Riduzione della dose nella SPECT cardiaca: apparecchiature e software

Optimization of procedures in Nuclear Cardiology

Nuclear Medicine Department
AO Papa Giovanni XXIII
Bergamo
Italy
Disclosure Slide

Il sottoscritto Adriana Ghilardi

DICHIARA

□ che, nell’esercizio delle funzioni di Relatore, NON E’ in alcun modo portatore di interessi commerciali propri o di terzi; dichiara altresì che gli eventuali rapporti avuti negli ultimi due anni con soggetti portatori di interessi commerciali non sono tali da permettere a tali soggetti di influenzare le proprie funzioni al fine di trarne vantaggio;
"WILL SOMEONE TELL JOHNSON, THE MEETING'S NOT OVER!!!"
Dose Reduction

Software Advances

Hardware Advances

Iterative Filtering
Iterative RR Filtering

New Collimators
New Detectors

Attenuation / Scatter Correction
New Tracers

Stress-Only Imaging
Advantages and disadvantages of PET and SPECT in a busy clinical practice.

Bateman TM.
Cardiovascular Radiologic Imaging, Mid-America Heart and Vascular Institute, Kansas City, MO 64111, USA. tbateman@saint-lukes.org

The continued high utilization of rest-stress single-photon emission computed tomographic (SPECT) myocardial perfusion imaging (MPI) is supported by its known clinical benefits, established reimbursement, and wide availability of cameras and radiopharmaceuticals. However, traditional rest-stress SPECT protocols tend to be lengthy and inefficient, and the prevalence of equivocal studies continues to be a problem. The use of stress-only SPECT protocols in selected patients, and a new generation of ultrafast SPECT cameras have led to improved image quality, reduced dosimetry and shorter, more efficient MPI protocols. The utilization of positron emission tomographic (PET) MPI has been accelerated by the availability of radiopharmaceuticals that can be generated on-site, and by the availability of more PET cameras. Emerging evidence consistently demonstrates that PET provides improved image quality, greater interpretive certainty, higher diagnostic accuracy, lower patient dosimetry, and shorter imaging protocols as compared to SPECT. Importantly, PET imaging allows assessment of left ventricular function at peak-stress, and evaluation of microvascular function through the measurement of absolute myocardial blood flow at rest and at peak-stress. Wider utilization of PET MPI is hindered by a high cost of entry, high on-going costs, and an immature reimbursement structure.
Roles of imaging in CAD

- Diagnosis
- Coronary anatomy & function
- Myocardial anatomy & function
- Valve anatomy & function
- Objective assessment of symptoms
- Disease severity & burden
- Acute & chronic risk assessment
- Myocardial viability, stunning & hibernation
- Guiding revascularisation
- Monitoring therapy
Cardiac perfusion SPECT: quantitative analysis

Perfusion Quant. (QPS)
- 3-D sampling
- Normal limits
- Polar maps

Function Quant. (QGS)
- Surface detection
- Volume measurement
- Motion assessment

Analysis
- L/H ratios
- % hypoperfusion
- % reversibility
- Ungated volumes
  - TID
  - LV mass
  - LVEF
  - ED volumes
  - ES volumes
  - Wall motion
  - Wall thickening
  - Peak filling rate
From Thallium201 to Tc99m-Sestamibi / Tetrofosmin

Planar

myocardial perfusion

SPECT

myocardial perfusion + LV function

Gated-SPECT
Natural history of “new ideas”

Innovation

Umbridled enthusiasm

Harsh reality

Ultimate applicability

Thoughtful adaptation

TIME

Table 1. Quantitative nuclear cardiology

Operator independent, quantitative assessment of myocardial perfusion or function is a principal competitive advantage of nuclear cardiology over other modalities
- Decreased reliance on expertise of interpreter
- Improved reproducibility
- Facilitates serial assessments
- Standardization of results from center to center

Nuclear cardiology = standardization = optimization
Nuclear cardiology = standardization = optimization

Radiopharmacy → Uniformity → Quality Control → Acquisition → Processing

Report
optimization of procedures

- Imaging quality
- Less dosimetry
- Reduced acquisition time
optimization of procedures

- radiopharmaceuticals
  - Tetrofosmin
  - Sestamibi
  - MIBG
  - Tc99m
  - I123
  - F18DG
  - NH13
  - F18lupiridaz
  - Rb82
  - PET

