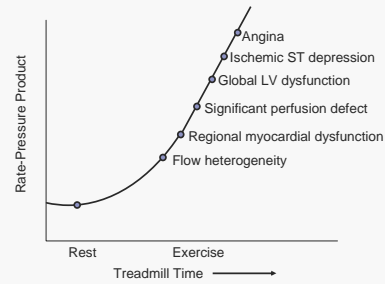


The 47th Scientific Annual Meeting of Kor Soc Circulation
SCMR symposium 2006, Oct. 13th, 2006

Radionuclide-based Insights into Perfusion and Viability : Beyond Diagnosis

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Ischemic Cascade



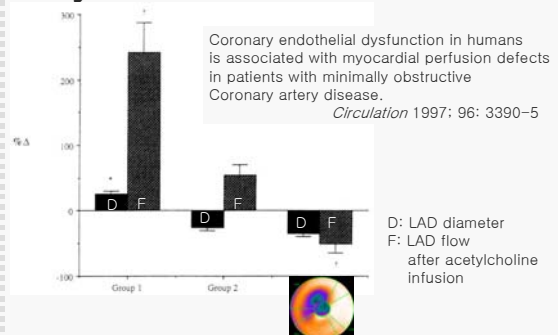
From Beller. Clinical nuclear cardiology, Philadelphia: Saunders, 1995:98.

Apparently Normal Coronary Artery

Only 6.8% of normal reference segments were actually normal; the rest had diffuse atherosclerosis, with a mean cross-sectional narrowing of 51% in normal segments.

Atherosclerosis in Angiographically "Normal" Coronary Artery
Reference Segments: IVUS Study with Clinical Correlations
JACC 1995; 25: 1479-85

Endothelial Dysfunction & Myocardial Perfusion Defects



Chest pain & Normal MPI

n=3,594 (summed data by 1991)
annual event rate=0.9%/yr

n=309 (Steinberg et al. *Am J Cardiol* 1993; 71:1270-3)
10-year-follow-up
0.1%/yr for cardiac death
0.6%/yr for nonfatal MI

n=292 (Chonnam Univ. Hosp. data)
mean follow-up 25 months
annual event rate=0.7%/yr

Strongly positive exercise ECG & Normal MPI

Fagan LF Jr, et al. *Am J Cardiol* 1992; 69:607-11
n=70, annual cardiac event = 0.7%/yr

Schalet BD, et al. *Am J Cardiol* 1993; 72:1201-3
n=154, no death or MI during 34±17 months

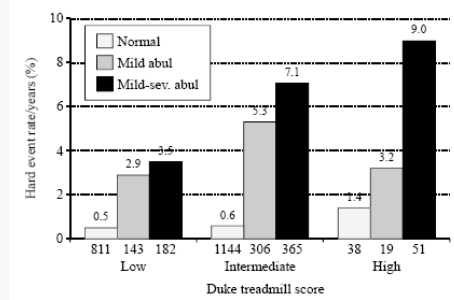
Krishnan R, et al. *Am Heart J* 1994; 127:804-16
n=32, no cardiac events during 38.3 (3-72) months

Chonnam Univ. Hosp. data
n=44, no cardiac events during 25 (7-58) months

Angiographic CAD & Normal MPI

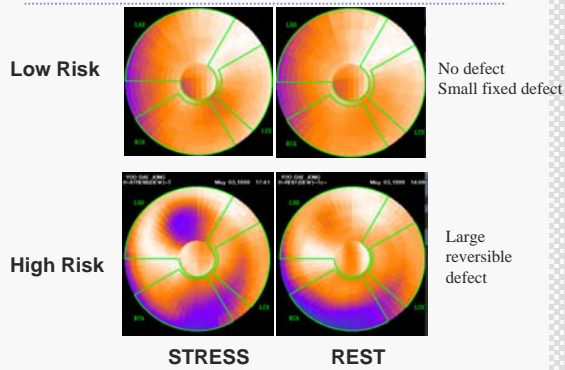
	no.	no. of events	annual cardiac event rate (%/yr)
Brown & Rowen, 1993	75	1	0.75
Abel-Fattah et al., 1994	97	3	1.1
Doat et al., 1994	52	2	0.7
Wahl et al., 1985	8	0	0
Pamelia et al., 1985	22	2	3.2
Younis et al., 1989	36	0	0
Sum	290	8	0.9

