Surgical AVR Results in High-Risk Severe AS Patients

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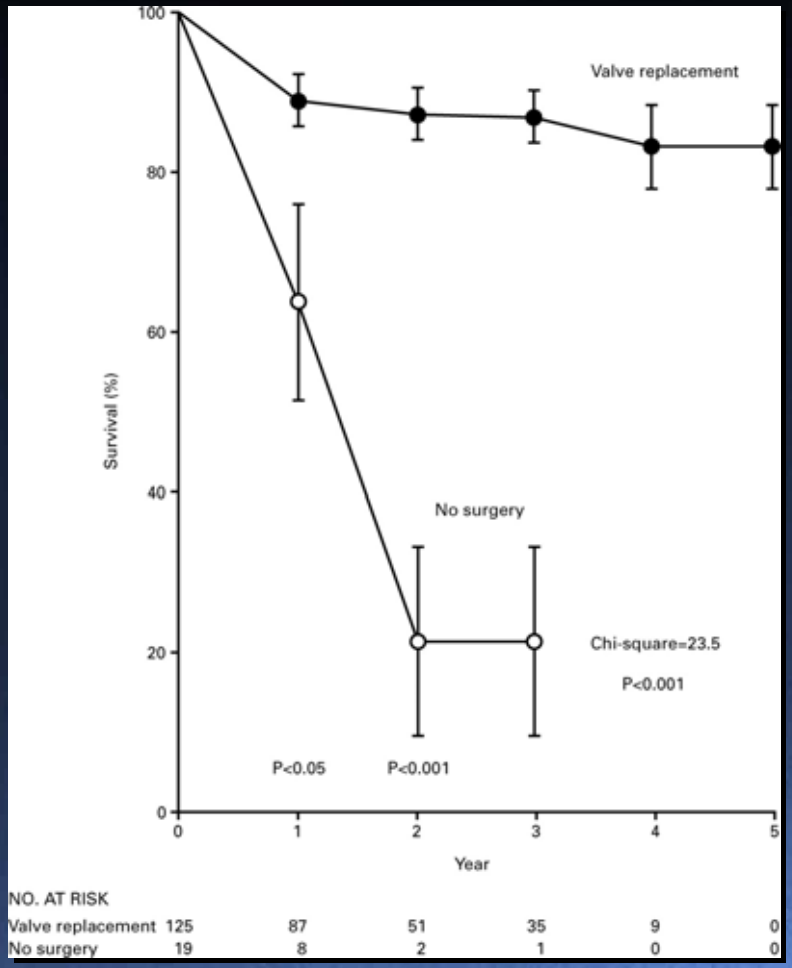
Aortic valve replacement



Survival among Patients with Severe Symptomatic Aortic Stenosis Who Underwent Valve Replacement and Similar Patients Who Declined to Undergo Surgery

Schwarz E et al. The effect of aortic valve replacement on survival. Circulation 1982;66:1105-10

Surgical Results of AVR
- STS database -

Operative Category	Number	Operative mortality
Isolated AVR	26,317	4.3
Multiple valve replacement	3,840	9.6
AVR + CABG	22,713	8.0
Multiple valve replacement + CABG	1,424	18.8
AVR + any valve repair	938	7.4
Aortic valve repair	597	5.9
AVR + aortic aneurysm repair	1,723	9.7
AVR + other*	356	8.4

Independent Risk factors for operative mortality for Isolated AVR: STS database

Risk factor	Odds ratio	CI
Salvage status	7.12	4.69–10.68
DDRF	4.32	2.83–6.43
Emergency status	3.46	2.62–4.52
First reoperation	1.70	1.44–1.99
Cardiogenic shock	1.67	1.14–2.40
NYHA IV	1.56	1.35–1.81
Inotropic agent used	1.47	1.10–1.95
CVA	1.44	1.14–1.80
MI	1.36	1.12–1.65
Female gender	1.25	1.10–1.42
Diabetes	1.23	1.04–1.44
Age (mean: 68.7)	1.03	1.03–1.04
EF (mean: 49.9%)	0.99	0.99–1.00

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

European Heart Journal (2005) **26**, 2714–2720

- To analyse decision-making in elderly patients with severe, symptomatic aortic stenosis (AS)
- 216 patients aged 75 had severe AS (valve area ≤0.6 cm²/m² body surface area or mean gradient ≥50 mmHg) and angina or NYHA class III or IV

