

**Clinical implication of
Preserved LV diastolic function at
Lateral mitral annulus
In patients with
Isolated diastolic dysfunction**

Sung-Ai Kim

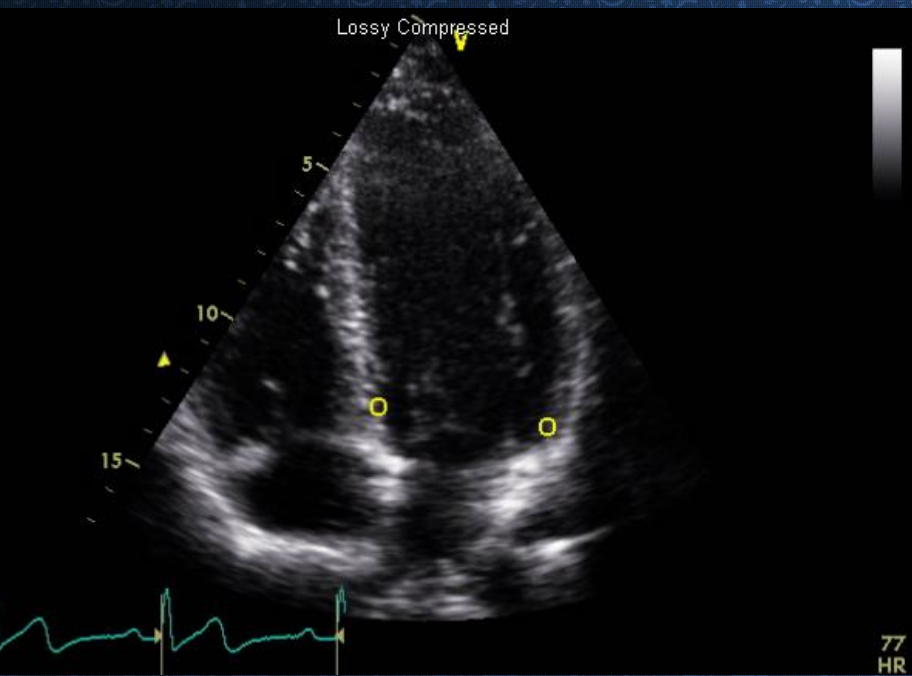
Cardiology Division

Hallym University Sacred Heart Hospital

Introduction

- Isolated diastolic dysfunction accounts for more than 1/3 of heart failure, increasing to almost one half of the cases in the elderly population
- Pulsed wave TDI has been used as a method to assess function by analysis of the motion of the mitral annulus during diastole

Septal Ea vs Lateral Ea

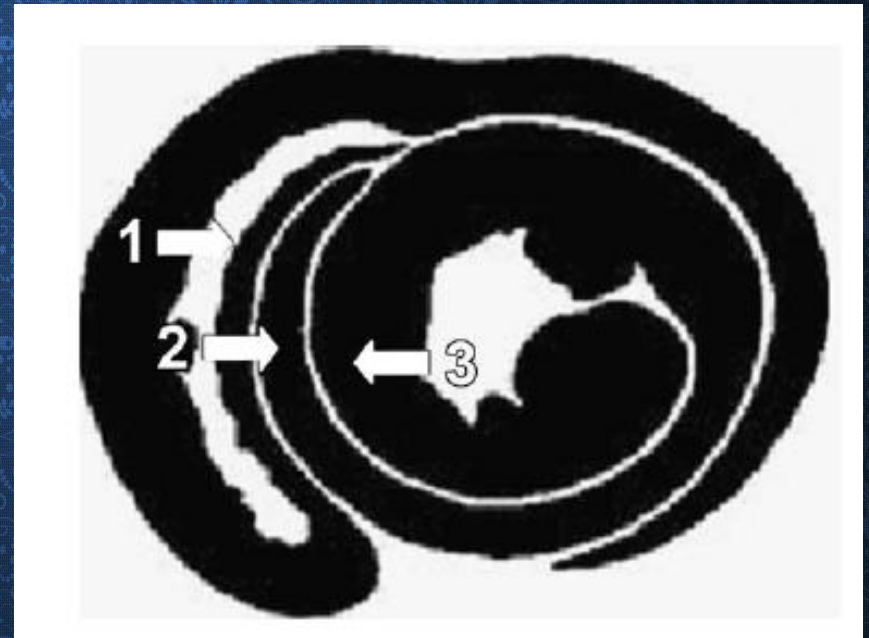
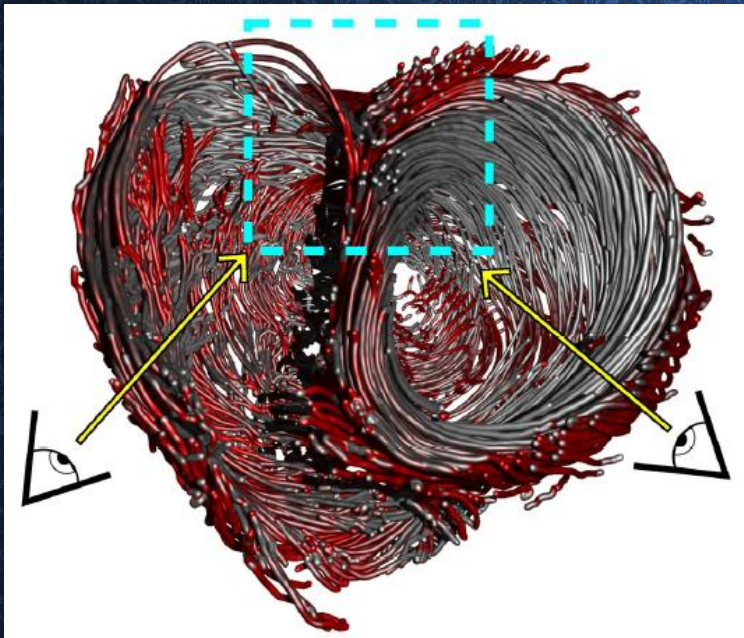


