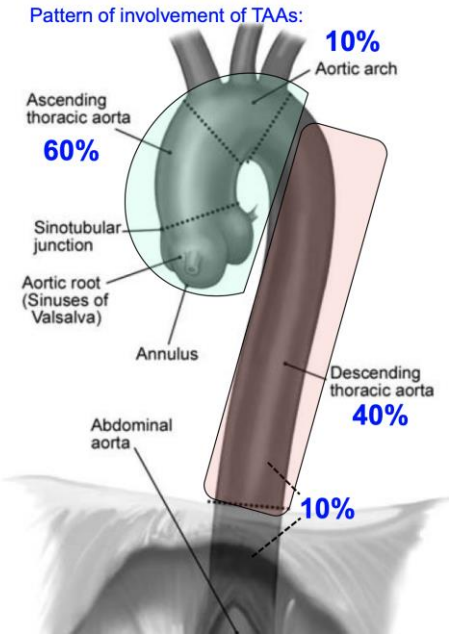


Thoracic aorta aneurysms and dissections

Incidence

- TAA: 10.4 per 100.000 per year (m:f ~ 1.7:1)
- TAD: 2.9 per 100.000 per year (m:f ~ 4:1 to 1:1)

Annual risk of rupture or dissection

- TAA < 5 cm → 2%
- TAA 5.0-5.9 cm → 3%
- TAA ≥ 6.0 cm → 7%

LEVEL 3

Isselbacher EM in Baliga, Nienaber, Isselbacher, Eagle (eds): *Aortic Dissection and Related Syndromes, Springer 2007.*

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

Table 2 Type of valvular heart disease

	Total population *n*=5001		Patients with intervention *n*=1269	
Native valve disease (%)	71.9		87.0	
Aortic (% native)	44.3		57.4	
Aortic stenosis (%)		33.9		46.6
Aortic regurgitation (%)		10.4		10.8
Mitral (% native)	34.3		24.3	
Mitral stenosis (%)		9.5		10.2
Mitral regurgitation (%)		24.8		14.1
Multiple (% native)	20.2		16.8	
Right (% native)	1.2		1.5	
Previous intervention (%)	28.1		13.0	
Conservative surgery (%)	18.4		28.7	
Valve replacement (%)	81.6		71.3	

3rd cause of VHD
3rd reason for intervention

Iung B et al. Eur Heart J **2003**; 24:1231-43

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

Interventions on AR in 2001
(Euro Heart Survey on Valvular Heart Disease):

Aortic valve replacement with mechanical or bioprosthesis	94.1%
Replacement by homograft	2.5%
Replacement by autograft	1.7%
Aortic valve repair	1.7%

Most frequent etiologies 2001
(Euro Heart Survey)

Degenerative	50%
Rheumatic	15%
Congenital	15%
Endocarditis	8%

Iung B.: Eur Heart J; **2003**:24:1231-43

VHD II Survey

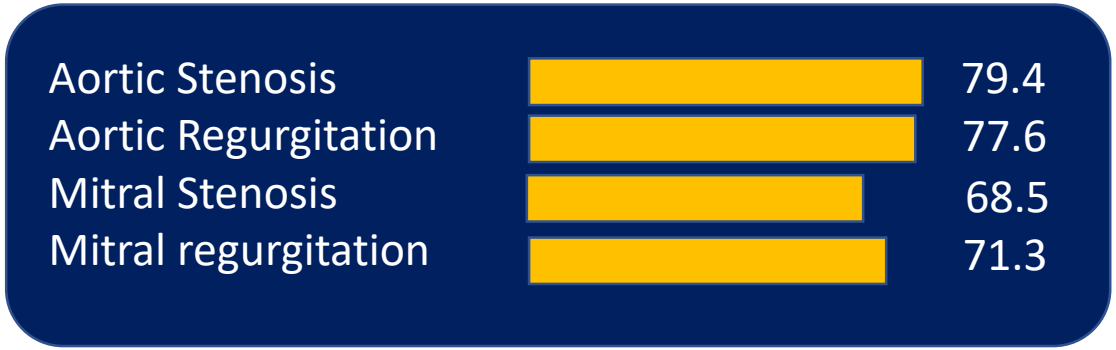
7247 patients (4483 hospitalized and 2764 outpatients)

Centers 222 of 28 countries: **Severe VHD 5219 patients**

Iung B et al. Circulation **2019**; 140(14):1156-1169 **Valvular Heart Disease II (VHDII) Survey**

VHD II Survey

64% of patients had an
Intervention decisions for single VHD



Iung B et al. Circulation 2019; 140(14):1156-1169 **Valvular Heart Disease II (VHDII) Survey**

Transcatheter valve procedures were performed in **38.7%** of patients with aortic stenosis and **16.7%** of those with mitral regurgitation.