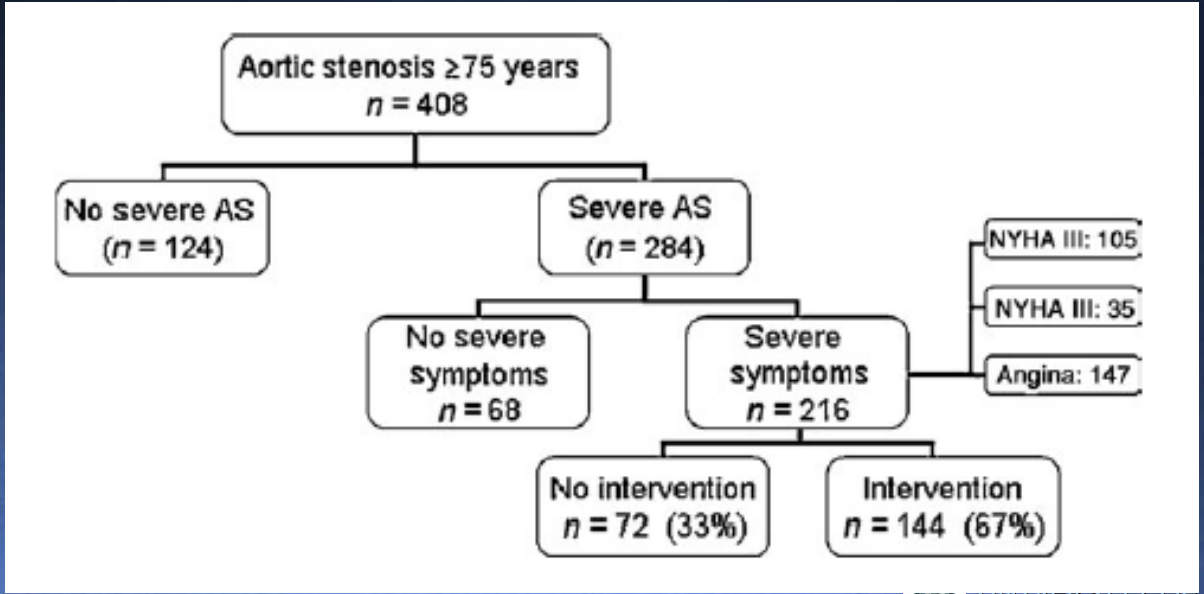


Table 1 Predictive factors of therapeutic decision

Factors	Decision not to operate ($n = 72$) mean ± SD or n (%)	Decision to operate ($n = 144$) mean ± SD or n (%)	P-value
Demographics			
Age	81.7 ± 4.8	79.5 ± 3.7	0.0004
Gender (male)	31 (43.1)	70 (48.6)	0.44
Previous percutaneous coronary intervention	1 (1.4)	8 (5.6)	0.15
Previous coronary bypass grafting	5 (6.9)	4 (2.8)	0.15
Previously known valve disease	57 (79.2)	102 (70.8)	0.19
Risk factors			
Smoking (current)	1 (1.4)	10 (6.9)	0.11
Hypertension	42 (59.1)	92 (63.9)	0.50
Diabetes	17 (23.6)	27 (18.8)	0.40
Insulin treated	5 (6.9)	10 (6.9)	1.0
Dyslipidaemia	22 (31.0)	56 (38.9)	0.26
Family history	10/57 (25.6)	29/118 (24.6)	0.30
Comorbidity			
Previous myocardial infarction	16 (22.2)	22 (15.3)	0.21
Carotid atherosclerosis	5 (6.9)	8 (5.6)	0.76
Lower limb atherosclerosis	8 (11.1)	9 (6.3)	0.28
Creatinine >200 μmol/L	5 (7.0)	4 (2.8)	0.16
Neurological dysfunction	12 (16.9)	7 (4.9)	0.009
Chronic obstructive pulmonary disease	14 (19.4)	23 (16.0)	0.52
≥1 comorbidity	37 (51.4)	58 (40.3)	0.15
Charlson comorbidity index			0.01
0	20 (27.8)	60 (41.7)	
1	18 (25.0)	48 (33.3)	
2	17 (23.6)	20 (13.9)	
3	10 (13.9)	13 (9.0)	
>3	7 (9.7)	3 (2.1)	
Symptoms			
Angina pectoris	49 (69.0)	98 (69.1)	0.98
NYHA class IV	15 (20.8)	20 (13.8)	0.19
Congestive heart failure at admission	23 (31.9)	28 (19.6)	0.04
Atrial fibrillation	18 (25.3)	21 (14.6)	0.05
Investigations			
LV ejection fraction (%)	51.5 ± 17.6	59.0 ± 12.2	0.001
< 50%	24/57 (42.1)	21/127 (16.5)	
LV end-diastolic dimension (mm)	49.6 ± 7.6	49.7 ± 6.4	0.97
Systolic pulmonary artery pressure (mmHg)	37.9 ± 23.0	39.4 ± 18.2	0.72
Aortic valve area (cm^2)	0.73 ± 0.23	0.68 ± 0.55	0.40
Indexed aortic valve area (cm^2/m^2)	0.42 ± 0.13	0.38 ± 0.25	0.24
Mean aortic gradient	52.4 ± 19.8	56.3 ± 18.2	0.17
Aortic regurgitation grade 2/4	12/68 (17.6)	26/134 (19.4)	0.76
Coronary artery disease	17/23 (73.9)	82/140 (58.6)	0.18
Euroscore	9.4 ± 2.9	8.1 ± 1.8	0.0006

Univariable analysis. In case of missing data, the number of patients with available data is specified at the denominator. Definitions of risk factors and comorbidities are detailed in the appendix.

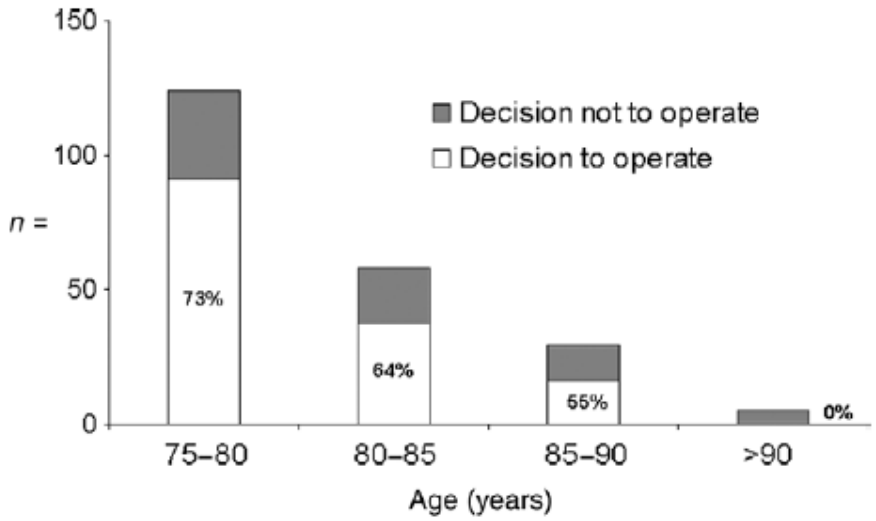


Figure 2 Decision to operate according to age range.

