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Highlights of the 2006 Scientific Sessions of the American Society of Nuclear Cardiology

Montreal, Canada, September 7 to 10, 2006

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Leiden, the Netherlands; Providence, Rhode Island; Ottawa, Canada; Baltimore, Maryland; Los Angeles, California; Atlanta, Georgia; Chicago, Illinois; Philadelphia, Pennsylvania; New York, New York; and New Haven, Connecticut

The 11th Annual Scientific session of the American Society Nuclear Cardiology (ASNC, chaired by Dr. Daniel Berman) was held from September 7 through 10, 2006, in Montreal, Canada, with more than 1,100 registrants in attendance. This 4-day meeting was divided into 4 major tracks (plenary sessions, core curriculum, advanced track, and investigative 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 in the Young Investigator Award.

Plenary Sessions

The Mario Verani Memorial Lecture: evolving challenges and opportunities for nuclear cardiology (Dr. Ami Iskandrian) 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 ASNC. In the fifth Mario Verani Lecture, Dr. Iskandrian addressed new challenges and opportunities for nuclear cardiology. He noted that although American Heart Association/American College of Cardiology guidelines recognize many class 1 indications for radionuclide imaging, there is a paucity of evidence-based (Level 1) data. Prospective multicenter trials, such as the INSPIRE (AdenosINe Sestamibi Post-InfaRction Evaluation) trial, that use radionuclide imaging end points are much needed.

Dr. Iskandrian also discussed the use of radionuclide imaging for defining end points of novel therapies, such as regenerative therapy with stem cells. He emphasized the importance of quantification of myocardial perfusion and/or function, especially in view of the substantial interobserver variability even among expert readers using visual analysis. Accordingly, the Food and Drug Administration has now accepted quantitative image analysis as an alternative for multiple readers' visual interpretation.

Another technique discussed by Dr. Iskandrian is neuronal imaging with ^{123}I-metaiodobenzylguanidine (MIBG). Several multicenter studies are now underway using MIBG single-photon emission computed tomography (SPECT) to explore which patients are at risk for sudden cardiac death and which benefit from implantable cardioverter-defibrillator therapy. The role of imaging in special populations, including those with chronic kidney disease, also was highlighted. Forty-seven percent of these patients die from cardiovascular complications. However, even after coronary revascularization, survival remains poor. Moreover, many patients die with normal left ventricular (LV) ejection fraction, and patients with normal myocardial perfusion have worse outcome as compared with the normal population. Thus, unresolved issues remain in patient management, including the use of radionuclide imaging in renal dysfunction.

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Detecting the high-risk patient. Dr. William Wijns discussed the clinical value of radionuclide imaging and computed tomographic (CT) angiography in detection of the high-risk patient. In the past, visualization of the coronary arteries was the domain of invasive angiography and the threshold for angiography was relatively high. Myocardial perfusion imaging served efficiently as the gatekeeper to this invasive procedure. However, with the recent introduction of noninvasive CT angiography, the threshold has become considerably lower, and low-risk patients may have their coronary anatomy visualized. This development resulted in detection of coronary artery disease (CAD) at an earlier stage with more mild and nonobstructive CAD detected than before. To better understand the clinical significance of these findings and decide on appropriate clinical management, new demands and questions are put on myocardial perfusion imaging. For example, in a study of 140 patients with intermediate likelihood of CAD who all had multislice CT angiography, no CAD was found in approximately one-third of patients, nonobstructive CAD in another one-third, and obstructive CAD (>50% luminal narrowing) in another one-third of patients. However, 40% of patients with nonobstructive CAD had abnormal perfusion on stress SPECT, and 50% of patients with obstructive CAD had normal perfusion on stress SPECT.