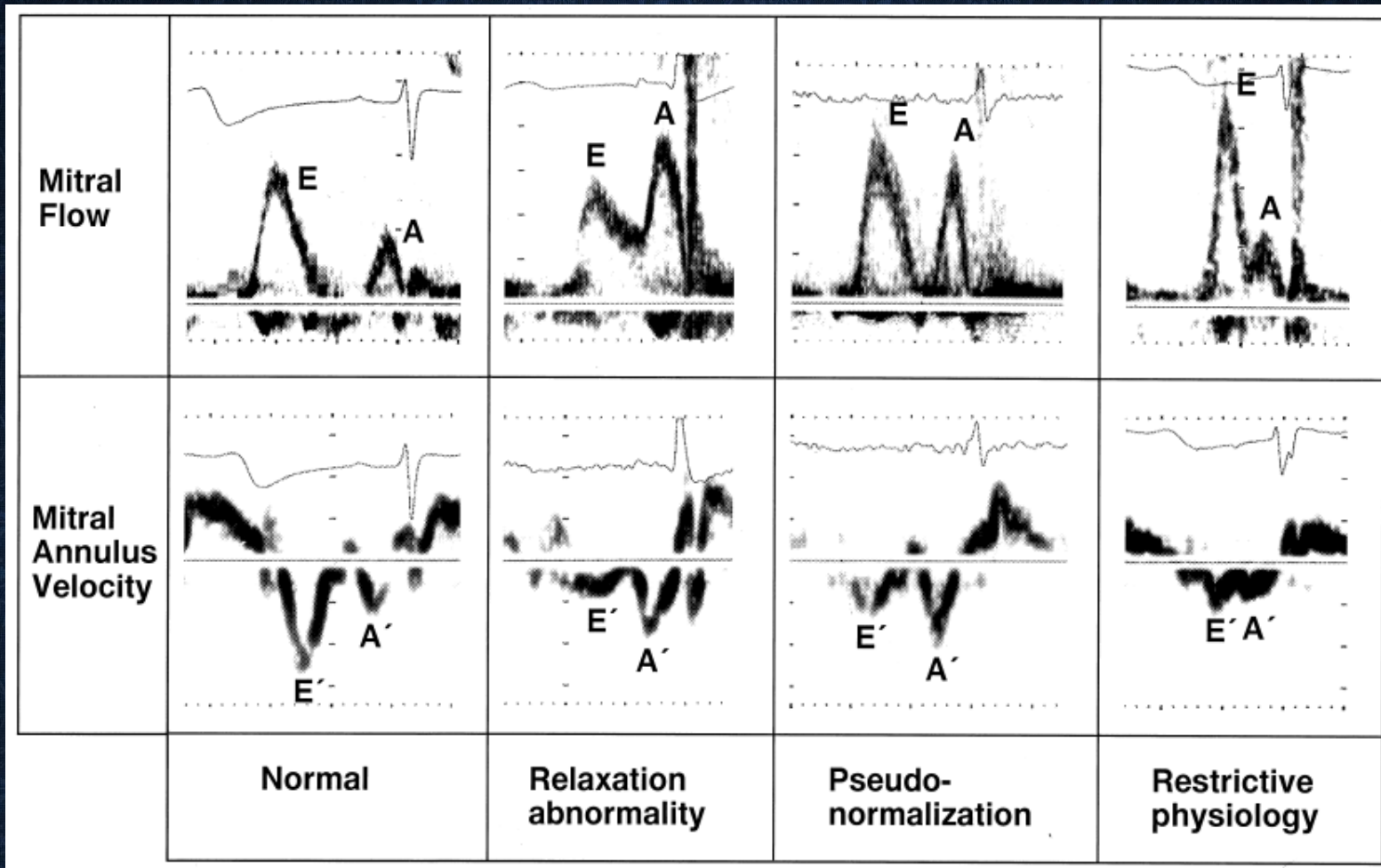
Mitral annular velocity in age groups

Age (yr)	S'		E'		A'	
	septal	lateral	septal	lateral	septal	lateral
18-29	6.6±1.2	7.6±2.5	9.3±1.9	10.3±2.5	4.9±1.4	3.1±1.4
30-39	6.2±0.9	7.3±2.4	8.7±2.0	9.6±2.5	5.4±1.4	3.9±2.0
40-49	6.1±1.0	6.1±2.1	8.1±1.8	8.7±2.2	6.2±1.6	3.7±1.7
50-59	5.4±1.2	4.3±0.9	6.8±1.8	6.6±2.0	7.2±1.3	3.6±0.9
60-77	5.3±1.0	5.1±2.2	5.6±1.3	6.2±2.4	7.0±1.9	5.1±2.3
Average	6.0±1.1	6.3±2.4	7.9±2.1	8.5±2.8	6.0±1.7	3.8±1.8

