Usefulness and Safety of Exercise Stress Echocardiography in Asymptomatic Patients with Very Severe Aortic Stenosis

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Background

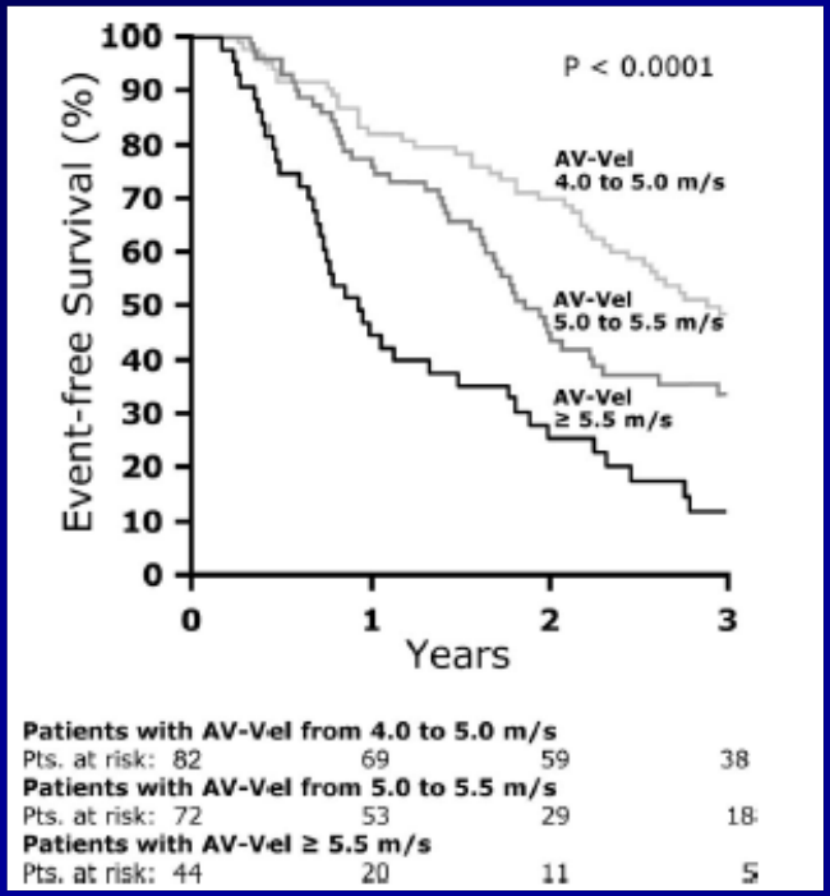
- The management of asymptomatic pts with severe aortic stenosis (AS) remains controversial.
- A watchful waiting approach has been demonstrated to be safe and generally justified, although concerns exist (SCD, irreversible myocardial damage, delayed in reporting symptoms, etc)
- Pts with **very severe AS** are characterized by a poor prognosis and a high cardiac event rate.
- Nevertheless, their optimal timing for surgical intervention is debatable.

Bonow et al. September 23, 2008:e1–142 ACC/AHA VHD Guidelines: 2008 Focused Update Incorporated

- CLASS IIb
- 1. AVR may be considered for asymptomatic patients with severe AS* and abnormal response to exercise (e.g., development of symptoms or asymptomatic hypotension). *(Level of Evidence: C)*
- 2. AVR may be considered for adults with severe asymptomatic AS* if there is a high likelihood of rapid progression (age, calcification, and CAD) or if surgery might be delayed at the time of symptom onset. *(Level of Evidence: C)*
- 3. AVR may be considered in patients undergoing CABG who have mild AS* when there is evidence, such as moderate to severe valve calcification, that progression may be rapid. *(Level of Evidence: C)*
- 4. AVR may be considered for asymptomatic patients with extremely severe AS (aortic valve area less than 0.6 cm2, mean gradient greater than 60 mm Hg, and jet velocity greater than 5.0 m per second) when the patient's expected operative mortality is 1.0% or less. *(Level of Evidence: C)*