The EURObservational Research Programme Valvular Heart Disease II Survey

CONCLUSIONS

Despite good concordance between Class I recommendations and practice in patients with aortic VHD, **the suboptimal number in mitral VHD** and late referral for valvular interventions suggest the **need to improve further guideline implementation.**

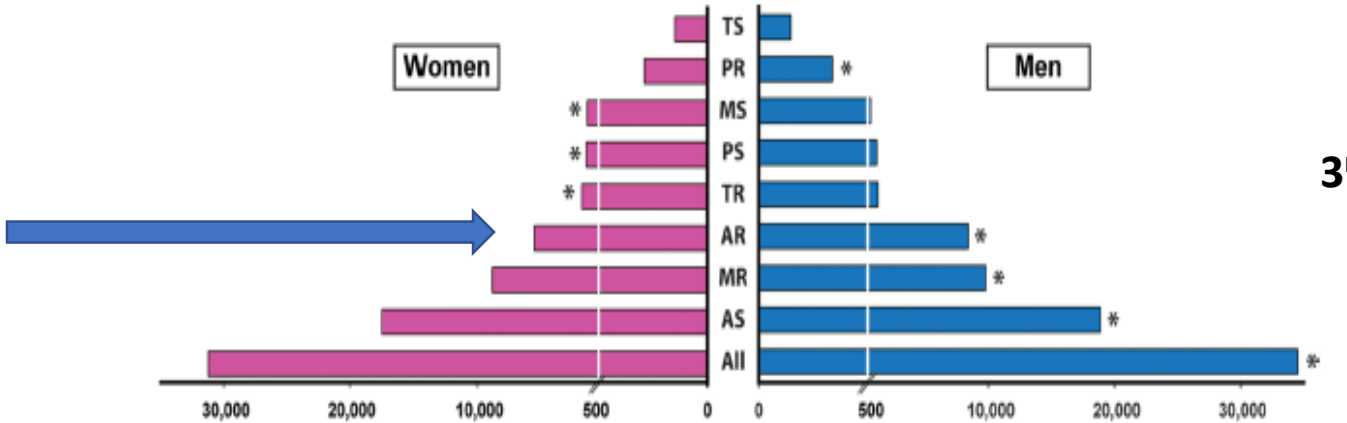
Iung B et al. Circulation 2019; 140(14):1156-1169 **Valvular Heart Disease II (VHDII) Survey**

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

Nationwide registers from hospitals in Sweden 2003-2010: patients with a first diagnosis of VHD