Invasive tools used during cardiac catheterization to evaluate coronary flow reserve and, thus, the entire coronary arterial system, demonstrate a substantial spread and overlap of coronary flow reserve in patients with obstructive and nonobstructive CAD, suggesting that many of the apparently false-positive stress SPECT studies may be due to abnormal coronary flow reserve. Conversely, patients with false-negative stress SPECT studies may have adequate collateral circulation. Invasive interrogation of the coronary flow reserve clearly demonstrates the limitations of coronary anatomy as visualized by either invasive or noninvasive coronary angiography. The prior experience with invasive angiography now needs to be translated into noninvasive cardiac imaging techniques to aid physicians in making appropriate clinical decisions. Noninvasive imaging also may aid coronary angiography in patient populations that are at higher risk, but who are still underdiagnosed and undertreated, such as patients with diabetes, women, and the elderly. Dr. Wijns concluded that noninvasive cardiac imaging is well positioned to play an important role to guide therapy in the high-risk patient. More than ever, there is a need for accurate evaluation of the hemodynamic significance of individual coronary stenoses. The knowledge derived from invasive evaluation of vulnerable, non–flow-limiting plaques needs to be transferred to noninvasive imaging. This requires "crosstalk" between interventional cardiologists and noninvasive cardiac imagers. Ultimately, the incremental cost-effectiveness of diagnostic imaging procedures will have to be demonstrated.

Nuclear imaging in special populations. Dr. Avjit Lahiri pointed out that, by the year 2030, the number of patients with type 2 diabetes mellitus worldwide will amount to 370 million. The risk for developing CAD is 2- to 4-fold higher in patients with diabetes than in nondiabetic patients, and in many patients with diabetes, CAD is asymptomatic. Stress myocardial perfusion imaging has been shown to be equally effective in detecting the presence of CAD and in estimating prognosis as in patients without diabetes. However, for any given size of myocardial perfusion abnormality, the mortality in patients with diabetes was 2-fold greater. In addition, the long-term outcome in patients with diabetes and normal SPECT images was 1.5- to 3-fold worse than patients without diabetes. Several studies assessed the prevalence of silent CAD in truly asymptomatic patients with diabetes. Dr. Lahiri proposed the use of CT coronary calcium scoring (CAC) as a prescreening tool to enrich the target population. If only diabetic patients with CAC ≥100 Agatston units would be screened with stress SPECT imaging, approximately 50% of patients can be anticipated to have abnormal SPECT images, with 20% being markedly abnormal, far greater than noted when examining all asymptomatic diabetics. The use of CAC scoring and stress myocardial SPECT are therefore synergistic in predicting cardiovascular mortality and morbidity and may prove to be a cost-effective approach in asymptomatic patients with diabetes.

Abbreviations and Acronyms

CAC = coronary artery calcium
CAD = coronary artery disease
CT = computed tomography
FDG = ^{18}F-fluorodeoxyglucose
LV = left ventricular
MIBG = ^{123}I-metaiodobenzylguanidine
MMP = matrix metalloproteinase
MRI = magnetic resonance imaging
PET = positron emission tomography
SPECT = single-photon emission computed tomography

Value of radionuclide imaging in patients with heart failure. Dr. Prem Soman discussed the value of radionuclide imaging in patients with heart failure. Myocardial perfusion imaging has been used extensively in patients with heart failure for the detection of CAD (to differentiate between ischemic and nonischemic cardiomyopathy), in the assessment of myocardial viability, for risk stratification, and in the quantification of LV (dys)function. Radionuclide imaging has been useful in the identification of the 70% of patients with ischemic cardiomyopathy, ischemic, and/or dysfunctional but viable myocardium who can benefit from revascularization with improvement in symptoms, regional and global LV function, and survival.

The use of neurohumoral imaging with MIBG predicts outcome in both ischemic and nonischemic cardiomyopathy and may be used to monitor response to heart failure therapy. Dr. Leslee Shaw also addressed the role of nuclear imaging in women. Before the introduction of contemporary techniques, myocardial perfusion imaging was notable for a lower diagnostic accuracy in women than in men