Pharmacologic Stress Testing Tool Box

Myocardial Perfusion Imaging (MPI)
The purpose of the *MPI Pharmacologic Stress Testing Tool Box* is to assist with distinguishing various patient profiles requiring pharmaceutical stress agents and to provide a resource for clinicians who are utilizing single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI or MPI). The Tool Box does not specifically endorse any of the recommendations.

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ASNC Guidelines and Standards

The American Society of Nuclear Cardiology (ASNC) served as the author or co-author on each of the documents listed below. The date shown with each guideline or statement reflects the most recent date of approval or endorsement. For clinical documents related to nuclear cardiology training (such as COCATS), click here.

Clinical Documents are available in PDF format and require the free Adobe Acrobat Reader plug-in for your Web browser.

Imaging Guidelines for Nuclear Cardiology Procedures

- **Introduction** - 2009
- **First-Pass Radionuclide Angiography (FPRNA)** - 2009
- **Equilibrium Radionuclide Angiocardiography (ERNA)** - 2009
- **Stress Protocols and Tracers** - 2009
- **Myocardial Perfusion and Planar Imaging** - 2009
- **Updated! Single Photon Emission Computed Tomography** - 2010
- **PET Myocardial Perfusion and Glucose Metabolism Imaging** - 2009
- **Standardized Reporting of Radionuclide Myocardial Perfusion and Function** - 2009

Appropriate Use Criteria

- **Appropriate Use Criteria for Cardiac Radionuclide Imaging** - 2009
  Appendix: **Appropriate Use Criteria for Cardiac Radionuclide Imaging Data Supplement** - 2009
- **Appropriate Use Criteria for Coronary Revascularization** - 2009
- **Appropriate Use Criteria for Stress Echocardiography** - 2008
- **Appropriate Use Criteria for Transthoracic and Transesophageal Echocardiography** - 2007
- **Appropriate Use Criteria for Cardiac Computed Tomography and Cardiac Magnetic Resonance Imaging** - 2006
Clinical Updates

- **Stress-Only Myocardial Perfusion Imaging** - 2009
- **Combined Pharmacologic and Low-Level Exercise Stress Protocols for Radionuclide Myocardial Perfusion Imaging** - 2009
- **Adenosine Stress Protocols for Myocardial Perfusion Imaging** - 2007

Information Statements

- **New! Recommendations for Reducing Radiation Exposure in Myocardial Perfusion Imaging** - 2010
- **Variability in Radiation Dose Estimates from Nuclear and Computed Tomography Diagnostic Imaging** - 2009
- **DICOM and Interconnectivity Update** - 2009
- **Clinical Imaging for Prevention: Directed Strategies for Improved Detection of Presymptomatic Patients with Undetected Atherosclerosis** - 2008
- **ASNC Review of the ACCF/ASNC Appropriateness Criteria for SPECT MPI** - 2007
- **Computed Tomographic Imaging within Nuclear Cardiology** - 2005
- **Cost-Effectiveness of Myocardial Perfusion Imaging** - 2005

Other ASNC Documents

- **Conference Proceedings from the Ninth Nuclear Cardiology Invitational Conference** - 2008
- **Verification of Experience in Cardiovascular Computed Tomography** - 2007
- **A Report of the ASNC Task Force on Women and Heart Disease** - 2003
- **Suspected Acute Ischemic Syndromes in the Emergency Department or Chest Pain Center** - 2002

Other Clinical Guidelines

- **Outcomes Research in Cardiovascular Imaging: Report of a Workshop Sponsored by the National Heart, Lung and Blood Institute** - 2009
- **Introduction of New Technology for Clinical Use** - ASNC Imaging Guideline, 2009
  
