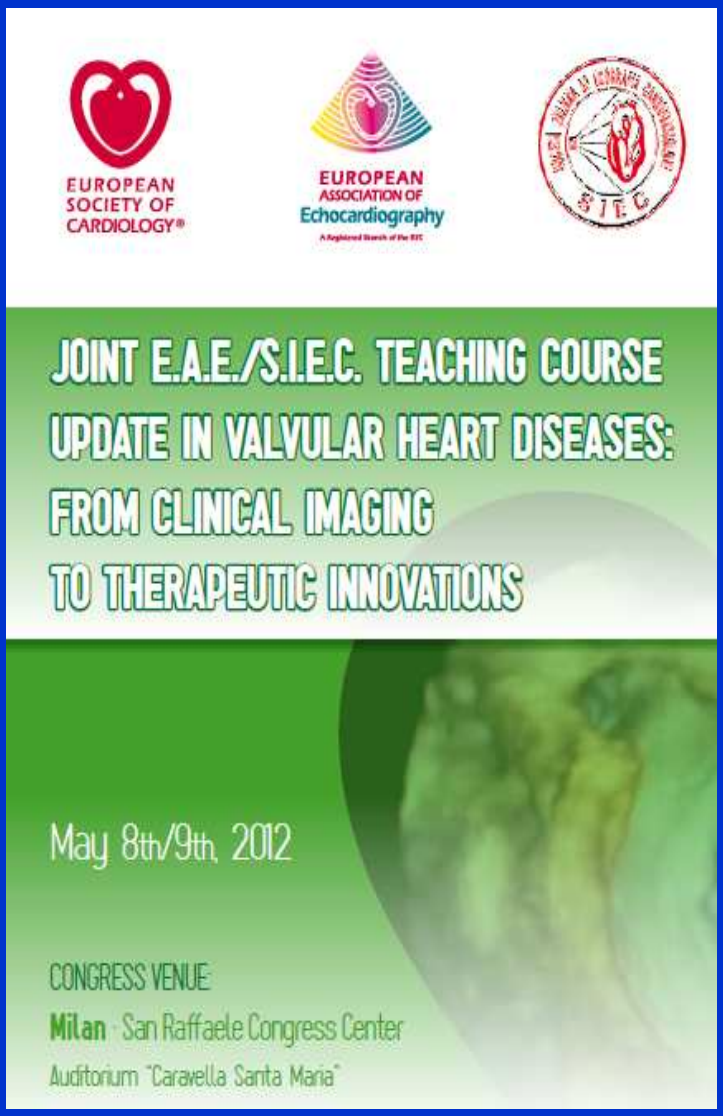


"Aortic Stenosis and Comorbidities: the clinical challenge"

P. Faggiano
Cardiology Division
Spedali Civili, Brescia - Italy

Factors affecting decision-making in patients with symptomatic severe aortic stenosis

- "Overestimation" of operative risk
  (Logistic Euroscore, Ambler Score)
- "Underestimation" of symptoms
  (age, poor mobility, concomitant diseases)
- "Underestimation" of hemodynamic severity
  (inconsistent grading, low-flow/low-gradient and preserved LVEF)
- Comorbidities and associated cardiac diseases
- ……

Clinical Outcome in Asymptomatic Severe Aortic Stenosis

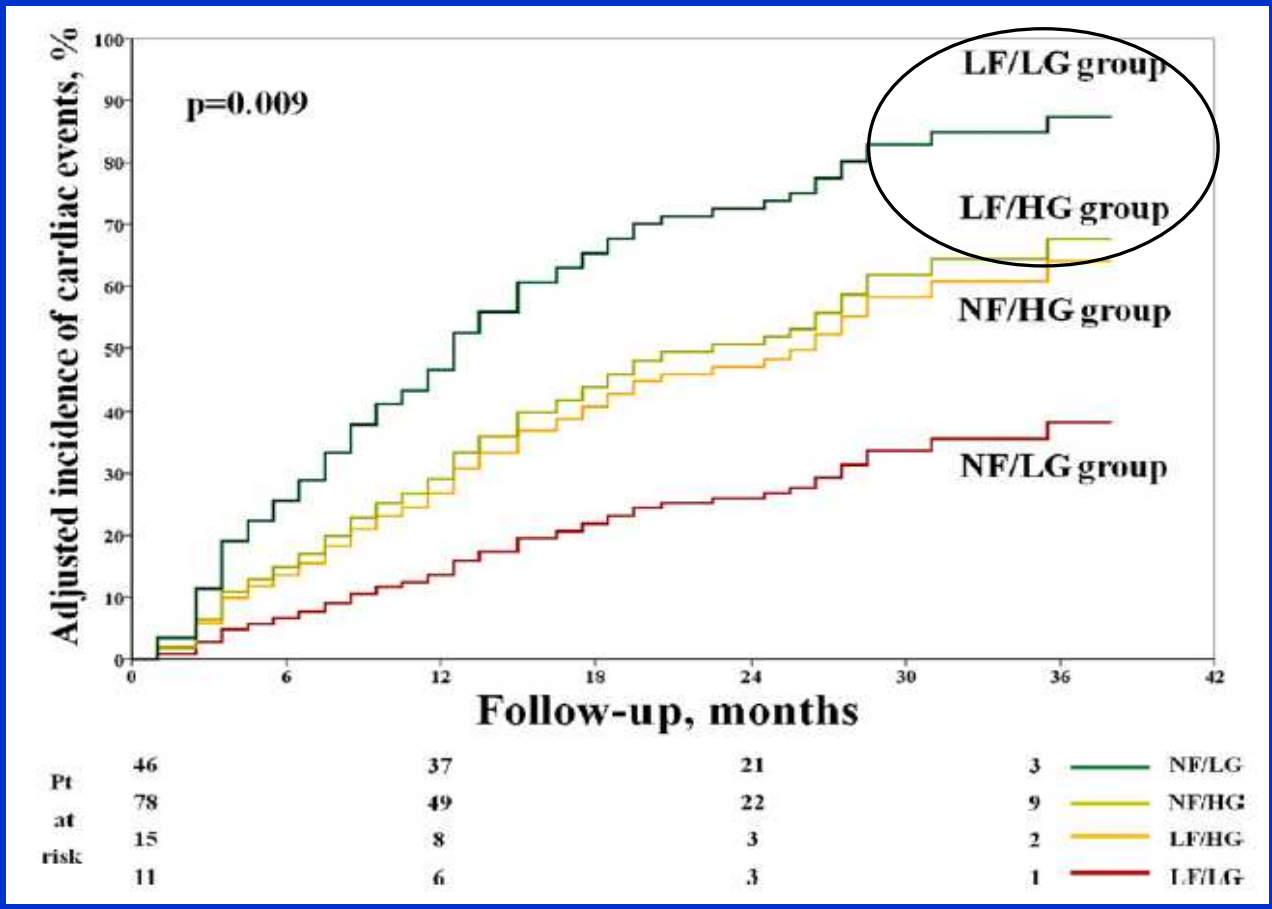
Insights From the New Proposed Aortic Stenosis Grading Classification

Lancellotti et Al.
J Am Coll Cardiol 2012;59:235–43

Under the same denomination of severe AS, four several entities might be identified that differ in terms of transvalvular flow rates and pressure gradients develop

	DP < 40 mmHg	DP ≥ 40 mmHg
SV ≥ 35 ml/mq	NF/LG (31%)	NF/HG (52%)
SV < 35 ml/mq	LF/LG (7%)	LF/HG (15%)

Adjusted Incidence of Cardiac Events According to the New Proposed Classification of Aortic Stenosis



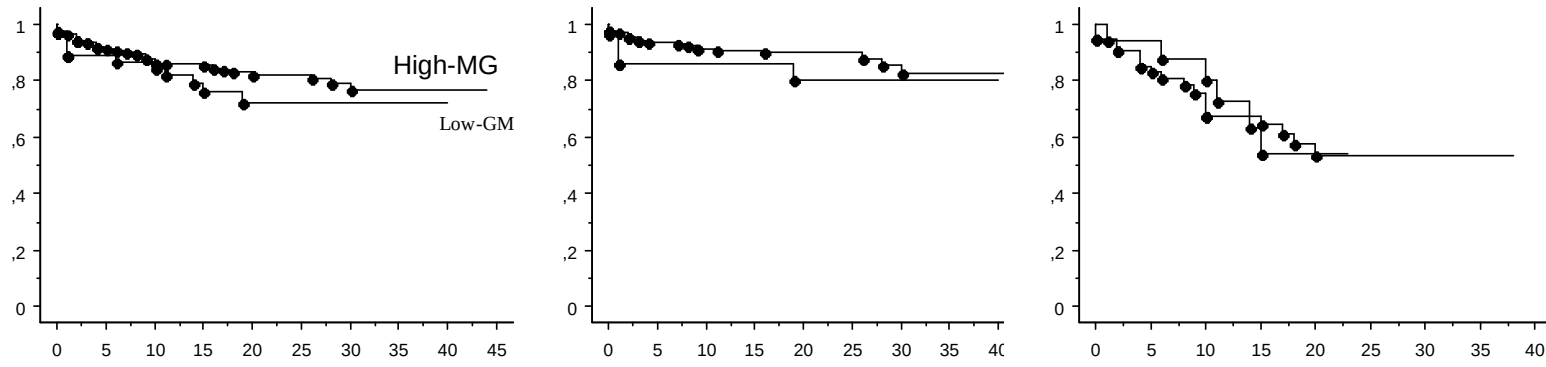
J Am Coll Cardiol 2012;59:235–43

Severe AS with normal LVEF and low or high mean gradient: different hemodynamic profiles but similar clinical outcome

323 pts, 60 with low MG (19%)

A. Rossi, P. Faggiano, preliminary data

All-cause mortality | SAVR or TAVI | Medical Th / Ball Valvul



Pts with severe AS , preserved LVEF and low-MG :

- are comparable for demographics, clinical presentation , associated cardiac conditions and comorbidities to those with high-MG;
- are characterized by a similar all-cause and cardiovascular mortality rate compared with high-MG pts
- have a prognostic benefit from surgical valve replacement or transcatheter implantation comparable to that observed in high-MG pts.

Factors affecting decision-making in patients with symptomatic severe aortic stenosis

- “Overestimation” of operative risk
- “Underestimation” of symptoms
- “Underestimation” of hemodynamic severity
- Comorbidities and associated cardiac diseases

Evaluation of Patients With Severe Symptomatic Aortic Stenosis Who Do Not Undergo Aortic Valve Replacement

Table 5. Rationale for Decisions to Not Perform AVR in Symptomatic Patients With Severe AS

	All Sites (n=126)	University (n=53)	VA (n=20)	Private (n=53)
Comorbidities/operative risk	61 (48)	30 (57)	8 (40)	23 (43)
Patient declined	24 (19)	2 (4)	5 (25)	17 (32)
Symptoms not from AS	24 (19)	11 (21)	5 (25)	8 (15)
Subvalvular stenosis	3 (2)	3 (6)	0	0
Died before surgery	4 (3)	4 (8)	0	0
AS not recognized	10 (8)	3 (6)	2 (10)	5 (9)

Data are presented as n (%).

Bach DS et al. Circ Cardiovasc Qual Outcomes. 2009;2:533-539

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Prevalence of comorbidities and associated cardiac diseases in patients with valve aortic stenosis. Potential implications for the decision-making process

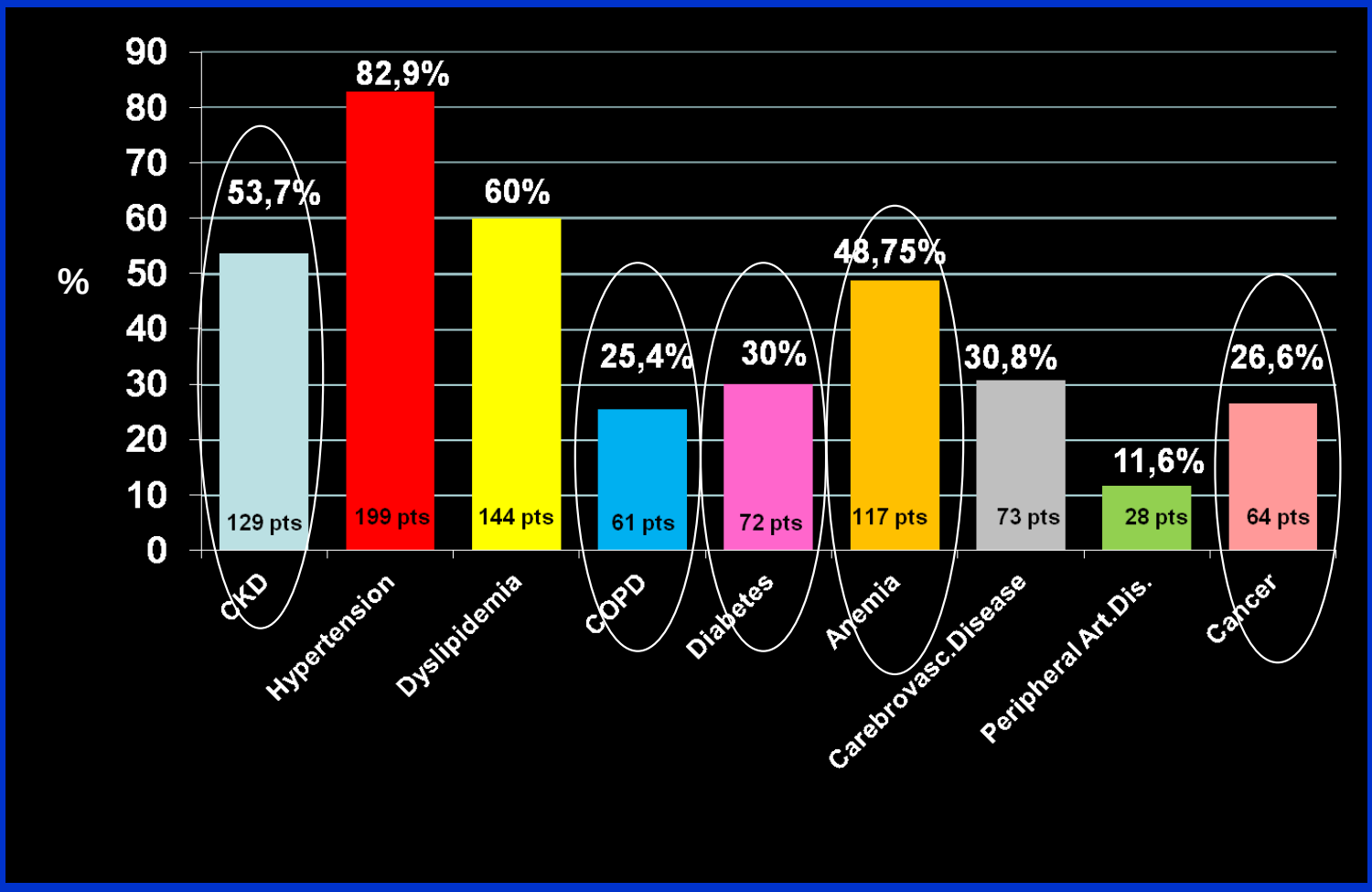
Pompilio Faggiano [a,b,*], Silvia Frattini [a,b], Valentina Zilioli [a,b], Andrea Rossi [c], Stefano Nistri [d], Frank L. Dini [e], Roberto Lorusso [f], Cesare Tomasi [g], Livio Dei Cas [a,b]

Systematic assessment of the "global" risk profile of 240 consecutive AS pts, focusing on the prevalence of comorbidities and coexisting cardiac diseases

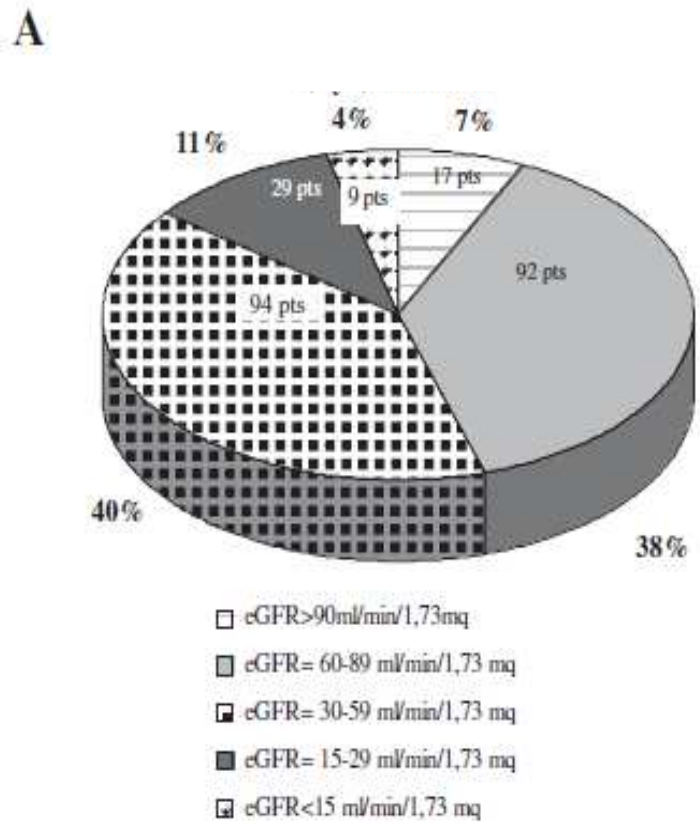
Demographics, clinical and Doppler-echocardiographic characteristics of the whole population. See text for details.

