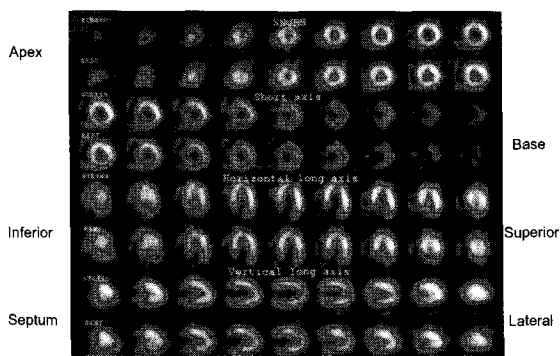


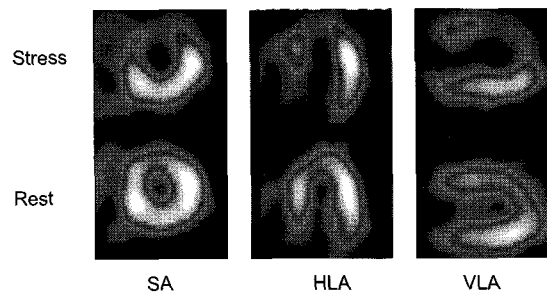
심장핵의학 검사의 판독

분당서울대학교병원 핵의학과
이 원 우

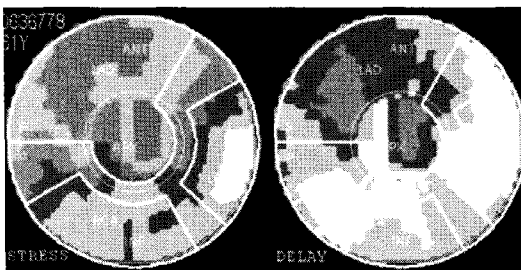
Normal myocardial perfusion SPECT



Myocardial Perfusion SPECT (LAD stenosis)