Treadmill vs MPI

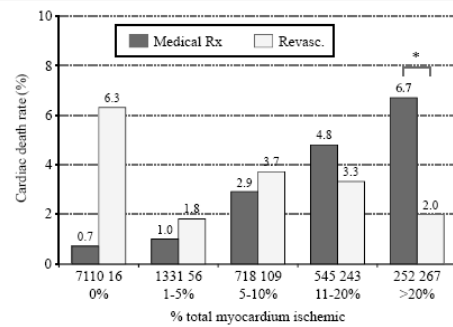


Circulation 2002;105:823-9

Perfusion & Risk Stratification

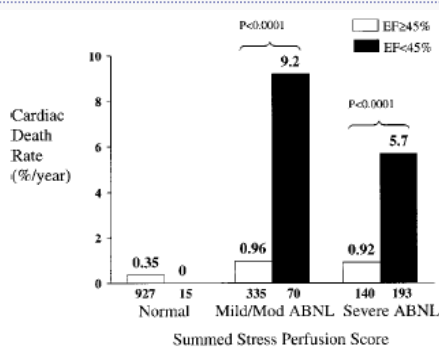


Perfusion & Risk Stratification



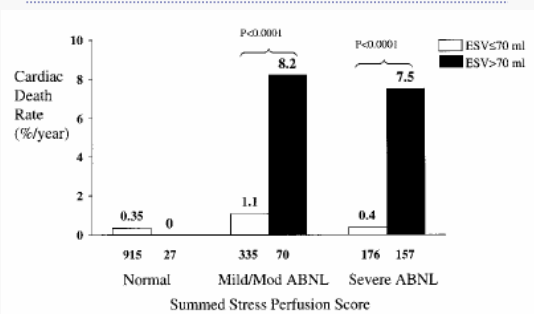
Circulation 2003;107:2900-7

Perfusion + Function



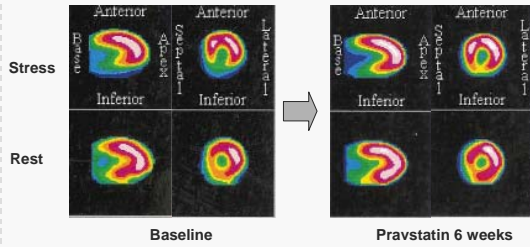
Circulation 1999;100:1035-42

Perfusion + Function



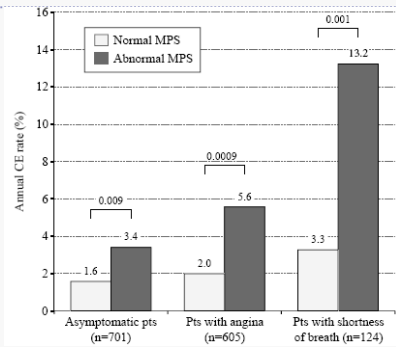
Circulation 1999;100:1035-42

Lipid Lowering & Perfusion



JACC 2003;42:600-10

Prognosis in Diabetic Pts



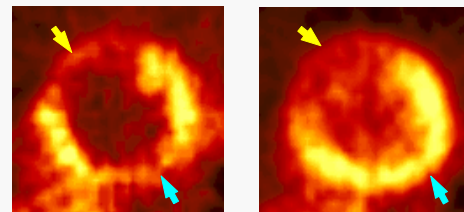
Eur Heart J 2004;25:543-50

Screening CAD in Diabetics

Diabetics, especially women, have a much higher cardiac event rate than nondiabetics and have a high incidence of asymptomatic ischemia.

There is growing support for screening for asymptomatic ischemia with myocardial SPECT in diabetics.

