# Survival Following Intervention in Patients with Low-Gradient Severe Aortic Stenosis and Preserved Left Ventricle Function.

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# Disclosures

**NONE**

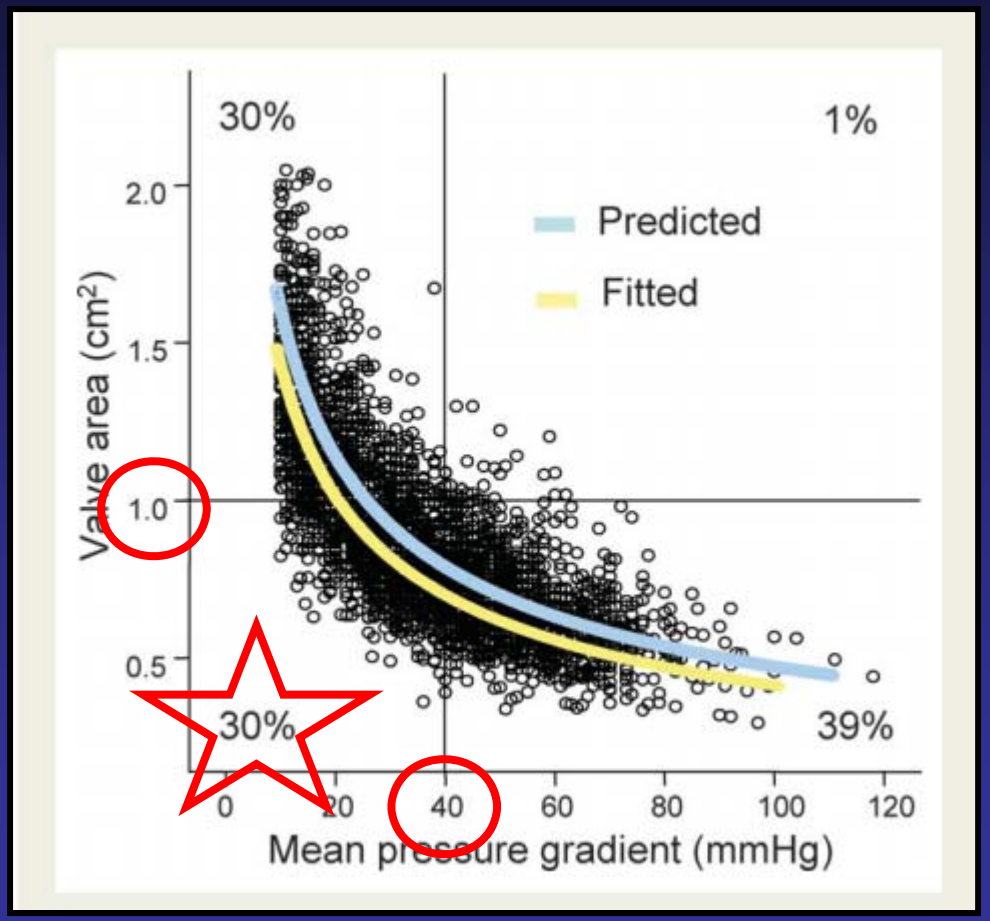
# Severe Aortic Stenosis

- Aortic valve area ≤ 1 $cm^2$
  - Indexed valve area ≤ 0.6 $cm^2/m^2$
- Mean pressure gradient ≥ 40mm Hg
- Peak velocity ≥ 4m/s

# Severe Aortic Stenosis

- Aortic valve replacement improves survival of symptomatic patients with severe aortic stenosis.