Difference in septal and lateral wall

- Septal wallfewer longitudinal fibers
.....more thick



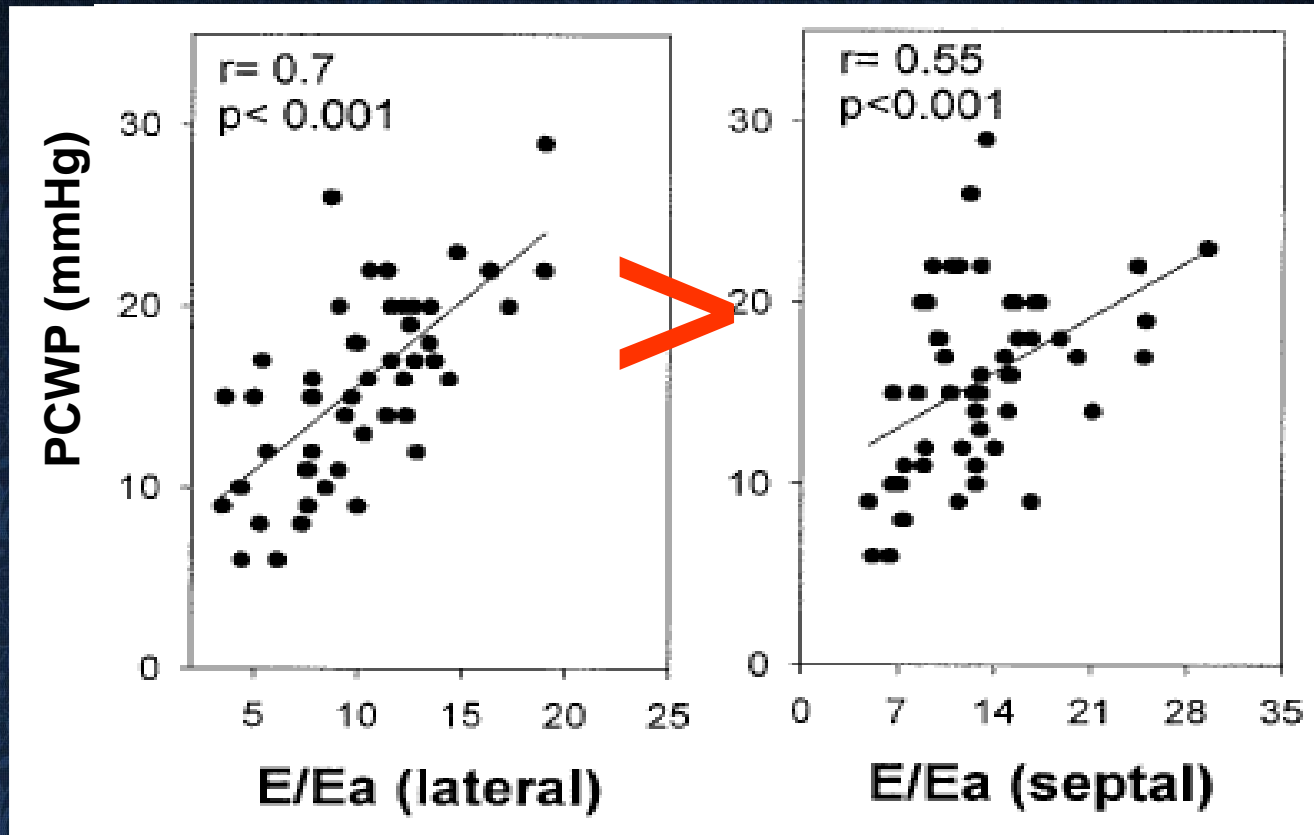


$E/Ea \propto$ LV filling pressure

Septal $E/Ea > 15$

Lateral $E/Ea > 10$

= increased filling pressure



lateral E/Ea \propto PCWP

ICU patients with EF $>50\%$ (mean age 60)

Septal TDI may overestimate diastolic dysfunction

**Lateral vs medial mitral annular tissue Doppler
in the echocardiographic assessment of diastolic
function and filling pressures: which should
we use?**

