OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference on
Clinical & Experimental Cardiology

April 15-17, 2013 Hilton Chicago/Northbrook, USA

RIA-FHRWW© analysis of the redistribution properties of Tc-99m isotope agents, sestamibi and myoview, enhances the detection of ischemic heart disease

Richard M Fleming and Gordon M Harrington
Omnific Imaging, USA

Background: Thallium-201 (Tl-201) imaging and detection of ischemic heart disease requires a protocol sequence of stress, isotope injection, stress imaging followed by redistribution imaging. In the United States this erroneously became known as stress-rest imaging. The introduction of Tc-99m isotopes in the late 1980's was followed by the misperception that these isotopes do not redistribute and subsequently require two doses of radioactive isotope, one given at rest and the other at stress. Our work and the work of others has clearly demonstrated that these isotopes do in fact redistribute and that like Tl-201, only a single dose of isotope should be given, followed by stress-redistribution imaging.

Methods: Almost 300 participants from seven centers throughout the U.S. and South Korea have been studied to determine if the Tc-99m isotopes, sestamibi and myoview, redistribute over time following stress. SPECT cameras were used to quantify isotope changes immediately following stress and again after adequate time has been allowed to provide for a 10% decay of the isotope. Quantitative analysis of these results were compared to angiographic findings.

Results: Two principle redistribution patterns evolved. The more commonly recognized phenomena of "washout" demonstrated a diminution in myocardial retention of both isotopes over time than would be expected had the isotopes followed a model of uptake-retention, which was popularized in the 1990's. The second pattern, demonstrated the opposite relationship, viz. "wash-in." This previously unappreciated delay in tracer uptake accounts for much of the 35-40% error rate seen in rest-stress imaging and was seen in "critically" narrowed arteries and in arteries with "vulnerable inflammatory plaque." This quantitative two phenomena model of tracer redistribution of wash-in and washout (FHRWW©) follows a parabolic relationship with quantified coronary lumen disease which provides an accurate measurement of ischemic heart disease, thereby replacing the prior erroneous model of rest-stress imaging which at best detected only 65% of disease and could not accurately detect of the target artery.

Conclusion: FHRWW© quantitative measurement of Tc-99m isotope redistribution provides a quantitative method for detecting ischemic heart disease, using the redistribution properties of these isotopes; replacing the prior erroneous model of rest-stress imaging with multiple injections of isotope, which by its very nature was unable to detect this redistribution phenomena.

Biography

Clinical Instructor/Cardiology Fellow, Department of Cardiology, University of Texas Health Science Center at Houston, Houston, Texas, 1989-1992. Director of Nuclear Cardiology and Lipid Research, the Center for Clinical Cardiology & Research, Iowa, 1992-1995. Development Effort of a Nuclear Technologist Program for Methodist College, Omaha, NE, with Pat Sullivan, July 1998-April 1999. Clinical Service Association, Department of Cardiology, Creighton University, Omaha, NE, 1999-2004. The Fleming Heart & Health Institute, Omaha, NE, 1999-2004. Veterans Administration Health Care System, February 2005-Present. Gulf Coast Veterans Health Care System, Biloxi, MS, 2005-2007. VA Central Iowa Health Care System, Des Moines, IA, 2005-2008. VA Sierra Nevada Health Care System, Reno, NV, 2005-2007. Exercise Stress Testing Certification Director for IM Residents, 2005-2007. Electrocardiogram Conference Director for IM Residents, Morning Report, 2006-2007. Nuclear Cardiology Reviewer, January 2006-2007. Physician Services Contractor-Inspecting Military Medical Facilities, 2007. Cardiologist, Cardiovascular Institute of Southern Missouri, Poplar Bluff, MO, 2008-2009. Cardiology Consultant. Reno, NV. 2005-Present.

rmfmd7@hotmail.com