	All population
N	240
Age (years)	78.6 ± 8.9(range 47–96)
<65 years	19 (7.9%)
65–74 years	40 (16.6%)
75–84 years	120 (50%)
>85 years	61 (25.5%)
Sex (M/F)	96/144 (40%/60%)
BSA (m^2)	1.79 ± 0.19
BMI (kg/m^2)	25.3 ± 3.9
<18 kg/m^2	5 (2%)
>30 kg/m^2	24 (10%)
Symptoms:[a]	226 (94.2%)
Dyspnoea	158 (65.8%)
Syncope	33 (13.7%)
Angina	61 (25.4%)
NYHA class:	14 (5.8%)
I	20 (8.3%)
II	99 (41.3%)
III	39 (16.2%)
IV	
Aortic valve area (cm^2)	0.7 ± 0.2
<1 cm^2	196 (81.6%)
Peak pressure gradient (mm Hg)	75.6 ± 27.4
Mean pressure gradient (mm Hg)	50 ± 18.4
Left ventricular ejection fraction (%)	51.2 ± 12.9
Left ventricular mass index (g/m^2)	204.5 ± 60.46
Systolic pulmonary artery pressure (mm Hg)	41.6 ± 12.9
Logistic EuroSCORE %	26.6 ± 20.6

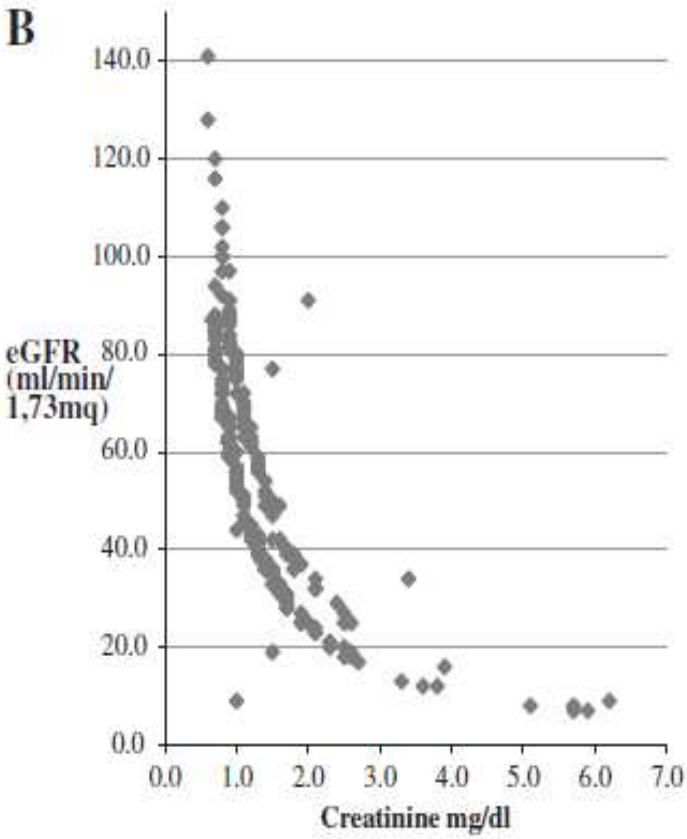
Comorbidities



Prevalence of renal (dys)function according to eGFR



Relation between serum Creatinine and eGFR



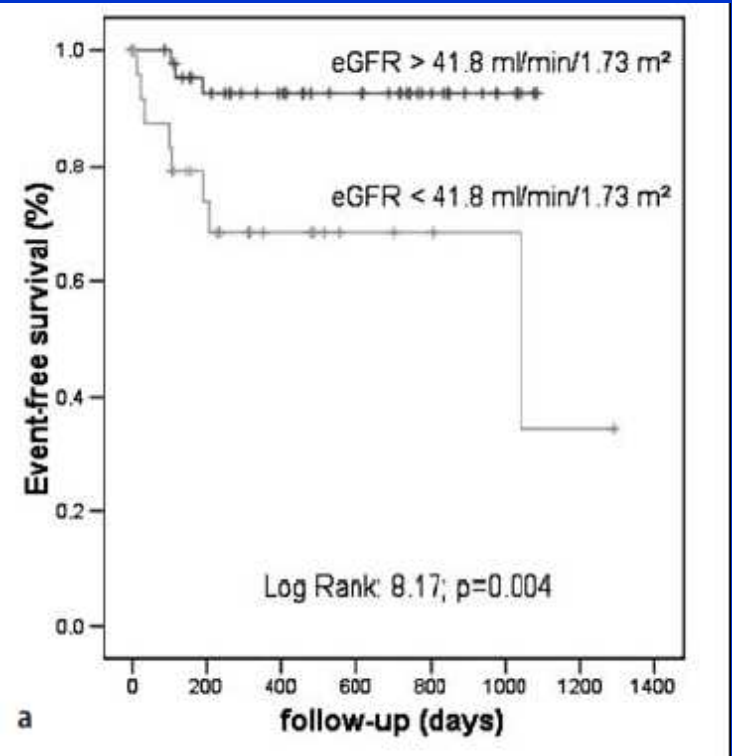
- A moderate to severe CKD was detected in over 50% of pts by means of eGFR, despite a normal or only mildly elevated serum creatinine
- Serum creatinine is commonly included in risk scores, such as logistic EuroSCORE, but as a renal disease indicator it is less accurated than eGFR

Clin Res Cardiol 96:23–29 (2007)
DOI 10.1007/s00392-006-0452-1

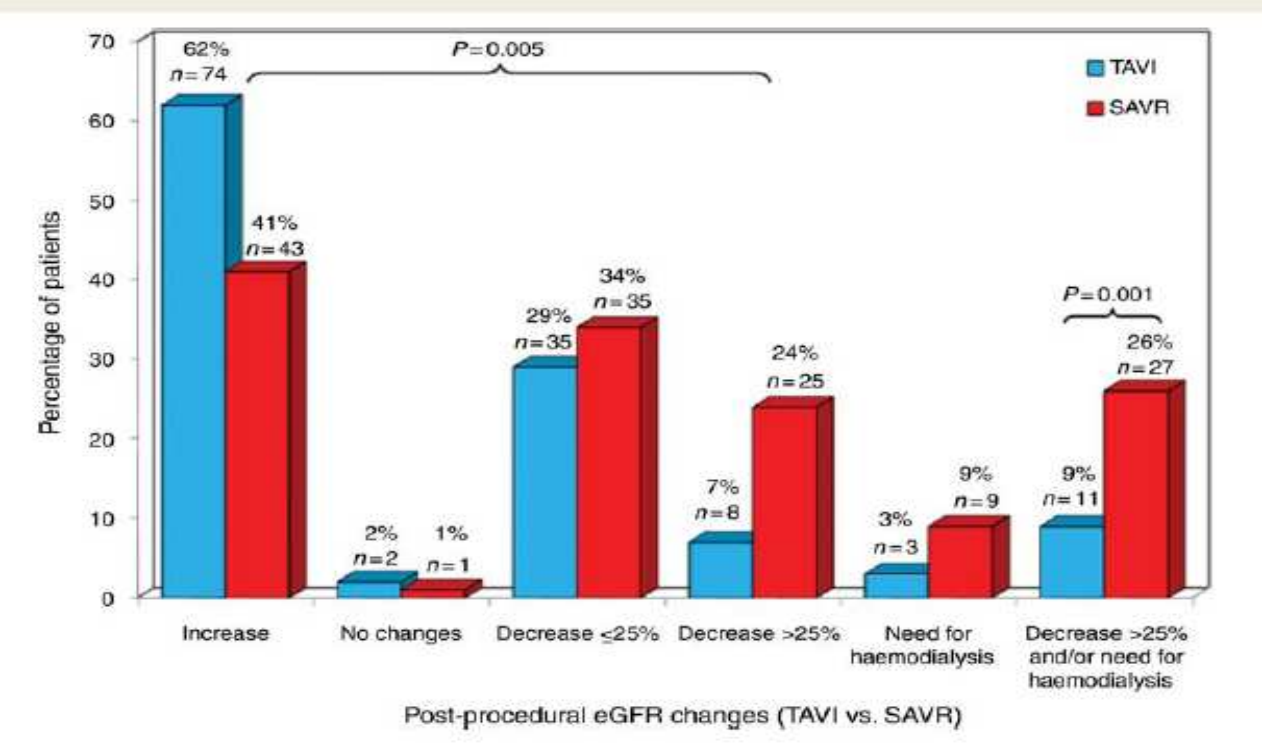
ORIGINAL PAPER

C. Bruch
D. Kauling
H. Reinecke
M. Rothenburger
H. H. Scheld
G. Breithardt
T. Wichter

Prevalence and prognostic impact of comorbidities in patients with severe aortic valve stenosis



Acute kidney injury following transcatheter aortic valve implantation: predictive factors, prognostic value, and comparison with surgical aortic valve replacement



AKI was a very powerful predictor of death during the postoperative period (OR 4,14) independently of baseline comorbidities and periprocedural complications,

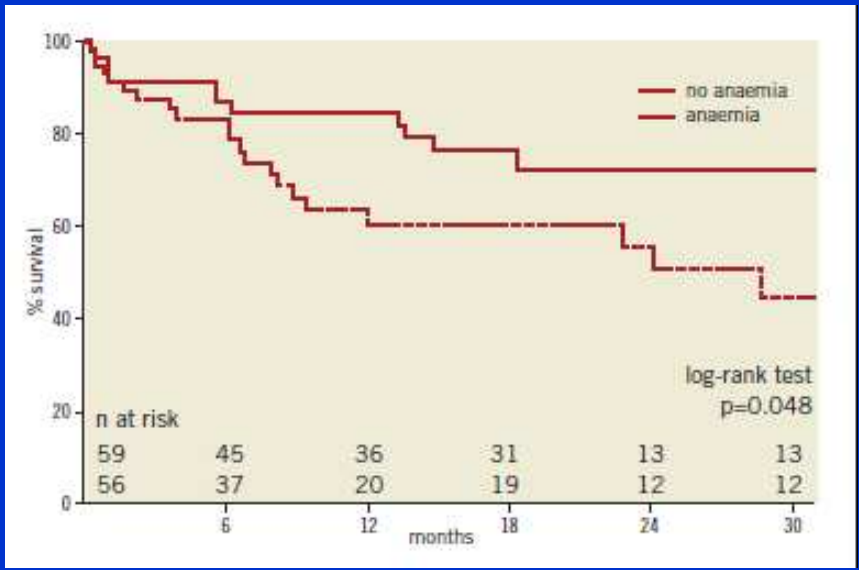
Eur H J (2010) 31, 865–874

Prevalence and prognostic implications of baseline anaemia in patients undergoing transcatheter aortic valve implantation

Nicolas M. Van Mieghem, MD; Rutger-Jan Nuis, Msc; Apostolos Tzikas, MD, PhD; Nicolo Piazza, MD; Carl Schultz, MD; Patrick W. Serruys, MD, PhD, Peter P. de Jaegere*, MD, PhD

Eurointervention 2011; 7: 184

The prevalence of baseline anemia was 49%.
Anemic pts undergoing TAVI required more RBC transfusions and prolonged hospitalisation



Conclusions: In our series, baseline anaemia is common in patients undergoing TAVI, forecasts a need for more red blood cell transfusions and is associated with increased 1-year mortality.

Acquired and Reversible von Willebrand Disease With High Shear Stress Aortic Valve Stenosis

Kazunori Yoshida, MD, Satoshi Tobe, MD, Masahito Kawata, MD, and Masahiro Yamaguchi, MD

Ann Thorac Surg 2006;81:490–4

Results. Eight of 29 patients reported episodes of bleeding, including three episodes of major bleeding, in the 6 months before surgery. None of the patients were receiving anticoagulation therapy. Although there was

Conclusions. In conclusion, valve replacement can result in increases in von Willebrand factor in patients with aortic valve stenosis.

ELSEVIER

European Journal of Cardio-thoracic Surgery 35 (2009) 628–634

www.elsevier.com/locate/ejcts

Review

Intestinal angiodysplasia and aortic valve stenosis: let's not close the book on this association

Pankaj Kumar Mishra [a,*], Jan Kovac [b], John de Caestecker [c], Graham Fancourt [d], Elaine Logtens [a], Tom Spyt [a]

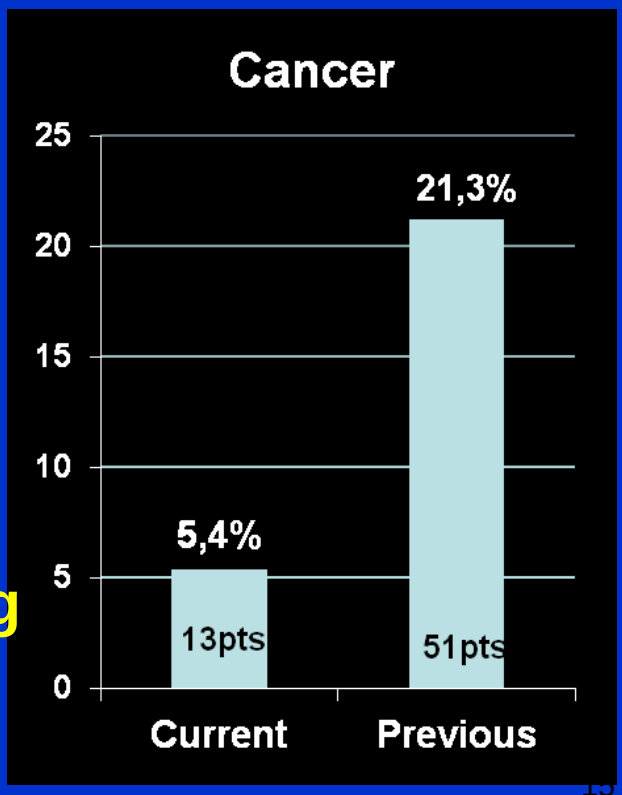
Increased awareness among the physicians that unexplained GI bleeding in a patient with aortic stenosis strongly suggests angiodysplasia should lead to further investigations and aortic valve intervention.

Incidental Findings in Patients Evaluated for Thoracic Aortic Pathology Using Computed Tomography Angiography

Karthikeshwar Kasirajan,[1] and Anand Dayama,[2] Concord, California, and Atlanta, GA

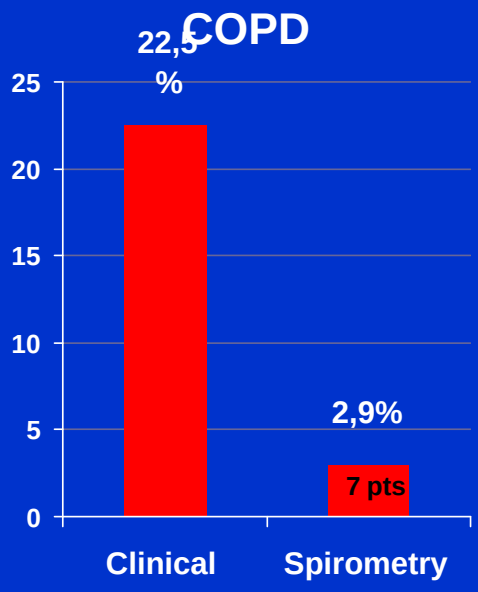
Ann Vasc Surg 2012; 26:306

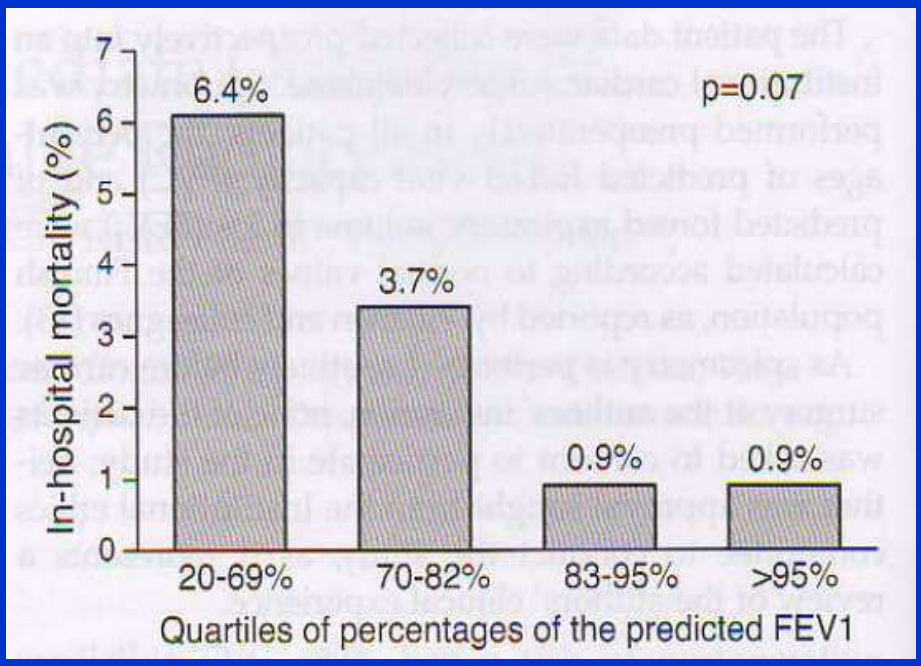
11/242 (4.5%) new cancer with metastatic disease



Changes in decision-making process

Pulmonary Function and Immediate Outcome of Patients Undergoing Aortic Valve Replacement





Preoperative pulmonary function testing could be of benefit in identifying high-risk patients