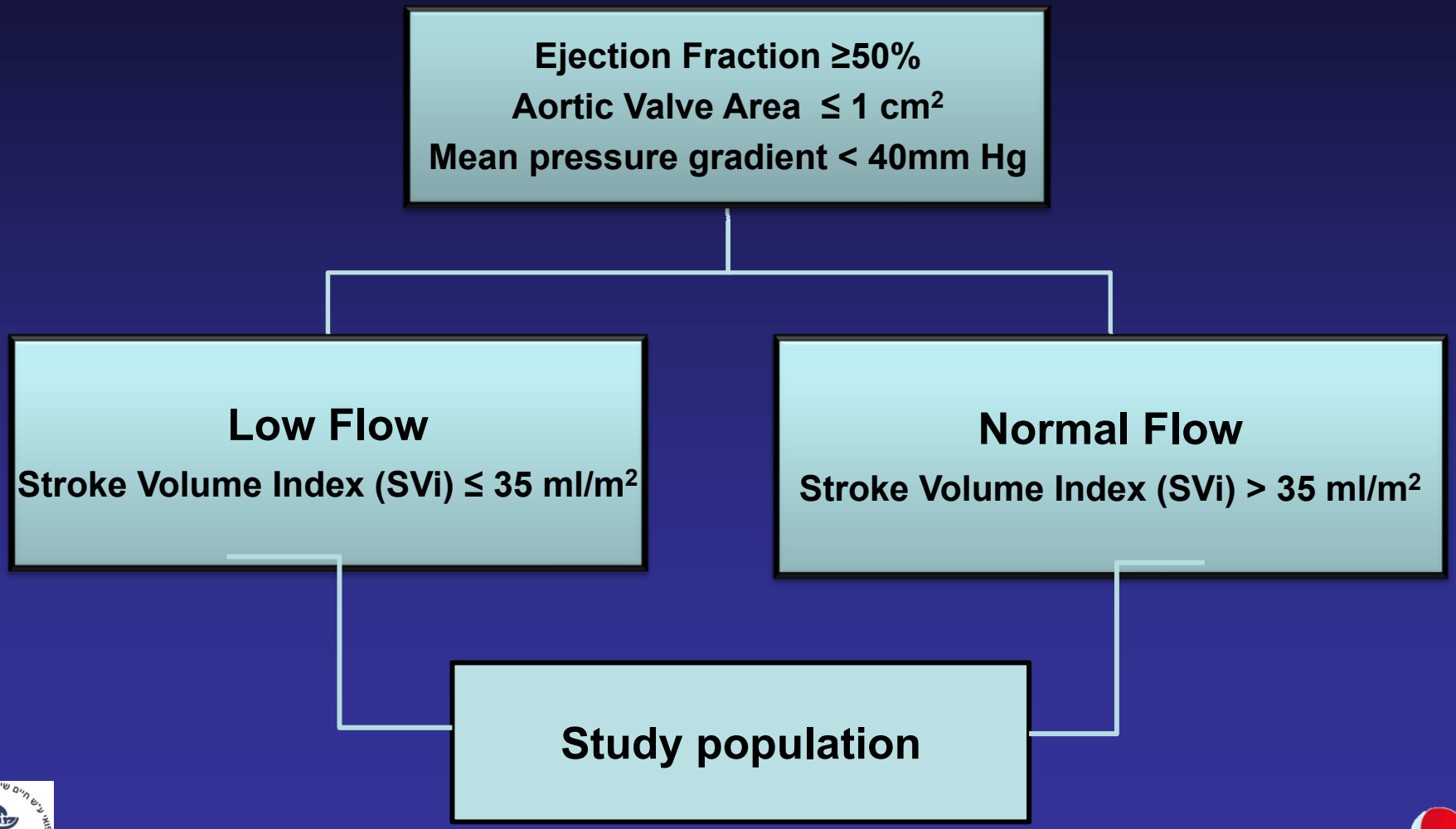
# Severe Aortic Stenosis






*Minners J, et-al. Inconsistencies of echocardiographic criteria for the grading of aortic valve stenosis. Eur Heart J. 2008.*

# Low Gradient Severe Aortic Stenosis with Preserved Ejection Fraction



# Low Gradient Severe Aortic Stenosis with Preserved Ejection Fraction

- There are conflicting data regarding the effect of aortic valve intervention on survival.