- instrumentation
  - GSPEDT
  - DSEPDC
  - G-PET_CT
  - CZT

- software - processing
  - Image processing

Tc99mSestamibi \ Tetrofosmin

Tracers

- availability
- dosimetry
- imaging quality

no side effects
Acquisition Protocols

(Two separate days or 1 day)

Tc99m-Sestamibi / Tetrofosmin

5 - 10 - 30 min

no defects

STOP

45 - 60 min

G-Spect
 stress

G-Spect
 rest

- double head
- geometry 90°
- body contour
- high resolution collimator

- MTX 64 x 64 → 128 X 128
- 32 + 32 frames / detector
- Zoom 1.45 [ resolution pxl 3.3 mm ]
- frame/time 20 - 30 - 40 sec
- ECG trigger 12 frames / cycle
From Gated-SPECT to SPECT evolution

Gated-SPECT

myocardial perfusion + LV function

Attenuation correction
Scatter correction
Cardio Focusing Collimator
SPECT / CT

- Activity administered
- Dosimetry
- Full Time Acquisition
- Processing
Pazienti con probabilità di evento grave: > 4% a 20 mesi
Dose per esame: 9 – 15 mSv
Indice di rischio: induzione di tumore 0.02% – 0.05% a 10 - 15 anni dall’esposizione

Sul 50% circa dei pazienti cui si è evitata la coronarografia si è evitato:
• Rischio equivalente da irradiazione
• Rischio aggiuntivo di complicazioni gravi dell’ordine dello 0.1% 0.2%
MAJOR ACHIEVEMENTS IN NUCLEAR CARDIOLOGY

Advances in technical aspects of myocardial perfusion SPECT imaging

Piotr J. Slomka, PhD,a James A. Patton, PhD,b Daniel S. Berman, MD,a and Guido Germano, PhDa

Although myocardial perfusion SPECT (MPS) imaging is widely used in current clinical practice, it suffers from some fundamental limitations including long image acquisition, low image resolution, and patient radiation dose.

SIEMENS IQ•SPECT

Siemens introduced recently (SNM 2008) IQ•SPECT, which consists of three components: an astigmatic collimator, an optimized organ-of-interest centered acquisition, and iterative reconstruction. The collimator is based on a previously developed astigmatic (cardiofocal) collimator concept.28 The collimator is designed so that the center of the field-of-view magnifies the heart both in axial as well as in trans-axial direction.

In IQ•SPECT this organ centric orbit acquisition technique is combined with a new proprietary iterative reconstruction algorithm based on Flash3D29,30 (see also the section on image reconstruction) which models the astigmatic geometry of these collimators. IQ•SPECT reconstruction also includes state-of-the-art distance-dependent isotropic (3D) resolution recovery, CT-based attenuation correction, and energy window-based scatter correction. The reported image acquisition time of this system can be as short as 4 minutes. These collimators are offered as an upgrade to the existing Symbia line of cameras.31 The Symbia T series systems also allow for obtaining of CT calcium scan in as little as 30 seconds during the same imaging session, where the CT data could be also used for attenuation correction. Figure 16 shows an example of a clinical 4-minute stress and 4-minute rest MPS scan with CT attenuation correction obtained with Symbia T camera equipped with IQ•SPECT technology.
IQ•SPECT Technologies

IQ•SPECT

Collimation

IQ•SPECT

Acquisition

IQ•SPECT

Reconstruction

- SMARTZOOM Collimator
- 4 x more counts from the heart
- No truncation
- All holes are perpendicular to the detector
- 1:1 representation of the heart
- Avoids truncation of the torso
- Standard sensitivity
- All 48,000 holes have unique position
- 2 times magnification of the heart in all directions
- Avoids truncation of the torso
- About 4 times sensitivity for the heart

48,000 hexagonal holes
1.9 mm hole diameter
40 mm length, same as ME
HRES-like resolution response

Cast Collimator

Precise Collimator Determination

Parallel Coll
Focusing Coll
Abstract EANM  Goteborg 2014
BS Poliambulanza

Operator defines heart center on the PPM. Orbit automatically defined so that the heart is centered in all views.
- Radial positions change dynamically to avoid collisions.
Cardiac Focusing Collimator [IQSPECT] in Myocardial imaging as a new diagnostic tool: eight months experience