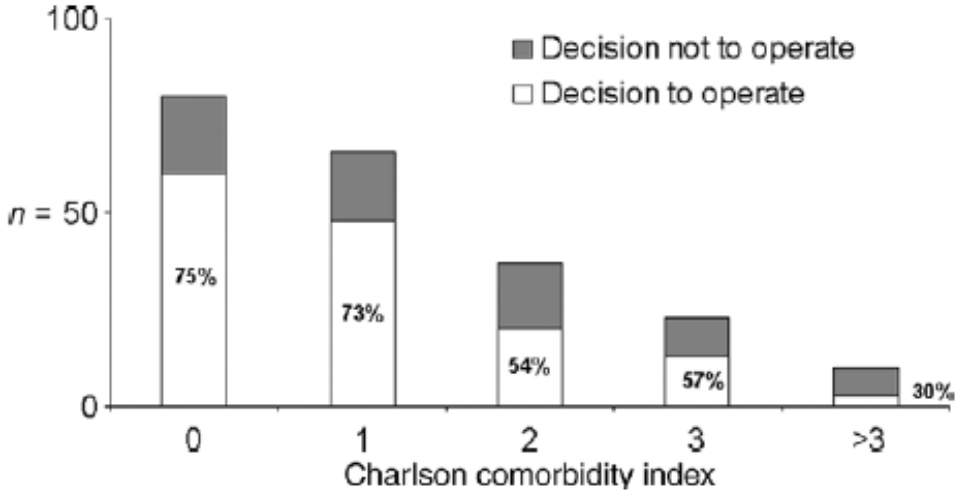


Figure 4 Decision to operate according to comorbidities.

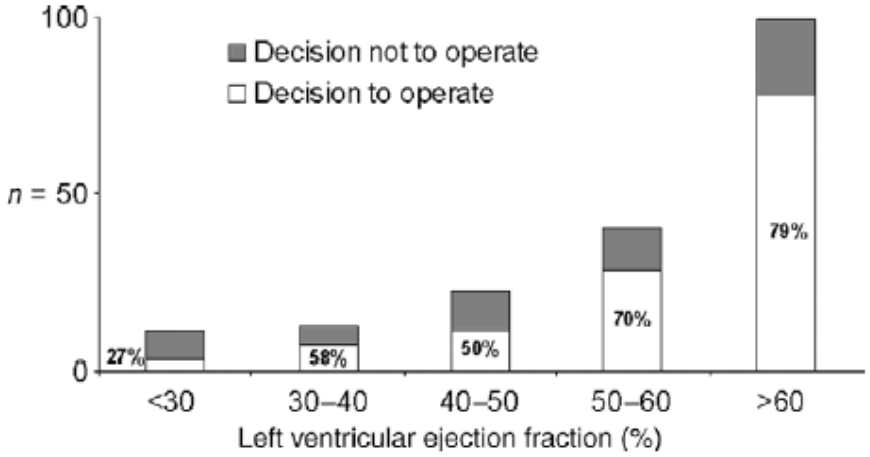


Figure 3 Decision to operate according to left ventricular ejection fraction.

Table 2 Factors associated with a decision not to operate

	P-value	Odds ratio	95% CI
LV ejection fraction	0.003		
>50%		1	
30–50%		2.27	1.32–3.97
≤30%		5.15	1.73–15.35
Age (years)	0.008		
75–80		1	
80–85		1.84	1.18–2.89
≥85		3.38	1.38–8.27
Charlson comorbidity index	0.14		
0–1		1	
≥2		1.72	0.83–3.50

Multivariable analysis including the Charlson comorbidity index as a forced variable. Hosmer–Lemeshow goodness-of-fit $\chi^2 = 2.65$ (df = 5), $P = 0.75$, *c*-index 0.72.

Table 3 Factors associated with a decision not to operate

	P-value	Odds ratio	95% CI
LV ejection fraction	0.004		
>50%		1	
30–50%		2.66	1.57–4.64
≤30%		7.09	2.42–20.82
Age (years)	0.005		
75–80		1	
80–85		1.90	1.22–2.99
≥85		3.60	1.47–8.82
Neurological dysfunction	0.02	3.82	1.23–12.27

Multivariable analysis including separate comorbidities. Hosmer–Lemeshow goodness-of-fit $\chi^2 = 5.48$ (df = 4), $P = 0.24$, *c*-index 0.73.

Table 4 Predictive factors of 1-year mortality

	P-value	Hazard ratio	95% CI
Charlson comorbidity index	0.001	1.54	1.18–1.99
NYHA class IV vs. III	0.05	2.37	1.02–5.55
Gender (male vs. female)	0.04	2.34	1.05–5.23
Decision to operate	0.94	0.97	0.41–2.27

Multivariable analysis.

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

European Heart Journal (2005) **26**, 2714–2720

- Surgery was denied in **33%** of elderly patients with severe, symptomatic AS
- Older age and LV dysfunction were the most striking characteristics of patients who were denied surgery, whereas comorbidity played a less important role

AVR in Octogenarians: identification of high-risk pts

European Journal of Cardio-thoracic Surgery 37 (2010) 1304—1310

- Objective: to identify high-risk groups for surgical AVR in octogenarians and to estimate their operative risk
- Between 1996 and 2006, 493 consecutive octogenarians with symptomatic AS underwent AVR with and without (51%) concomitant CABG
- The 30-day mortality rate was 8.4%
- 6 months mortality was 15.2%

Table 1
Patient characteristics and univariate association between risk factors and 6-month mortality.