*Dumesnil JG, et-al. Paradoxical low flow and/or low gradient severe aortic stenosis despite preserved left ventricular ejection fraction: implications for diagnosis and treatment. Eur Heart J 2010.*

*Jander N, et al. Outcome of patients with low-gradient "severe" aortic stenosis and preserved ejection fraction. Circulation 2011.*

- Resulting in inconsistent referral to valvular intervention.

*Clavel MA, et-al. Outcome of patients with aortic stenosis, small valve area, and low-flow, low-gradient despite preserved left ventricular ejection fraction. J Am Coll Cardiol 2012.*

# Aim

- To evaluate the effect of aortic valve intervention on survival among patients with low gradient severe aortic stenosis and preserved ejection fraction.

# Methods

## Study Population

- 416 patients who underwent Echocardiographic and Doppler studies at Sheba medical center between 2004 - 2012.

# Methods

## Inclusion criteria

- Ejection fraction ≥ 50%
- Aortic valve area ≤ 1 $cm^2$
- Mean pressure gradient ≤ 40mm Hg

## Exclusion criteria

- Ejection fraction < 50%
- Another significant valvular disease

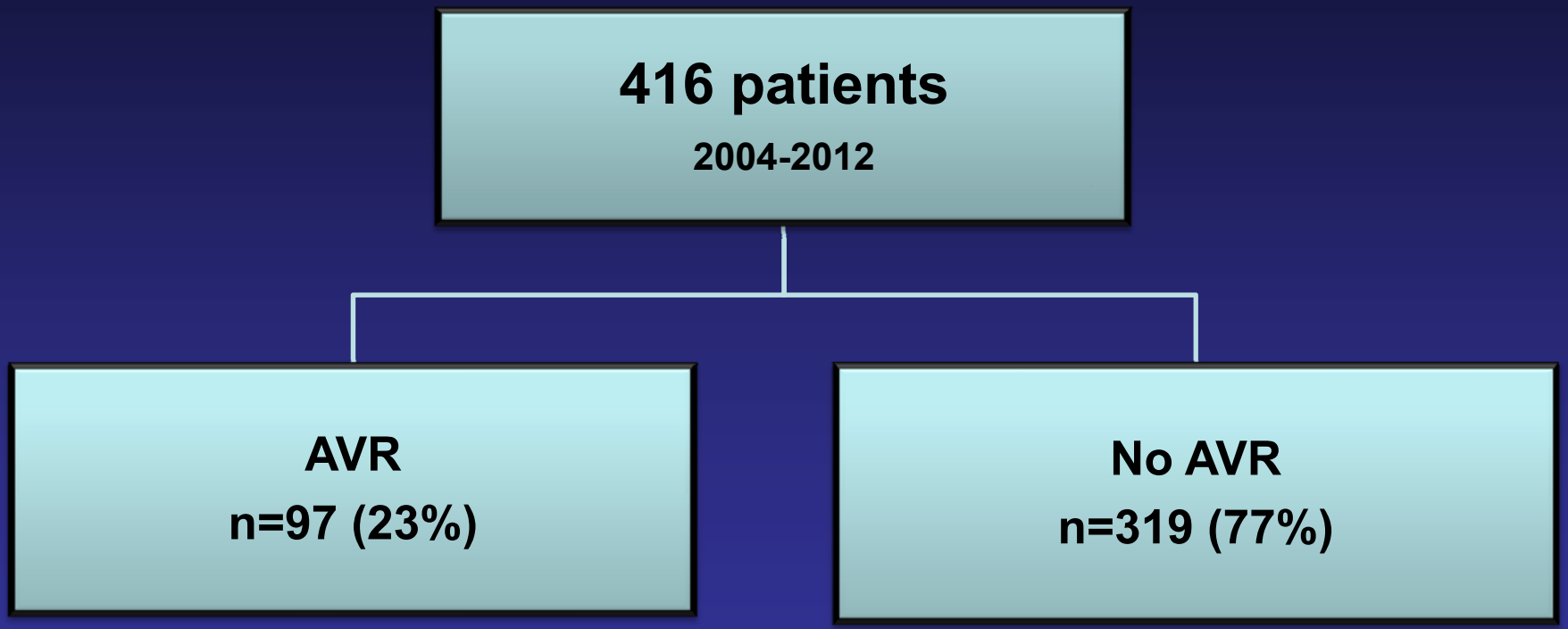
# Methods

- Echocardiographic parameters
- Clinical data
- Valvular intervention
- Death records from the ministry of health

