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MEETING HIGHLIGHTS

Highlights of the 2005 Scientific Sessions of the American Society of Nuclear Cardiology

Seattle, Washington, September 29–October 2, 2005

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Leiden, the Netherlands; Providence, Rhode Island; Los Angeles, California; Atlanta, Georgia; St. Louis, Missouri; Fox River Grove, Illinois; Philadelphia, Pennsylvania; Manhasset, New York; New Haven, Connecticut; and Boston, Massachusetts

The American Society of Nuclear Cardiology (ASNC) now consists of more than 4,700 nuclear cardiology professionals. The 10th Annual Scientific Session (chaired by Dr. Diwakar Jain) was held from September 29 through October 2, 2005 in Seattle Washington, with more than 1,500 registrants in attendance. This four-day meeting was divided into five major tracks (plenary sessions, core curriculum, advanced track, investigative track, and technical track), as well as read-with-the-expert sessions and satellite symposia. In addition, original research was contributed in the form of abstract presentations, and included a competition for the Young Investigator Award.

PLENARY SESSIONS

Clinical debates: controversies in clinical cardiology and cardiac imaging. The first plenary session consisted of a series of debates, and the first considered the issue of screening all asymptomatic diabetic patients for coronary artery disease (CAD).

Dr. Frans J. Th. Wackers argued that screening was appropriate because of the well-documented excessive cardiovascular morbidity and mortality in patients with diabetes. However, because the overall prevalence of silent CAD is relatively low (22% in the Detection of Ischemia in Asymptomatic Diabetes [DIAD] study), it is important to identify "enriched subgroups" with a higher diagnostic yield. Coronary artery calcium (CAC) scoring with electron beam computed tomography may be an appropriate and simple first step, and only patients with substantial CAC would require stress radionuclide myocardial perfusion imaging (MPI). Dr. Raymond Gibbons argued that there is insufficient evidence that screening of asymptomatic diabetic patients alters outcome. Moreover, the cost in health care dollars to society would be staggering and prohibitive. He argued that primary prevention and treatment, and appropriate evidence-based testing would be more effective than routine screening.

In the second debate, Drs. Jack Ziffer and Marcelo DiCarli addressed the pros and cons of non-invasive computed tomography angiography (CTA). Dr. Ziffer believed that 64-slice computed tomography (CT) would ultimately replace stress MPI because of the detailed anatomic information that can be obtained. Computed tomography not only detects CAC, coronary anatomy, and luminal stenoses but also visualizes alterations of the coronary vessel wall, allowing plaque characterization. In addition, left ventricular (LV) function can readily be assessed by CT, making it a "one-stop stop." The high specificity of CTA will allow adequate exclusion of CAD with eventual replacement of invasive cardiac catheterization. Dr. DiCarli argued that CTA would not replace MPI because of inherent technical limitations. Computed tomography angiography still has limited spatial resolution for distal vessels; the overall sensitivity for the presence of proximal stenoses is 95%, but decreases to 82% when distal stenoses are included. Multislice CT is limited by the patient's radiation exposure, arrhythmias during acquisition, and nephrotoxicity of contrast. Also, coronary calcifications, frequently present in elderly and diabetic patients, negatively affect diagnostic accuracy. Most important, extensive literature has shown that not coronary anatomy (CTA) but the ischemic burden (MPI) determines prognosis: coronary anatomy versus coronary pathophysiology.

In the third debate, Drs. Timothy Bateman and Manuel Cerquiera debated whether positron emission tomography (PET) MPI would replace single-photon emission computed tomography (SPECT) MPI. Dr. Bateman argued that PET

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Abbreviations and Acronyms

ASNC = American Society of Nuclear Cardiology
CAC = coronary artery calcium
CAD = coronary artery disease
CT = computed tomography
CTA = computed tomography angiography
ECG = electrocardiogram
ICD = implantable cardioverter-defibrillator
LV = left ventricular
MIBG = ^{123}I-metaiodobenzylguanidine
MPI = myocardial perfusion imaging
MRI = magnetic resonance imaging
PET = positron emission tomography
SPECT = single-photon emission computed tomography

was simply better because of higher spatial resolution, higher contrast, higher count density, routine use of attenuation correction, and less scatter. Also, patient radiation dosimetry is considerably lower using short-lived positron emitters, and PET imaging is substantially faster than SPECT imaging. The diagnostic yield of PET imaging has been consistently better with PET than with SPECT (accuracy 87% vs. 71%). Dr. Cerquiera conceded that the quality of PET was superior to that of SPECT, but he did not expect SPECT to be replaced by PET for practical and economic reasons. Positron emission tomography imaging is difficult to perform in a regular clinical practice. The PET camera and cyclotron are expensive, costly to operate, require large spaces and specially trained personnel. Lastly, ^{82}Rubidium generators make it possible to perform PET MPI studies in facilities without a cyclotron but are still expensive.