A. Ghilardi, G. Medolago, L. Pozzi, MT Caloiero, C. Bianchi, A. Bruno

AO Papa Giovanni XXIII
Bergamo, Italy
www.hpg23.it
<table>
<thead>
<tr>
<th></th>
<th>LEHR</th>
<th>Smartzoom [IQSPECT]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTX</td>
<td>128x128</td>
<td>128x128</td>
</tr>
<tr>
<td>Zoom</td>
<td>1.45</td>
<td>1</td>
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<tr>
<td>Starting angle</td>
<td>-45°</td>
<td>-59°</td>
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<tr>
<td>Global rotation</td>
<td>90°</td>
<td>+104°</td>
</tr>
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<td>Views /detector #</td>
<td>32+32</td>
<td>32-32</td>
</tr>
<tr>
<td>Time/view</td>
<td>30sec</td>
<td>20-30 sec</td>
</tr>
<tr>
<td>Distance</td>
<td>Body-countour</td>
<td>28cm</td>
</tr>
<tr>
<td></td>
<td>SIEMENS</td>
<td>Bergamo</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td><strong>MTX</strong></td>
<td>128x128</td>
<td>128x128</td>
</tr>
<tr>
<td><strong>Zoom</strong></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Starting angle</strong></td>
<td>-59°</td>
<td>-59°</td>
</tr>
<tr>
<td><strong>Global rotation</strong></td>
<td>+104°</td>
<td>+104°</td>
</tr>
<tr>
<td><strong>Views /detector #</strong></td>
<td>17+17</td>
<td>32-32</td>
</tr>
<tr>
<td><strong>Time/view</strong></td>
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<td>20-30 sec</td>
</tr>
<tr>
<td><strong>Distance</strong></td>
<td>28 cm</td>
<td>28 cm</td>
</tr>
</tbody>
</table>

**Imaging quality**

**Smartzoom [IQSPECT]**
**Sensitivity**

**Acquisition Time:**

5 min

**PSF**

<table>
<thead>
<tr>
<th></th>
<th>LEHR</th>
<th>Smartzoom [IQSPECT]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean counts</td>
<td>Totall counts</td>
<td>Mean counts</td>
</tr>
<tr>
<td>Detector 1</td>
<td>7,19</td>
<td>1983,316</td>
</tr>
<tr>
<td>Detector 2</td>
<td>6,85</td>
<td>1891,133</td>
</tr>
</tbody>
</table>

**Efficiency Ratio [smartzoom/LEHR]**

Detector 1: 1.90  
Detector 2: 2.07
Attenuation correction

**DIAGNOSIS**

The attenuation-corrected IQ•SPECT stress images show severe ischemia in the anterior wall, septum and apex with evidence of partial reversibility in the resting images. The attenuation-corrected LEHR acquisitions show similar extent of ischemia. The LV cavity appears mildly dilated and appears similar in both studies. The calcium score study shows a total calcium score of 1554 with extensive calcification in all three vessels, with maximum involvement of LAD. The extent and severity of anteroseptal ischemia is suggestive of a high grade proximal LAD stenosis. The

**COMMENTS**

This study, although it reflects a relatively straightforward example of reversible LAD territory ischemia demonstrated the diagnostic equivalence of a fast four minute IQ•SPECT study with CT attenuation correction to that of a four times longer standard LEHR SPECT, also with CT attenuation correction.
Normal patient
LEHR

Smartzoom [IQSPECT]

normal

ischemia
<table>
<thead>
<tr>
<th></th>
<th>LEHR</th>
<th></th>
<th>Smartzoom IQSPECT</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Rest</td>
<td>Stress</td>
<td>Rest</td>
</tr>
<tr>
<td><strong>EDV</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>124</td>
<td>113</td>
<td>130</td>
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<tr>
<td><strong>LVEF</strong></td>
<td>44</td>
<td>46</td>
<td>43</td>
</tr>
<tr>
<td><strong>WMS</strong></td>
<td>10</td>
<td>21</td>
<td>9</td>
</tr>
</tbody>
</table>
MIBG SPECT vs MPI Tetrofosmin
SLICES

Smartzoom [IQSPECT]

4hrs MIBG

4hrs MPI

4hrs MIBG

4hrs MPI
MIBG SPECT [ IQ collimator ]
quantification

MIBG  28  MPI  26  SD  2  precoci
MIBG%  41  MPI%  30  SD  3  tardive
Scintigraphic Patterns: Perfusion Defect
CONCLUSION

• **18F-FDG** has been shown to be a sensitive noninvasive marker of *myocardial ischemia*.
• The finding of a *persistent metabolic switch* from fatty acid to glucose, 24 h after the resolution of transient myocardial ischemia on a treadmill, provides the potential for diagnosing myocardial ischemia in the acute-care setting.