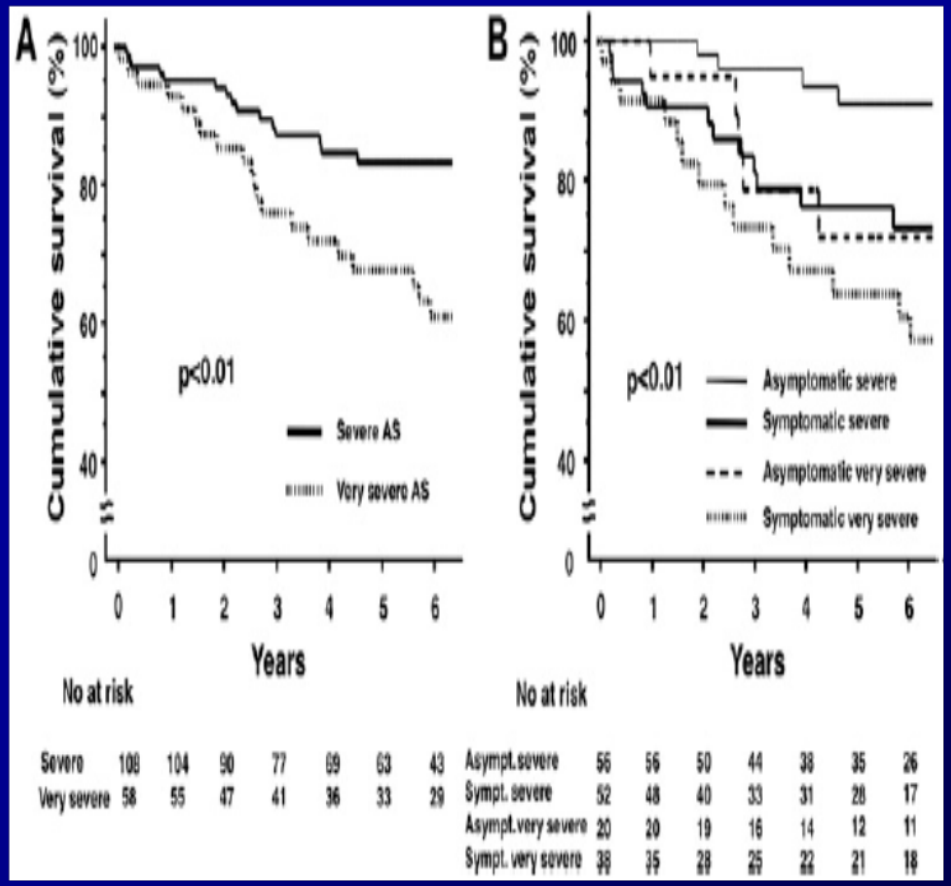
Natural History of Very Severe Aortic Stenosis

Raphael Rosenhek, MD; Robert Zilberszac; Michael Schemper, PhD; Martin Czerny, MD; Gerald Mundigler, MD; Senta Graf, MD; Jutta Bergler-Klein, MD; Michael Grimm, MD; Harald Gabriel, MD; Gerald Maurer, MD