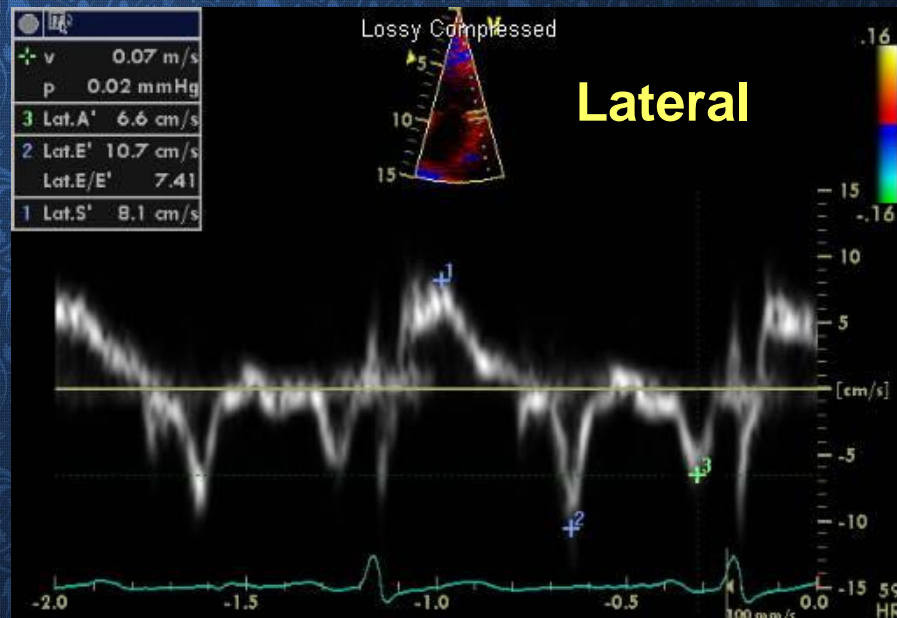
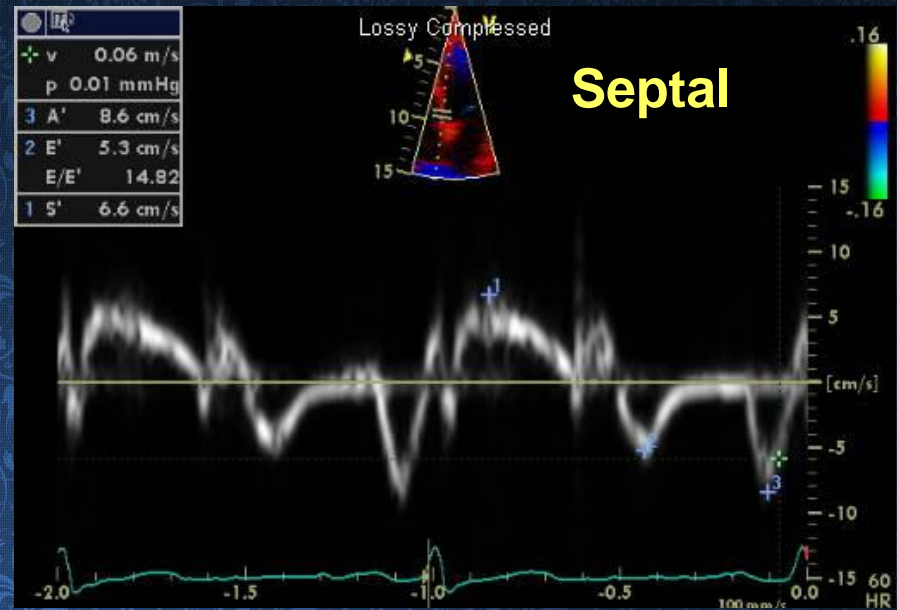
**Differences of Lateral and Septal Mitral Annulus Velocity by Tissue Doppler
Imaging in the Evaluation of Left Ventricular Diastolic Function**

No general consensus exists as to whether the medial vs the lateral portion of the Mitral annulus provides a more accurate assessment of LV diastolic function

Patient 1 : lateral Ea / Aa > 1

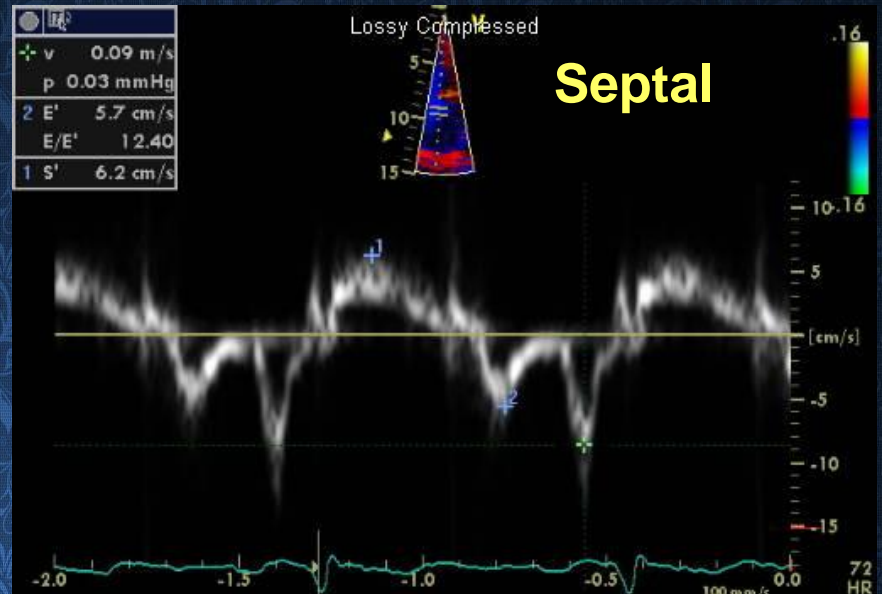
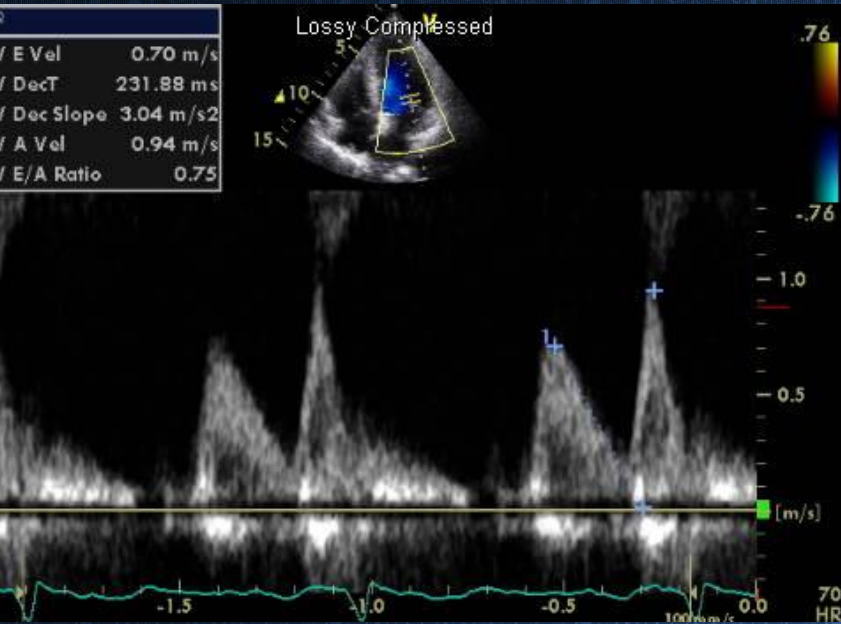