The Mario Verani Memorial Lecture: Dr. Daniel Berman: cardiac imaging in CAD: changing roles and changing players. The highlight of the second plenary session was the Mario Verani Memorial Lecture by Dr. Daniel Berman. The Mario Verani lecture is presented each year at the ASNC annual meeting by a prominent nuclear cardiologist, in memory of Dr. Mario Verani (1943 to 2001), a pioneer in nuclear cardiology and founder and past president of the ASNC. Dr. Berman discussed the changes occurring in cardiology, changing concepts, changing clinical questions. With the aging population, increase of obesity, diabetes, and metabolic syndrome, the clinical picture of CAD has changed. In addition, marked changes have occurred in the ability to treat patients and reduce the risk. In the past, it was sufficient to identify the patient who needed revascularization; in the present era the challenge is to identify the asymptomatic patient who needs aggressive medical treatment. The armamentarium of cardiac imaging has expanded and changed. Non-invasive cardiac imaging of anatomy and function is central to the diagnosis and management of patients with known or suspected CAD. The new players in the diagnostic game are, in addition to conventional radionuclide MPI with electrocardiogram (ECG)-gated SPECT, CT techniques, sophisticated echocardiographic techniques, magnetic resonance imaging (MRI), and PET. Radionuclide imaging is increasingly combined with CT imaging. The wealth of information provided by hybrid imaging devices allows for the development of new diagnostic and management algorithms. Depending on the a priori risk of CAD, physicians have to decide if imaging is needed, and if so, which test.

Patients at low (<15% likelihood of CAD) risk are generally not tested. Patients with typical and limiting angina must be sent directly to cardiac catheterization. In the intermediate-risk populations (15% to 85% likelihood), screening for CAC by CT scanning appears appropriate and subsequent management can be guided by the degree of CAC detected. Patients with CAC and extensive (quantified) myocardial ischemia on MPI should be managed invasively. On the other hand, patients with CAC but minimal ischemia are candidates for aggressive medical therapy. Computed tomography angiography may be indicated in patients with CAC and moderate myocardial ischemia on MPI to ensure that no high-risk CAD is missed. It seems likely that combined (or sequential) diagnostic testing with CT and SPECT (or PET) in the near future will provide means to diagnose CAD tailored to the type of patients and symptoms.

CORE CURRICULUM: ADVANCES IN CLINICAL NUCLEAR CARDIOLOGY

New tracers in nuclear cardiology. Dr. James Udelson discussed the use of new tracers to assess cardiac sympathetic innervation and fatty acid metabolism. Cardiac sympathetic innervation can be evaluated using ^{123}I-metaiodobenzylguanidine (MIBG); tracer uptake in the heart is compared with activity in the mediastinum, yielding the heart-to-mediastinum ratio. A reduced heart-to-mediastinum ratio is a powerful predictor of poor outcome in patients with severe heart failure, even more predictive than LV ejection fraction, peak oxygen consumption, and pulmonary capillary wedge pressure.

More recent studies have compared perfusion with MIBG uptake in patients with previous infarction and demonstrated that the extent of denervated myocardium frequently exceeds the area of reduced perfusion. The clinical relevance of this observation relates to the fact that patients with this perfusion-MIBG mismatch could be at increased risk of ventricular arrhythmias, and it is hoped that MIBG imaging may help in the selection of patients who need an implantable cardioverter-defibrillator (ICD). Improved patient selection is needed, because the devices are costly and many patients are potential candidates for ICD therapy. According to the Multicenter Automatic Defibrillator Implantation Trial (MADIT)-II criteria, patients with previous infarction and depressed LV ejection fraction (≤30%) should receive an ICD, but only 35% of these patients received appropriate shocks over a three-year period.

Evaluation of free fatty acid metabolism can be performed with ^{123}I-betamethyl-p-iodophenyl-pentadecanoic acid. The main interest is identification of regions that