  [Click here for the Executive Summary]
Joint Society Statements

- ACCF/AHA Focused Update on Perioperative Beta Blockade - 2009
- 2008 Key Data Elements and Definitions for Cardiac Imaging - 2008
- 2008 Health Policy Statement on Structured Reporting in Cardiovascular Imaging - 2008
- Clinical Competence Statement on Cardiac Imaging With Computed Tomography and Magnetic Resonance - 2005
  Click here for the correction posted online November 23, 2009

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ACCF/ASNC/ACR/AHA/ASE/SCCT/SCMR/SNM 2009 Appropriate Use Criteria for Cardiac Radionuclide Imaging

A Report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, the American Society of Nuclear Cardiology, the American College of Radiology, the American Heart Association, the American Society of Echocardiography, the Society of Cardiovascular Computed Tomography, the Society for Cardiovascular Magnetic Resonance, and the Society of Nuclear Medicine: Endorsed by the American College of Emergency Physicians can be accessed by clicking on the following link:

http://circ.ahajournals.org/cgi/content/full/119/22/e561
Current Pharmacologic Stress Agents

**Adenosine**
Click on the following link for the full prescribing information:
http://www.astellas.us/docs/adenoscan.pdf

**Dipyridamole**
Click on the following link for the full prescribing information:

**Regadenoson**
Click on the following link for the full prescribing information:
http://www.astellas.us/docs/lexiscan.pdf
Patient Profiles: Special Populations

Overview
Special Patient Populations and A2A Agonists for Pharmacologic Stress Testing:

<table>
<thead>
<tr>
<th>Patient Type or Issue</th>
<th>Special Consideration or Recommendation</th>
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<tbody>
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<td>COPD/Asthma</td>
<td>Contraindications to Pharmacologic Vasodilators</td>
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<td>Renal Insufficiency/ESRD on Dialysis</td>
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<td>Left Bundle Branch Block</td>
<td>Higher Heart Rate Response with A2A Agonists a Possible Concern</td>
</tr>
</tbody>
</table>

Patient with COPD/Asthma
- Dyspnea is the most common Regadenoson AE vs. placebo (61%)
- Regadenoson currently not contraindicated in such patients

Caffeine Consumption
- Regadenoson results consistent with Adenosine findings

Caffeine Content of Popular Coffee
- Starbucks Coffee
  - Short (8 oz.): 180mg; Decaf – 15mg
  - Tall (12 oz): 260mg; Decaf – 20mg
  - Grande (16 oz.): 330mg; Decaf – 25mg
  - Venti (20-24oz.): 415mg; Decaf – 30mg

- McDonald's Coffee
  - Small coffee (12 oz): 109mg
  - Large coffee (16 oz): 145mg

Patient with Obesity
- No difference in diagnostic accuracy or side-effect profile based on weight with Regadenoson

Left Bundle Branch Block
- LBBB induced septal defects are heart rate dependent
- Currently no data available but study underway using quantitative SPECT analysis
Bibliography

Below is a list of the references from the webcast curricula provided by Dr. Manuel Cerqueira and Dr. John Mahmalian:

**Webcast 1: The Rationale for Exercise or Pharmacologic Stress Testing**

Pharmacologic Stress Testing for SPECT Myocardial Perfusion Imaging: Preferred over Exercise Stress?  
John J. Mahmalian, MD


Pharmacologic Stress Agents: What is Available and How to Use Them
Manuel D. Cerqueira, MD

6. Provided by Dr. David K. Glover, PhD, University of Virginia.
Webcast 2: Advances in Pharmacologic Stress Agents

Selective A2A Ok for Pharmacologic Stress Testing: Mechanisms of Action and Administration
Manuel D. Cerqueira, MD


**Selective A2A Agonists: What Do Clinical Trials Tell Us?**
John J. Mahmarian, MD


Webcast 3: Managing Special Populations and Side Effects with Pharmacologic Stress Agents

A2A Agonists in Special Populations: COPD, Renal Failure, and Obesity
John J. Mahmarian, MD


A2A Agonists Side Effects and Management: Frequency, Treatment, and Use of Exercise
Manuel D. Cerqueira, MD