Variable	Mean ± SD/*N* (%)	Odds ratio [CI]	*p*-value
Female	334 (68)	1.03 [0.61–1.74]	0.91
Age (years)	83 ± 2	1.2 [1.05–1.26]	0.002
Body height (cm)	164 ± 8	0.99 [0.96–1.02]	0.56
BMI (kg/m^2)	25.3 ± 4.0	0.93 [0.87–0.99]	0.02
Ejection fraction (%)	53 ± 16	0.98 [0.96–0.99]	0.002
Creatinine (mg/dl)	1.2 ± 0.5	1.9 [1.2–2.88]	0.006
Blood glucose (mg/dl)	131 ± 51	1.006 [1.002–1.01]	0.007
Diabetes mellitus	145 (29)	1.4 [0.83–2.33]	0.21
Atrial fibrillation	92 (19)	1.6 [0.88–2.79]	0.13
Hypertension	349 (71)	1.2 [0.68–2.04]	0.57
Hyperlipidaemia	203 (41)	0.98 [0.59–1.61]	0.93
History of myocardial infarction	65 (13)	1.02 [0.5–2.10]	0.97
History of congestive heart failure	100 (20)	0.7 [0.36–1.35]	0.29
Advanced NYHA-class (III + IV)	283 (57)	1.3 [0.80–2.19]	0.28
History of stroke	43 (9)	1.07 [0.46–2.5]	0.87
Chronic obstructive pulmonary disease	133 (27)	1.4 [0.83–2.37]	0.21
Peripheral artery disease	37 (8)	1.9 [0.87–4.30]	0.11
Liver failure	40 (8)	1.95 [0.91–4.18]	0.09
Renal failure	115 (23)	1.5 [0.89–2.63]	0.13
Acute infection	18 (4)	1.1 [0.31–3.89]	0.88
Emergency procedure	27 (6)	3.0 [1.28–6.89]	0.011
Prior cardiac surgery	30 (6)	0.87 [0.29–2.57]	0.8
Concomitant bypass surgery	241 (49)	1.2 [0.73–1.94]	0.49

BMI: body mass index; CI: confidence interval; NE: not estimated; NYHA: New York Heart Association.

Outcomes of surgical AVR in High-Risk Pts: A multiinstitutional study

- 159 pts (2002. 1 – 2007.12)
- Primary AVR, STS PROM >10%

Ann Thorac Surg 2011;91:49 –56

Table 1. Preoperative Demographics and Risk Factors

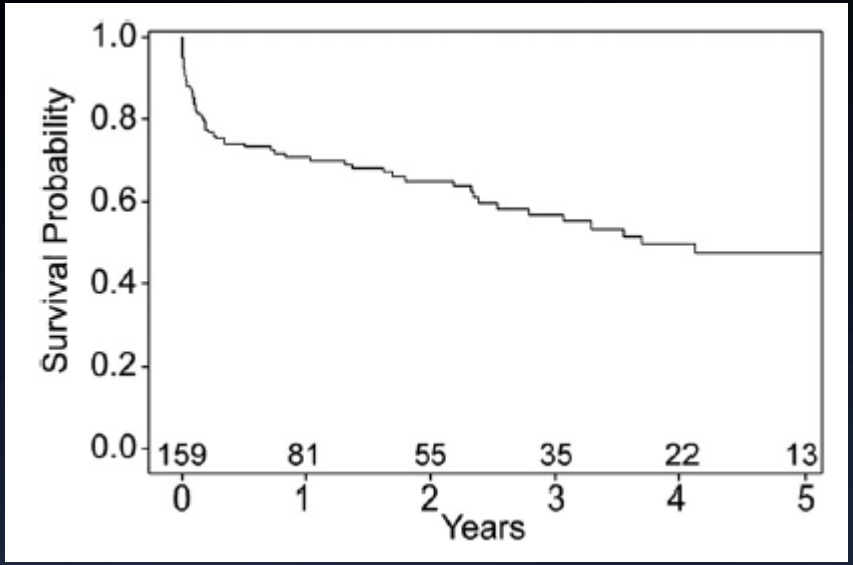
Characteristic	All Patients (n = 159)
Age (years, mean ± SD)	76.1 ± 11.2 Median: 80 years Range: 43 to 93 years
Female gender	67 (42%)
Ejection fraction (mean ± SD%)	0.461 ± 0.153 (median: 48%)
NYHA class III-IV	124 (78.0%)
Congestive heart failure	130 (81.8%)
Previous myocardial infarction	52 (32.7%)
Angina	56 (35.2%)
Previous CABG	62 (39.0%)
Preoperative CVA	37 (23.3%)
Cerebrovascular disease	64 (40.3%)
Peripheral vascular disease	53 (33.3%)
Chronic lung disease	
None	113 (71.1%)
Mild	24 (15.1%)
Moderate	9 (5.7%)
Severe	13 (8.2%)
Immunosuppressive therapy	11 (6/9%)
Current smoker	12 (7.5%)
Diabetes mellitus	78 (49.1%)
Hypertension	141 (88.7%)
Last creatinine level (mean ± SD)	2.8 ± 2.5 (median: 1.6)
Renal failure (creatinine > 2.0)	80 (50.3%)
Dialysis	37 (23.3%)
STS PROM	16.3 ± 7.3% (median: 13.7%)

Table 2. Operative Characteristics

Operative Data	All Patients (n = 159)
Implant Type:	
Mechanical valve	12 (7.6%)
Bioprosthetic valve	147 (92.4%)
Valve size implanted (mm)	(median: 23)
19–20 mm	19 (12.0%)
21–-22 mm	44 (27.7%)
23–24 mm	67 (42.1%)
25–26 mm	19 (11.9%)
≥ 27 mm	10 (6.3%)
Intraoperative intraaortic balloon pump	16 (10.1%)
Body mass index (mean ± SD)	27.3 ± 6.0 (median: 26.4)
Aortic cross-clamp time (minutes) (mean ± SD)	77.8 ± 24.2 (median: 77)
Cardiopulmonary bypass time (minutes) (mean ± SD)	117.2 ± 39.6 (median: 110)

Table 3. In-Hospital Outcomes

Outcomes	All Patients (n = 159)
Myocardial infarction	1 (0.6%)
Transient neurologic event	4 (2.5%)
Permanent neurologic event	7 (4.4%)
Reexploration for bleeding	5 (3.1%)
Mediastinitis	1 (0.6%)
Septicemia	8 (5.0%)
Pneumonia	12 (7.5%)
Multisystem organ failure	11 (6.9%)
Postoperative atrial fibrillation	37 (23.3%)
Heart block requiring pacemaker	8 (5.0%)
Renal failure	25 (15.7%)
Dialysis	13 (8.2%)
GI bleeding or complications	7 (4.4%)
Prolonged ventilation	45 (28.3%)
Postoperative ventilator (hours) (mean ± SD)	84.9 ± 182.1 (median: 17)
Total ICU stay (hours) (mean ± SD)	165.6 ± 255.2 (median: 73.4)
Postoperative LOS (days) (mean ± SD)	12.6 ± 11.1 (median: 9)
In-hospital mortality	26 (16.4%)
- Preoperative dialysis (n = 37)	9 (24.3%)
- Preoperative severe COPD (n = 13)	5 (38.5%)
- Preoperative stroke (n = 37)	3 (8.1%)
- Prior CABG (n = 62)	7 (11.3%)
- Ejection fraction ≤ 0.35 (n = 42)	10 (23.8%)



No statistically significant predictors of in-hospital mortality were identified using the logistic regression model, most likely to the small patient cohort. Further, none of the potential risk factors for midterm survival were found to be significant predictors.