Setal E/Ea = 13



Patient 2

lateral $E_a / A_a < 1$



Septal $E/E_a = 12$

Objective

To evaluate the determinant factors which influence on the diastolic function at lateral mitral annulus.

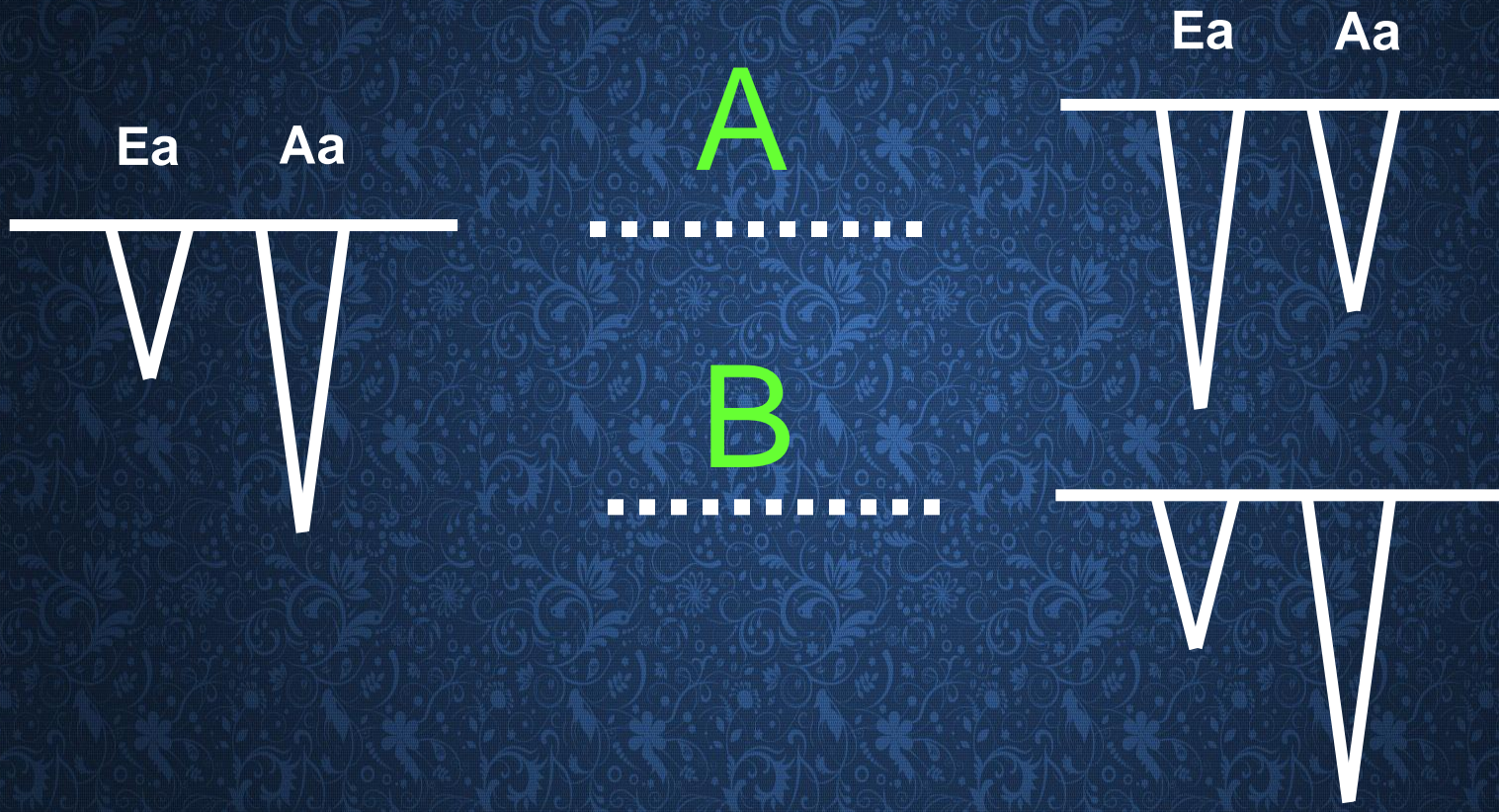
Method

- **Inclusion : isolated diastolic dysfunction**
 - Normal LVEF
 - No RWMA
 - Ea/Aa at septal annulus < 1.0
- **Exclusion : coronary artery disease,
significant valvular heart disease
cardiomyopathy**