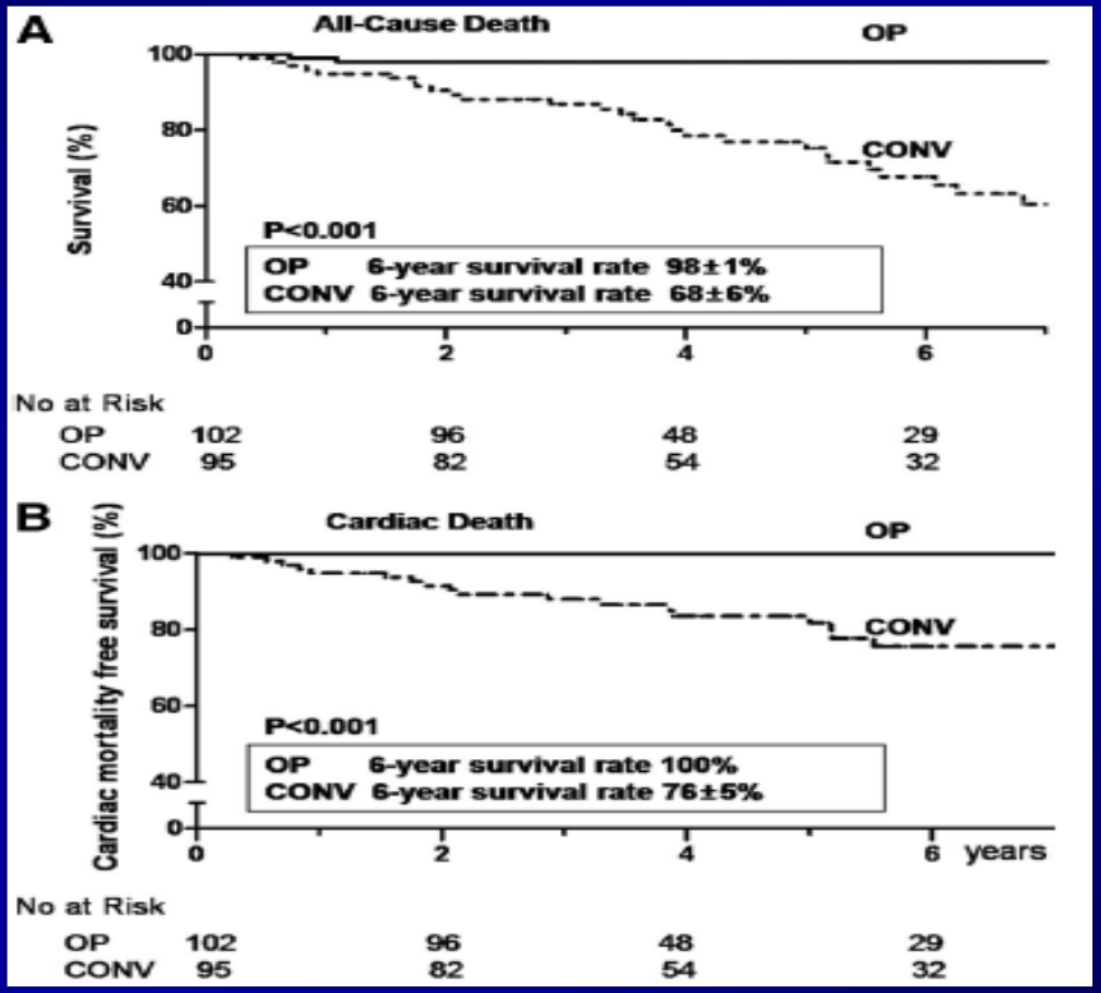
Clinical outcomes in non-surgically managed patients with very severe versus severe aortic stenosis

Takeshi Kitai,*,[1] Satoshi Honda,*,[1] Yukikatsu Okada,[2] Tomoko Tani,[1] Kitae Kim,[1] Shuichiro Kaji,[1] Natsuhiko Ehara,[1] Makoto Kinoshita,[1] Atsushi Kobori,[1] Atsushi Yamamuro,[1] Toru Kita,[1] Yutaka Furukawa[1]



Early Surgery Versus Conventional Treatment in Asymptomatic Very Severe Aortic Stenosis

Duk-Hyun Kang, MD, PhD; Sung-Ji Park, MD, PhD; Ji Hye Rim, MD; Sung-Cheol Yun, PhD; Dae-Hee Kim, MD, PhD; Jong-Min Song, MD, PhD; Suk Jung Choo, MD, PhD; Seung Woo Park, MD, PhD; Jae-Kwan Song, MD, PhD; Jae-Won Lee, MD, PhD; Pyo-Won Park, MD, PhD



Circulation. 2010;121:1502-1509.