Transcatheter vs Surgical AVR in High-Risk Patients <PARTNER trial>

N Engl J Med 2011;364:2187-98

- 25 centers, 2007.5 – 2009.8
- 699 high-risk pts assigned to TAVI or surgical replacement
- Primary end point: death from any cause of 1 year
- High-risk pts: STS score >10
- Exclusion criteria:

  BAV, non-calcified valve, CAD, LV EF<20%, aortic annulus <18mm or >25mm, severe renal insufficiency, recent CVA, severe MR or AR
- Of the 3105 patients who were screened at all the study centers and by the executive committee, 34% underwent randomization, and 23% were assigned to the high-risk subgroup

Table 1. Baseline Characteristics of the Patients.*

Characteristic	Transcatheter Replacement (N=348)	Surgical Replacement (N=351)	P Value
Age — yr	83.6±6.8	84.5±6.4	0.07
Male sex — no./total no. (%)	201/348 (57.8)	198/349 (56.7)	0.82
Society of Thoracic Surgeons score†	11.8±3.3	11.7±3.5	0.61
Logistic EuroSCORE†	29.3±16.5	29.2±15.6	0.93
New York Heart Association class — no./total no. (%)			0.79
II	20/348 (5.7)	21/349 (6.0)	
III or IV	328/348 (94.3)	328/349 (94.0)	
Coronary artery disease — no./total no. (%)	260/347 (74.9)	266/346 (76.9)	0.59
Previous myocardial infarction — no./total no. (%)	92/343 (26.8)	103/343 (30.0)	0.40
Previous CABG — no./total no. (%)	147/345 (42.6)	152/344 (44.2)	0.70
Previous PCI — no./total no. (%)	116/341 (34.0)	110/338 (32.5)	0.68
Previous balloon aortic valvuloplasty — no./total no. (%)	46/344 (13.4)	35/344 (10.2)	0.24
Cerebral vascular disease — no./total no. (%)	95/324 (29.3)	87/317 (27.4)	0.60
Peripheral vascular disease — no./total no. (%)	148/344 (43.0)	142/341 (41.6)	0.76
COPD — no./total no. (%)			
Any	151/348 (43.4)	151/351 (43.0)	0.94
Oxygen-dependent	32/348 (9.2)	25/351 (7.1)	0.34
Creatinine level >2 mg/dl (177 μmol/liter) — no./total no. (%)	38/343 (11.1)	24/344 (7.0)	0.06
Atrial fibrillation — no./total no. (%)	80/196 (40.8)	73/171 (42.7)	0.75
Permanent pacemaker — no./total no. (%)	69/345 (20.0)	76/347 (21.9)	0.58
Pulmonary hypertension — no./total no. (%)	125/295 (42.4)	110/302 (36.4)	0.15
Frail condition — no./total no. (%)	46/295 (15.6)	53/301 (17.6)	0.58
Extensively calcified aorta — no./total no. (%)	2/348 (0.6)	4/351 (1.1)	0.69
Deleterious effects of chest-wall irradiation — no./total no. (%)	3/348 (0.9)	3/351 (0.9)	1.00
Chest-wall deformity — no./total no. (%)	0	1/351 (0.3)	1.00
Liver disease — no./total no. (%)	7/344 (2.0)	9/346 (2.6)	0.80
Aortic-valve area — cm^2	0.7±0.2	0.6±0.2	0.13
Aortic-valve gradient — mm Hg	42.7±14.6	43.5±14.3	0.45
Left ventricular ejection fraction — %	52.5±13.5	53.3±12.8	0.45
Moderate or severe mitral regurgitation — no./total no. (%)	66/334 (19.8)	71/333 (21.3)	0.63

Table 2. Clinical Outcomes at 30 Days and 1 Year in the Intention-to-Treat Population.*

Outcome	30 Days			1 Year		
	Transcatheter Replacement (N=348)	Surgical Replacement (N=351)	P Value	Transcatheter Replacement (N=348)	Surgical Replacement (N=351)	P Value
	no. of patients (%)			*no. of patients (%)*		
Death						
From any cause	12 (3.4)	22 (6.5)	0.07	84 (24.2)	89 (26.8)	0.44
From cardiac causes	11 (3.2)	10 (3.0)	0.90	47 (14.3)	40 (13.0)	0.63
Repeat hospitalization	15 (4.4)	12 (3.7)	0.64	58 (18.2)	45 (15.5)	0.38
Death or repeat hospitalization	25 (7.2)	33 (9.7)	0.24	120 (34.6)	119 (35.9)	0.73
Stroke or transient ischemic attack						
Either	19 (5.5)	8 (2.4)	0.04	27 (8.3)	13 (4.3)	0.04
Transient ischemic attack	3 (0.9)	1 (0.3)	0.33	7 (2.3)	4 (1.5)	0.47
Stroke						
Minor	3 (0.9)	1 (0.3)	0.34	3 (0.9)	2 (0.7)	0.84
Major	13 (3.8)	7 (2.1)	0.20	17 (5.1)	8 (2.4)	0.07
Death from any cause or major stroke	24 (6.9)	28 (8.2)	0.52	92 (26.5)	93 (28.0)	0.68
Myocardial infarction	0	2 (0.6)	0.16	1 (0.4)	2 (0.6)	0.69
Vascular complication						
Any	59 (17.0)	13 (3.8)	<0.001	62 (18.0)	16 (4.8)	<0.001
Major	38 (11.0)	11 (3.2)	<0.001	39 (11.3)	12 (3.5)	<0.001
Acute kidney injury						
Creatinine >3 mg/dl (265 μmol/liter)	4 (1.2)	4 (1.2)	0.95	12 (3.9)	8 (2.7)	0.41
Renal-replacement therapy	10 (2.9)	10 (3.0)	0.95	18 (5.4)	20 (6.5)	0.56
Major bleeding	32 (9.3)	67 (19.5)	<0.001	49 (14.7)	85 (25.7)	<0.001
Endocarditis	0	1 (0.3)	0.32	2 (0.6)	3 (1.0)	0.63
New-onset atrial fibrillation†	30 (8.6)	56 (16.0)	0.006	42 (12.1)	60 (17.1)	0.07
New pacemaker	13 (3.8)	12 (3.6)	0.89	19 (5.7)	16 (5.0)	0.68