IR: 11 /100 000 person-years

IR: 20 /100 000 person-years

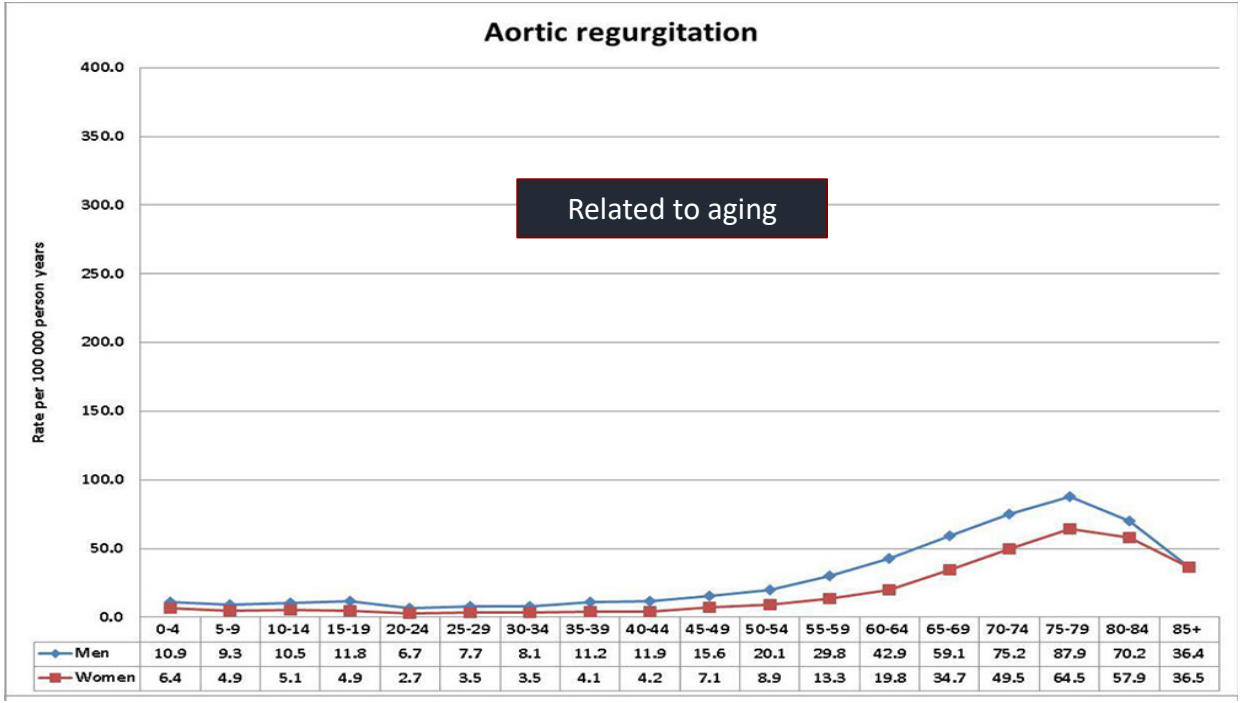


Incidence rate of valvular heart diseases (number per 100,000 person-years)

3rd most frequent Valve Disease

Andell P, et al. Heart 2017;103:1696–1703
Clavel MA, et al. Heart 2017; 103(21)

Aortic regurgitation and aneurysm: Epidemiology and Guidelines



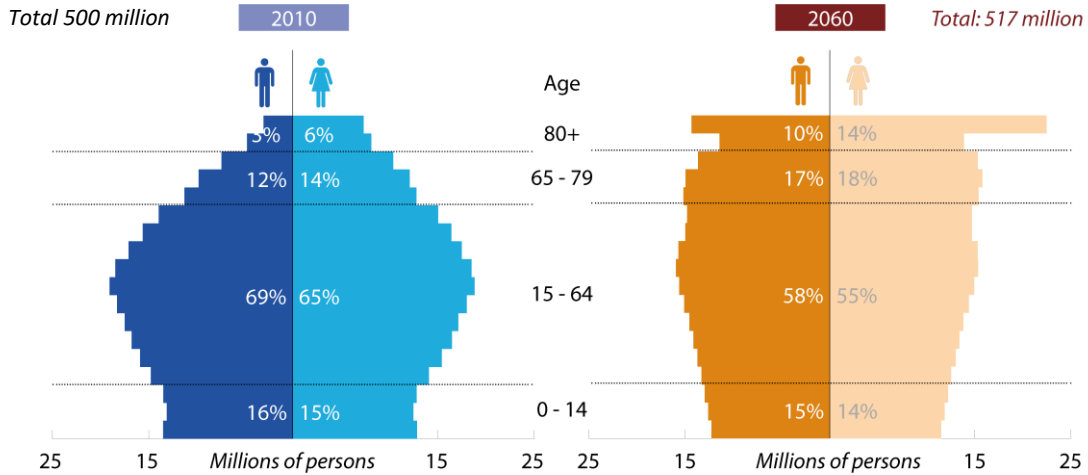
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Men	10.9	9.3	10.5	11.8	6.7	7.7	8.1	11.2	11.9	15.6	20.1	29.8	42.9	59.1	75.2	87.9	70.2	36.4
Women	6.4	4.9	5.1	4.9	2.7	3.5	3.5	4.1	4.2	7.1	8.9	13.3	19.8	34.7	49.5	64.5	57.9	36.5

Andell P, et al. Heart 2017;103:1696–1703
Clavel MA, et al. Heart 2017; 103(21)