Nissinen J et al. The Journal of Heart Valve Disease 2009; 18:374-379

…… **again……..**

- **“Frailty”**

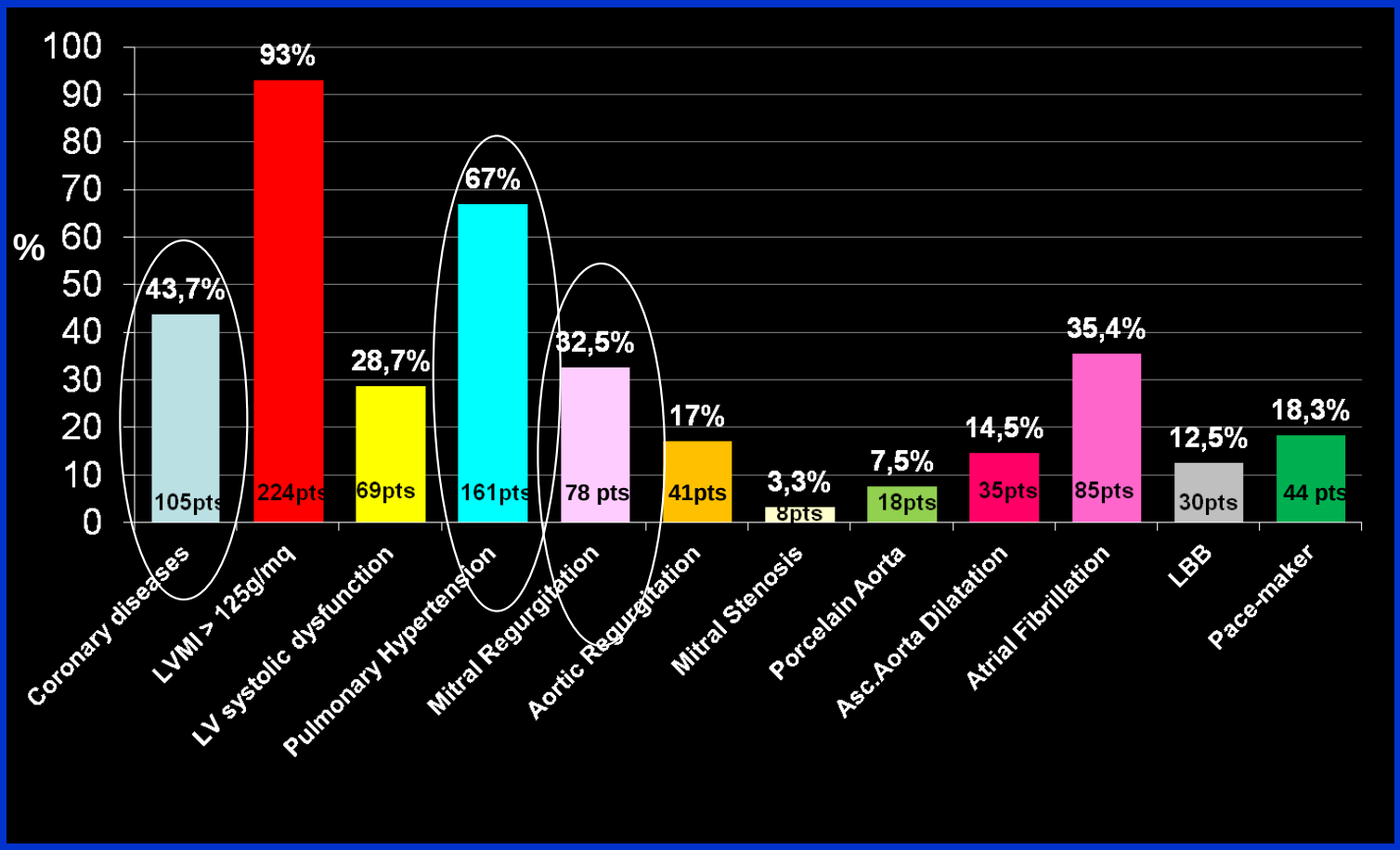
- **Disability and Dementia**

-**Liver dysfunction and hypoalbuminaemia**

- **Obesity - underweight**

- **……..**

Associated Cardiac Diseases



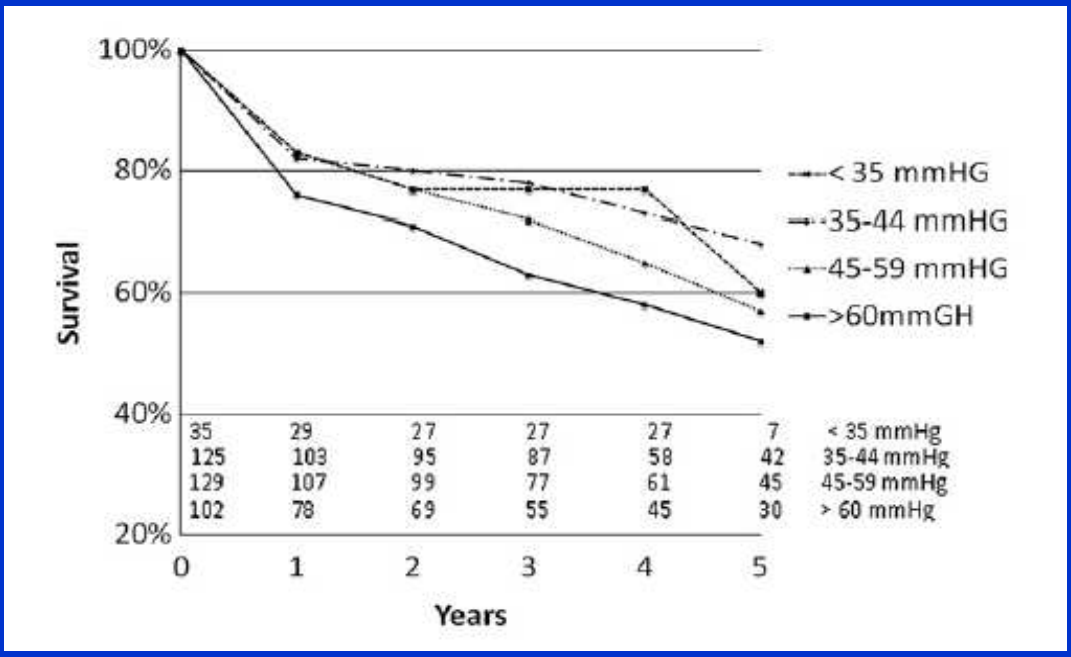
AS and coexisting significant coronary artery disease

just few questions

- Is angina secondary to aortic valve stenosis or to coronary disease?
- Surgical myocardial revascularization and noncritical AS
- Venous (or arterial) grafts are patent: what to do?
- Combined surgery? Combined percutaneous approach?
- Beta-blockers: Yes or Not ?
- ……

Impact of pulmonary hypertension on outcomes after aortic valve replacement for aortic valve stenosis

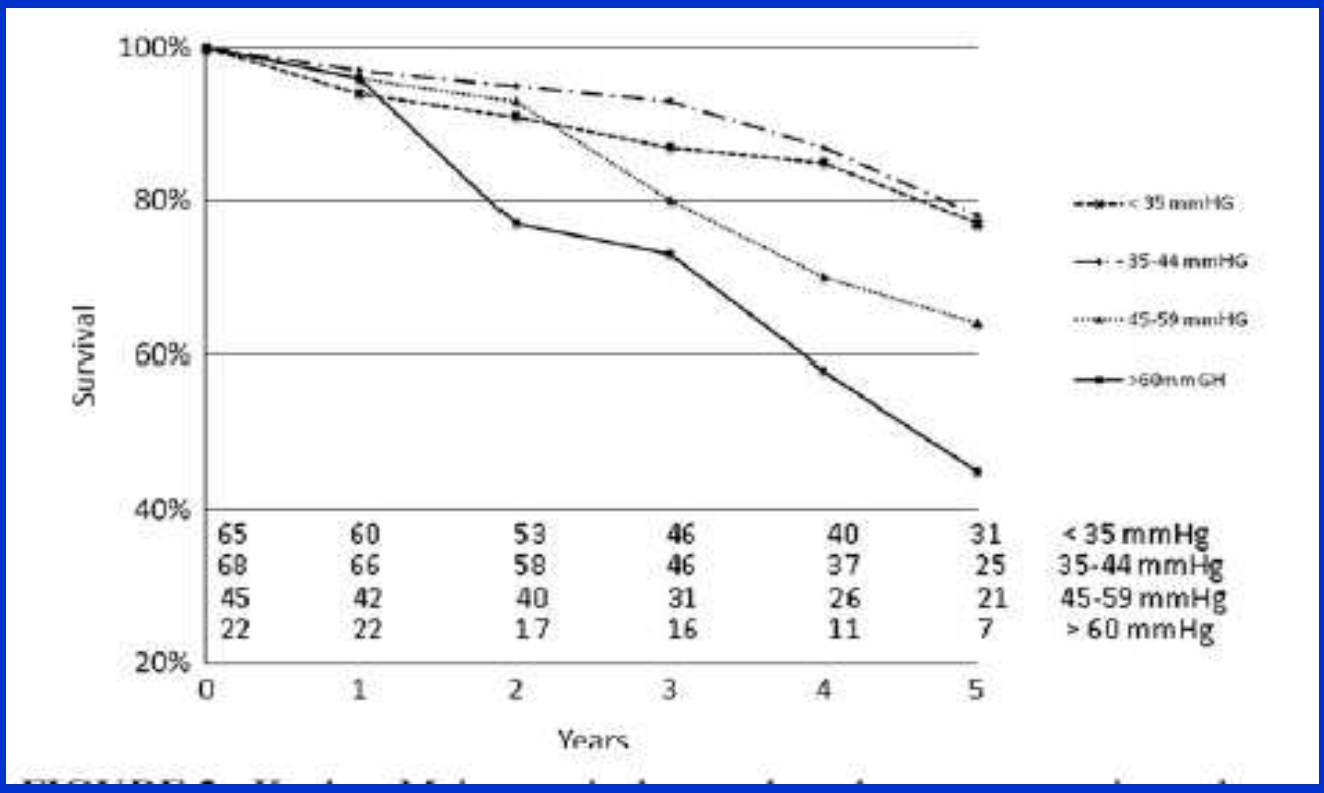
"In pts undergoing AVR, preoperative pulmonary hypertension Increased operative mortality and decreased long-term survival"



Kaplan–Meier survival curve based on preoperative pulmonary artery pressure.

J Thorac Cardiovasc Surg 2011;141:1424-30

“Patients with persistent moderate or severe pulmonary hypertension after aortic valve replacement had decreased long-term survival”



Kaplan–Meier survival curve based on postoperative pulmonary artery pressure

J Thorac Cardiovasc Surg 2011;141:1424-30

Aortic Stenosis and concomitant Mitral Regurgitation

- Are symptoms secondary to AS or MR?

- Which are the indications to concomitant surgical treatment (AVR + mitral valve replacement or repair) ?

- Relevance of echocardiographic assessment:
  - Organic or functional MR?
  - Severity of MR
  - Left ventricular filling pressures: normal, increased?
  - Pulmonary hypertension?

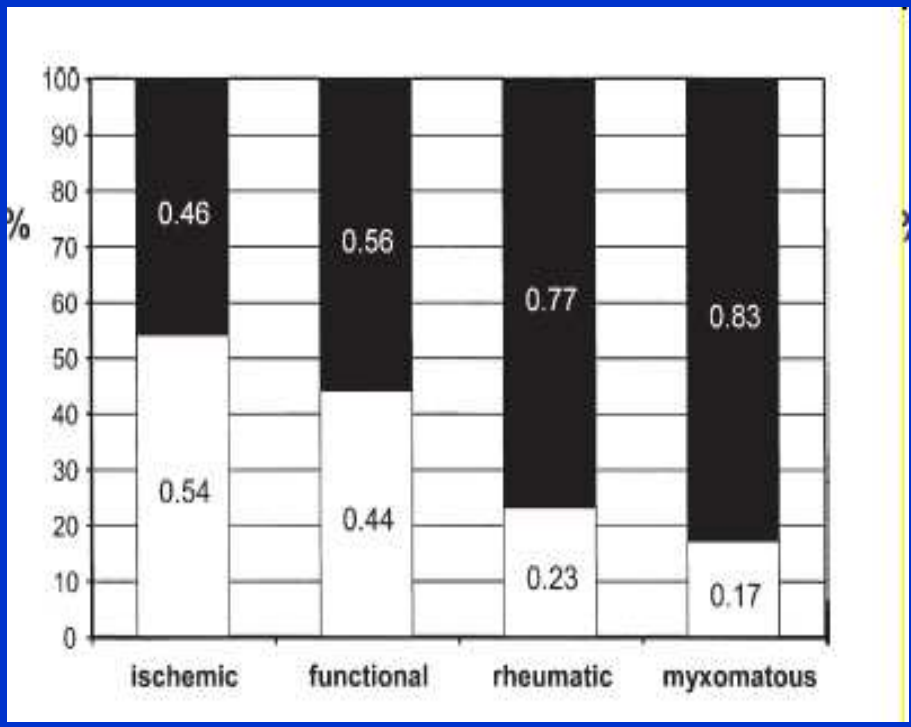
Effect of Aortic Valve Replacement for Aortic Stenosis on Severity of Mitral Regurgitation

Eynden et Al. Ann Thor Surgery 2007; 83: 1279-1284

80 patients with preoperative and 1-year post-op echo.

Preoperative MR was moderate (2+) in 78 patients (97.5%) and moderate-severe (3+) in 2 (2.5%).

Rheumatic 32%
Ischemic 32%,
Functional 21%
Myxomatous (15%)



“Functional or ischemic MR will likely improve after isolated AVR, whereas rheumatic or myxomatous MR will most likely remain stable or even deteriorate .
The decision to “treat” the mitral valve at the time of AVR remains difficult, but *preoperative echocardiographic analysis of the mitral valve morphology may give the most important prognostic factor for the change in MR severity:* ***the etiology of MR***.”

Provisional suggestions:
- mild MR: ***hold on!***
- severe MR: ***surgery! Percutaneous approach***
- moderate MR: careful morphological valve evaluation for decision-making

Table 1. Main characteristics of the study patients divided according to the therapeutic choice.

	Group AVR 141 pts	*Group TAVI 127 pts*	*Group BAV 49 pts*	*Group Med Th 51 pts*
· Age (years)	72 ± 10	83 ± 8 *	84 ± 9 *	81 ± 7 *
· Female gender (%)	52	32 *	49 §	29 * #
· Hypertension (%)	77	75	69	73
· Diabetes (%)	27	25	20	25
· Atrial fibrillation (%)	27	39	28	37
· NYHA functional class (1-4 scale)	2.3 ± 0.8	2.6 ± 0.6 *	2.9 ± 0.8 * §	2.9 ± 0.8 * §
· History of heart failure (%)	60	73 *	88 * §	76 *
· Chronic obstructive pulmonary disease (%)	16	22	39 * §	25
· Left bundle branch block (%)	8	17 *	20 *	16 *
· Serum creatinine (mg/dl)	1.08 ± 0.64	1.34 ± 0.74 *	1.78 ± 1.17 * §	1.74 ± 1.40 * §
· Glomerular filtration rate (ml/min/1.73)	73 ± 26	54 ± 23 *	47 ± 26 *§	48 ± 28 *§
· Haemoglobin (g/dl)	11.7 ± 1.8	11.9 ± 1.5	11.8 ± 1.4	11.9 ± 1.6
· Serum total colesterol (mg/dl)	162 ± 45	184 ± 47 *	162 ± 29 §	159 ± 38 *
· EUROSCORE	16 ± 12	28 ± 18 *	33 ± 18 *	31 ± 20 *
· LV relative wall thickness	0.55 ± 0.11	0.55 ± 0.11	0.55 ± 0.14	0.56 ± 0.13
· LV mass (gr/m ^{2})	209 ± 56	217 ± 59	241 ± 72 *§	207 ± 71 #
· LV end-diastolic diameter (mm)	50.7 ± 0.8	50.7 ± 0.8	52.3 ± 0.9	50.0 ± 0.9
· LV end-diastolic volume (ml)	139 ± 69	141 ± 69	155 ± 79	132 ± 67
· LV ejection fraction (%)	53 ± 11	51 ± 12	41 ± 15 *§	50 ± 10 #
· Pulmonary artery systolic pressure (mmHg)	38 ± 11	43 ± 14 *	47 ± 15 *§	43 ± 12 *
· Aortic valve area (cm^2/m^2)	0.41 ± 0.10	0.35 ± 0.08 *	0.34 ± 0.12 *	0.42 ± 0.13 § #
· Trans aortic valve peak gradient (mmHg)	79 ± 24	86 ± 22 *	71 ± 27 §	76 ± 24 §
· Bicuspid aortic valve (%)	8	1 *	4	6
· Beta-blockers (%)	42	28 *	21 *	35
· ACE-inhibitors/ARBs (%)	65	67	37 *§	65 #
· Diuretics (%)	70	83 *	95 *	75
· Statins (%)	46	53	45	63

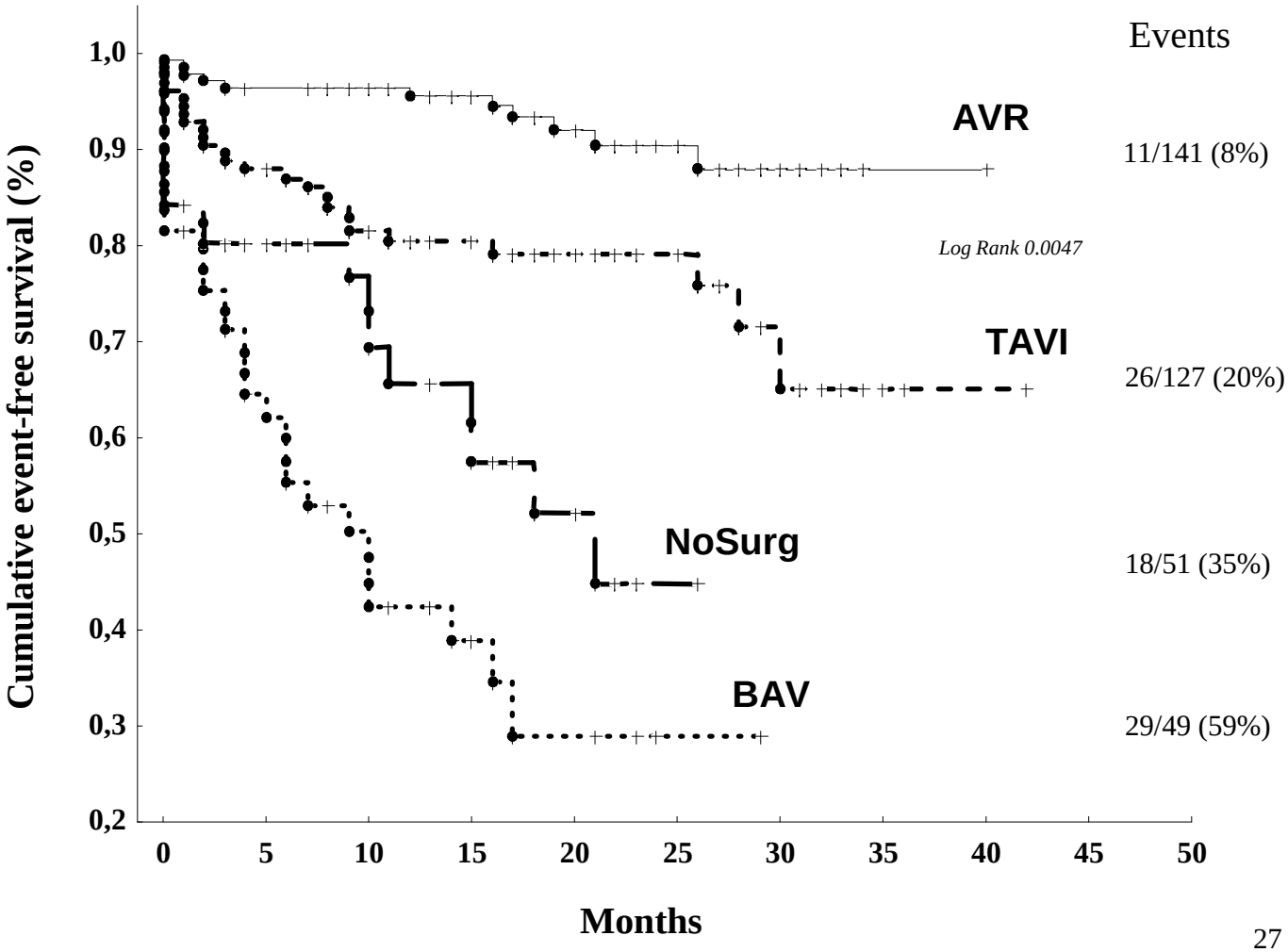
ACE = angiotensin-converting enzyme; ARB = angiotensine receptor blockers; AVR = traditional surgical aortic valve replacement; BAV = baloon aortic valvuloplasty; LV = left ventricular; NoSurg = No Surgery; NYHA = New York Heart Association; TAVI = tanscatheter aortic valve implantation.