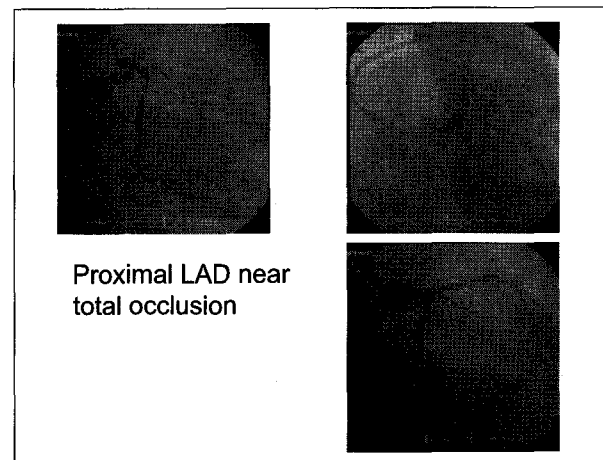
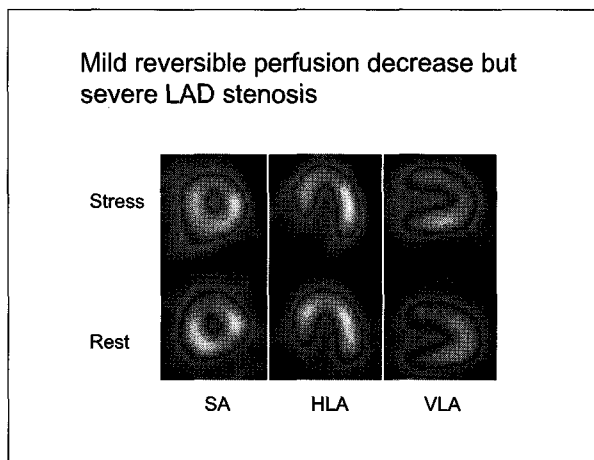
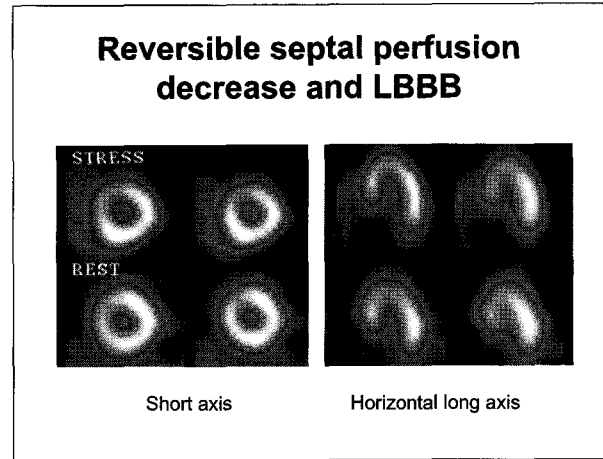
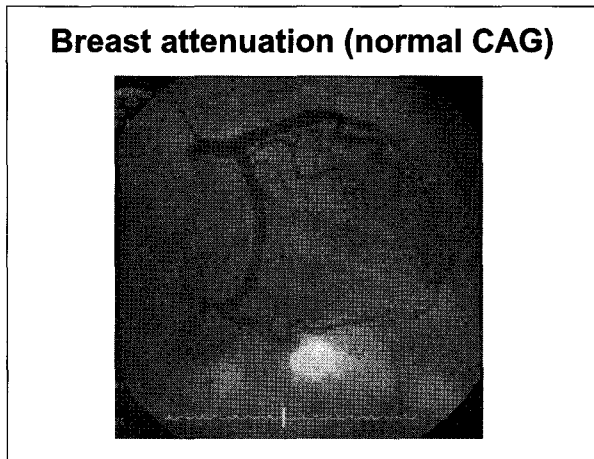
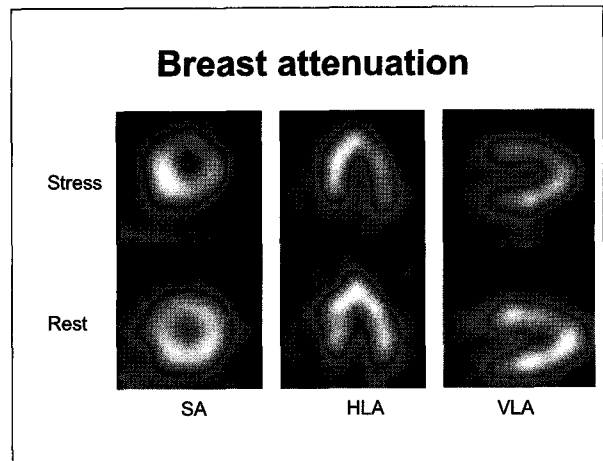
Myocardial Perfusion SPECT (LAD stenosis) – Polar map



Myocardial stress

- Exercise : Treadmil, bicycle
 - Physiologic demand ischemia
 - Can evaluate exercise capacity, ECG change, chest pain.
- Vasolilator : Adenosine, Dipyridamole,
 - Reliable stress
- Inotropic agent : Dobutamine
 - Asthma

Myocardial stress					
	Treadmil	Leg cycling	Dipyrid	Adenos	Dobuta
Heart rate	↑↑↑↑	↑↑↑	↑	↑	↑↑↑
Blood pressure	↑↑↑	↑↑↑↑	↓	↓	↑↑↑
Double product	↑↑↑↑	↑↑↑↑	↑	↑	↑↑↑↑
T1/2	variable	variable	long	~ 10 sec	~ 2 min
Antidote			Aminophylline		



Bayes theorem

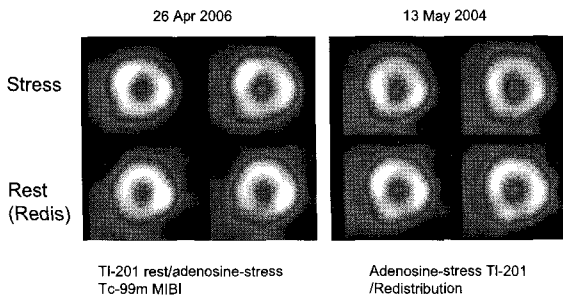
- $P(D+|T+) = \text{Positive predictive value}$
 $= \frac{P \times \text{Sen}}{P \times \text{Sen} + (1 - P) \times (1 - \text{Spec})}$
- If prev 3% 이고 MPS의 sen 90%, spec 80%이면
- MPS (+)의 PPV는 12%.

- If prev 90%이고 MPS의 sen 90%, spec 80%이면
- MPS (+)의 PPV는 98%.