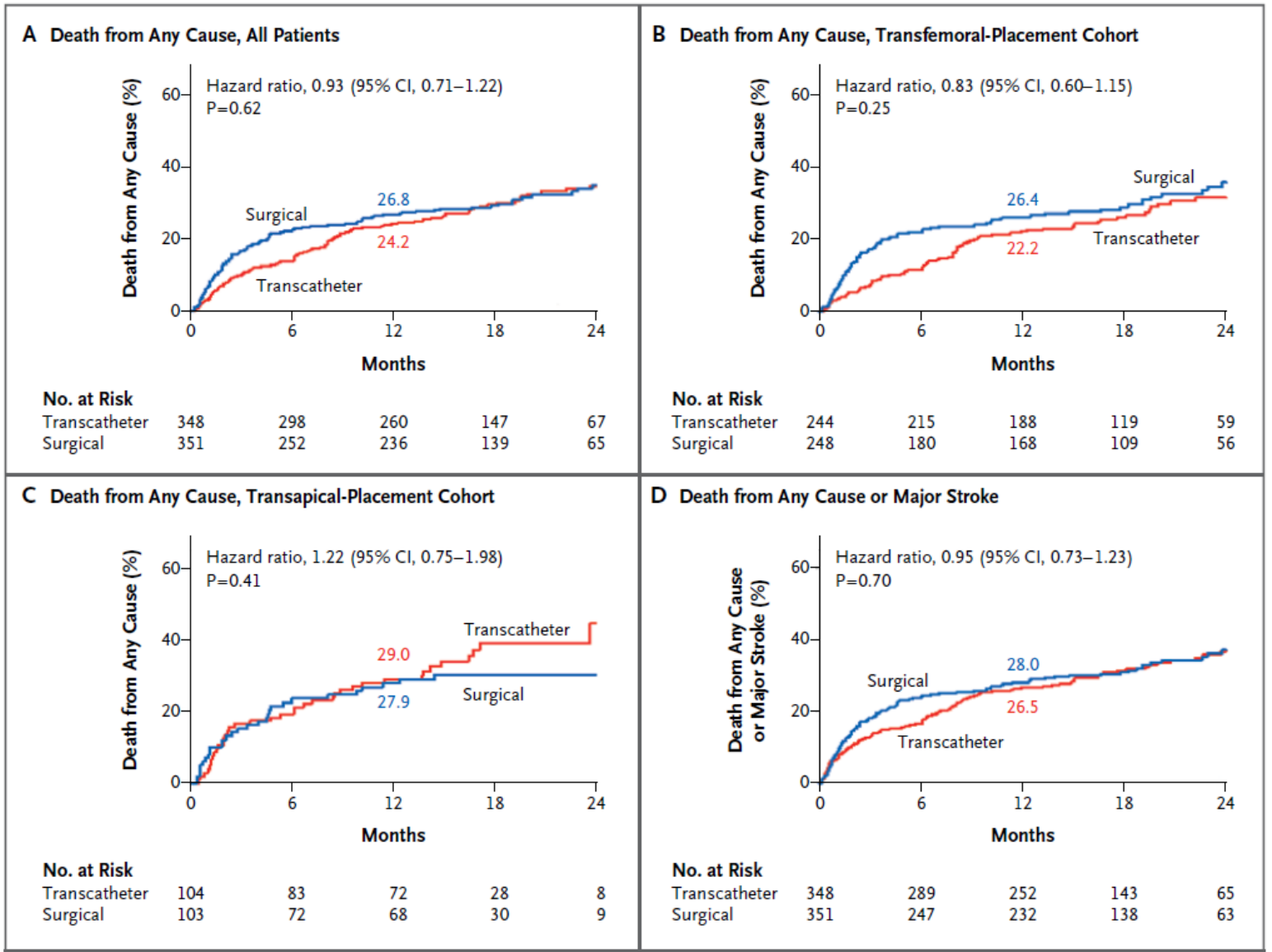


Figure 2. Time-to-Event Curves for the Primary End Point and Other Selected End Points.

Time-to-event curves are shown for death from any cause in all patients (Panel A), in the transfemoral-placement cohort (Panel B), and in the transapical-placement cohort (Panel C) and for a composite of death or major stroke (Panel D) among patients who were randomly assigned to undergo either transcatheter aortic-valve replacement (TAVR) or surgical aortic-valve replacement (AVR). The event rates were calculated with the use of Kaplan–Meier methods and compared with the use of the log-rank test.