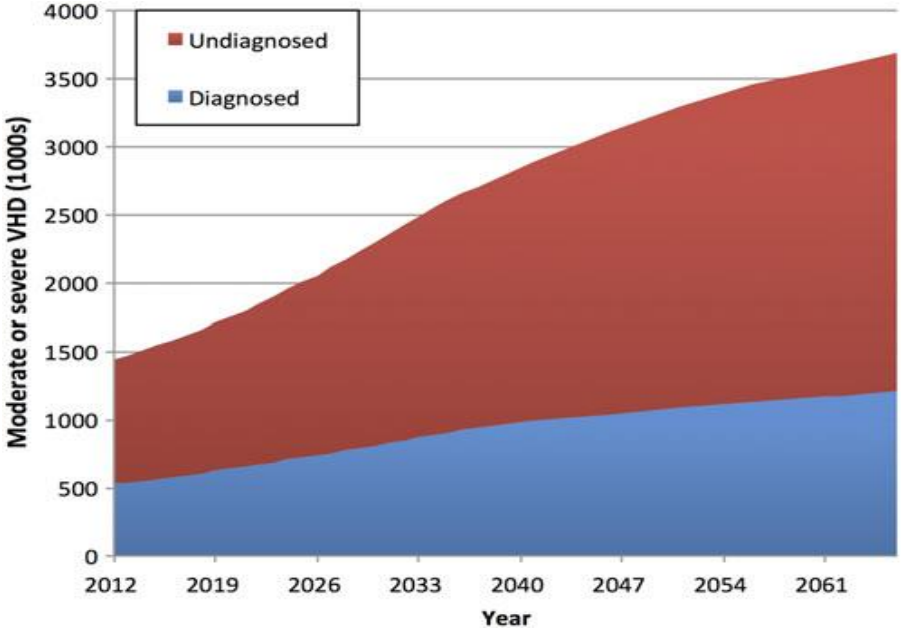
Aortic regurgitation and aneurysm: Epidemiology and Guidelines

EU27 population by age and sex

This will get worse...



Projection: this will double!!



D'Arcy JL et al. Eur Heart J. 2016; 37, 3515–3522

What do we know about epidemiology of AoR & AAA?

1. Related to aging:

- **Comorbidities**
- **Projected increase in prevalence**
- **Higher social demand: elderly “important population”**

What do we know about epidemiology of AoR & AAA?

2. Underdiagnosed disease (asymptomatic?, AA?):

- **Delayed diagnosis: more difficult treatment and higher costs**
- **Underestimated prevalence**
- **Unknown natural history**

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

When to go for intervention in AR & AA?

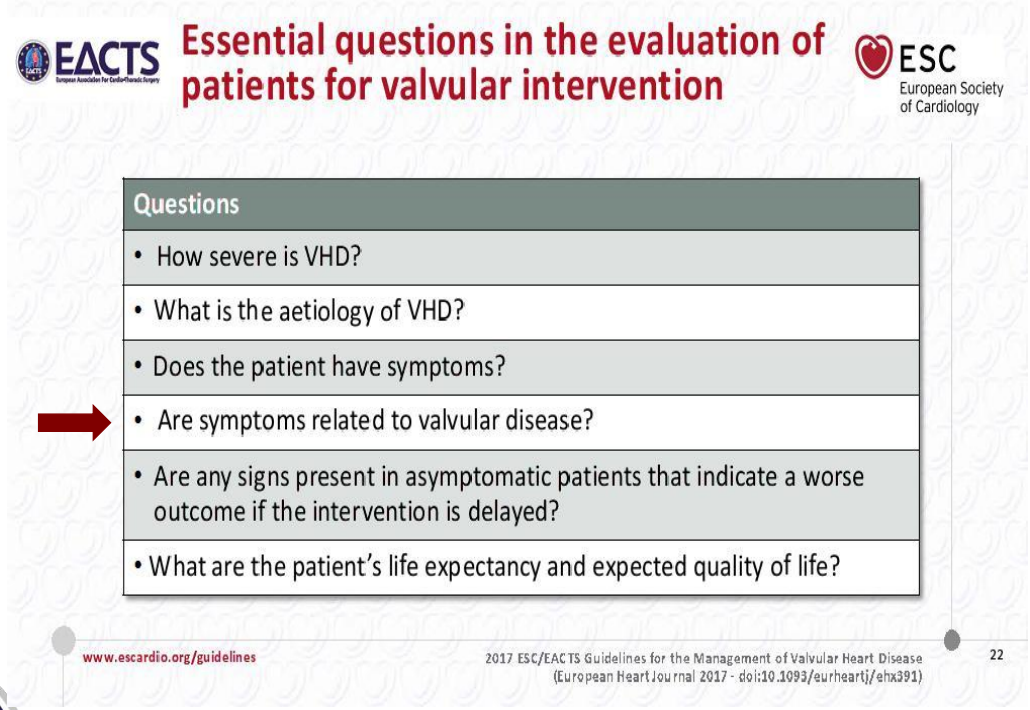
PRO

- Symptoms due to AR
- Signs of hemodynamic impact (AR)
- Signs of risk of aortic rupture (AA)