$p < 0.05$ vs AVR = * ; vs TAVI = § ; vs BAV = # ;

Cox proportional hazard analysis included :
age, aortic valve area, Logistic Euroscore, NYHA functional class, glomerular filtration rate, chronic obstructive pulmonary disease, history of heart failure, LV ejection fraction, pulmonary artery systolic pressure and the therapeutic approach to the symptomatic AS.

Table 2. Variables independently related to adverse events in the total study population (368 patients): multivariate Cox regression model.

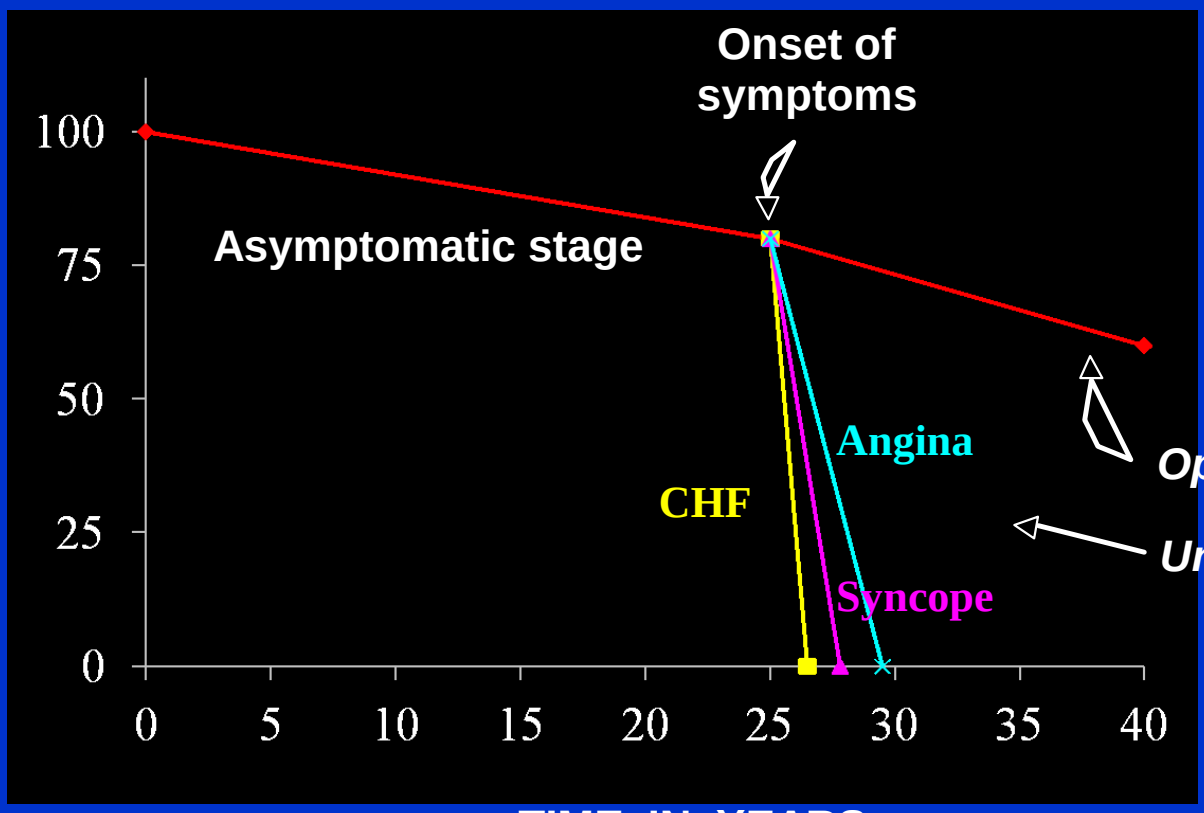
Variables	OR	*CI*	*p*
Left ventricular ejection fraction (%)	**0.98**	**0.96 – 0.99**	**0.003**
History of heart failure (%)	**2.25**	**1.16 – 4.34**	**0.02**
Glomerular filtration rate (ml/min/1.73)	**0.98**	**0.97 – 0.99**	**0.01**
Therapeutic approach for aortic stenosis	**1.82**	**1.10 – 3.25**	**< 0.001**


Events
AVR
11/141 (8%)
Log Rank 0.0047
TAVI
26/127 (20%)
NoSurg
18/51 (35%)
BAV
29/49 (59%)
Cumulative event-free survival (%)
1,0
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0
5
10
15
20
25
30
35
40
45
50
Months

- The systematic search for comorbidities and associated cardiac diseases , by means of not only physical evaluation , but also laboratory or more sophisticated techniques, allows to find a large number of conditions , often requiring specific and occasionally urgent treatment, along with the need to postpone AVR/TAVI or even to change the therapeutic approach.
- Future risk scores should include additional variables able to better stratify individual profile and contribute to the treatment choices.

Thank You for Your attention

Natural history of valvular aortic stenosis



Modified from Ross and Braunwald 1968, in Faggiano et Al. Am Heart J 1996; 132: 408

Helsinki Ageing Study

Frequency of Aortic Valve Stenosis in the Different Age Groups

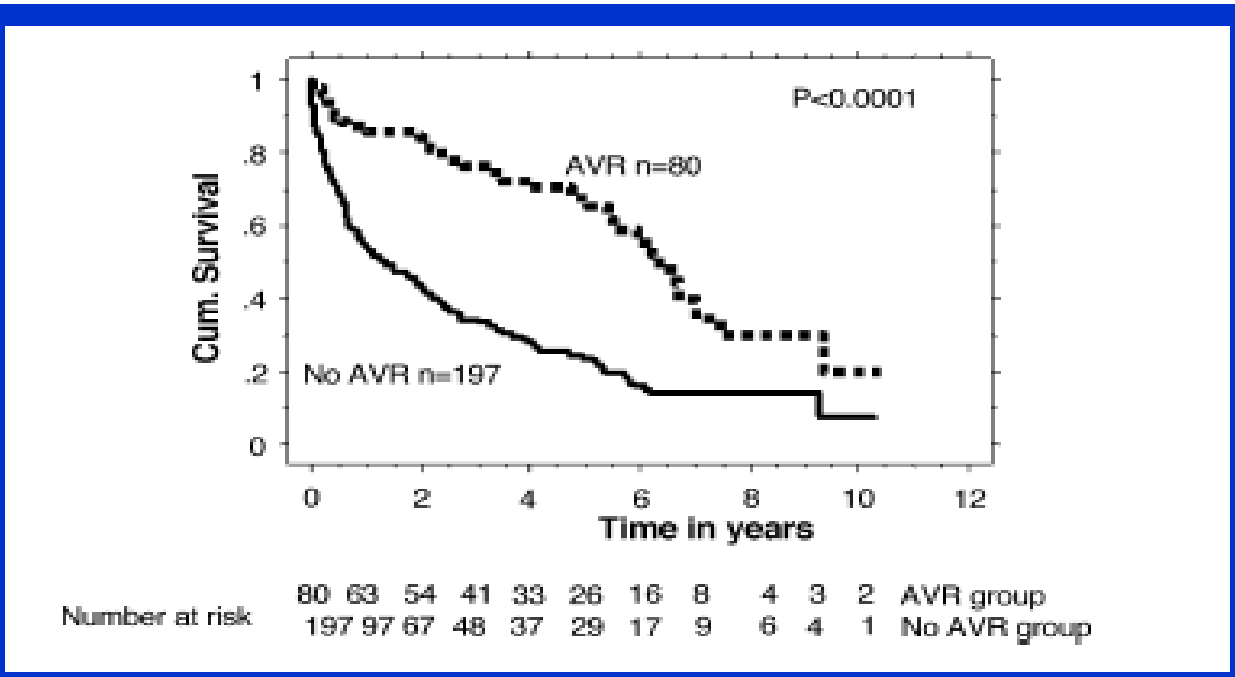
Lindroos et Al - JACC 1993: 21; 1220-5

Aortic Valve Area (cm^2)	Age groups (yr)		
	75-76 (n = 197)	80-81 (n = 155)	85-86 (n = 124)
? 1.2	5 (2.5)	6 (3.9)	10 (8.1)
? 1.0	4 (2.0)	4 (2.6)	10 (8.1)
? 0.8	1 (0.5)	4 (2.6)	7 (5.6)
? 0.6	0 (0.0)	3 (1.9)	4 (3.2)
? 0.4	0 (0.0)	0 (0.0)	1 (0.8)

ELSEVIER
European Journal of Cardio-thoracic Surgery 30 (2006) 722–727
www.elsevier.com/locate/ejcts

Survival in elderly patients with severe aortic stenosis is dramatically improved by aortic valve replacement: results from a cohort of 277 patients aged ≥80 years☆

Padmini Varadarajan, Nikhil Kapoor, Ramesh C. Bansal, Ramdas G. Pai *

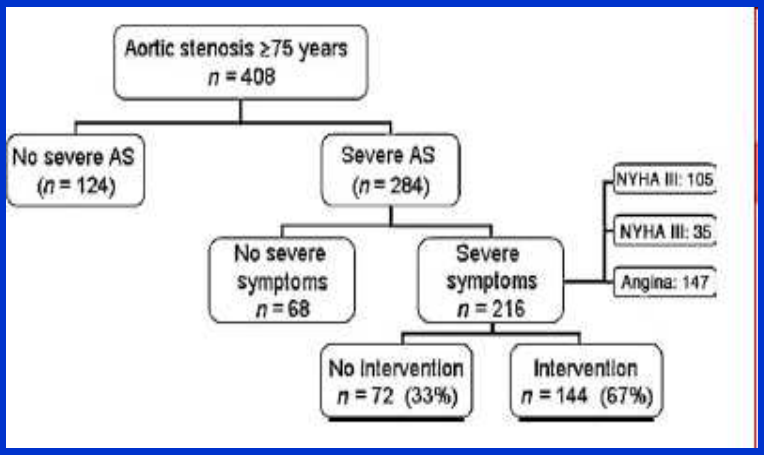


Conclusion: Prognosis of medically managed severe calcific AS in the elderly patients is dismal. AVR appears to improve survival of these patients and should be strongly considered in the absence of other major comorbidities.

European Heart Journal (2005) 26, 2714–2720
doi:10.1093/eurheartj/ehi471

Clinical research

Decision-making in elderly patients with severe aortic stenosis: why are so many denied surgery?



- **Surgery was denied in 33% of elderly pts with severe, symptomatic AS.**
- ***Older age*** **and** ***LV dysfunction*** **were the most striking characteristics of patients who were denied surgery.**

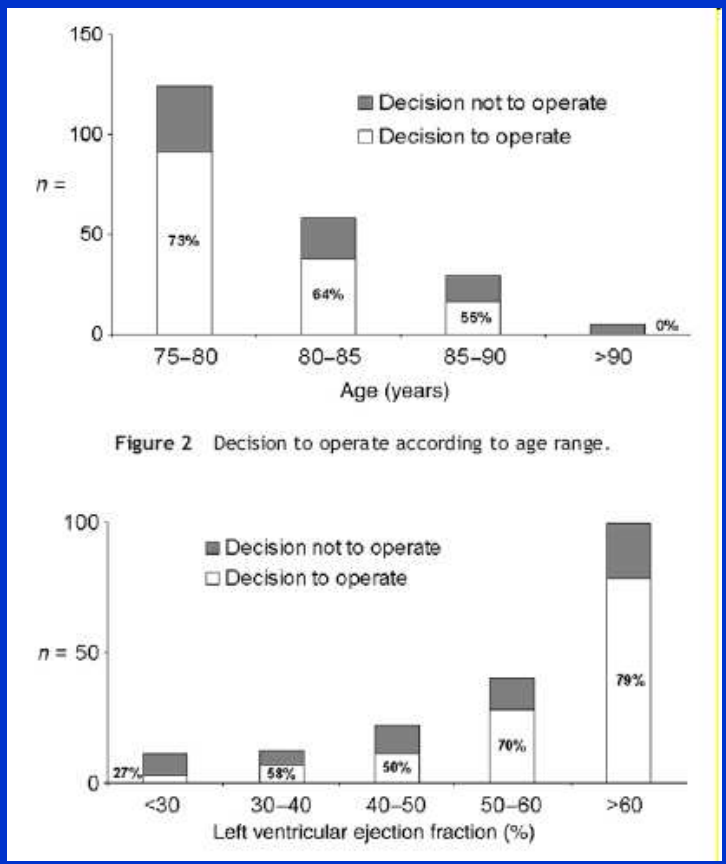


Figure 2 Decision to operate according to age range.

…. which are the absolute contraindications to aortic valve replacement ?

European Heart Journal (2008) **29**, 1463–1470
doi:10.1093/eurheartj/ehn183

SPECIAL ARTICLE

Transcatheter valve implantation for patients with aortic stenosis: a position statement from the European Association of Cardio-Thoracic Surgery (EACTS) and the European Society of Cardiology (ESC), in collaboration with the European Association of Percutaneous Cardiovascular Interventions (EAPCI)

-TAVI is indicated in patients with calcified pure or predominant AS. It is unlikely that it will be used in patients with pure aortic regurgitation

- TAVI should only be proposed in patients with severe symptoms that can definitely be attributed to valve disease because of pending questions on safety and valve durability.

- TAVI is not recommended for patients who simply refuse surgery on the basis of personal preference.

-TAVI is seldom considered in patients <70 years, however, age alone is not sufficient for its use instead of surgery.

-TAVI should currently be restricted to patients at high-risk (expected mortality >20% with the Logistic EuroScore) or with contraindications for surgery. It is premature to consider using it in patients who are good surgical candidates.

studies focusing on patient outcomes are needed in the future.

The Emerging Role of Exercise Testing and Stress Echocardiography in Valvular Heart Disease

Eugenio Picano, MD, PHD,* Philippe Pibarot, MD, PHD,† Patrizio Lancellotti, MD, PHD,‡ Jean Luc Monin, MD, PHD,§ Robert O. Bonow, MD‖

Stress echocardiography has a well-defined role in *AS pts with LV dysfunction* (low-flow/low-gradient, contractile reserve) (ACC/AHA class IIa recommendation, evidence B)

In *asymptomatic AS pts with normal LV function* the principal role of exercise testing is to unmask symptoms or abnormal blood pressure responses in patients with AS who claim to be asymptomatic

AVR is to consider in pts with exercise-induced symptoms or abnormal blood pressure responses during exervise testing: ACC/AHA guidelines (Class IIb recommendation) and ESC guidelines (Class I for symptoms, Class IIa for abnormal blood pressure)

(J Am Coll Cardiol 2009;54:2251–60)

Factors affecting decision-making in patients with symptomatic severe aortic stenosis

- "Overestimation" of operative risk
- "Underestimation" of symptoms
- "Frail elderly"
  - New emerging risk factor in cardiac surgery
  - Importance of pre-operative evaluation

Frailty: The Missing Element in Predicting Operative Mortality

Joanna Chikwe, MD, FRCS, and David H. Adams, MD

Semin Thoracic Surg 22:109-110

Frailty, Aging, and Cardiac Surgery Outcomes

The Stopwatch Tells the Story*

Cleveland JC JACC Vol. 56, No. 20, 2010

Frail Patients Are at Increased Risk for Mortality and Prolonged Institutional Care After Cardiac Surgery

Circulation 2010;121:973-978

Table 4. Risk-Adjusted Impact of Frailty on Prolonged Institutional Care

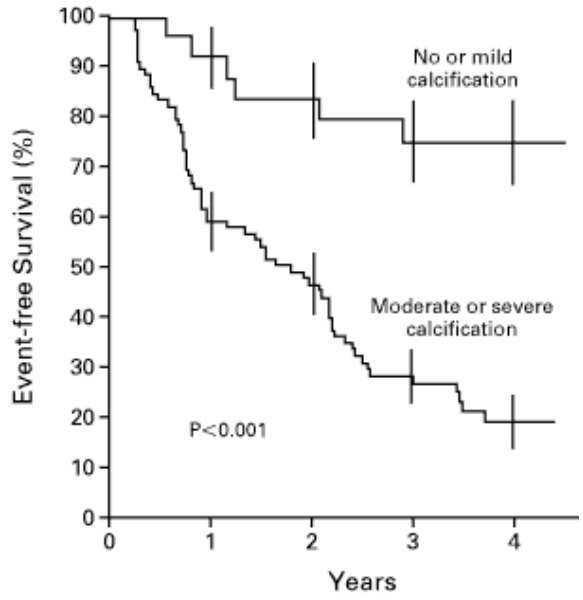
Preoperative Characteristics	OR	95% CI	*P*
Frail	6.3	4.2–9.4	0.0001
Age*	2.0	1.8–2.3	0.0001
Female sex	1.6	1.2–2.0	0.0003
Diabetes	1.4	1.1–1.8	0.01
COPD	1.5	1.1–2.0	0.01
RF	1.6	1.1–2.4	0.02
CHF	1.4	1.1–1.8	0.02
PVD	1.9	1.4–2.5	0.0001
Urgency of surgery			
Urgent/emergent	4.5	3.0–6.5	0.0001
In-house	2.6	2.0–3.5	0.0001
Elective	1.0	—	—
Procedure (other vs isolated CABG)	2.0	1.5–2.6	0.0001

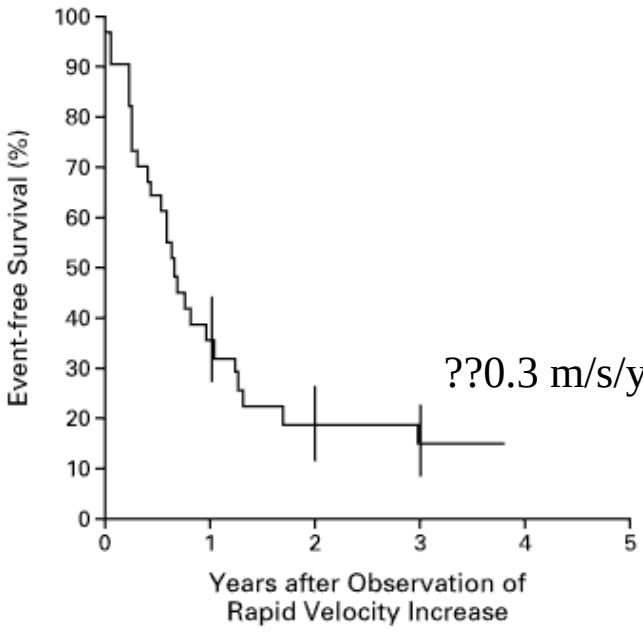
Table 2. Unadjusted In-Hospital Outcomes

Variable, n (%)	Nonfrail (n=3669)	Frail (n=157)	*P*
Mortality	164 (4.5)	23 (14.7)	0.0001
Discharge location (patients discharged alive)			
Home	3189 (91.0)	69 (51.5)	0.0001
Institution	316 (9.0)	65 (48.5)	. . .
Blood transfusion	1239 (33.8)	97 (61.8)	0.0001
Low cardiac output syndrome	373 (10.2)	34 (21.7)	0.0001
Sepsis	120 (3.3)	18 (11.5)	0.0001
Pneumonia	266 (7.3)	32 (20.4)	0.0001
Permanent stroke	70 (1.9)	5 (3.2)	0.23
Delirium	335 (9.1)	23 (14.7)	0.020
Postoperative RF	361 (9.8)	36 (22.9)	0.0001
Prolonged ventilation	584 (15.9)	57 (36.3)	0.0001
Prolonged LOS	1075 (29.3)	87 (55.4)	0.0001

Frailty is an independent risk factor for reduced midterm survival after cardiac surgical intervention

Predictors of outcome in severe, asymptomatic aortic stenosis





??0.3 m/s/yr

No. of Patients at Risk					
No or mild calcification	25	23	20	17	9
Moderate or severe calcification	101	48	38	21	7

No. of Patients at Risk				
34	12	7	5	

"The presence of moderate or severe calcifications, together with a rapid increase in aortic-jet velocity (?0.3 m/s/yr), identifies patients with a very poor prognosis. These patients should be considered for early valve replacement rather than have surgery delayed until symptoms develop".