• thus, metabolism plays a critical role in sustaining myocellular viability by adapting quickly to the ischemic injury response,
Multimaging evaluation of stress-induced myocardial ischemia with stress PET/CT [F\textsubscript{18-DG}] and stress/rest gated SPECT [Tc\textsubscript{99m-Tetrofosmin}]: Preliminary data

Nuclear Medicine Department
AO Papa Giovanni XXIII
Bergamo
Italy
Tc99m-Tetrofosmin 7.5 MBq/Kg

F18-DG 230 MBq

Tc99m-Tetrofosmin 9 MBq/Kg

Imaging Protocol

STRESS G_SPECT

PET

REST G_SPECT

5 min

glycaemia

45 min

60 min

1st day

2nd day
**ACQUISITION PARAMETERS**

- **Collimator**: Smart Zoom [IQ SPECT]
- **Matrix**: 128 x 128 pixels
- **Zoom**: 1.00
- **Views**: 30 + 30 views [20-30 sec view]
- **Mode**: Step & shoot
- **Orbit**: Circular cardiac focusing [28cm]
- **Total Arc**: 105° [from RAO 59° to LLO 163°]
- **ECG Trigger**: Frame mode
- **Frames / Cycle**: 12

**Reconstruction PARAMETERS**

<table>
<thead>
<tr>
<th></th>
<th>SPECT</th>
<th>Gated SPECT</th>
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</thead>
<tbody>
<tr>
<td><strong>FLASH 3D filtering</strong></td>
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</tr>
<tr>
<td><strong>Iterations</strong></td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td><strong>Subsets</strong></td>
<td>3</td>
<td>2</td>
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<tr>
<td><strong>Gauss</strong></td>
<td>6</td>
<td>6</td>
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### CT Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>mAs</td>
<td>82</td>
</tr>
<tr>
<td>Kv</td>
<td>130</td>
</tr>
<tr>
<td>Slice Thickness</td>
<td>5 mm</td>
</tr>
<tr>
<td>Pitch</td>
<td>0.4</td>
</tr>
<tr>
<td>FOV</td>
<td>700 mm</td>
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</table>

### PET Acquisition Parameters

<table>
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<tbody>
<tr>
<td># Beds</td>
<td>1</td>
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<tr>
<td>Scan time</td>
<td>15 min</td>
</tr>
<tr>
<td>Patient position</td>
<td>supine</td>
</tr>
<tr>
<td>Position</td>
<td>Cranio_caudal</td>
</tr>
<tr>
<td>Scan Modality</td>
<td>List Mode [32 bit]</td>
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</table>

### PET Reconstruction Parameters

<table>
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<td>Sampling List Mode</td>
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<tr>
<td>Zoom</td>
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<td>Static Imaging</td>
<td>Iterative OSEM filtering</td>
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<tr>
<td>Position</td>
<td>Cranio_caudal</td>
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<tr>
<td>Scan Modality</td>
<td>List Mode [32 bit]</td>
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</table>

### Reconstruction Parameters

<table>
<thead>
<tr>
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<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Iterations</td>
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<tr>
<td>Subsets</td>
<td>4</td>
</tr>
<tr>
<td>Gaussian</td>
<td>5</td>
</tr>
<tr>
<td>Matrix</td>
<td>128x128 pixels</td>
</tr>
</tbody>
</table>
Case Report

PET

No-Gated ED

gated SPECT ED-stress

SPECT Stress

ED-gated SPECT

ED-PET

Fusione PET-SPECT stress
Exercise 18FDG imaging seems to be well suited for direct imaging of exercise-induced myocardial ischemia.

Exercise-induced myocardial ischemia can be imaged directly with 18FDG. Combined exercise 18FDG-99mTc-sestamibi imaging provides a better assessment of exercise-induced myocardial ischemia compared with exercise-rest perfusion imaging. Direct ischemia imaging eliminates some of the limitations of presently used myocardial perfusion imaging.
**How to Interpret an Attenuation-Corrected Myocardial Perfusion Study**

*Normal* attenuation-correction images differ from uncorrected images as follows:

1. Myocardial counts are near uniform
2. Male and female myocardial count distributions are the same
3. The right ventricle is more clearly seen
4. The apex may appear slightly thinned
5. Septal and lateral walls appear longer in long-axis views
6. Effect on gated images