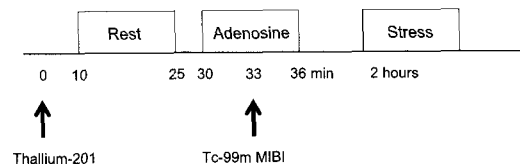
Bayes theorem

- $P(D-|T-) = \text{Negative predictive value}$
 $= \frac{(1 - P) \times \text{Spec}}{(1 - P) \times \text{Spec} + P \times (1 - \text{Sen})}$
- If prev 90%이고 MPS의 sen 90%, spec 80%이면
- MPS (-)의 NPV는 47%.

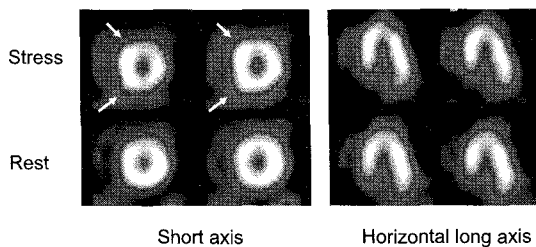
Comparison of myocardial SPECT protocols



TI-201 rest/adenosine-stress Tc-99m MIBI Myocardial SPECT

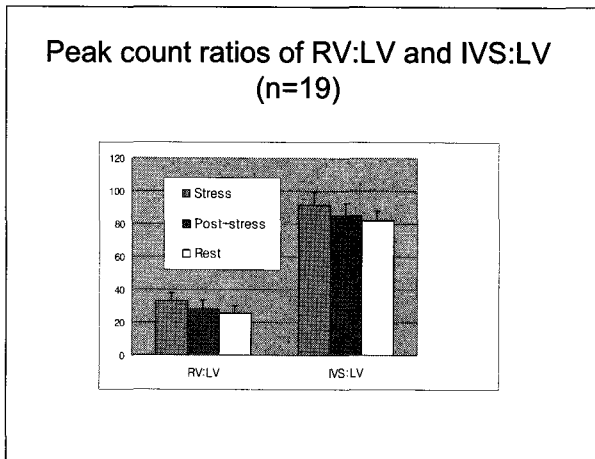
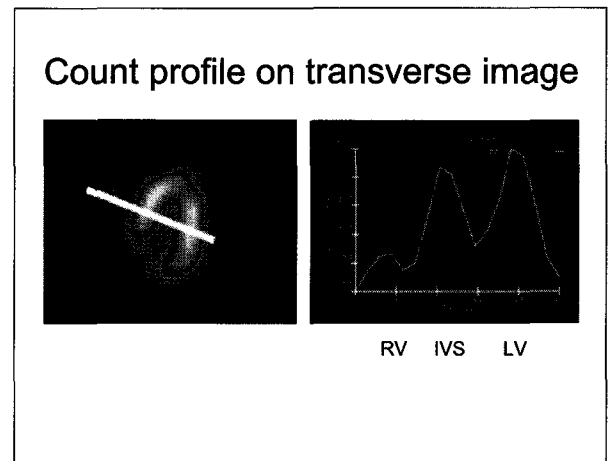
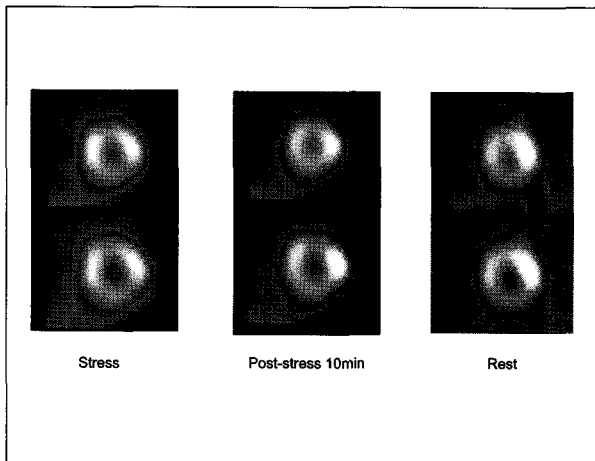