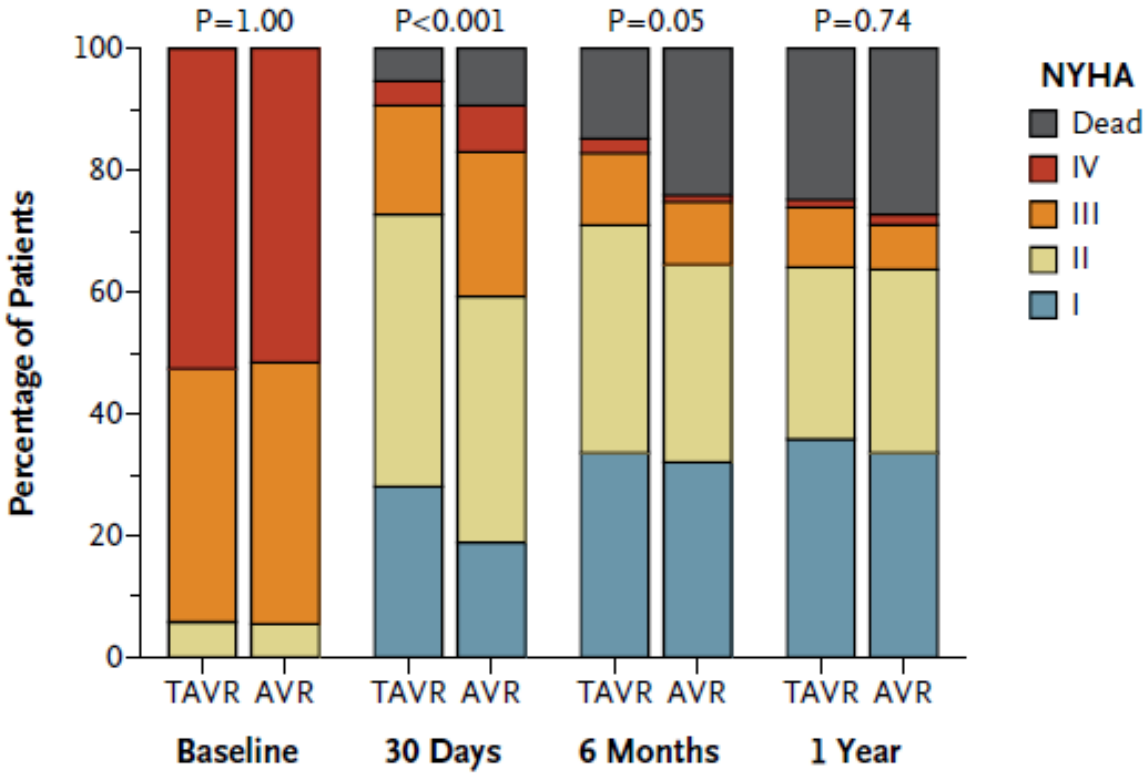


Figure 4. Symptom Status.

Shown is the New York Heart Association (NYHA) functional status (according to time point) for 697 of 699 patients who were randomly assigned to undergo either transcatheter aortic-valve replacement (TAVR) or surgical aortic-valve replacement (AVR).

PARTNER trial

- In conclusions, in patients with AS who are at high risk for operative complications and death, surgical aortic valve replacement and balloon-expandable transcatheter replacement were associated with similar mortality at 30 days and 1 year and produced similar improvements in cardiac symptoms
- Transcatheter replacement is an alternative to surgical replacement in a well chosen, high-risk subgroup of patients with aortic stenosis

AMC experience

Patient population

- 1998.1 – 2010.12
- Isolated AVR for aortic stenosis
- Exclusion

  : multiple valve surgery

  : CABG

  : severe AR
- 464 patients underwent isolated AVR for aortic stenosis

Demographic data

	Total (n=464)	Low Risk (Euroscore<10) (n=433)	High Risk (Euroscore>10)	P-value
Age	63.4±11.0	62.7±10.6	72.5±11.9	<0.001
Sex (Male)	262 (56.5%)	242 (55.9%)	20 (64.5%)	0.349
Euroscore	3.71±4.61	2.7±2.0	18.1±6.3	<0.001
DM	50 (10.8%)	45 (10.4%)	5 (16.1%)	0.320
HTN	77 (16.6%)	71 (16.4%)	6 (19.4%)	0.669
COPD	69 (14.9%)	54 (12.5%)	15 (48.4%)	<0.001
Creatinine	1.05±1.14	1.0±0.5	1.9±2.2	0.024
Dialysis dependent CRF	11 (2.4%)	6 (1.4%)	5 (16.1%)	<0.001