Rosenhek et Al. - N Eng J Med 2000; 343:611-7

FINDINGS ASSOCIATED TO A FASTER PROGRESSION

- **Older age**
- **Smoking**
- **Hypertension**
- **Obesity /diabetes**
- **Lipid abnormalities**
- **Degenerative aortic stenosis**
- **Valve calcification and regurgitation**
- **Bicuspid valve**
- **Concomitant coronary artery disease**
- **Chronic renal failure and dialysis**
- Mild-moderate stenosis at initial presentation
- Symptoms appearance or worsening
- Left ventricular systolic dysfunction and/or low cardiac output
- Hemodynamic changes during exercise
- ……..

Faggiano et Al. Am Heart J 1996

Factors affecting decision-making in patients with symptomatic severe aortic stenosis

- "Overestimation" of operative risk
- "Underestimation" of symptoms
- "Frail elderly"
- "Underestimation" of hemodynamic severity
- **Comorbidities and associated cardiac diseases**

Comprehensive assessment of frailty for elderly high-risk patients undergoing cardiac surgery☆

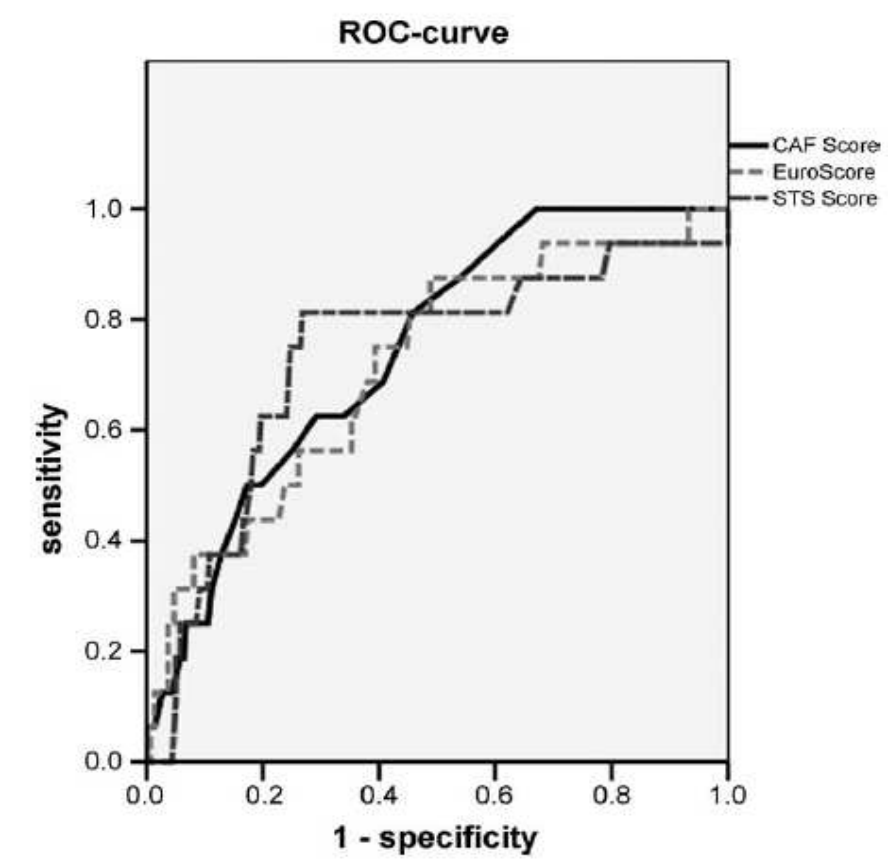
CAF parameters
Frailty test
Grip strength
Walking speed
Balance
Rise up from chair
Pick up a pen
Put on and remove a jacket

Mortality rate among each CAF category.

	CAF category		
	Not frail (1–10 points)	Moderately frail (11–25 points)	Severely frail (26–35 points)
Survival			
Alive % within CAF category	96.4	92.2	78.3
Dead % within CAF category	3.6	7.8	21.7

There is a correlation between a high CAF score and an increased 30-day mortality

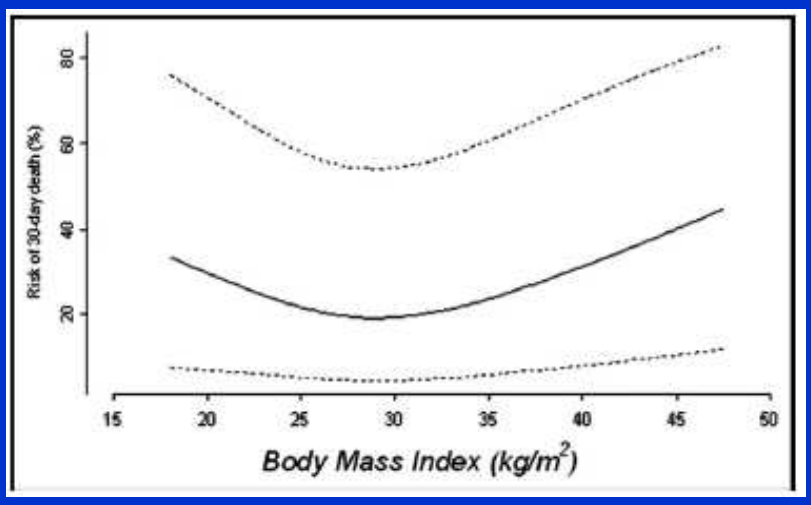
European Journal of Cardio-thoracic Surgery 39 (2011) 33-37



The values for the AUC of ROC proved the validity of the CAF score to assess the risk profile of the individual elderly patient regarding 30-day mortality. Furthermore, a low-to-moderate correlation between CAF score, EuroSCORE and STS score demonstrated the potential of the Frailty score as a valuable risk assessment in addition to the commonly used scoring systems.

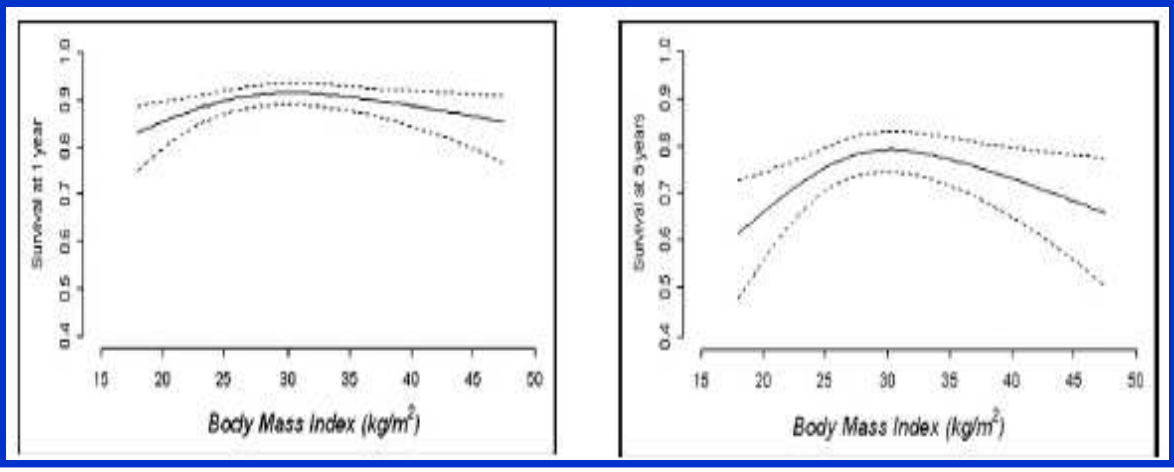
Effect of Body Mass Index on Survival in Patients Having Aortic Valve Replacement for Aortic Stenosis With or Without Concomitant Coronary Artery Bypass Grafting

Am J Cardiol 2011;108:1767–1771

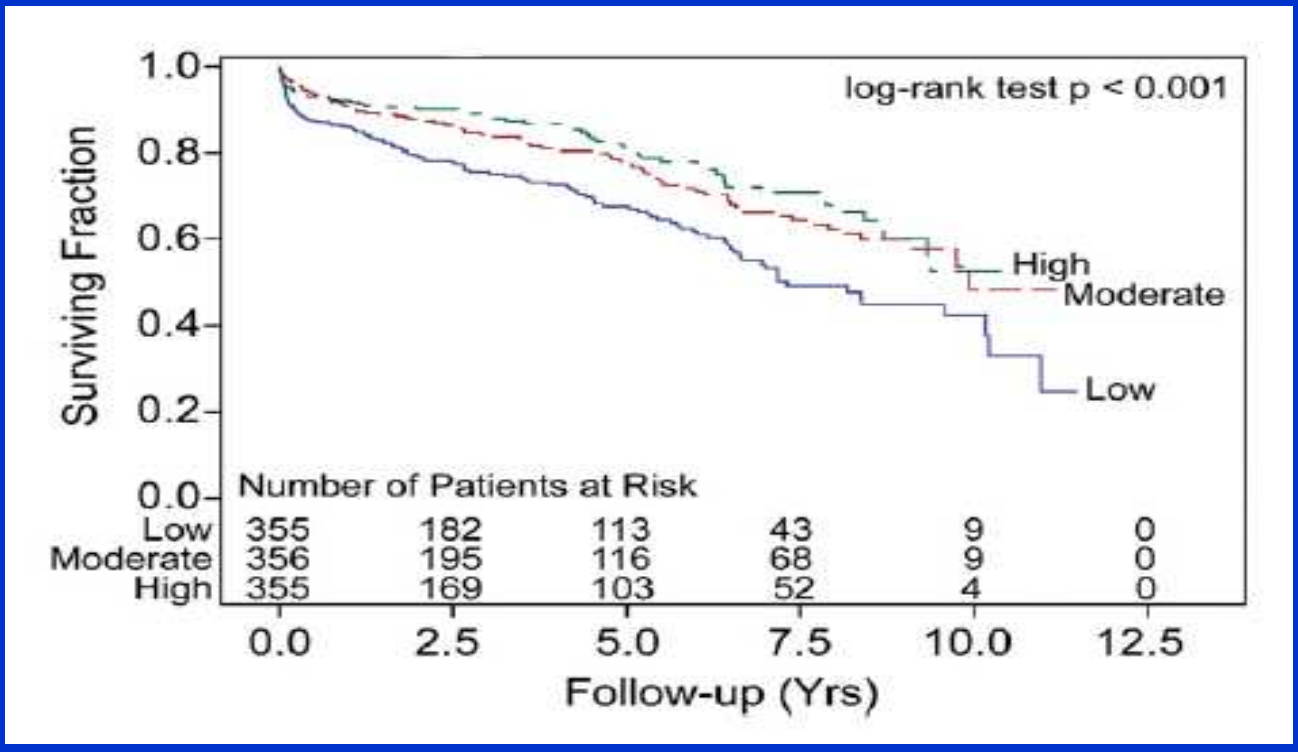


Strong and significant adjusted association between BMI and 30-day and longterm mortality.

Better 30-day and long-term survival was observed for pts with BMI in the low 30s compared to pts with BMI in the mid 20s or 40 kg/m2.



Does Body Mass Index Affect Outcomes for Aortic Valve Replacement Surgery for Aortic Stenosis?

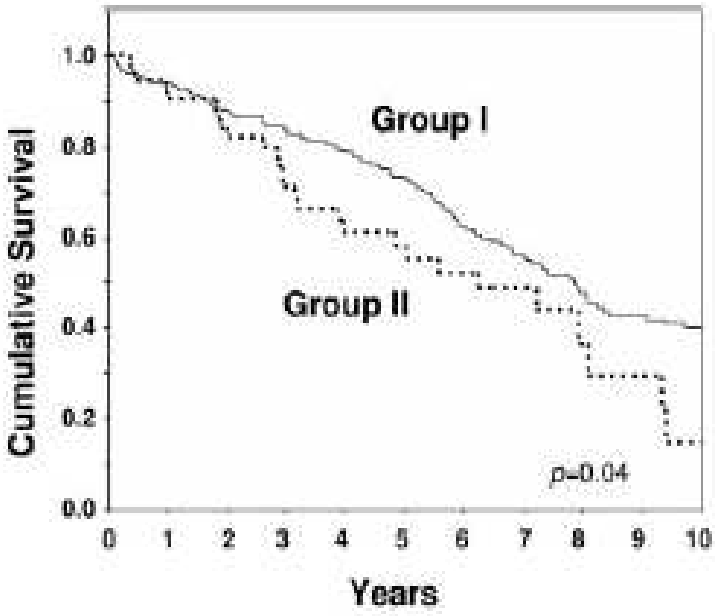


Increasing BMI has no independent association with worsened outcomes in the short or long term, and overweight patients have a survival benefit after surgery

Ann Thorac Surg 2012;93:742–7

Aortic Valve Replacement and Concomitant Mitral Valve Regurgitation in the Elderly. Impact on Survival and Functional Outcome

Barreiro et al. *Circulation*. 2005;112[suppl I]:I-443–I-447



Number of patients at risk each year

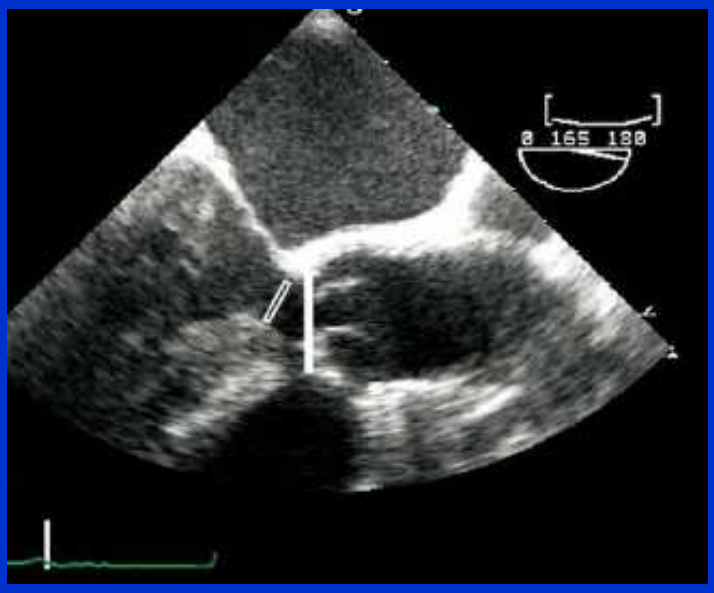
	1	2	3	4	5	6	7	8	9	10
Group I	239	201	176	151	125	100	82	65	53	45
Group II	48	40	31	23	20	15	10	5	4	2

Kaplan–Meier actuarial survival curves for Group I and Group II.

Postoperative echo demonstrated **improvement** in MR in 81.8% of functional MR patients. However, MR **persisted or worsened** in 65.4% of patients with intrinsic mitral valve disease (myxomatous, calcific MR).

Conclusions—Moderate MR is an independent risk factor impacting long-term survival in elderly patients undergoing AVR. Therefore, patients with intrinsic mitral valve disease should be considered for concomitant MV surgery.

Subvalvular Left Ventricular Outflow obstruction for Patients Undergoing Aortic Valve replacement for Aortic Stenosis: Echocardiographic Recognition and Identification of Patients at Risk



…a rough rule would be to consider myectomy if the LVOT diameter is less than 1.4 cm at its narrowest point (correlating with a cross-sectional area of 1.5 cm2), or is less than 70% of the diameter of the decalcified aortic valve annulus.
If performed, septal myectomy should be in proportion to the severity of LV hypertrophy, sometimes requiring removal of only a few millimeters of Tissue.