Transient septal hyperperfusion



Post adenosine-stress Tc-99m MIBI Myocardial SPECT





Adenosine-effects with continuous infusion

Variable	Baseline	Adenosine	Recovery(10min)
Heart rate, bpm	72.9±7.5	94.4±13.9 ¹	76.0 ±9.5
C.O., L/min	5.24±0.7	8.12±1.6 ¹	4.87 ±1.0
EF, %	66.1±6.4	73.5±5.1 ¹	63.0 ±9.1
Ea, mmHg/mL	2.26±0.58	1.66 ±0.48 ¹	2.62±0.91 ²
PCWP, mmHg	13.6±5.4	16.2 ±5.4 ¹	12.6±3.7
LVEDP, mmHg	16.6±6.4	21.1±6.3 ¹	17.4±8.1
LVESP, mmHg	157.5±22.8	139.1±25.0 ¹	159.1±28.3
LVEDV, mL	110.8±22.6	118.6 ±27.1 ²	105.0±29.5
LVESV, mL	38.5 ±13.5	32.0±12.5 ¹	39.9±17.4
RAP, mmHg	4.82±3.1	6.40±2.6 ²	4.82±2.0

Ea; effective arterial elastance
 1 P<0.001 vs baseline
 2 P<0.05 vs baseline
 Nussbacher et al. 1995 Circulation