=> Total 1166 consecutive patients were recruited

Septal annulus

Lateral annulus



Results

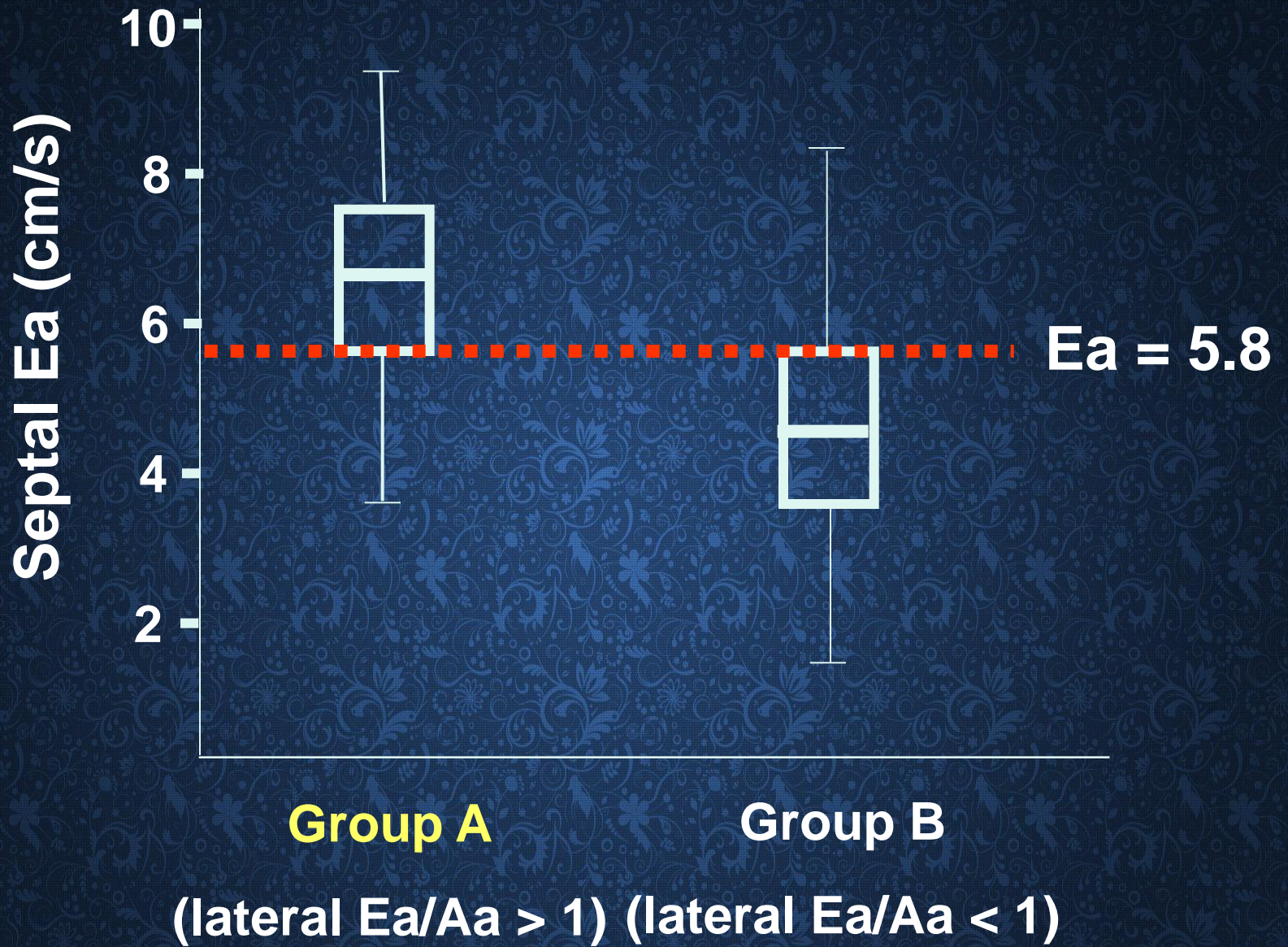
Baseline characteristics

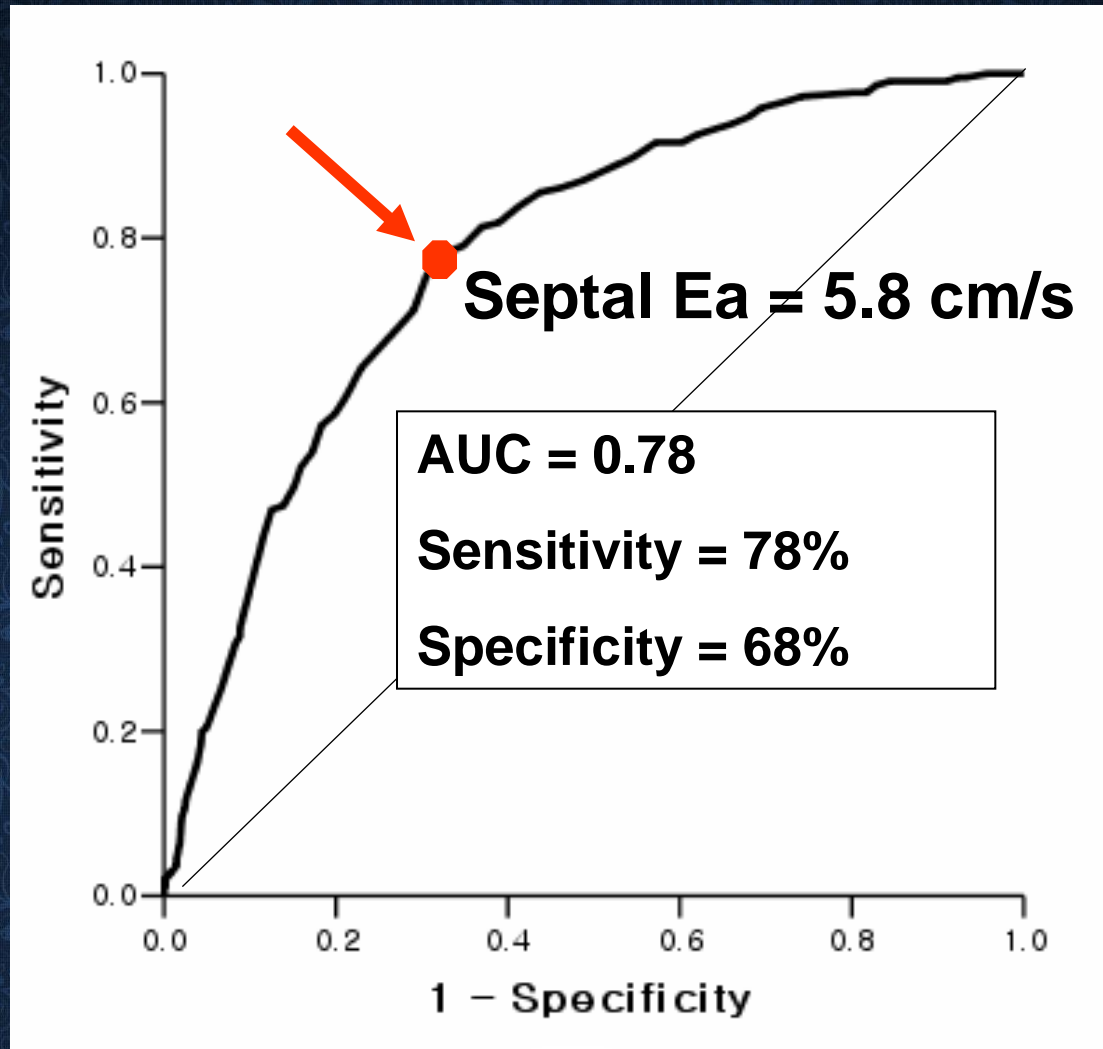
	Group A (n = 215)	Group B (n = 951)	p-value
Age (year)	54.5 ± 10.9	66.8 ± 10.8	< 0.001
Male (%)	58	43	< 0.001
BSA (m ²)	1.7 ±0.1	1.6 ±0.1	< 0.001
BMI (kg/m ²)	24.1 ± 3.3	24.6 ± 8.8	0.44
Heart rate (bpm)	70.0 ± 12.7	72.5 ± 23.3	0.11
HTN (%)	45	55	0.006
Diabetes (%)	14	23	0.003
eGFR (ml/min/1.73 m ²)	106.2 ± 125.3	91.0 ± 43.2	0.11
Dyslipidemia (%)	34	31	0.33
Current smoker (%)	22	15	0.01

Echocardiographic characteristics

2D	Group A (n = 215)	Group B (n = 951)	p-value
LVEF (%)	64 ± 3.8	64 ± 4.1	0.69