Influencers

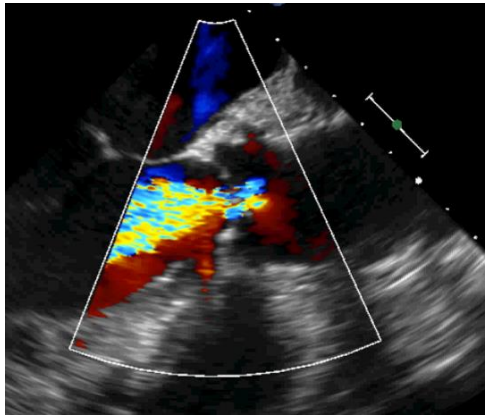
- Comorbidities (HTA, Bicuspid, Marfan,..)
- Lifestyle (sport)
- Intervention results and risks

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

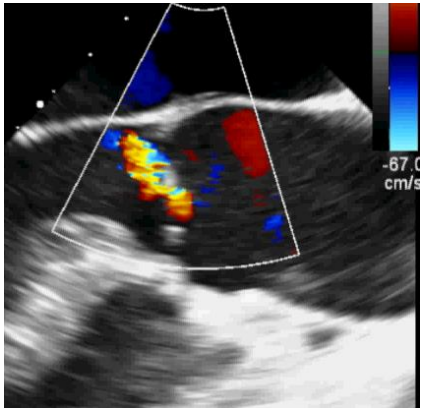


Aortic regurgitation and aneurysm: Epidemiology and Guidelines

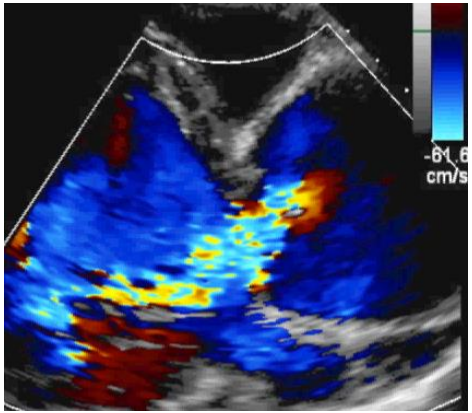
Indication by the valve, by the AA or by both



Severe AR
AA 35 mm



Moderate AR
Bicuspid AV
AA 54 mm



Severe AR
AA 70 mm

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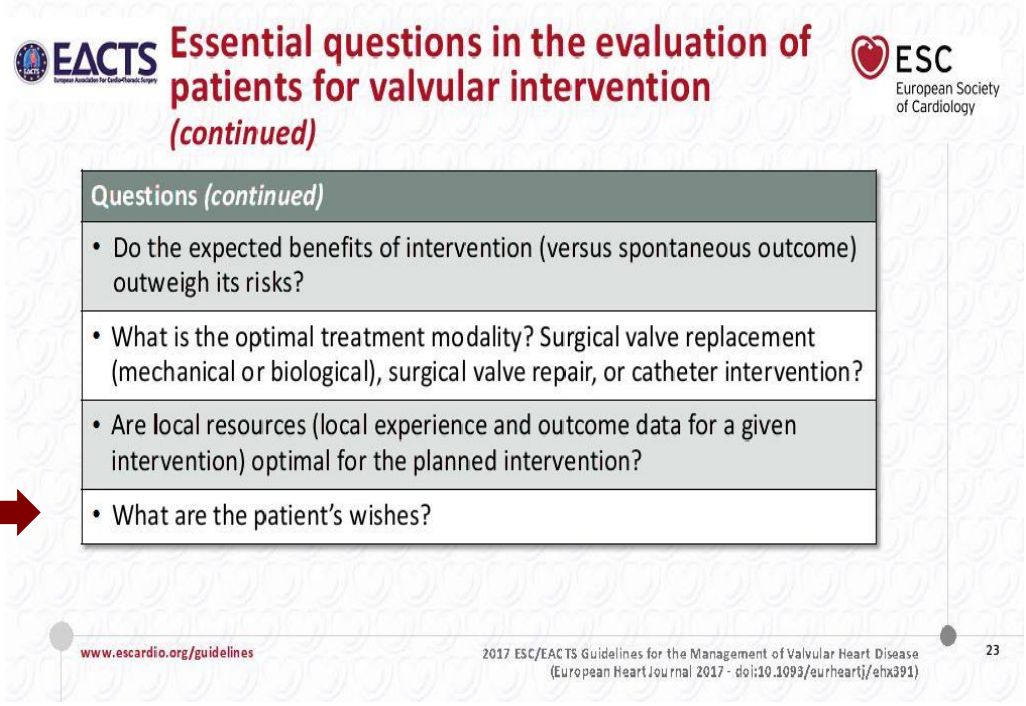