# Statistical analysis

- The effect of aortic valve intervention on survival was assessed as a time dependent covariate in the Cox multivariate model.
- Mantle - Byar survival analysis was used to evaluate the survival of patients before and after intervention.

# Results




AVR - Aortic Valve Replacement

# Baseline characteristics

| | AVR (n=97) | no AVR (n=319) |
|---|---|---|
| Male (%) | 50 | 40 |
| Age>80 (%) | 27 | 54 * |
| BMI (kg/m$^2$) | 28±4 | 28±5 |
| BSA (m$^2$) | 1.8±0.2 | 1.8±0.2 |

* P< 0.001

# Baseline characteristics

| | AVR (n=97) | no AVR (n=319) |
|---|---|---|
| Diabetes Mellitus (%) | 41 | 35 |
| Hypertension (%) | 65 | 69 |
| Dyslipidemia (%) | 47 | 50 |
| Active Smokers (%) | 5 | 6 |
| Chronic Renal Failure (%) | 17 | 25 |
| Ischemic Heart Disease (%) | 45 | 46 |
| Cerebrovascular Disease (%) | 14 | 20 |

# Echocardiographic characteristics

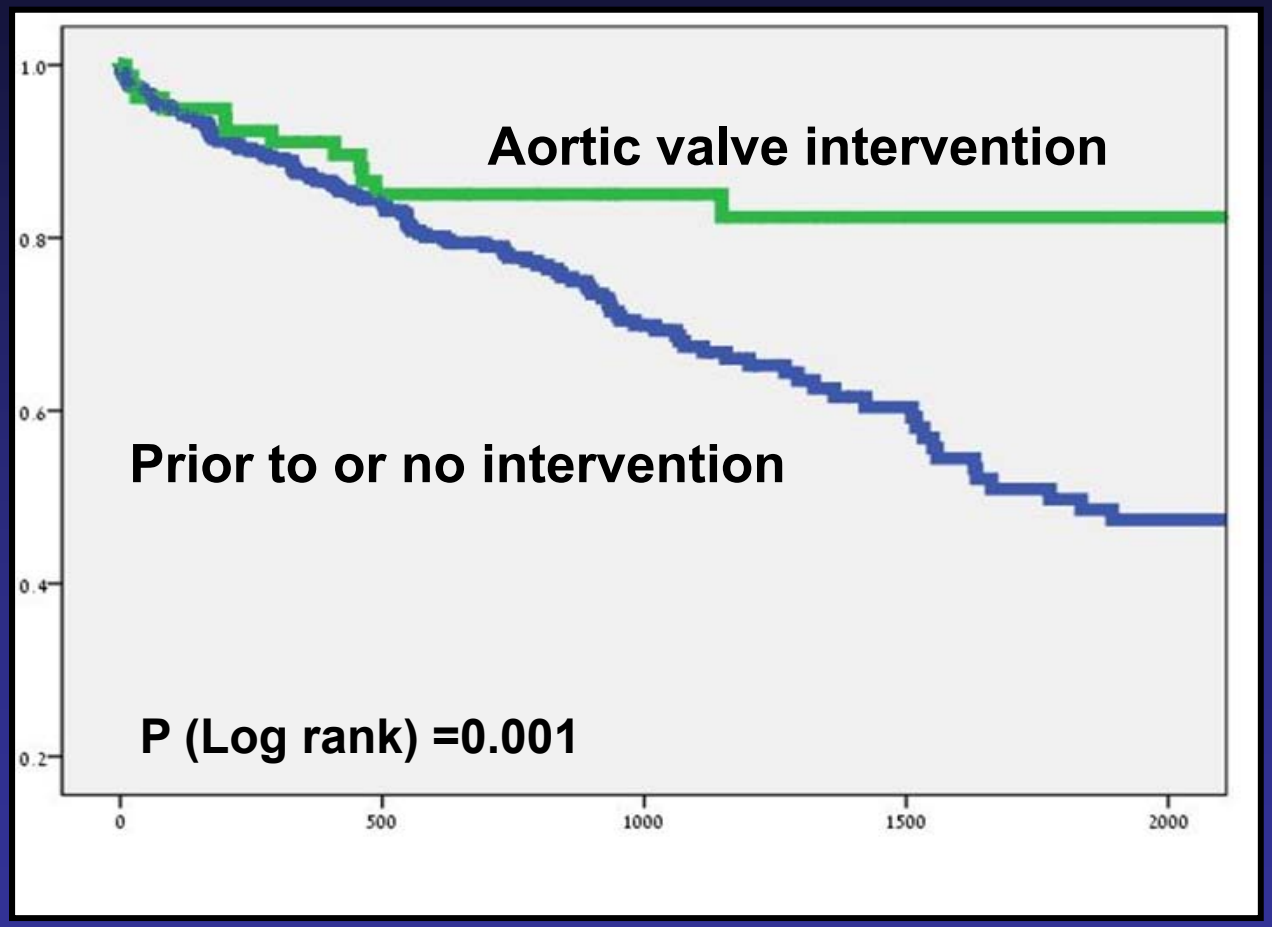
| | AVR (n=97) | no AVR (n=319) |
|---|---|---|
| Left Ventricle Ejection Fraction (%) | 59 ± 5 | 60 ± 5 |
| LV diastolic dimension (cm) | 4.7 ± 0.5 | 4.5 ± 0.5 |
| LV systolic dimension (cm) | 2.8 ± 0.5 | 2.7 ± 0.5 |
| Septum width (cm) | 1.2 ± 0.2 | 1.2 ± 0.2 |
| LV mass (gr) | 203 ± 51.5 | 190 ± 46 |
| LA area ($cm^2$) | 22 ± 4.3 | 23.2 ± 7.6 |
| Estimated Pulmonary Artery Pressure (mmHg) | 38.5 ± 12 | 40.6 ± 11.9 |