ESC-VHD guidelines 2012

AVR should be considered in asymptomatic patients, with normal EF and none of the above mentioned exercise test abnormalities, if the surgical risk is low, and one or more of the following findings is present:

- Very severe AS defined by a peak transvalvular velocity >5.5 m/s or,
- Severe valve calcification and a rate of peak transvalvular velocity progression ≥0.3 m/s per year.

Class of recommendation IIa , level of evidence C

Aim

To asses the safety and clinical contribution of exercise stress echocardiography (ESE) in the management of asymptomatic pts with very severe AS

Methods

- Consecutive asymptomatic pts with very severe AS, defined by a peak trans-aortic jet velocity ≥ 5 m/s and/or mean gradient ≥ 60 mmHg, who underwent ESE at RMC Echo-Lab between 8/2001 and 10/2011.
- Excluded : pts with more than mild to moderate MR/AR, previous valvular surgery or LV dysfunction (LVEF < 50%).
- The ESE (symptom-limited) was supervised by an on-site experienced cardiologist, and blood pressure was measured every 1 minute.
- Bruce protocol was applied in 80% of the patients.

Methods

- Doppler-echo measurements were performed at rest and during early recovery phase.

- The ESE was considered abnormal if it was stopped prematurely because of limiting symptoms, blood pressure drop at peak effort, complex ventricular arrhythmia or the presence of an abnormal contractile response (decrease, no change or only mild improvement, less than expected, of LV contraction at peak exercise).

Results

- 49 consecutive pts with very severe AS
- 31 male (63%)
- Mean age 68±11 y
- Follow-up: 18.4±21.4 months

Results – ESE data

	Rest	Peak
Heart rate (b/m)	78±16	136±19
Systolic BP	138±16	152±25
Diastolic BP	80±9	84±9
Exercise time (min)		5.7±2.8
METS		7±3
Trans-aortic gradients(mmHg):		
Peak	106±12	127±20
Mean	68±8	82±17
AVA (cm^2)	0.66±0.18	

Results-ESE data

- ESE was abnormal in 21 pts (43%) due to:
  - ✓ symptoms (18 pts): dyspnea (14)
    angina (3)
    dizziness (1)
  - ✓ Abnormal BP response (3pts)
- An abnormal contractile response was observed in 8 pts(16%), two of them without significant CAD.
- No cases of syncope nor complex ventricular arrhythmia were observed.
- 7 out of 21 pts didn't reach target HR (85% of maximal predicted HR)

ESE data according to study result

	Normal ESE (28 pts)	Abnormal ESE (21 pts)	*P*
Age	66±12	70±10	0.23
Gender(M/F)	17/11	14/7	0.7
Peak HR	141±18	129±19	0.03
Ex. Time	6.7±3	4.3±1.7	0.002
METS	7.9±3	6.1±2.4	0.03
Rest peak gradients	106±11	107±12	0.9
Ex. peak gradients	131±21	122±20	0.2
Rest mean gradients	67±9	68±7	0.8
Ex. mean gradients	83±17	77±13	0.26
AVA	0.7±0.14	0.62±0.11	0.07

Clinical events in 21 pts with abnormal ESE

- 20 pts underwent AVR after a mean interval of 8.1±14.7 months (1-65) from the index ESE.

- 1 pt refused surgery and died 52.8 m. after the index ESE

Clinical events in 28 pts with normal ESE

- 23 pts underwent AVR 21.4±17.7 months (0.4-59) from the index ESE

  11: symptoms 22 m (4-42) after ESE
  4: low ex. capacity at ESE
  3: repeated abnormal ESE
  3: AV stenosis severity
  2: unknown

- 4 pts: conservative Tx

  2: asymptomatic 26.4 and 105 m. after ESE
  1: developed symptoms-refused surgery-died 32.4 m. after ESE
  1: died 27.6 m. after ESE