The 50's in asymptomatic AR

LV EF < 50 %

LVESD > 50 mm (25 mm/m^2 BSA)

Ascending aorta diameter > 55 mm

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

ESC European Society of Cardiology

European Heart Journal (2021) **00**, 1–72
doi:10.1093/eurheartj/ehab395

ESC/EACTS GUIDELINES

2021 ESC/EACTS Guidelines for the management of valvular heart disease

Developed by the Task Force for the management of valvular heart disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

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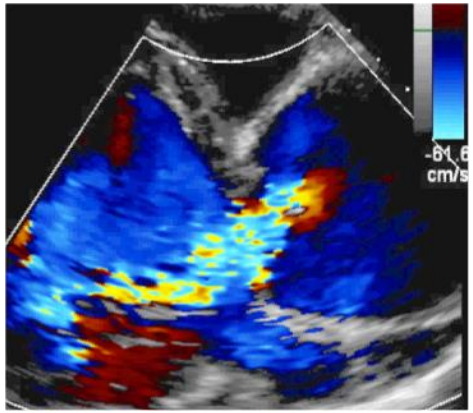
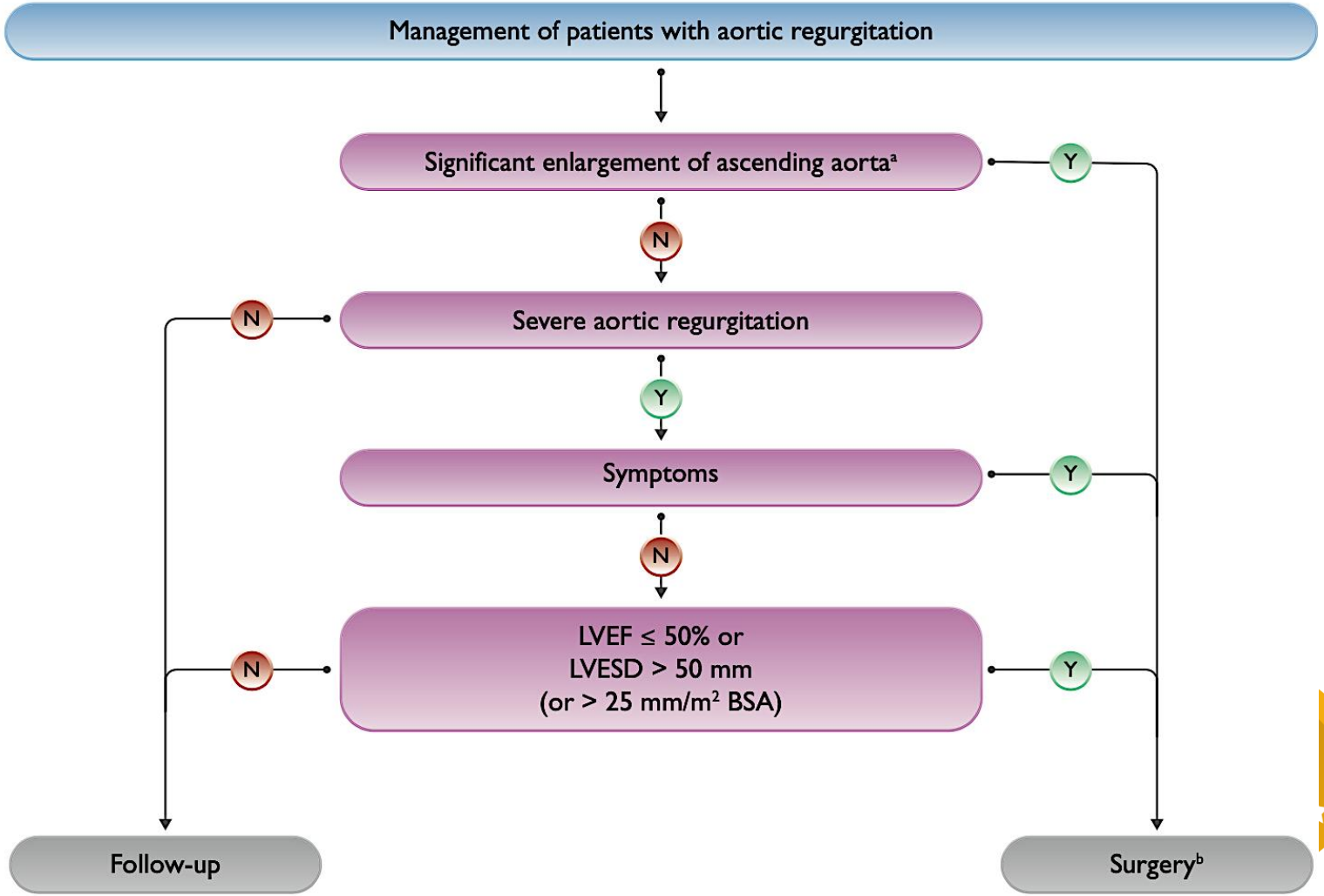
Aortic regurgitation and aneurysm: Epidemiology and Guidelines