LVEDV (ml)	85 ± 17	74 ± 17	< 0.001
LVESV (ml)	30 ± 7.9	26 ± 7.8	< 0.001
LV mass (g/m ²)	84 ± 19	89 ± 23	0.002
RWT	0.3 ± 0.1	0.4 ± 0.1	< 0.001
LAVI (ml/m ²)	30 ± 9.4	32 ± 9.1	0.007

Doppler	Group A (n = 215)	Group B (n = 951)	p-value
E (cm/s)	64 ±15	59 ±14	< 0.001
A (cm/s)	67 ±13	80 ±18	< 0.001
DT (ms)	214 ± 39	235 ± 41	< 0.001
Sa_septal (cm/s)	7.1 ± 1.4	6.6 ± 1.5	< 0.001
Sa_lateral (cm/s)	8.5 ± 2.1	7.6 ± 1.8	< 0.001
Ea_septal (cm/s)	6.6 ± 1.3	5.1 ± 1.4	< 0.001
Ea_lateral (cm/s)	10.7 ± 6.6	6.8 ± 1.8	< 0.001
E/Ea_septal (cm/s)	10.1 ± 3.6	12.2 ± 4.0	< 0.001
E/Ea_lateral (cm/s)	6.4 ± 2.1	9.2 ± 3.4	< 0.001
E/Ea_septal > 15 (%)	4.6	20.8	< 0.001
E/Ea_lateral > 10 (%)	6.9	30.5	< 0.001