# Echocardiographic characteristics

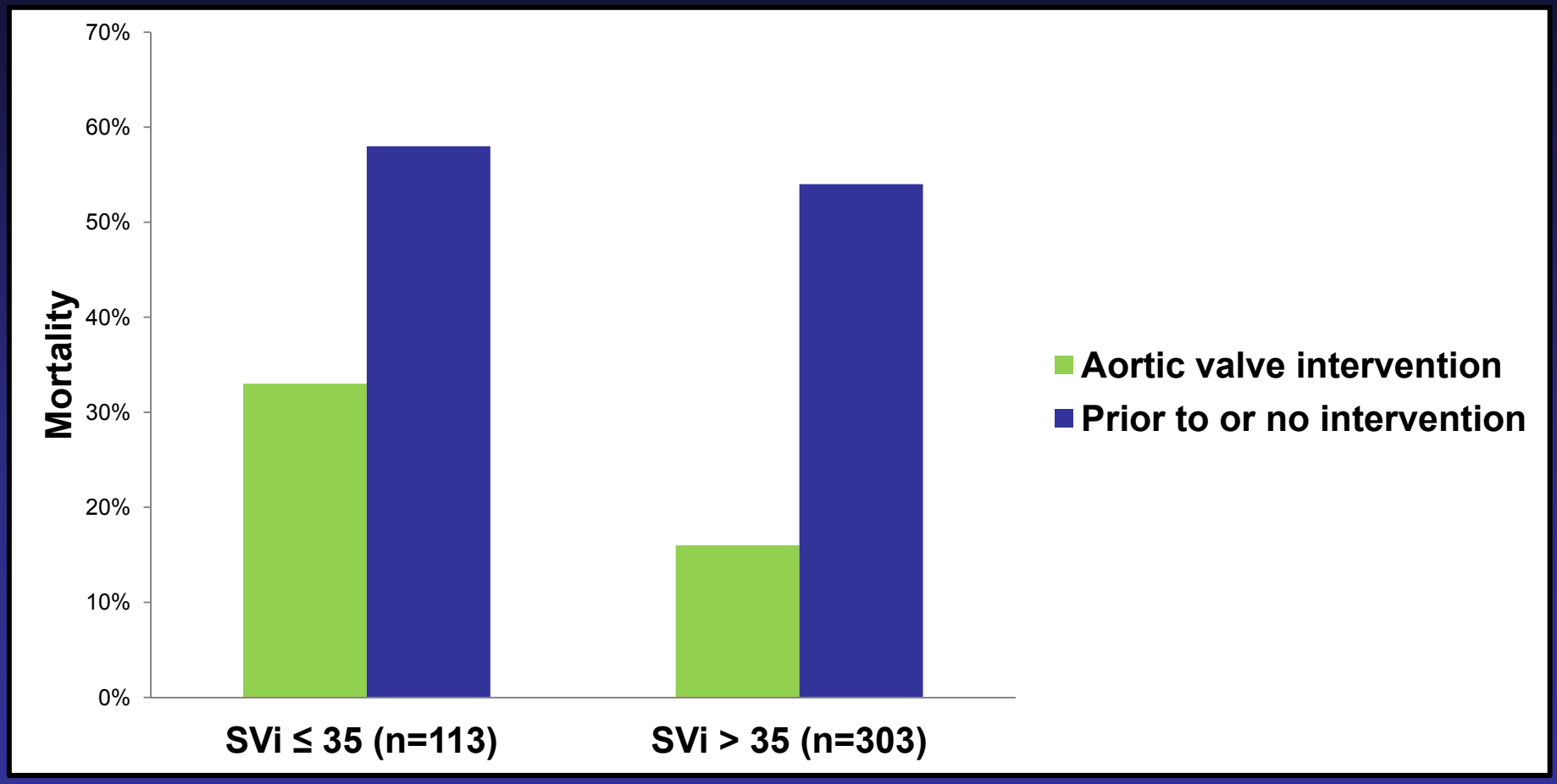
| | AVR (n=97) | no AVR (n=319) |
|---|---|---|
| Aortic Valve area ($cm^2$) | 0.8 ± 0.1 | 0.8 ± 0.1 |
| Indexed Area ($cm^2/m^2$) | 0.45 ± 0.06 | 0.47 ± 0.07 |
| Aortic Valve Mean Gradient (mmHg) | 32 ± 5.3 | 30 ± 6.5 * |
| Peak Velocity (m) | 3.7 ± 0.4 | 3.5 ± 0.4 |
| SV Index ($ml/m^2$) | 40.3 ± 6.1 | 38.7 ± 7.2 |
| Cardiac Index ($L/min*m^2$) | 2.7 ± 0.5 | 2.7 ± 0.5 |