---

**Comparison of Segmental Counts in Normal Obese Females and Males**

<table>
<thead>
<tr>
<th></th>
<th>Stress Uncorrected</th>
<th>Stress Corrected</th>
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</thead>
<tbody>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>70.2</td>
<td>70.1</td>
</tr>
<tr>
<td></td>
<td>88.9</td>
<td>88.9</td>
</tr>
<tr>
<td></td>
<td>62.7</td>
<td>61.2</td>
</tr>
<tr>
<td></td>
<td>69.5</td>
<td>69.5</td>
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<tr>
<td></td>
<td>66.4</td>
<td>66.4</td>
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<tr>
<td></td>
<td>59.3</td>
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<td></td>
<td>70.8</td>
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<td></td>
<td>79.2</td>
<td>79.2</td>
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<tr>
<td></td>
<td>79.4</td>
<td>79.4</td>
</tr>
<tr>
<td></td>
<td>73.8</td>
<td>73.8</td>
</tr>
<tr>
<td><em>P</em> &lt; 0.001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Male**       |                   |                  |
| Mean           | 69.5              | 69.5             |
|               | 67.7              | 67.7             |
|               | 65.0              | 65.0             |
|               | 63.0              | 63.0             |
|               | 61.2              | 61.2             |
|               | 63.8              | 63.8             |
|               | 68.7              | 68.7             |
|               | 68.4              | 68.4             |
|               | 70.0              | 70.0             |
| *P* < 0.001   |                   |                  |

---

**The Problem of Nonuniform Soft Tissue Attenuation**

- Breasts
- Subdiaphragmatic structures
- Arms
- Under-arm fat pads
- Liver

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Evolving Approaches to Risk Stratification, Cardiac CT, and Attenuation Correction: How Do They Impact Nuclear Cardiology?

Gary V. Heller, MD, PhD
Associate Director, Cardiology
Director, Nuclear Cardiology
Professor of Medicine and Nuclear Medicine
University of Connecticut School of Medicine
Hartford Hospital
Hartford, Connecticut

PET/CT and SPECT/CT

- Advantages
  - Improved resolution
  - Accurate attenuation correction by transmission or CT
  - Measure absolute blood flow and coronary flow reserve using N-13 ammonia or O-15 water; Rb-82

Attenuation Map - Anthropomorphic Phantom

Scanning Line Source
CT Scan

Short Axis slices - normal myocardium

Att. Corrected Scanning line source
Uncorrected
Att. Corrected CT Scan
Filtering

BPF

Limiti

- Aumento del rumore
- Apparente *ispessimento* della parete miocardica
- Body-contour *non* sempre compensa gli algoritmi di ricostruzione
Vantaggi

- Compensazione per non stazionarietà della risposta del collimatore
- Modellizzazione dell’emissione e del rumore
- Corregge per la variazione della distanza paziente detector modellando sia orbite fisse che variabili
- Indipendente dall’operatore
- Incorpora le mappe di attenuazione (in progress)
Configurazione 9 rivelatori indipendenti in modo da aumentare la sensibilità fino a 10 volte.
POSIZIONAMENTO PAZIENTE

- Posizionamento del paziente sia seduto che supino
  - Maggiore comfort per il paziente

- Nessun movimento percepibile
  - Non c'è bisogno di ruotare la camera attorno al paziente
  - Non c'è bisogno di ruotare il paziente di fronte alla camera
Nuove Applicazioni

- Protocolli a basso dosaggio - permette la riduzione di oltre l’80 % della dose di radiazioni

- Protocollo dinamico – quantificazione della riserva di flusso coronarico

- Acquisizione Simultanea del Doppio isotopo 99mTc/123I MIBG o 99mTc/Tl o Tl/123I MIBG
Quantification Blood flow and Coronary Reserve

D-SPECT

SPECT

LAD #6: 75% occlusion – FFR=0.86

Time activity curves

CdZnTe [detector]
Dynamic Imaging (D-SPECT)

Patient 1 – 17 Segments results:

Index of Absolute Perfusion

17 segments CFR

Average vessels CFR

Vessels CFR

Relative Perfusion

STR

RST

Reproduced without permission of author
Improvement in **PET myocardial** perfusion image quality and quantification with flurpiridaz F 18

Daniel S. Berman, MD, Guido Germano, PhD, and Piotr J. Slomka, PhD  J Nucl Cardiol 2012

resolution recovery in the reconstruction technique and correction for Respiratory and cardiac motion.
Why Nuclear Cardiology?