Echo criteria for Severe Ao R



Qualitative	
Valve morphology	Abnormal/flail/large coaptation defect
Colour flow regurgitant jet area[a]	Large in central jets, variable in eccentric jets
CW signal of regurgitant jet	Dense
Other	Holodiastolic flow reversal in descending aorta (EDV >20 cm/s)
Semiquantitative	
Vena contracta width (mm)	>6
Pressure half-time[b] (ms)	<200
Quantitative	
EROA (mm^2)	≥30
Regurgitant volume (mL/beat)	≥60
Enlargement of cardiac chambers	LV dilatation

Aortic


Management of patients with aortic regurgitation
Significant enlargement of ascending aorta[a]
Y
N
Severe aortic regurgitation
N
Y
Symptoms
Y
N
LVEF ≤ 50% or
LVESD > 50 mm
(or > 25 mm/m² BSA)
N
Y
Follow-up
Surgery[b]

Aortic regurgitation and aneurysm: Epidemiology and Guidelines

Recommendations for surgery for severe Ao Regurgitation and in the next slide for AAA (irrespective of Ao R severity)

Is recommended or is indicated

Indications for surgery	Class[a]	Level[b]
A) Severe aortic regurgitation		
Surgery is recommended in symptomatic patients regardless of LV function.[105–109]	I	B
Surgery is recommended in asymptomatic patients with LVESD >50 mm or LVESD >25 mm/m^2 BSA (in patients with small body size) or resting LVEF ≤50%.[107,108,112,114,115]	I	B
Surgery may be considered in asymptomatic patients with LVESD >20 mm/m^2 BSA (especially in patients with small body size) or resting LVEF ≤55%, if surgery is at low risk.	IIb	C
Surgery is recommended in symptomatic and asymptomatic patients with severe aortic regurgitation undergoing CABG or surgery of the ascending aorta or of another valve.	I	C
Aortic valve repair may be considered in selected patients at experienced centres when durable results are expected.	IIb	C

Data derived from a single randomized clinical trial or large non-randomized studies

Consensus of opinion of the experts and/or small studies, retrospective studies or registries

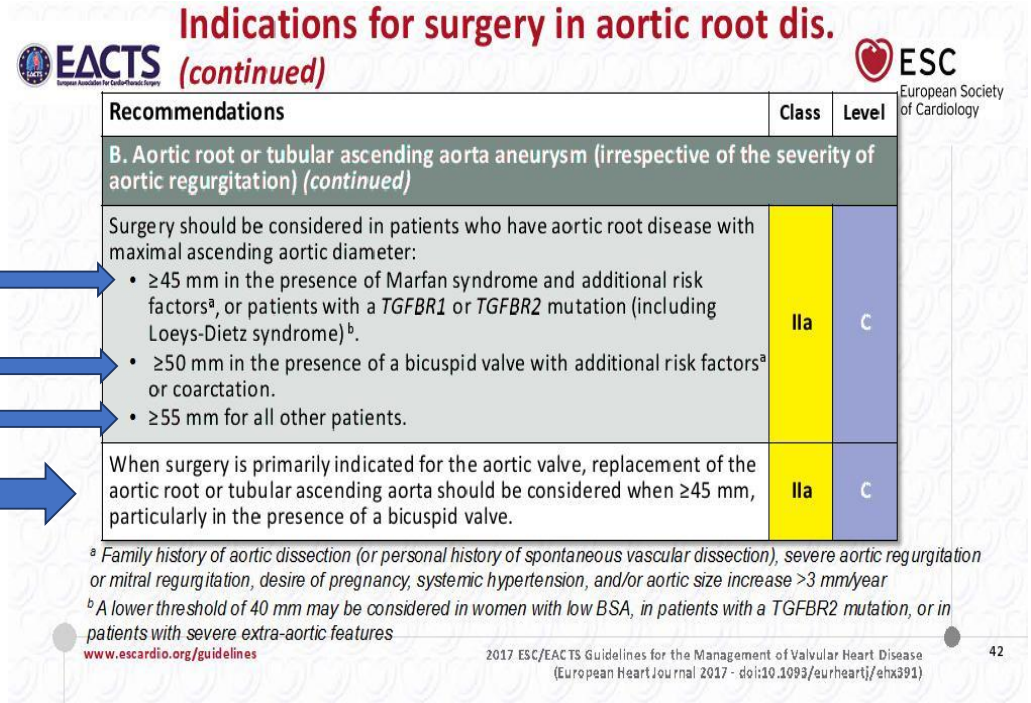
Aortic regurgitation and aneurysm: Epidemiology and Guidelines