Increased brightness of the right side of heart on MPS

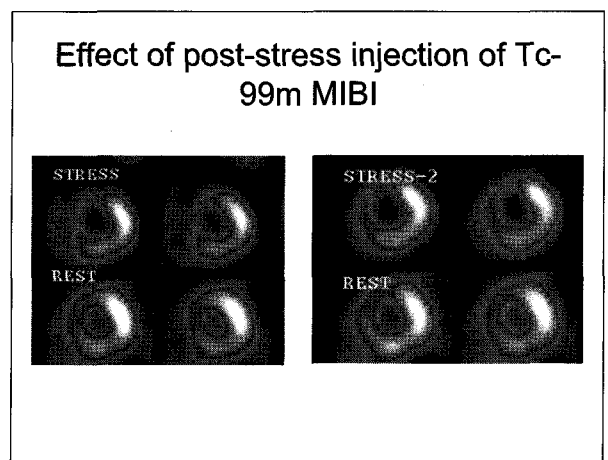
Permanent

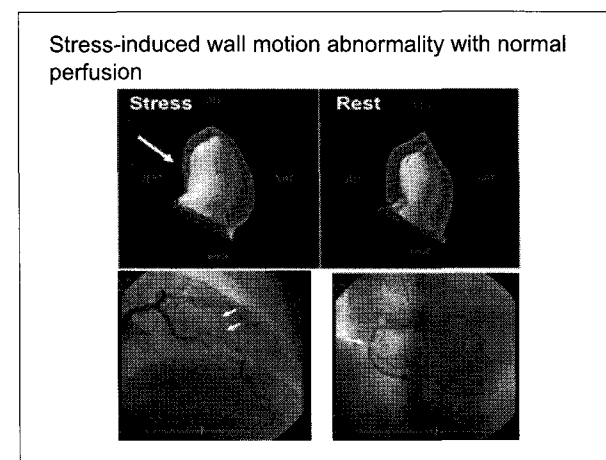
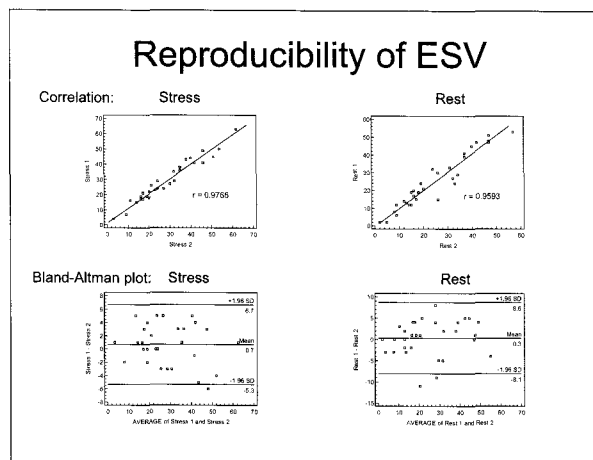
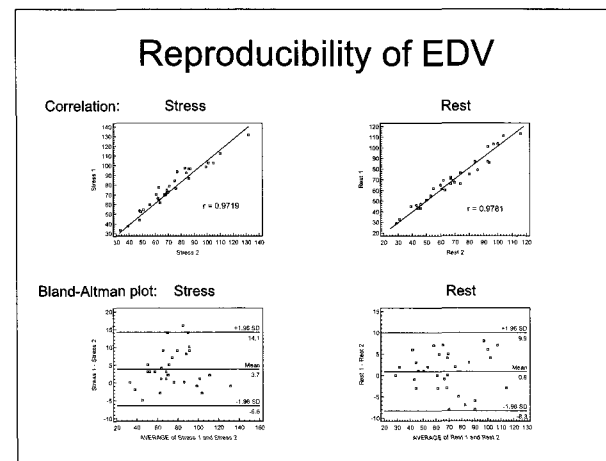
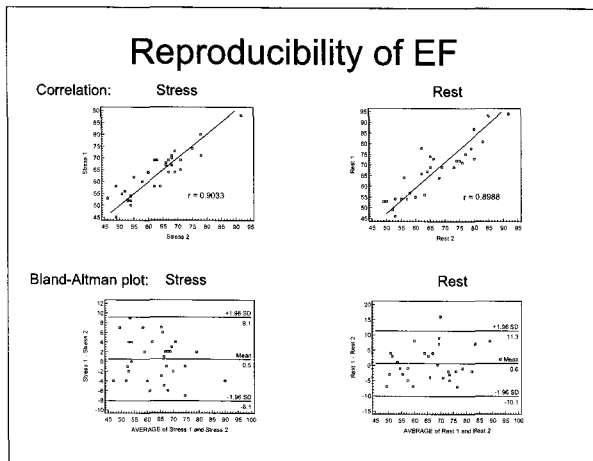
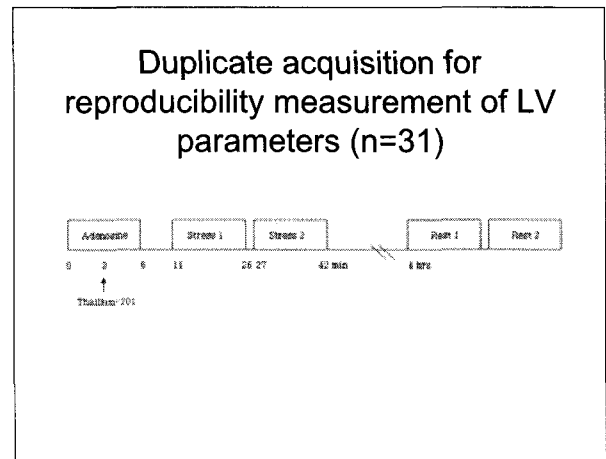
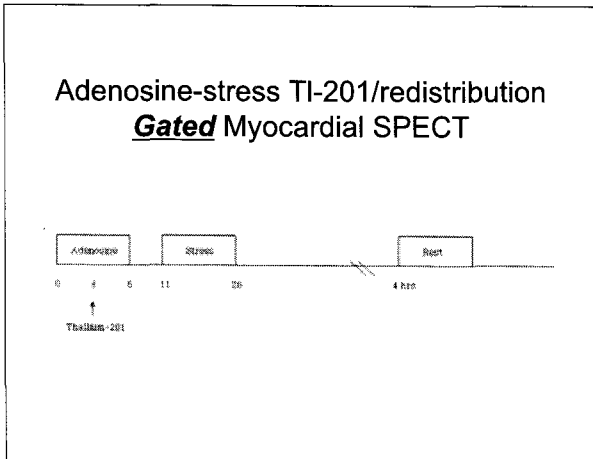
- Primary pulmonary hypertension
- COPD
- Congenital heart disease
- Valvular heart disease

Transient

- Pulmonary embolus
- Severe LV ischemia
- Large acute LV infarction

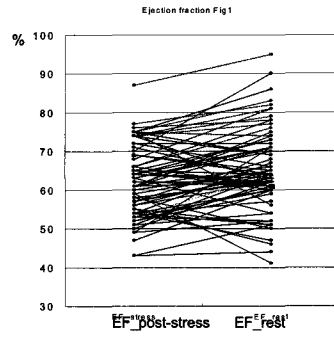
Wackers et al. 2005 JNC



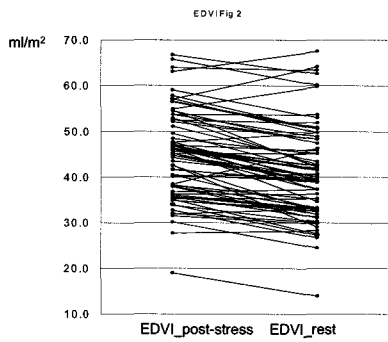


Adenosine-induced Functional Derangement of the Left Ventricle and its Relation to Attenuation Artifact of TI-201 Gated Myocardial Perfusion SPECT (n=71)