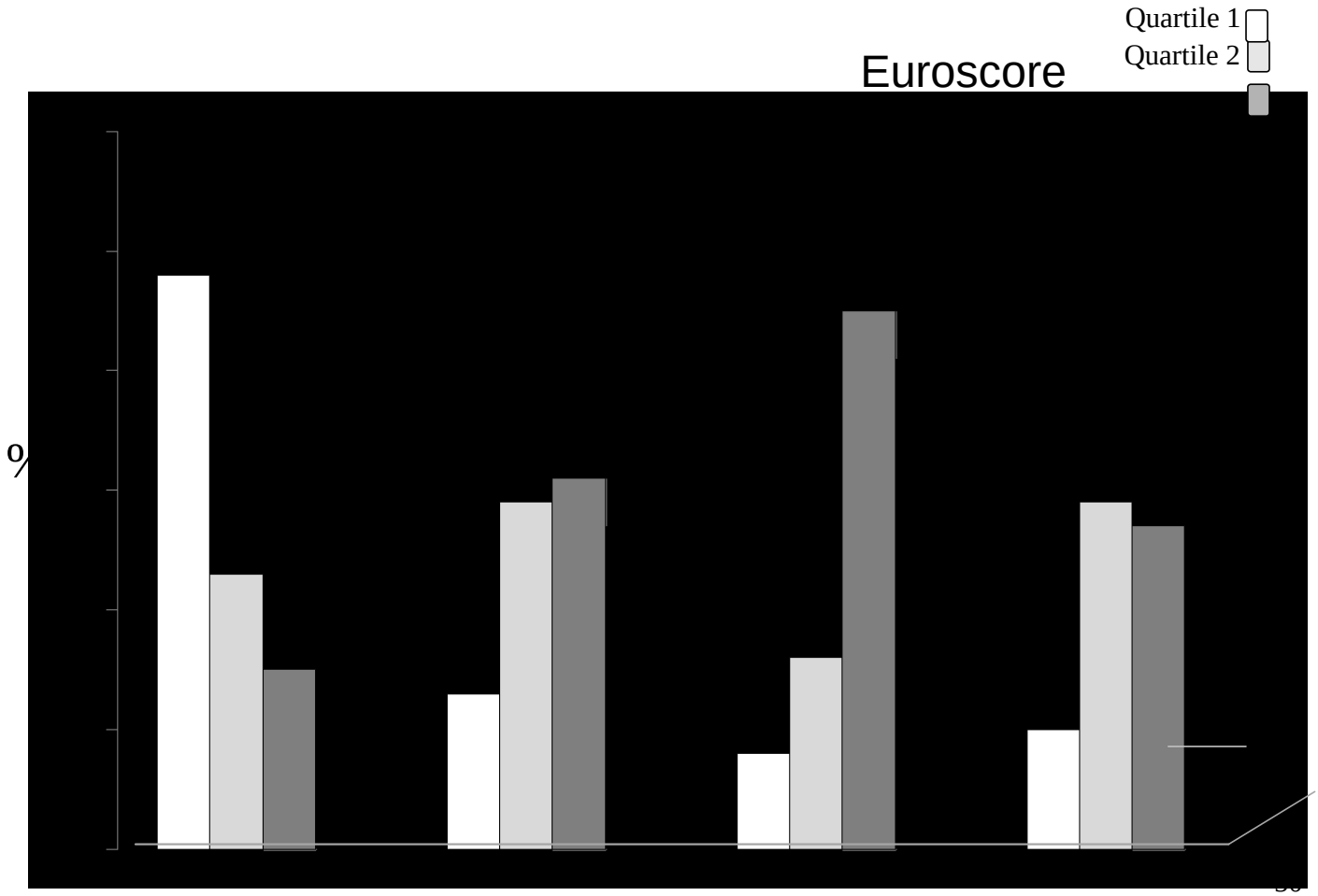
Bach J Am Soc Echo 2005; 18: 1155

Management of the elderly patient with aortic stenosis: key points

- Operative mortality of aortic valve replacement for aortic stenosis is approximately 10% in patients aged over 80 years. However, it is subject to important differences according to patient characteristics.
- Symptom assessment is frequently difficult in the elderly and should take into account comorbidities and lifestyle.
- The assessment of the severity and consequences of aortic stenosis relies mainly on echocardiography. It is necessary to check the consistency of different echocardiographic findings between themselves and with clinical assessment.
- Old age in itself is not a valid reason to deny aortic valve replacement.
- The decision to operate or not relies on a team approach, allowing for an individual estimation of the risk/benefit ratio taking into account predicted operative mortality, life expectancy according to age, comorbidities and the severity of valve disease.
- The use of multivariate scores is useful to reduce the subjectivity of the assessment of operative risk, although they lack predictive accuracy in high risk patients.

Iung B. Heart 2008;94:519–524

Distribution of pts candidated to the four therapeutic options according to the quartiles of Euroscore.

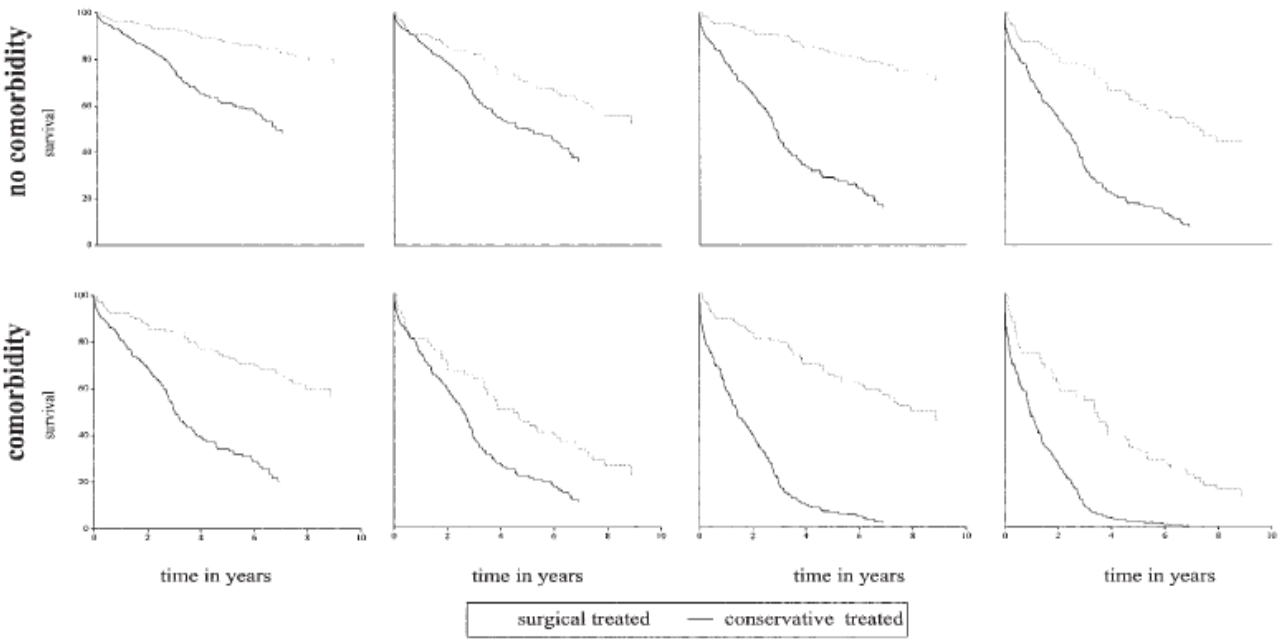


Which Elderly Patients with Severe Aortic Stenosis Benefit from Surgical Treatment? An Aid to Clinical Decision Making

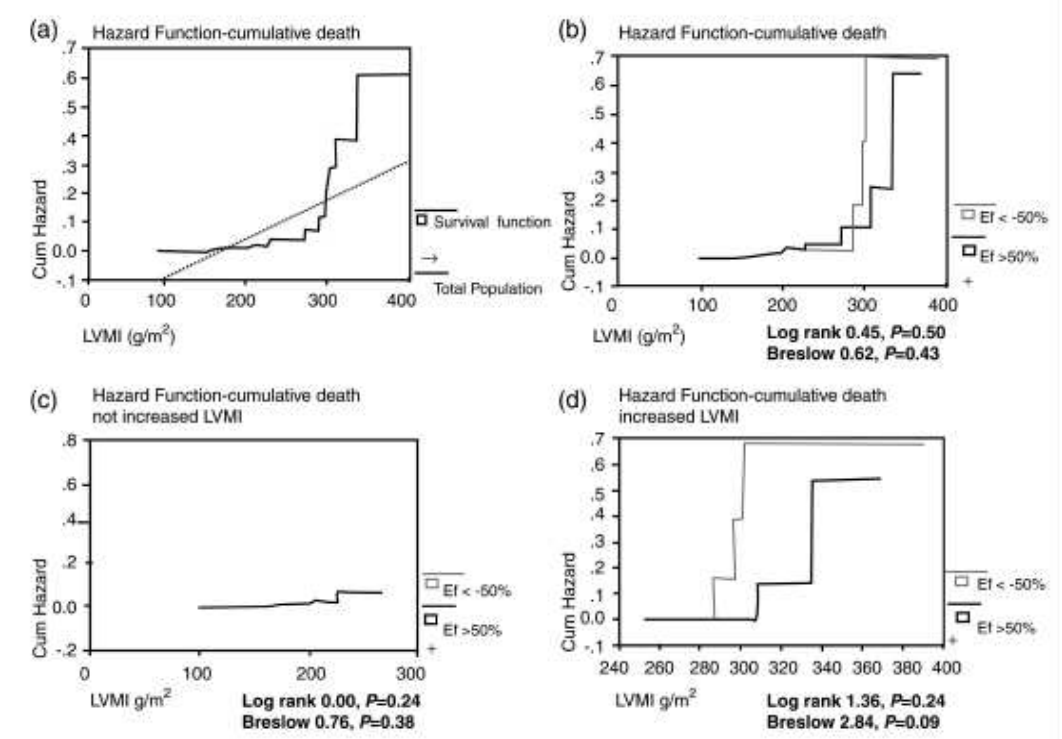
Berto J. Bouma, Renee B. A. van den Brink, K. Zwinderman, Emile C. Cheriex, Hans H. P. Hamer, Kong I. Lie, Jan G. P. Tijssen

J Heart Valve Dis 2004;13: 374-381

Figure I-b **critical aortic stenosis**



Left ventricular mass index as a prognostic factor in patients with severe aortic stenosis and ventricular dysfunction☆



· Increased LVMI could be responsible of higher mortality by means of contractile impairment, diastolic dysfunction, abnormalities of coronary flow reserve or arrhythmias.

· LVMI was the strongest predictor of death in pts with LVEF $\leq$ 50%

R. García Fuster et al. / Interactive CardioVascular and Thoracic Surgery 4 (2005) 260-266

Abnormal Left Ventricular Intracavitary Flow Acceleration in Patients Undergoing Aortic Valve Replacement for Aortic Stenosis A Marker for High Postoperative Morbidity and Mortality

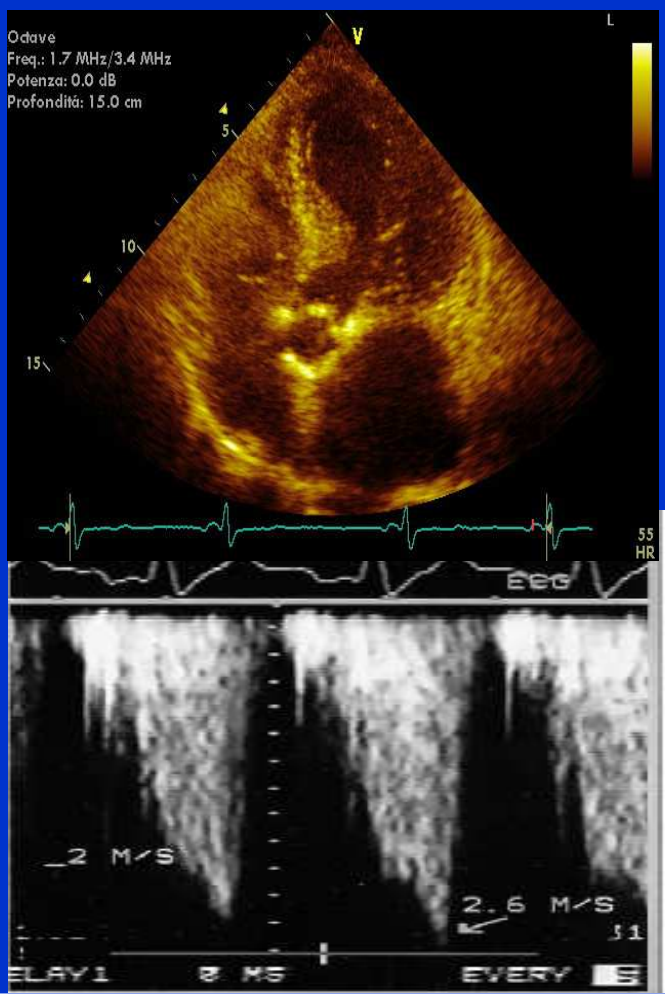
Aurigemma et Al. Circulation 1992;86:926-936

-Midventricular dynamic obstruction was observed after AVR for AS, particularly in women, and it was enhanced and exacerbated by the drop in LV afterload following AVR and inotropic treatment

- AS pts with marked concentric LV hypertrophy and Doppler evidence of abnormal intracavitary flow acceleration may be at high risk of hemodynamic compromise after AVR

- Increased post-operative morbidity and mortality of pts with these echocardiographic findings

- The magnitude of the intracavitary flow velocity and relative wall thickness on the preoperative study may provide important prognostic information.

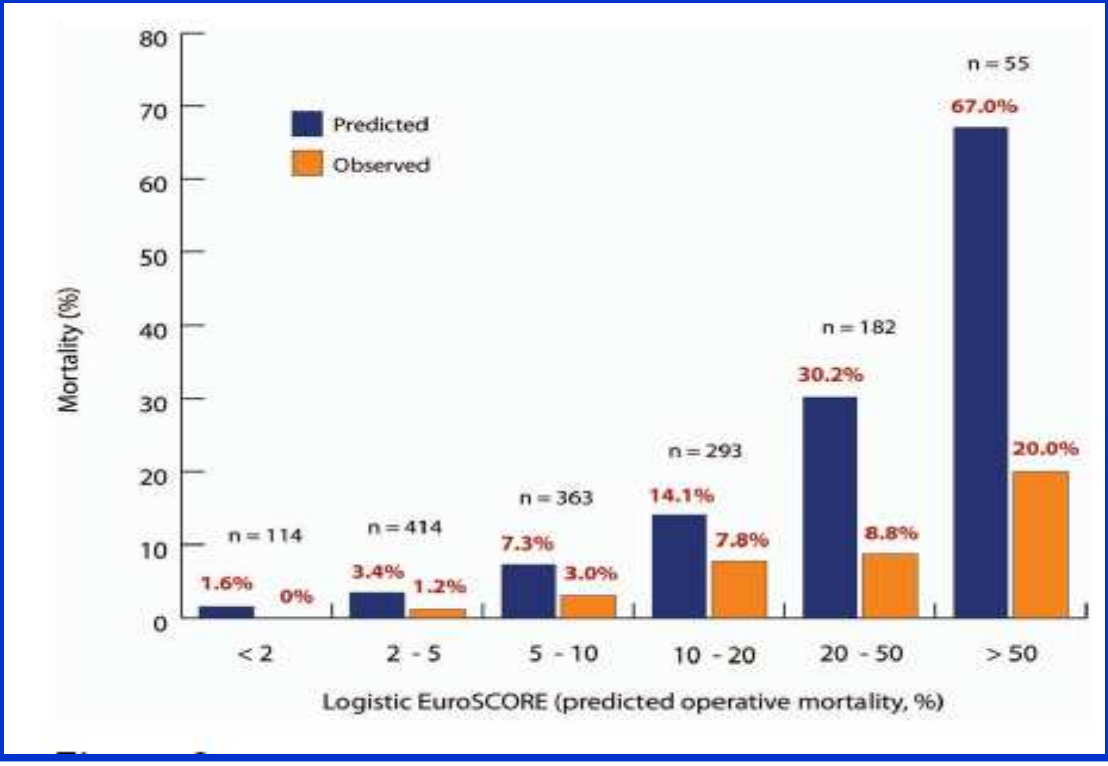


Journal of Cardiothoracic Surgery

The European System for Cardiac Operative Risk Evaluation (EuroSCORE) is not appropriate for withholding surgery in high-risk patients with aortic stenosis: a retrospective cohort study

Dimitri Kalavrouziotis*, Debbie Li, Karen J Buth and Jean-Francois Légaré

Predicted and observed mean operative mortality within all subgroups of EuroSCORE.