B) Aortic root or tubular ascending aortic aneurysm[c] (irrespective of the severity of aortic regurgitation)		
Valve-sparing aortic root replacement is recommended in young patients with aortic root dilation, if performed in experienced centres and durable results are expected.[133–136,140]	I	B
Ascending aortic surgery is recommended in patients with Marfan syndrome who have aortic root disease with a maximal ascending aortic diameter ≥50 mm.	I	C
Ascending aortic surgery should be considered in patients who have aortic root disease with maximal ascending aortic diameter: • ≥55 mm in all patients. • ≥45 mm in the presence of Marfan syndrome and additional risk factors[d] or patients with a *TGFBR1* or *TGFBR2* mutation (including Loeys–Dietz syndrome).[e] • ≥50 mm in the presence of a bicuspid valve with additional risk factors[d] or coarctation.	IIa	C
When surgery is primarily indicated for the aortic valve, replacement of the aortic root or tubular ascending aorta should be considered when ≥45 mm.[f]	IIa	C

Is recommended or is indicated

IIa Should be considered

Aortic regurgitation and aneurysm: Epidemiology and Guidelines



Indications for surgery in aortic root dis. *(continued)*

Recommendations	Class	Level
B. Aortic root or tubular ascending aorta aneurysm (irrespective of the severity of aortic regurgitation) *(continued)*		
Surgery should be considered in patients who have aortic root disease with maximal ascending aortic diameter: • ≥45 mm in the presence of Marfan syndrome and additional risk factors[a], or patients with a *TGFBR1* or *TGFBR2* mutation (including Loeys-Dietz syndrome)[b]. • ≥50 mm in the presence of a bicuspid valve with additional risk factors[a] or coarctation. • ≥55 mm for all other patients.	IIa	C
When surgery is primarily indicated for the aortic valve, replacement of the aortic root or tubular ascending aorta should be considered when ≥45 mm, particularly in the presence of a bicuspid valve.	IIa	C

[a] *Family history of aortic dissection (or personal history of spontaneous vascular dissection), severe aortic regurgitation or mitral regurgitation, desire of pregnancy, systemic hypertension, and/or aortic size increase >3 mm/year*

[b] *A lower threshold of 40 mm may be considered in women with low BSA, in patients with a TGFBR2 mutation, or in patients with severe extra-aortic features*

www.escardio.org/guidelines

2017 ESC/EACTS Guidelines for the Management of Valvular Heart Disease (European Heart Journal 2017 - doi:10.1093/eurheartj/ehx391)

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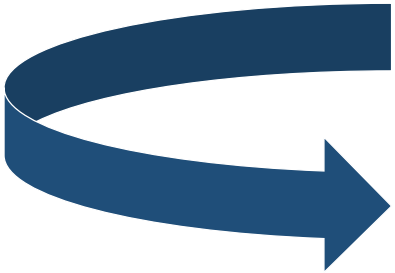
Aortic regurgitation and aneurysm: Epidemiology and Guidelines

- AR &AA: Underdiagnosed and is expected a pathology to increase
- Related to ageing and too late diagnosed & treated
- Classical indication for intervention based on past surgical outcomes (less repair rate, more advanced disease, better whole knowledge..)



Room for improvement:

- **to increase awareness,**
- **diagnose earlier and more precisely**
- **treat it more timely and properly**

THANK YOU

www.eacts.org

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