- 1 pt: lost FU

Results: follow-up

- A total of 43 pts (88%) of the entire population were referred for surgery at a mean interval of 15.2 months±25 (range 1-65) from the index ESE
- The mean interval from index ESE and surgery was significantly longer in pts with a normal ESE compared to those with an abnormal study: 21.4 vs 8.1 months, *P=0.01*
- CAD was present in 20 out of 44 pts(45%) in whom angiography was performed.
- In total, 6 pts (12%) died :

  3 pts several years after AVR
  2 pts who developed symptoms but refused surgery
  1 pt with normal ESE

Conclusions and implications

- ESE, under careful supervision, may be safely performed and is capable of unmasking symptoms and hemodynamic deterioration in almost half of “asymptomatic” patients with very severe AS.

- Very severe AS comprise a group of patients with a high event rate. Nevertheless, in selected cases, patients with normal ESE may be closely followed until symptoms develop before elective valve replacement is considered.


THANK YOU

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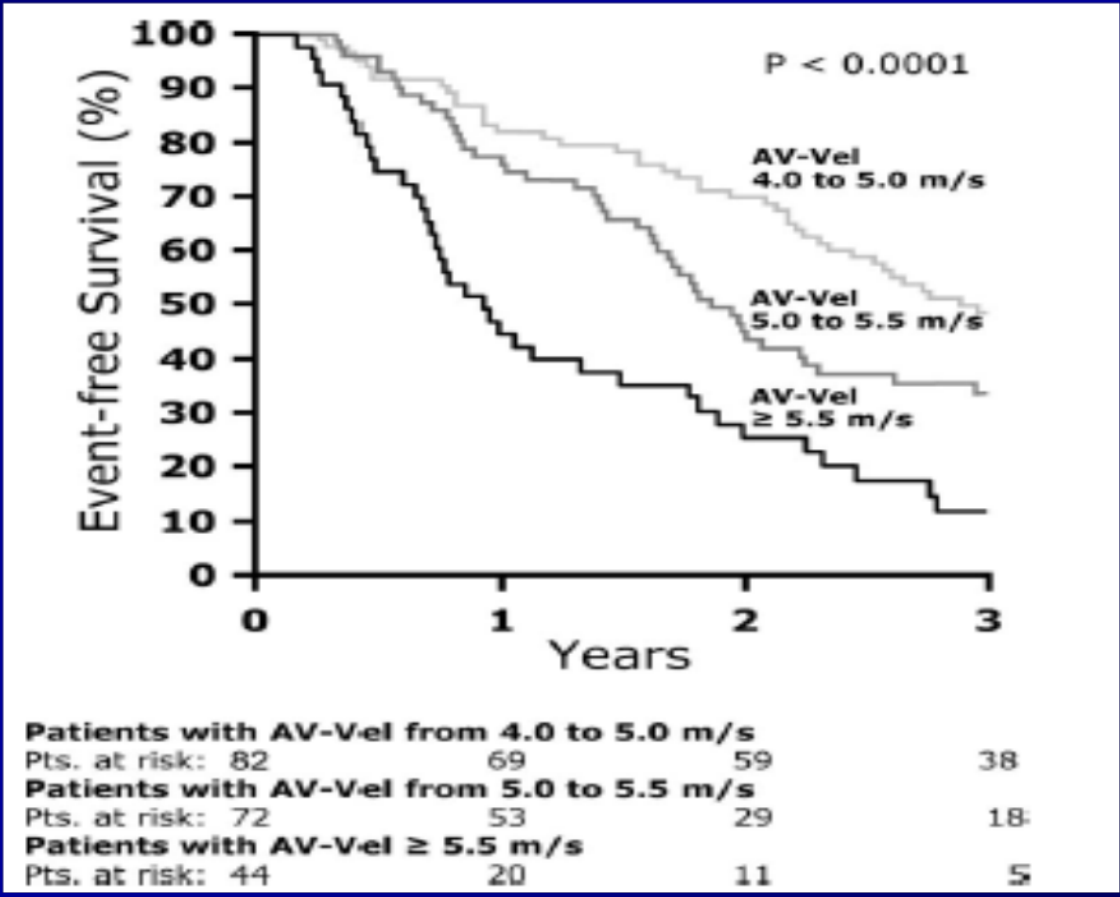

(*Circulation*. 2010;121:151-156.)

