72 year old man
DM for 20 yrs

Visited ER via private clinic for resting chest tightness & exertional dyspnea for 3 days

ECG: suspicious Q in V3-6
Consulted for MPS by EM Dr
Tc-99m Tetrofosmin

1. SAME DAY “PROTOCOL: REST-STRESS”

- REST 10mCi
  - 0 min
  - 60 min

- STRESS 25~30mCi
  - 100 min
  - 130 min

2. SAME DAY “PROTOCOL: STRESS-REST”

- STRESS 25~30mCi
  - 0 min
  - 15 min

- REST 25~30mCi
  - 265 min
  - 295 min

Satran A Nuclear Cardiology: Practical Applications. NY 2004
LVEF = 52%
EDV = 111 ml
ESV = 54 ml
Q. Fixed defect (50% uptake) & akinesia
What do you do next?
Transmurality vs. Functional Recovery

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**REST AND LOW DOSE DOBUTAMINE PROTOCOL**

- **99mTc MIBI REST**
  - 0.4 mCi/kg
- **“Rest” Imaging**
- **8 ECG-gating**
- **Dobutamine 7.5 µg/kg/min**


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**REST REDISTRIBUTION AND LOW DOSE DOBUTAMINE**

- **201Tl REST**
  - 4 mCi
- **“Rest” Imaging**
- **Increasing of dobutamine dose**
- **Redistribution**

**Dobutamine protocol**
- (0-3 min) : 5 µg/kg/min
- (3 min to acquisition end) : 10 µg/kg/min

STRESS 25~30mCi
0 15 min

LDD Imaging
Dobutamine 5 μg/kg/min
0 5 min

REST 25~30mCi
265 min 295 min
Wall Motion during LDDB Infusion

Rest

LVEF = 52 %
EDV = 111 ml
ESV = 54 ml

5 ug/kg/min

LVEF = 70 %
EDV = 93 ml
ESV = 28 ml
Pre-PCI

Rest

Low dose DB

Post-PCI

3 mo later

LVEF=52%
EDV=111ml
ESV=54ml

LVEF=70%
EDV=93ml
ESV=28ml

LVEF=56%
EDV=103ml
ESV=45ml
1980.3. Ninoy had heart attack in jail
1980.5. Ninoy sent to Dallas for CABG

Students protested against military regime in Korea
Soldiers killed people in Gwangju
Gwangju citizens did armed protest to soldiers
and defeated army for a week
No crime at all during the free days in Gwangju

1983.8.21. Ninoy assassinated
1986. 2. Cory became the 11th president of Philippines

Democratic Party of Korea campained with yellow flags

1998 Daejung Kim became president of Republic of Korea
TRIBUTE TO NINOY
65/M

**CC:** for evaluation of myocardial viability

**PH:** DM on medication for 20 yrs

**SH:** alcohol – quit 20 yrs ago (social)
smoking – quit 20 yrs ago (20 PYS)

**FH:** nonspecific

**PI:** exertional dyspnea for years
diffuse narrowing of LAD on CAG
Nitrate Tc-99m tetrofosmin myocardial perfusion SPECT

TID Ratio 1.03
Stress Tc: 11/16/2006

EF = 51% (R0)
EDV = 201 ml
ESV = 99 ml
SV = 102 ml
Mass = 194 gm

Estimated % Thickening

Rest Tc: 11/16/2006

EF = 41% (R0)
EDV = 207 ml
ESV = 122 ml
SV = 85 ml
Mass = 197 gm

Estimated % Thickening
S, R: perfusion on stress & rest, Tc-99m tetrofosmin SPECT
M: glucose metabolism, F-18 FDG PET
S, R: perfusion on stress & rest, Tc-99m tetrofosmin SPECT
M: glucose metabolism, F-18 FDG PET
Nonviable myocardium

Nontransmural infarction ~ 50%

Inducible ischemia (viable myocardium)
Inducible Ischemia

= most specific finding for functional recovery

Circulation 1998; 98:501–8
Functional Recovery after Revascularization

S

R 30%

M 96%

0%
Nitrates

1. Increase myocardial blood flow to hypoperfused myocardial segments by dilating the stenotic lumen
2. Selectively relax the epicardial (conductance) vessels, thereby facilitating flow through collateral channels to zones of myocardial ischemia
3. Decrease LV preload and afterload, thereby decrease the subendocardial compression forces and improving subendocardial perfusion
N-13 ammonia PET study:
Effect of transdermal nitroglycerin on global and regional myocardial perfusion in patients with angiographically proven CAD


• Subjects: 20 pts (age 30-79 yrs) with chronic stable angina responsive to sublingual nitroglycerin

• Double-blind randomized placebo control study:
  20 patients were randomly allocated to receive a precordial skin patch containing either nitroglycerin (Nitro-Dur 0.4 mg/h; n=10) or placebo (n=10)
Percent change in regional myocardial perfusion from baseline to 3 hours postpatch for both "nonischemic" and "ischemic" zones: Preferential enhancement of flow to the ischemic zones with nitroglycerin.
NTG increased myocardial blood flow in viable myocardium, whereas blood flow remained unchanged in nonviable myocardium.
According to ROC curve analysis, a ratio of 1.1 for N-13 ammonia-NTG to N-13 ammonia baseline was the optimal cutoff value for detection of segmental viability, with an AUC of 0.92±0.030.
viability
a shift toward normal of at least two grades or complete normalization of a resting image compared with the initial exercise image
BASELINE/NITRATE $^{99\text{m}}$Tc IMAGING

For nitrate imaging, criteria of $^{99\text{m}}$Tc sestamibi injection
1. Systolic BP dropping $>$20 mmHg
2. Systolic BP $<$ 90 mmHg
3. None of 1 or 2, 15 min after the start of infusion, and the infusion was maintained for a further 2 min

Sciagra et al.
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Stress MPS

Rest MPS

Nitrate-augmented rest MPS

Courtesy Dr. Hendra Budiawan
Nitrate and Viability

Tc-99m-sestamibi SPECT for myocardial viability: Pooled data

Without Nitrate (n=308 from 13 studies)
sensitivity 79%, specificity 58%

With Nitrate (n=180 from 7 studies)
sensitivity 86%, specificity 83%

*J Nucl Med* 2006; 47:1307–11
AYOS?
SALAMAT!