European Heart Journal Advance Access published March 15, 2011

European Heart Journal
doi:10.1093/eurheartj/ehr061

ESC REPORT

ESC Working Group on Valvular Heart Disease Position Paper: assessing the risk of interventions in patients with valvular heart disease

- **Risk Score:**

- **Logistic Euroscore : 17 variables**
- **Society of Thoracic Surgeons (STS) score: 24 variables**
- **Ambler Score (used for valve disease): 13 variables**

Factors affecting decision-making in patients with symptomatic severe aortic stenosis

- **“Overestimation” of operative risk**
- **“Underestimation” of symptoms**
  - **Age of patient, individual lifestyle, poor mobility**
  - **Differential Diagnosis with other cardiac or extracardiac concomitant diseases**
  - **Role of exercise testing; Role of brain natriuretic peptide (BNP)**

Factors affecting decision-making in patients with symptomatic severe aortic stenosis

- "Overestimation" of operative risk
- "Underestimation" of symptoms
- "Underestimation" of hemodynamic severity
  - Inadequate echocardiographic evaluation
  - "low flow-low gradient"
  - rate of AS progression and risk factors correlated to a faster progression

Inconsistent grading of aortic valve stenosis by current guidelines: haemodynamic studies in patients with apparently normal left ventricular function

Jan Minners, Martin Allgeier, Christa Gohlke-Baerwolf, Rolf-Peter Kienzle, Franz-Josef Neumann, Nikolaus Jander

- ***Inconsistent grading of AS*** **(AVA < 1 cm2 but gradient ≤ 40 mmHg) occurred in 36% of pts with preserved LVEF (≥ 50%) irrespective of the method used to assess stenosis severity (echo vs cardiac catheterisation)**

- **The proportion of pts with *reduced stroke volume* (stroke volume index ≤ 35 ml/mq) despite apparently normal LVEF was higher in the subset of pts with inconsistent grading (52%) than in those with consistent grading (29%)**

" Paradoxical low-flow AS" is often the cause of discordance between AVA and gradient

Heart 2010;**96**:1463–1468. doi:10.1136/hrt.2009.181982

STS score *underestimates mortality*
Euroscore and Ambler score *overestimate* mortality

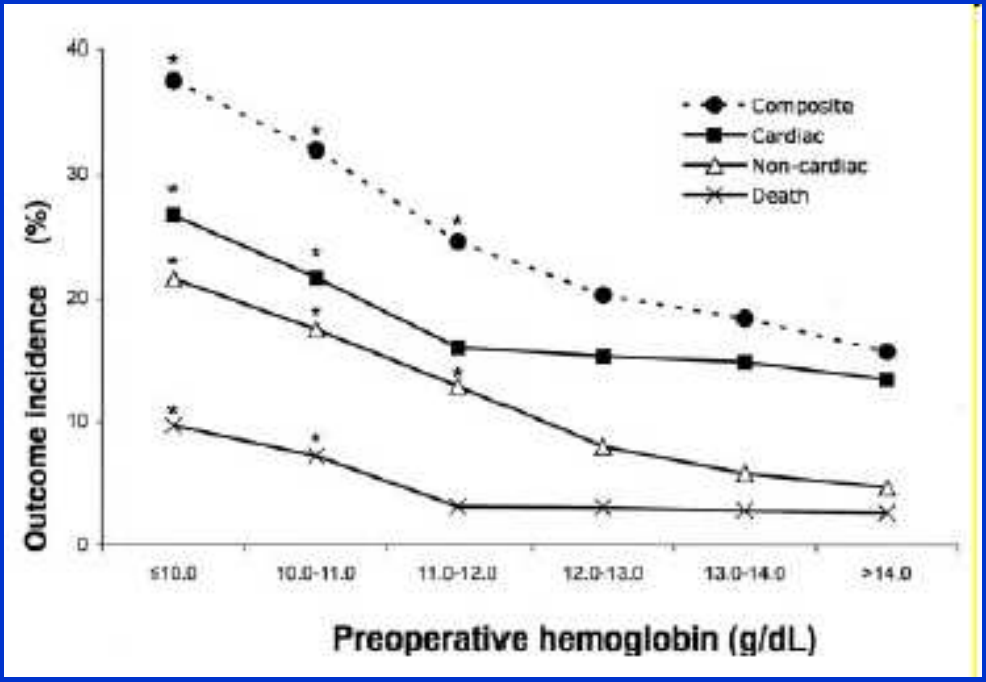
Table 3 Predicted and observed mortality rates using different risk scores in high-risk patients (modified from reference[39])

	STS score	Additive EuroSCORE	Logistic EuroSCORE	Ambler score
N	64	84	64	97
Predicted mortality (%)	13.3	14.0	50.9	19.0
Observed mortality (%)	18.7	11.9	15.6	13.4
Ratio of observed to predicted mortality	1.41	0.85	0.31	0.71
Observed late mortality (%)	45.3	33.3	29.7	26.8

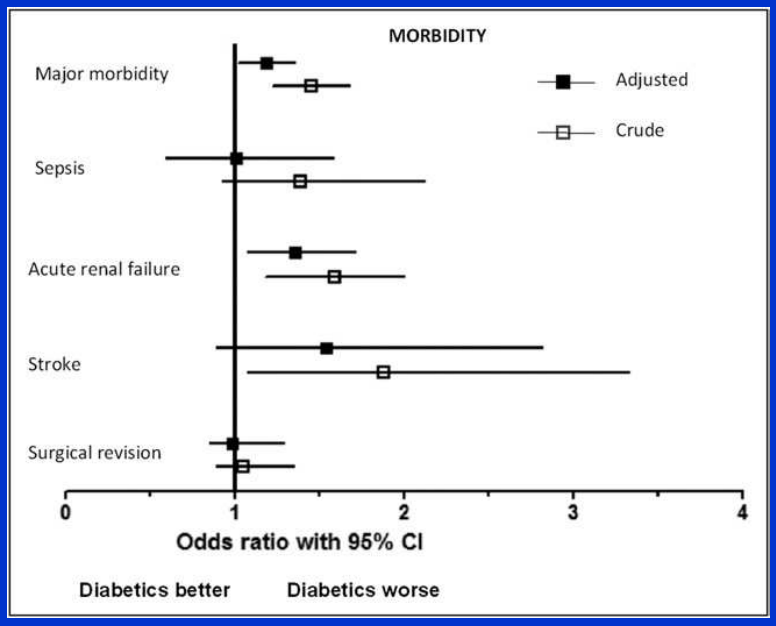
- **Discordance between predicted and observed mortality rates**
- **Suboptimal power to discriminate between high risk and low risk patients**

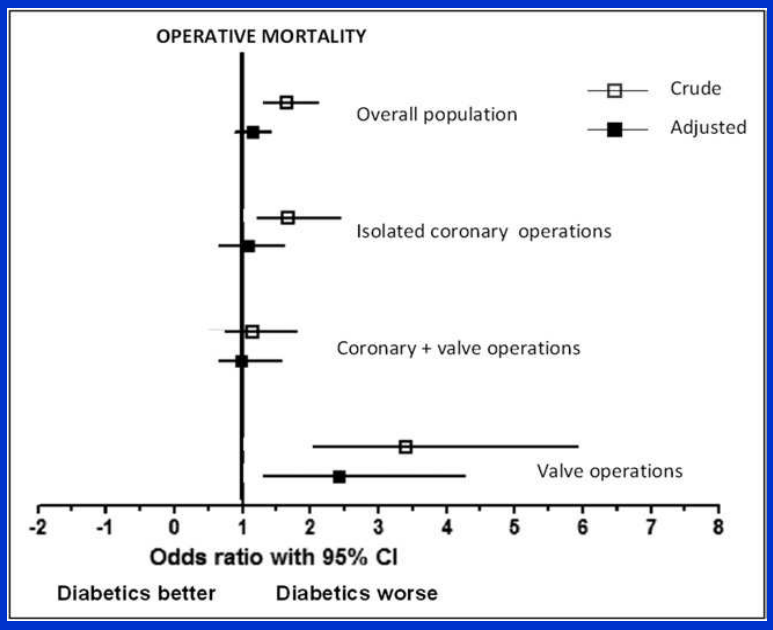
Impact of Preoperative Anemia on Outcome in Patients Undergoing Coronary Artery Bypass Graft Surgery

Kulier et Al. Circulation 2007; 116:471

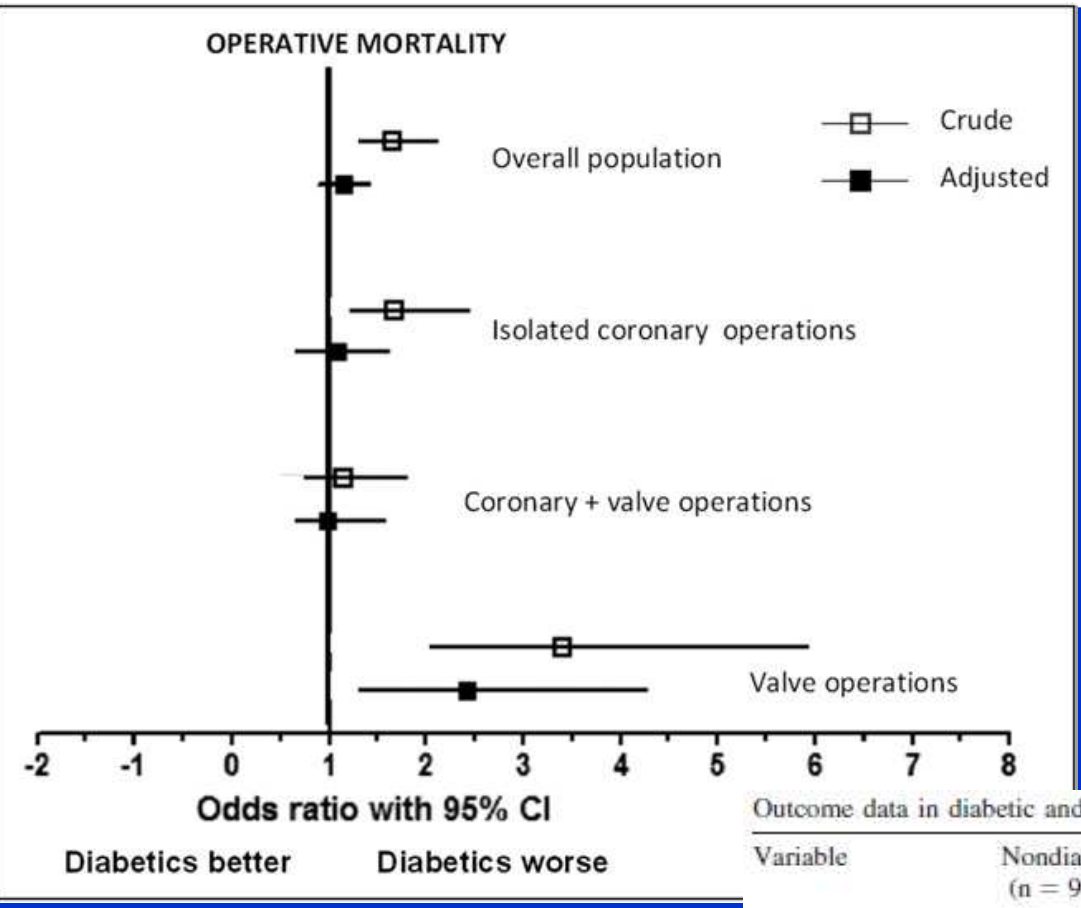


Comparison of Morbidity and Mortality in Diabetics Versus Nondiabetics Having Isolated Coronary Bypass Versus Coronary Bypass plus Valve Operations Versus Isolated Valve Operations





Castelvecchio S et al. Am J Cardiol 2011;107:535–539

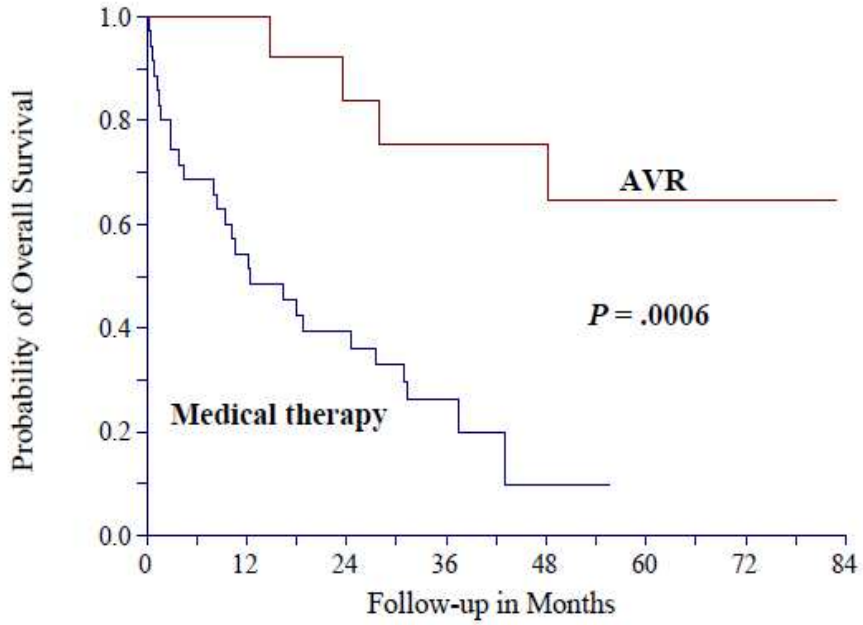


Outcome data in diabetic and nondiabetic patients

Variable	Nondiabetics (n = 9,229)	Diabetics (n = 1,480)	p Value	
			Crude	Adjusted
Mechanical ventilation (hours)	26 ± 86	34 ± 108	0.002	0.232
Intensive care unit stay (days)	3.1 ± 5.0	3.8 ± 6.7	0.001	0.036
Hospital stay (days)	6.5 ± 7.1	7.6 ± 9.9	0.001	0.001

Am J Cardiol 2011;107:535–539

Management and outcomes of severe aortic stenosis in cancer patients

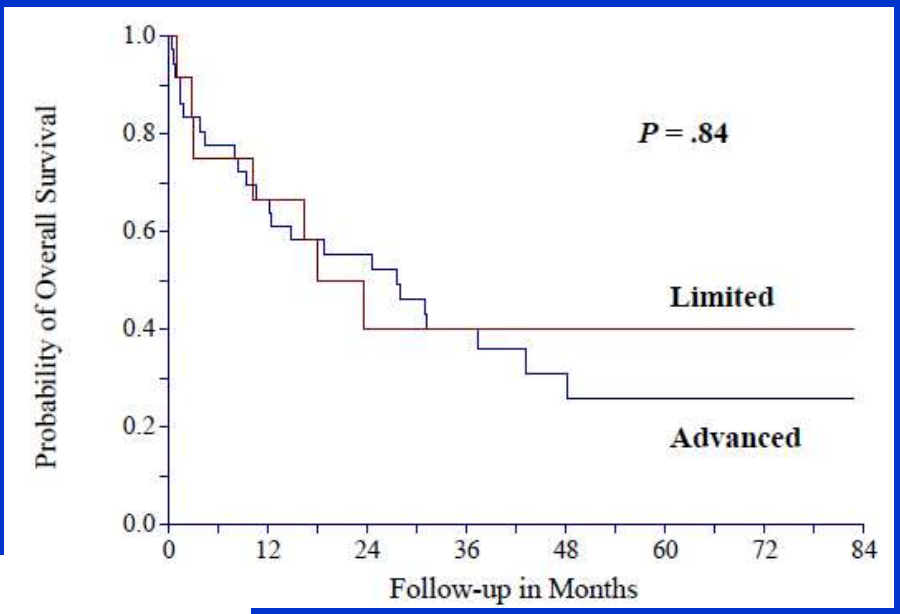


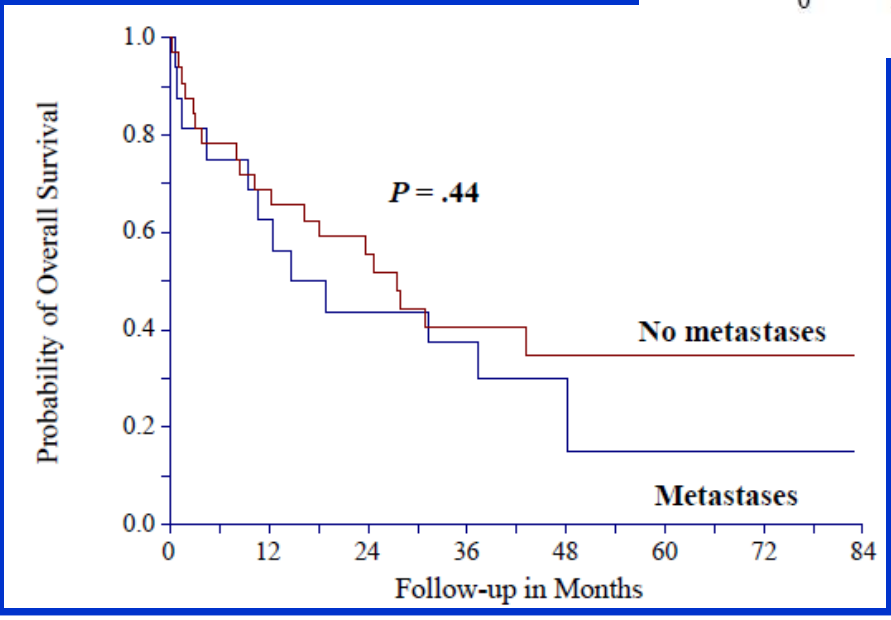
		0	12	24	36	48	60	72
Number at risk	AVR	13	13	10	8	7	3	3
	Medical Therapy	35	19	12	4	1	0	0

Kaplan-Meier plot of survival by AS treatment.