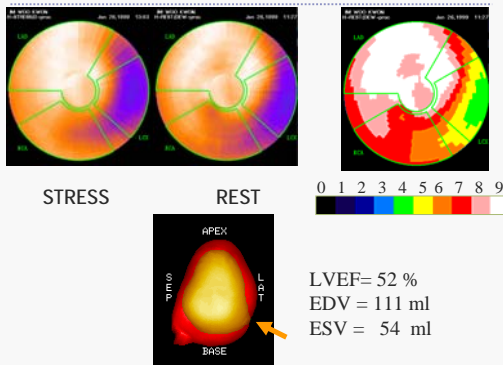
Myocardial Viability



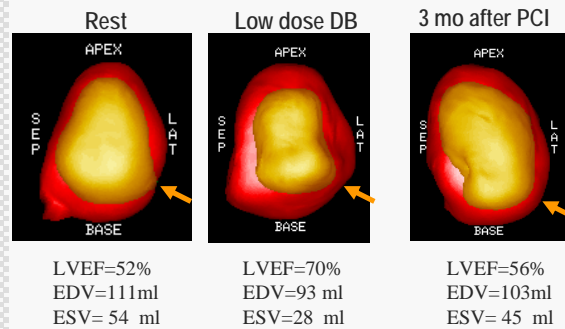
$^{13}\text{NH}_3$ - PET

^{18}FDG - PET

Case: Hibernating Myocardium



Case: Hibernating Myocardium

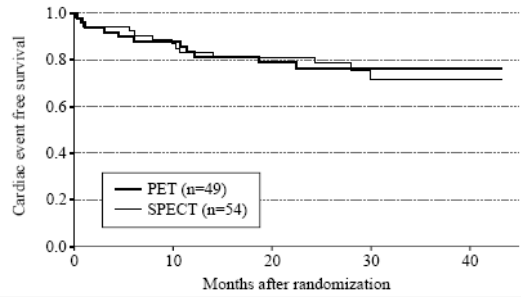


Characteristics of dysfunctional but viable myocardium

Characteristic	Technique	Signs of viability
Contractile reserve	Dobutamine echocardiography dobutamine MRI	Improved contraction during infusion of low dose, dobutamine
Intact cell membrane	Thallium-201 SPECT	Tracer activity >50% Redistribution >10%
Intact mitochondria	Technetium-99m SPECT	Tracer activity >50% Improved tracer uptake after nitrates
Glucose metabolism	FDG imaging	Tracer activity >50% Perfusion-metabolism mismatch

Heart 2005;91:111-7

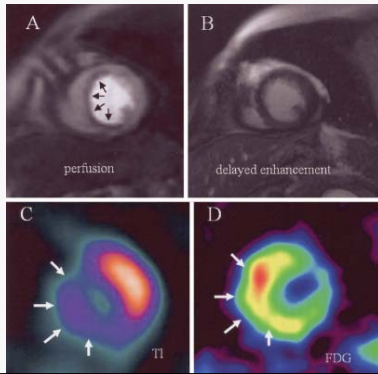
PET vs. SPECT



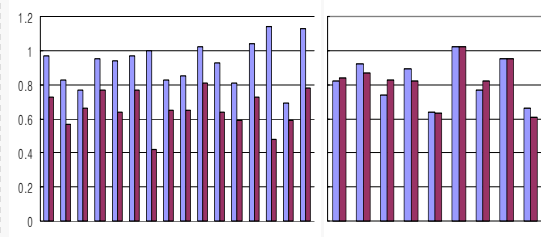
JACC 2001;37:81-8

Hibernating Myocardium

Circulation 2006;113:e158-e159

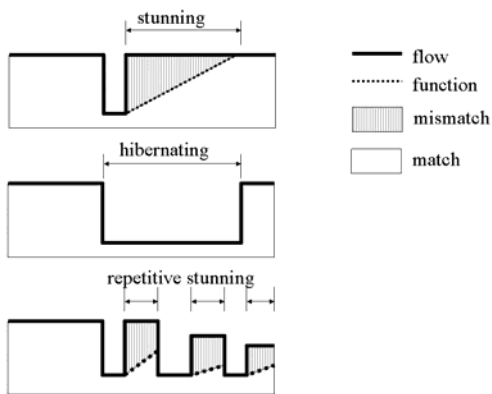


Resting MBF in Hibernating Myocardium



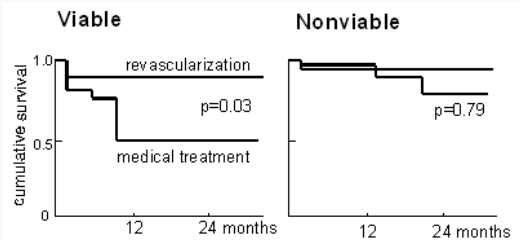
Legend:
■ MBF in Region with Normal Function, ml/min/g
■ MBF in Region with Hibernating Myocardium, ml/min/g

Am J Physiol Heart Circ Physiol 2005; 288: H984-99



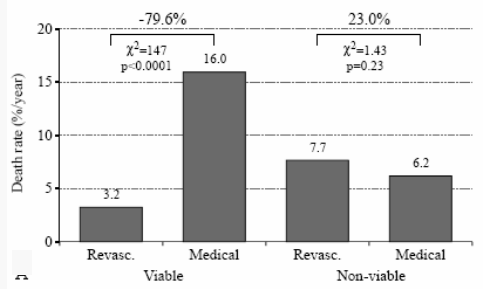
Flow-function relationship in variable viable myocardiums

Prognosis vs. Treatment



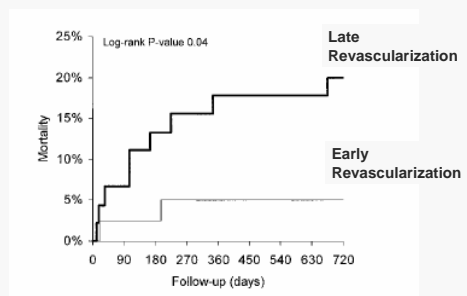
Am J Cardiol 1994; 73:527-33

Prognosis vs. Treatment



Meta-analysis. *JACC* 2002;39:1151-8

Timing of Revascularization



Circulation 2003;108[suppl II]:II-39-II-42