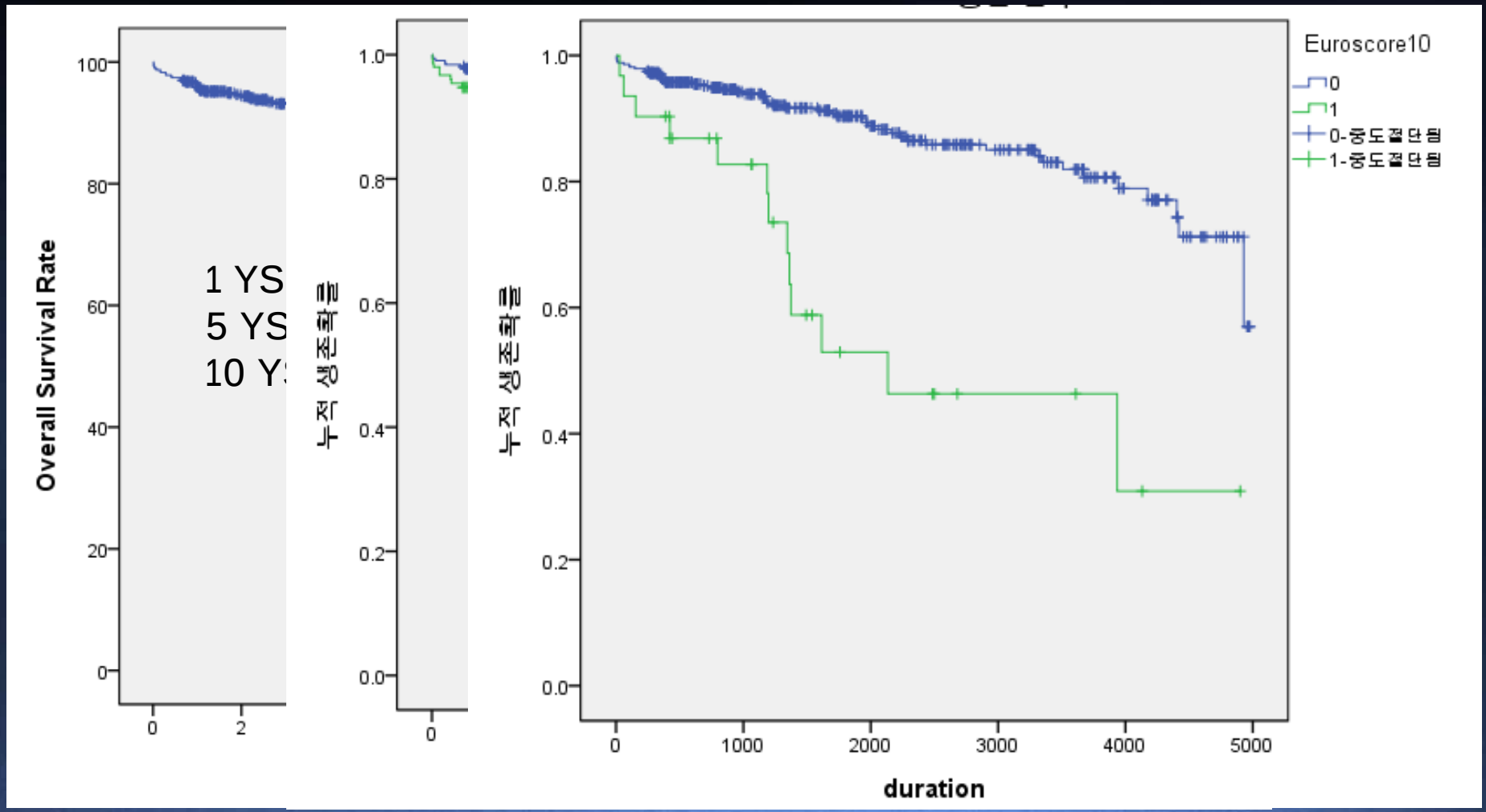
Pre-op hemodynamic data

	Total (n=464)	Low Risk (Euroscore<10)	High Risk (Euroscore>10)	P-value
LVEF	58.3±12.5	59.8±11.1	38.2±13.1	<0.001
LVIDs	32.3±9.2	31.7±8.5	41.7±13.2	<0.001
LVIDd	50.0±8.8	49.7±8.3	54.0±13.0	0.082
ESV	46.9±32.0	43.8±28.2	90.5±48.0	<0.001
EDV	107.1±45.6	104.7±43.8	140.6±56.9	0.002
Pulmonary HTN	27 (5.8%)	12 (2.8%)	15 (48.4%)	<0.001

Operative data

	Total (n=464)	Low Risk (Euroscore<10) (n=433)	High Risk (Euroscore>10) (n=31)	P-value
CPB time	109.1±39.3	108.2±36.7	122.5±65.8	0.246
ACC time	71.1±26.4	70.6±25.0	78.0±41.3	0.341
Tissue valve	187 (40.3%)	162 (37.4%)	25 (80.6%)	<0.001
Post-op bleeding	19 (4.1%)	18 (4.2%)	1 (3.2%)	1.000
Sternal wound problem	6(1.3%)	6 (1.4%)	0	1.000
30-day mortality	6 (1.3%)	5 (1.2%)	1 (3.2%)	0.341
1-year mortality	19 (4.1%)	16 (3.7)	3 (9.7%)	0.126
5-year mortality	44 (9.5%)	33 (7.6%)	11 (35.5%)	<0.001

Survival Rate



Conclusions

- About 30% patients of severe Aortic stenosis refuse the surgical treatment
- TAVI might be good treatment modality in these patients
- Surgical results of Isolated AVR for Aortic stenosis was acceptable
- Therefore, selection of candidates for TAVI should be performed carefully

Thank you

EuroSCORE system

Patient Factors	Change sheet to change lang
Age	55yr
Sex	☐ Female
Chronic pulmonary disease	☐ Yes
Extracardiac arteriopathy	☐ Yes
Neurological dysfunction	☐ Yes
Previous cardiac surgery	☐ Yes
Serum creatinine >200 µmol/ L	☐ Yes
Active endocarditis	☐ Yes
Critical preoperative state	☐ Yes
Cardiac Factors	
Unstable angina	☐ Yes
LV dysfunction moderate or LVEF 30-50%	☐ Moderate O
Lv dysfunction poor or LVEF<30	☐ Poor
Recent myocardial infarct	☐ Yes
Pulmonary hypertension	☐ Yes
Operation Factors	
Emergency	☐ Yes
Other than isolated CABG	☐ Yes
Surgery on thoracic aorta	☐ Yes
Postinfarct septal rupture	☐ Yes

Additive EuroSCORE	0
Logistic EuroSCORE (mortality %) =	0.88%

For the latest information on EuroSCORE visit http://www.euroscore.org

To download the latest version of this calculator visit

www.euroscore.org/calculators

Φ	βi	Xi
0	0.0666354	1
1	0.3304052	FALSE
1	0.4931341	FALSE
2	0.6558917	FALSE
2	0.841626	FALSE
3	1.002625	FALSE
2	0.6521653	FALSE
3	1.101265	FALSE
3	0.9058132	FALSE
2	0.5677075	FALSE
1	0.4191643	FALSE
3	1.094443	FALSE
2	0.5460218	FALSE
2	0.7676924	FALSE
2	0.7127953	FALSE
2	0.5420364	FALSE
3	1.159787	FALSE
4	1.462009	FALSE

Additive euroSCORE = $\Sigma\Phi$

Logistic euroSCORE =

$$e^{(-4.789594 + \Sigma\beta i Xi)} / 1 + e^{(-4.789594 + \Sigma\beta i Xi)}$$