Am Heart J 2011;161:1125-32

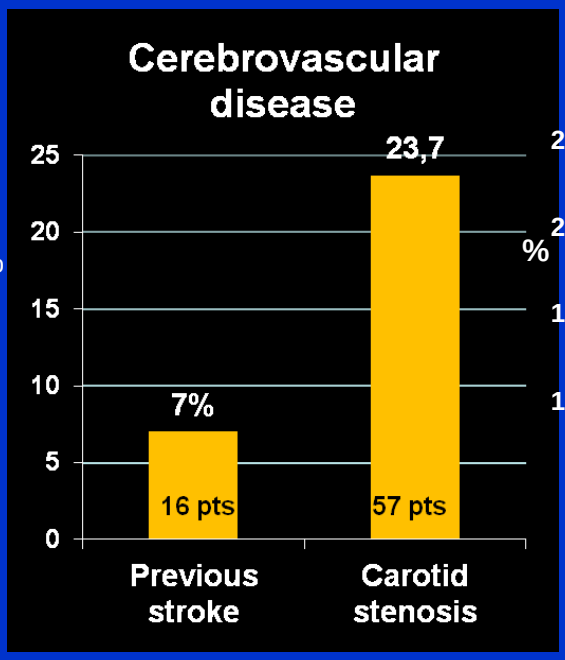
Cancer pts with severe AS who undergo AVR have an improved survival, *regardless of the cancer status*

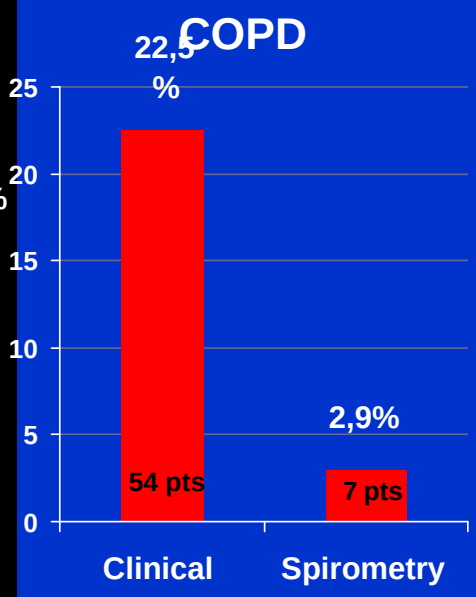


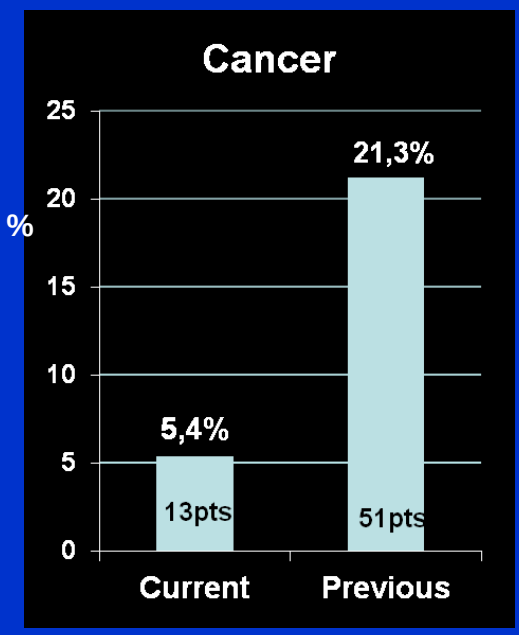


Am Heart J 2011;161:1125-32

Prevalence of Cerebrovascular Disease, COPD and Cancer



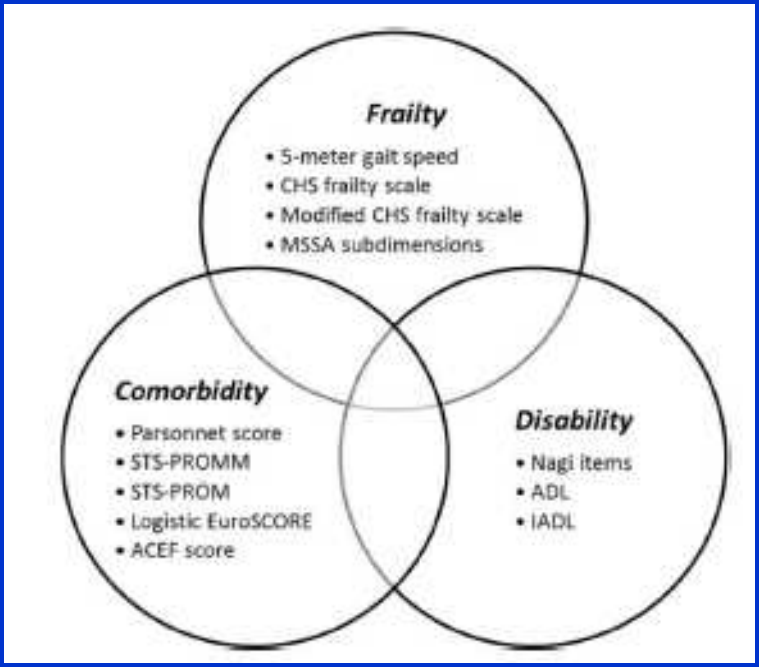




Comorbidities	Potential prognostic and therapeutic implications
Impaired kydney function	· postoperative renal failure and dialysis · increased operative and long-term mortality
Impaired lung function	· postoperative respiratory failure, prolonged ventilation · increased operative and long-term mortality
Anemia	· worsened symptoms of aortic stenosis · increased risk of transfusion
Cancer · previous · current	· myocardial dysfunction by chemiotherapy · concomitant coronary-pericardial-valve disease by radiotherapy · increased operative risk · increased risk of recurrence after extracorporeal circulation · possible contraindication to valve replacement
Diabetes	· difficult surgical wound healing and increased mortality
Cerebrovascular disease	· increased mortality and morbidity · combined surgery often required
Peripheral artery disease	· possible or sometimes absolute contraindication to surgical or percutaneous valve replacement
Hypertension	· possible misclassification of AS severity · postoperative incomplete LV hypertrophy regression
Dyslipidemia	· risk marker for extra-cardiac atherosclerosis

Addition of Frailty and Disability to Cardiac Surgery Risk Scores Identifies Elderly Patients at High Risk of Mortality or Major Morbidity

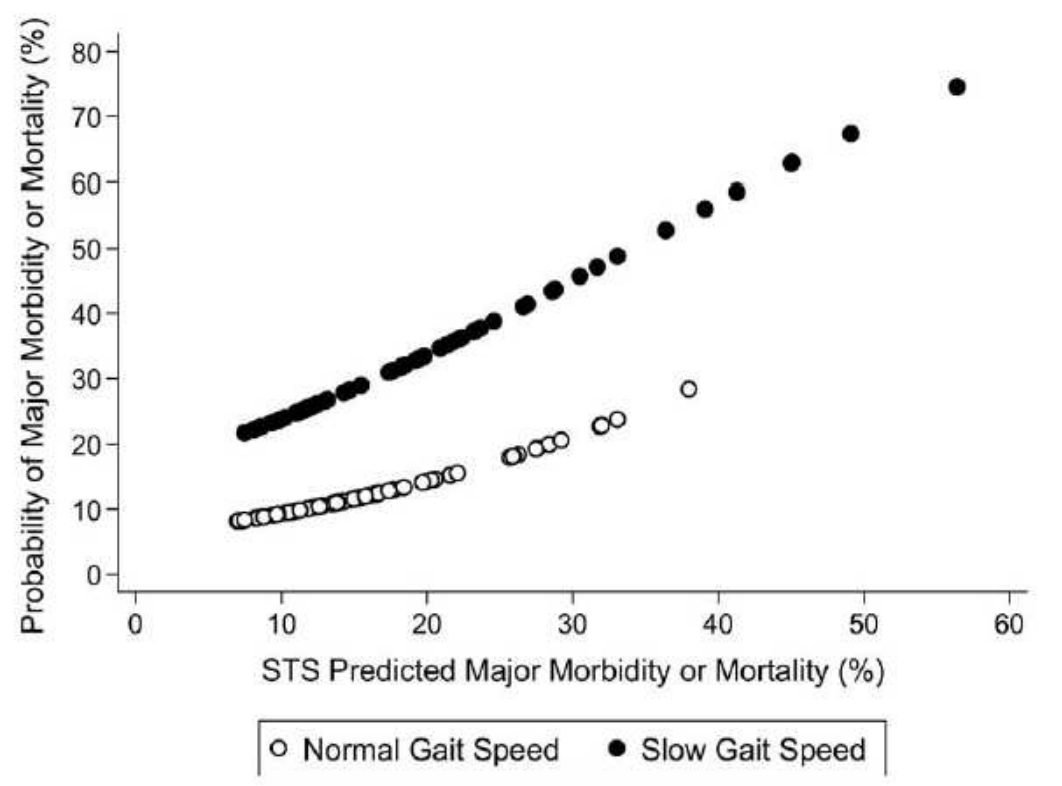
? Frailty and disability provide incremental prognostic value above surgical risk scores for predicting mortality or major morbidity.



Circ Cardiovasc Qual Outcomes. 2012;5:222-228.)

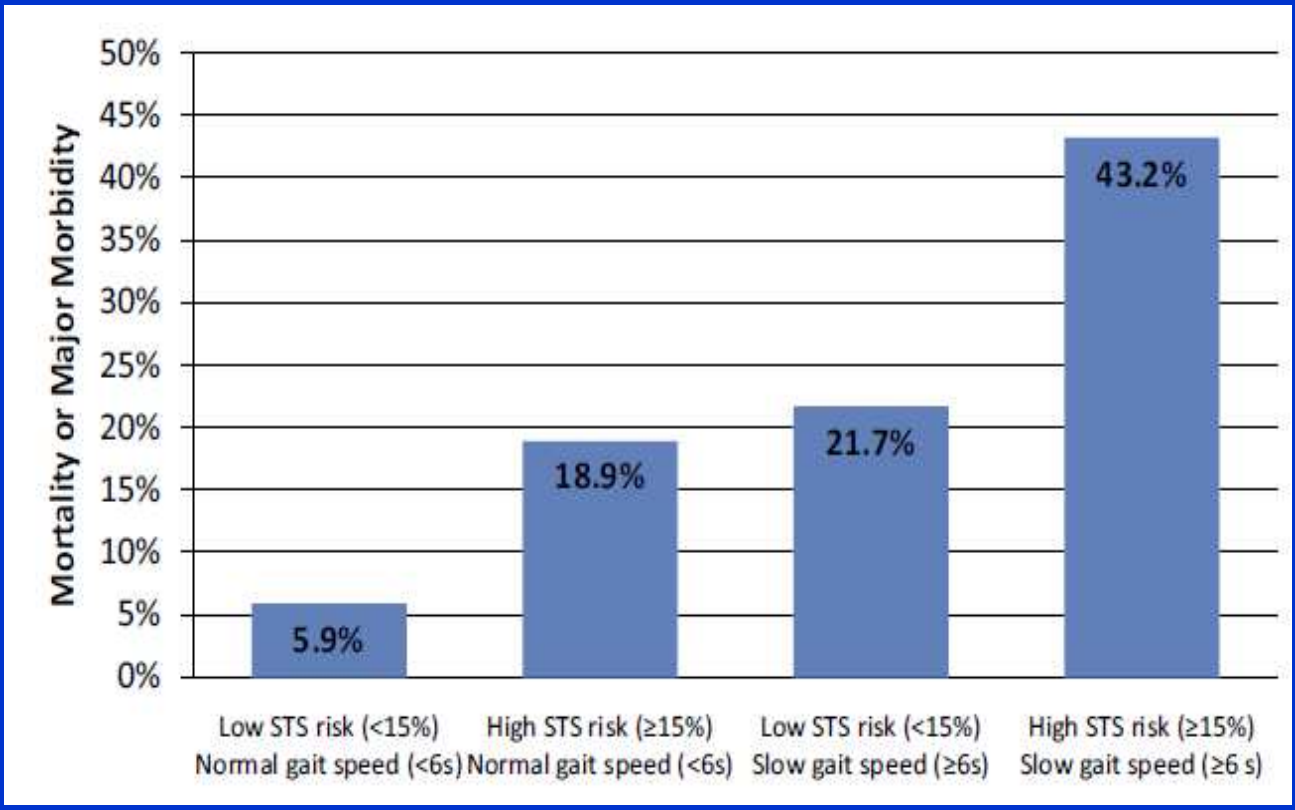
Gait Speed as an Incremental Predictor of Mortality and Major Morbidity in Elderly Patients Undergoing Cardiac Surgery

Predicted Probability of Mortality or Major Morbidity According to Gait Speed and the STS Risk Score



J Am Coll Cardiol 2010;56:1668–76

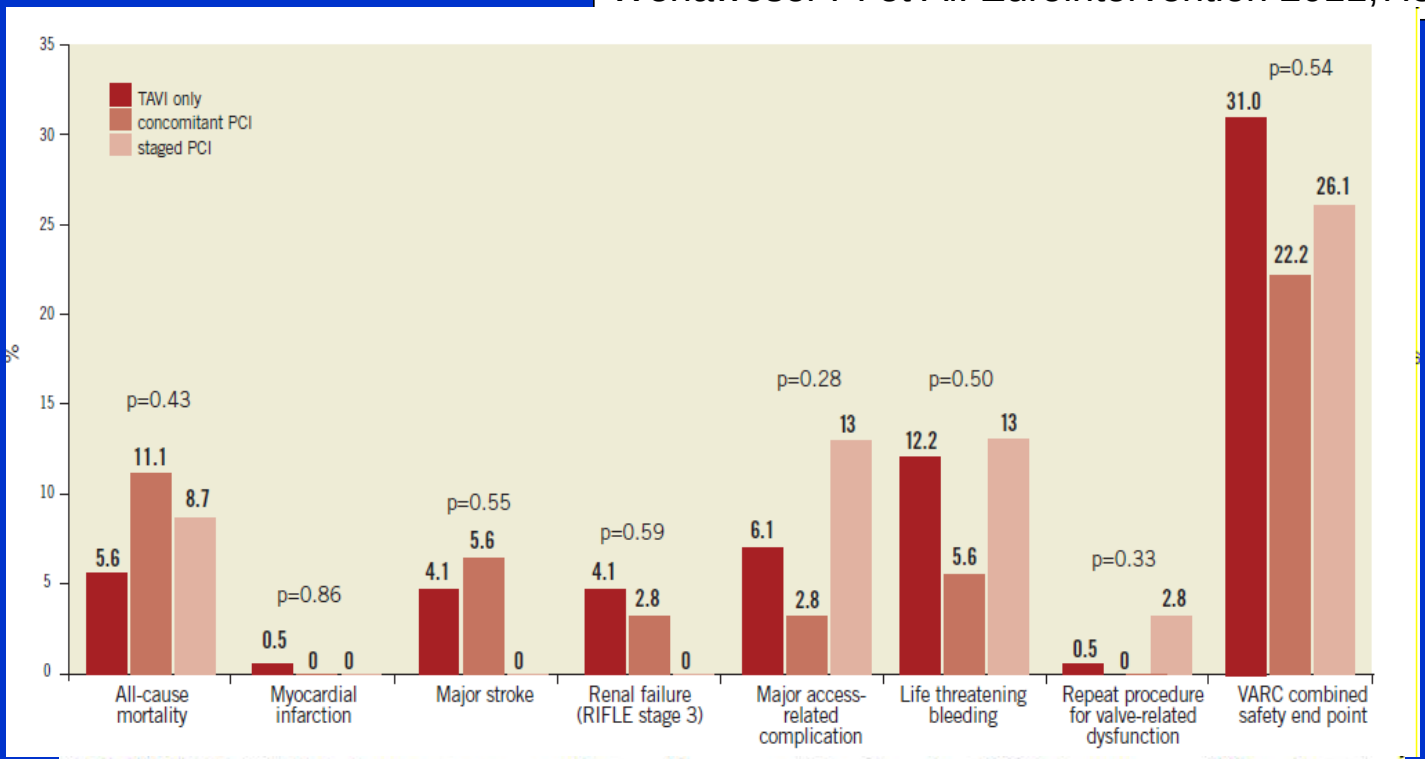
Mortality or Major Morbidity According to Gait Speed and the STS Risk Score



J Am Coll Cardiol 2010;56:1668–76

Impact of coronary artery disease and percutaneous coronary intervention on outcomes in patients with severe aortic stenosis undergoing transcatheter aortic valve implantation

Wenaweser P. et Al. Eurointervention 2011;7:541



Conclusions: CAD is frequent among patients with severe AS undergoing TAVI. Among carefully selected patients, revascularisation by means of PCI can be safely performed in addition to TAVI either as a staged or a concomitant intervention.

CAD and Aortic Stenosis in the TAVR Era: Old Questions, New Paradigms. The Evolving Role of PCI in the Treatment of Patients with Aortic Stenosis

Susheel K. Kodali and Jeffrey W. Moses

Circulation published online January 26, 2012

Percutaneous Coronary Intervention in Patients with Severe Aortic Stenosis: Implications for Transcatheter Aortic Valve Replacement

Sachin S. Goel, Shikhar Agarwal, E. Murat Tuzcu, Stephen G. Ellis, Lars G. Svensson, Tarique Zaman, Navkaranbir Bajaj, Lee Joseph, Neil S. Patel, Olcay Aksoy, William J. Stewart, Brian P. Griffin and Samir R. Kapadia

Circulation published online January 26, 2012

- **PCI can be performed in pts with severe symptomatic AS without increased risk of short term mortality or procedural complications compared to propensity matched pts without AS.**

- **Pts with EF < 30% and STS score >10% are at a highest risk of 30-day mortality after PCI**

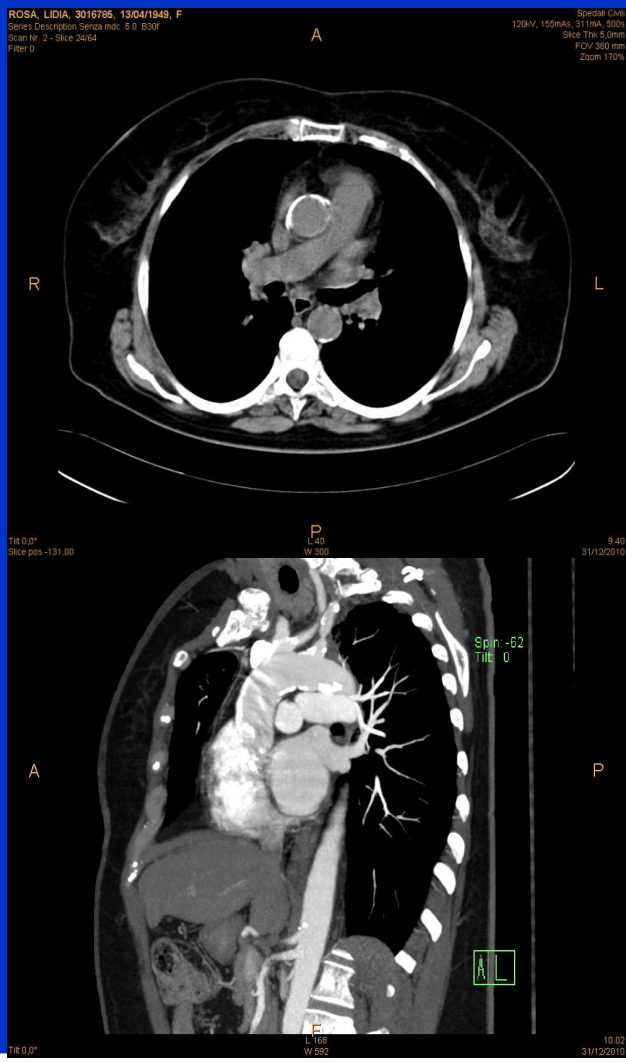
Porcelain Aorta

- *May be a contraindication to AVR ?* It influences the therapeutic approach

- It is not only peculiar of elderly patients ? for example post-irradiation patients

- It has to be always identified before cardiac surgery (How to make diagnosis?)

- Is it always a real problem?



Associated cardiac disease	Potential prognostic and therapeutic implications
Coronary artery disease: · Significant artery stenosis · Previous CABG · PCI + stenting	· increased operative mortality · combined surgery required · risk of reintervention increased · LITA patent may be contraindication to re-sternotomy · unclear relation between symptoms and AS severity
LV hypertrophy	· asymmetric septal myectomy required · postoperative low-output syndrome · increased late mortality
LV dysfunction	· increased operative and long-term mortality · postoperative heart failure
Pulmonary hypertension	· increased operative and long-term mortality
Ascending aorta dilatation	· increased risk of aortic dissection · combined surgery sometimes required
Mitral regurgitation	· worsened prognosis · combined surgery required if severe and organic
Porcelain aorta	· aortic clamping technically difficult
Atrial fibrillation	· worsened prognosis and long-term anticoagulant therapy also in patients with bioprosthesis
LBBB	· increased risk of complete AV block conduction after valve replacement