* P< 0.001

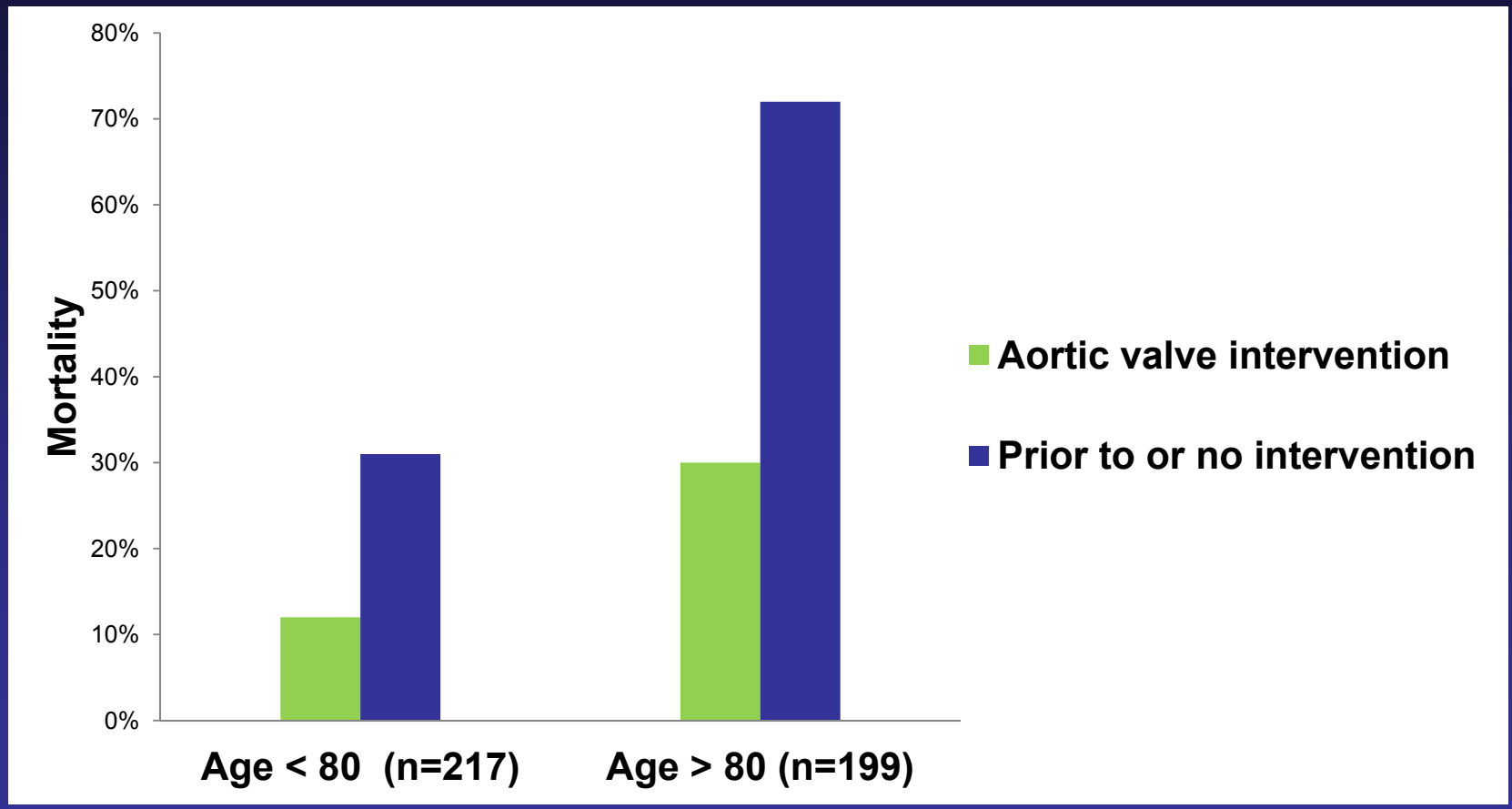
# Mantel Byar Survival Curve



# Effect of Intervention on Mortality by Stroke Volume Index (SVi)



# Effect of Intervention on Mortality by Age



# Multivariate Cox Regression

| | Hazard Ratio | P Value |
|---|---|---|
| Male | 1.06 | 0.76 |
| Age > 80 y | 4.7 | <0.001 |
| Aortic valve area ≤ 0.8 $cm^2$ | 1.66 | 0.009 |
| BMI | 1.02 | 0.32 |
| Ischemic Heart Disease | 1.2 | 0.31 |
| Time Dependent Aortic valve Intervention | 0.51 | 0.028 |

# Limitations

- Retrospective Analysis
- Single Center Cohort
- Measurements error (Stroke volume errors)
- Ejection Fraction Estimation
- Lack of data regarding patients symptoms

# Conclusion

- Our data suggest that aortic valve replacement is associated with improved survival among patients with low gradient severe aortic stenosis and preserved left ventricle function.