- accuracy of diagnosis

- FN, FP

prognostic evaluation

- monitoring therapy efficacy

- unnecessary invasive procedure
Hybrid PET/CT Imaging
SPECT + MSCT

no calcium in the coronary arteries
highly calcified left main coronary artery

volume rendered CT
anterior view

ct vessel view

pet-ct fusion
ant.

latent
inf.

lad
lca
rca

integrated 64-slice CTA and SPECT
stress
(lad: TPD = 12%)

rest

head

CMR shows subendocardial anterior wall and apical enhancement.

Reduced metabolic uptake at these sites on FDG PET.
The decision whether cardiac imaging is reasonable or not should be based on how the information gained will influence subsequent patient care and patient outcomes including health status and survival.

Table 1. Examples of Appropriate and Inappropriate Use of MPI According to the AUC⁶

<table>
<thead>
<tr>
<th>APPROPRIATE INDICATIONS FOR MPI</th>
<th>INAPPROPRIATE INDICATIONS FOR MPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Intermediate or high-risk CAD patients</td>
<td>• Asymptomatic or low-risk patients</td>
</tr>
<tr>
<td>• Patients with a low likelihood of CAD who are unable to exercise or had an uninterpretable electrocardiogram</td>
<td>• Risk assessment of asymptomatic patients with a low to intermediate risk of coronary heart disease less than 2 years after stress testing</td>
</tr>
<tr>
<td>• Symptomatic patients following revascularization</td>
<td>• Routine testing less than 2 years after coronary revascularization in asymptomatic patients</td>
</tr>
<tr>
<td>• Patients with possible acute coronary syndrome</td>
<td>• Pre-operative testing of low-risk patients with good functional capacity before noncardiac surgery</td>
</tr>
<tr>
<td>• Asymptomatic patients with incomplete revascularization</td>
<td>• Detection of CAD in stable symptomatic patients who have a low pre-test probability of CAD, interpretable baseline electrocardiogram, and are able to exercise</td>
</tr>
<tr>
<td>• Evaluation of left ventricular function</td>
<td>• General screening prior to discharge from the hospital or prior to initiation of cardiac rehabilitation</td>
</tr>
<tr>
<td>• Evaluation of patients with unexplained troponin elevation</td>
<td></td>
</tr>
<tr>
<td>• Evaluation 3 months after acute coronary syndrome if there was no prior coronary angiogram</td>
<td></td>
</tr>
</tbody>
</table>

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*Provided as an educational service by* Astellas Pharma US, Inc.

*COMMITTED TO CARDIOLOGY*
Applicability of the appropriate use criteria for SPECT myocardial perfusion imaging in Italy: preliminary results

G. Medolago · C. Marcassa · A. Alkraisheh · R. Campini · A. Ghilardi · R. Giubbini · On behalf of The Italian Working Group of Nuclear Cardiology


Multi-center Assessment of the Utilization of SPECT Myocardial Perfusion Imaging Using the ACCF Appropriateness Criteria: The ACCF and United Healthcare SPECT Pilot Study


Impact of Education (n=862)

Appropriata 84%

Dubbio 9%

Non Appropriate 7%

2006 2007

2006

16,0%

12,0%

78,0%

2007

10,0%

5,0%

85,0%
Do exist any priorities for technologists?

- excellent diagnostic patient care
- development of the department and hospital as a whole
- teaching and developing others in the field

Technologists as students

ALL techs experience ongoing learning and receive education from:

- physicians,
- techs,
- program directors,
- PhDs,
- secretaries
- and patients

so we’re what we’ve been taught

Technologists as teachers

MOST techs were not trained to teach.

- teaching is but one facet of their job function...
- SOME techs present scientific lectures

Technologists teaching patients

techs perform diagnostic procedures on patients

- must provide information about radiation, NM procedure at hand to gain informed consent

Some patients may want to be instructed beyond the boundaries of techs education or responsibility: scan results….
Everybody's talking about
Bagism, Shagism, Dragism, Madism, Ragism, Tagism,
that-ism, is-m, is-m, is-m.
We are saying is give peace a chance
We are saying is give peace a chance
We are saying is give peace a chance
We are saying is give peace a chance

Everybody's talking about Ministers,
Banisters and canisters
Bishops and Fishops and Rabbis and Pop eyes,
bye bye, bye byes.
We are saying is give peace a chance

Give Nuclear Cardiology....
more than a chance!
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