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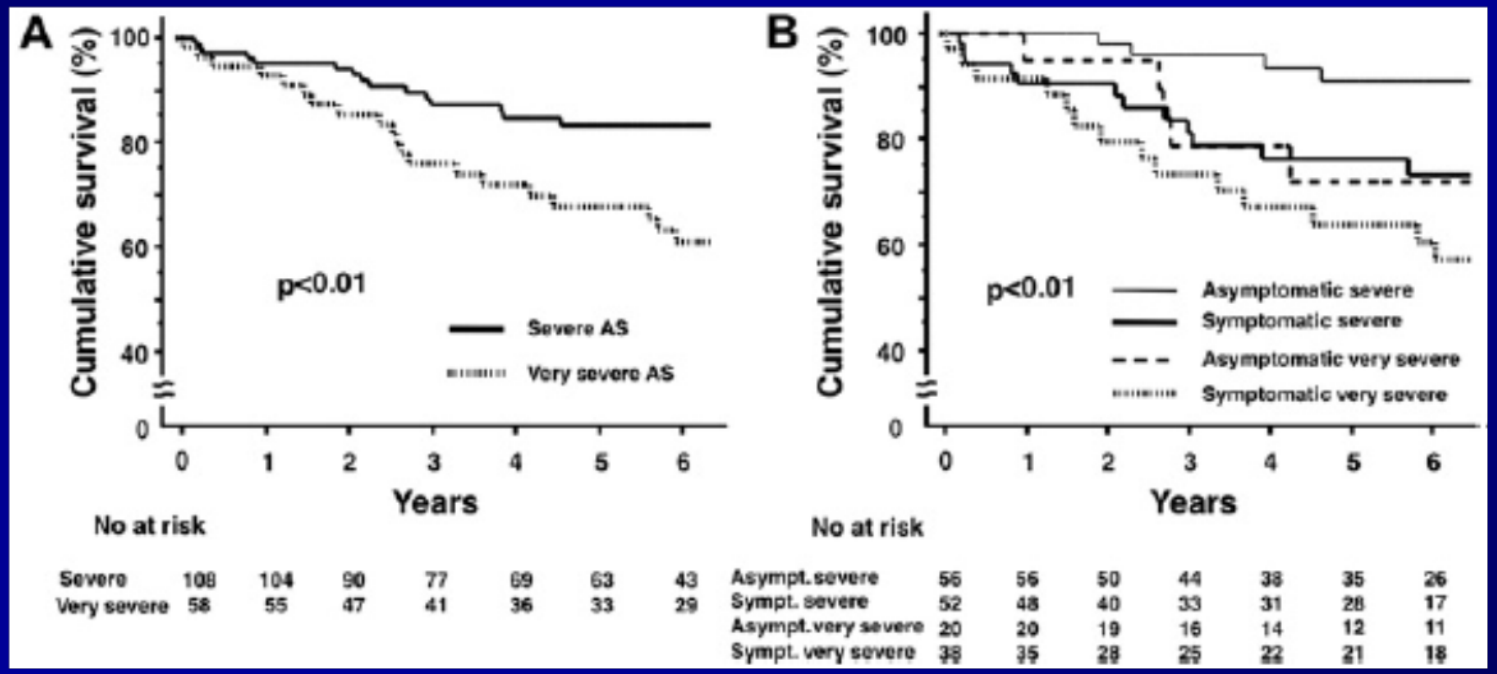

Heart 2011;**97**:2029–2032. doi:10.1136/heartjnl-2011-300137