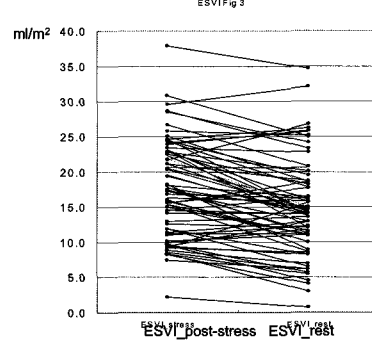
EF at post-stress and rest



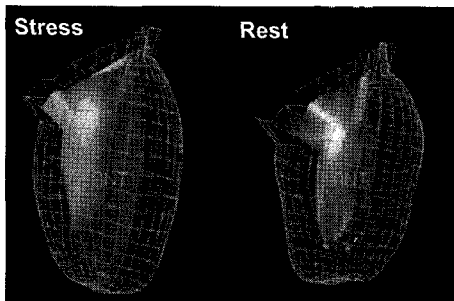
EDVI at post-stress and rest



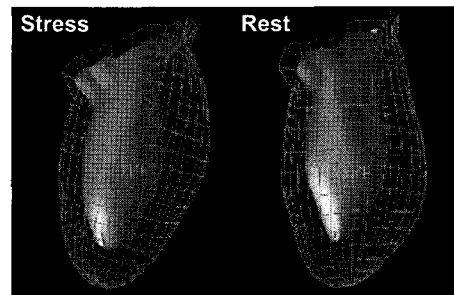
ESVI at post-stress and rest



Depressed LVEF at post-stress



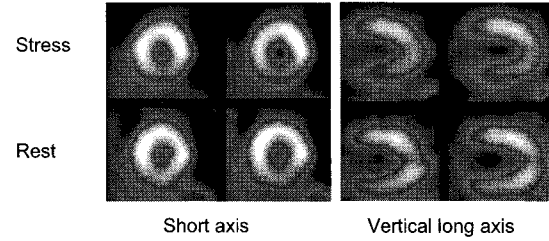
Non-depressed LVEF at post-stress



Clinical characteristics of the patients according to EF differences between post-stress and rest

	Group 1 EF post-stress=EF rest (n=46)	Group 2 EF post-stress<EF rest (n= 25)	P value
Male/Female	24/22	8/17	NS
Age (years)	58.5±10.2	59.2±10.0	NS
Hypertension	39.1% (18/46)	48.0% (12/25)	NS
Diabetes	10.9% (5/46)	24.0% (6/25)	NS
Non-specific EKG abnormality	8.7% (4/46)	40.0% (10/25)	<0.01
IVS (mm)	10.1±1.7	10.2±1.6	NS
LVPW (mm)	9.9±1.3	10.6±1.3	NS
IVS/LVPW ratio	1.0±0.1	0.97±0.1	NS
EDVI (ml/m ²) post-stress	44.6±9.5	45.0±10.2	NS
EDVI (ml/m ²) rest	40.3±10.3	41.7±10.3	NS
ESVI (ml/m ²) post-stress	18.3±7.2	16.1±8.2	NS
ESVI (ml/m ²) rest	13.4±6.7	17.2±6.4*	<0.05
Perfusion status			
Normal	21.7% (10/46)	32.0% (8/25)	NS
Reversible	65.2% (30/46)	36.0% (9/25)	<0.05
Persistent	13.0% (6/46)	32.0% (8/25)	NS
Cardiac event			
FLU CAG	2.1% (1/46)	none	NS
Observed period (days)	216.0±86.1 (range: 30-380)	215.6±87.0 (range: 34-327)	NS

Reversible mild perfusion decrease in inferior wall (M/43)-no cardiac event up to 1 year



MEMO