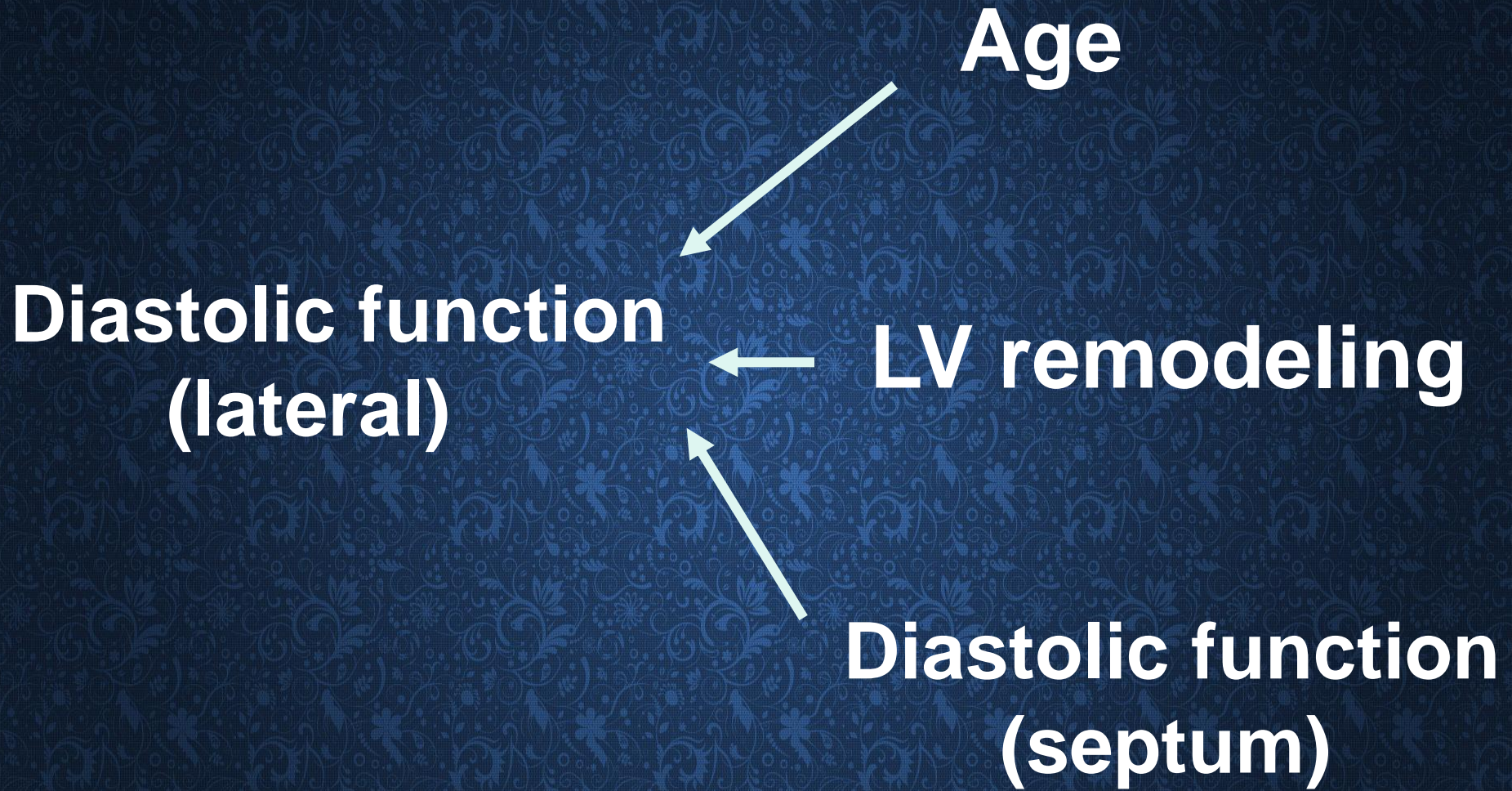




ROC analysis for prediction of preserved diastolic function at lateral annulus

Multivariate analysis for prediction of preserved diastolic dysfunction at lateral annulus

	HR	95% CI	p-value
Age	0.93	0.91-0.95	< 0.001
Male	0.85	0.54-1.34	0.50
BSA	2.00	0.49-8.05	0.32
DM	0.73	0.45-1.18	0.21
HTN	1.15	0.80-1.65	0.44
LVMI	1.01	0.99-1.01	0.18
RWT per 0.1	0.53	0.37-0.76	0.001
Septal Ea	1.61	1.40-1.85	< 0.001



Conclusion

- Preserved diastolic function at lateral annulus was independently associated with age, degree of LV remodeling and diastolic function at septal annulus

Further study

- **Correlation of Doppler parameter (E/Ea) in any site of mitral annulus with invasive data for predicting LV filling pressure should be assessed in all age groups**

경청해 주셔서 감사합니다

**Lateral vs medial mitral annular tissue Doppler
in the echocardiographic assessment of diastolic
function and filling pressures: which should
we use?**

Eur J Echocardiography 2005;6: 97-106

**Differences of Lateral and Septal Mitral Annulus Velocity by Tissue Doppler
Imaging in the Evaluation of Left Ventricular Diastolic Function**

AJC 2006;98: 970-972

**Comparison of early diastolic annular velocities measured at various sites
of mitral annulus in detection of mild to moderate left ventricular
diastolic dysfunction**

Heart Vessels 2007;22:67-72