NYU Langone CVI Story
Technology & Cardiac Imaging
AB / CG FOR PHYSICIAN REVIEW

NYU Langone Medical Center's Cardiac and Vascular Institute (CVI) offers advanced cardiac imaging technology to improve the care and save the lives of heart patients from around the world. NYU Langone has a rare depth of experience in imaging, performing over 10,000 echocardiograms alone each year.

Remarkable new imaging technologies, some pioneered at CVI, help to pinpoint the exact location of atrial septal defects; find the area of the heart muscle not receiving blood so it can be treated, and lessen the amount of radiation in CT scans for children. Advances in imaging at NYU Langone help guide interventional cardiologists to thread tiny devices through veins to plug up holes in the heart.

To leverage these technologies to their fullest potential, NYU Langone has assembled a distinguished team of subspecialists, who collaborate daily to resolve the most complex cardiac cases. The dialogue among CVI's subspecialists – cardiologists, cardiac imaging radiologists, interventional cardiologists and cardiovascular surgeons, benefits patients making procedures faster, improving precision and speeding recovery.

CVI physicians are known for ground breaking work in cardiac imaging. In the 1990's NYU Langone was one of the nation's first medical institutions to perform 3D echocardiography. 3D provided exquisite images of the structure of the heart and its four chambers, and allowed echocardiographers for the first time to see the heart the way the surgeon sees it. Over the following decade, NYU Langone was in the forefront in adopting real time 3D transesophageal echocardiography (TEE) and providing image guidance during interventional heart procedures for valve repairs and replacements, closing left atrial appendages and plugging holes in the atrial septum.

More recently, NYU Langone's **Muhamed Saric, MD, MPA,** associate professor of medicine in the Division of Cardiology, has advanced the technique of TEE, described as "tilt-up-then-left" or TUPLE, which improves the diagnosis of atrial septal defects (ASDs), ascertains the important anatomic relationships of ASDs to surrounding structures, and facilitates communication between echocardiographers and interventional cardiologists or cardiac surgeons performing ASD closures. This new technique was published in *Journal of the American Society of Echocardiography* (LINK).

An array of advanced CT technology is available at NYU Langone to diagnose heart problems, including several high-speed, high-resolution multi-detector CTs, a high-field 3-tesla imaging system, 64-detector row CT scanners, and a dual source CT

scanner (DSCT). All of these technologies have specific applications that can illuminate specific heart disease issues for each individual patient.

Cardiologist **Robert M. Donnino, MD,** assistant professor of medicine and radiology, and his colleagues at NYU Langone, are using the breakthrough DSCT, the fastest scanner available, to provide diagnostic images with the highest resolution and lowest possible radiation exposure for patients (especially important in children). This CT scanner is found in only a handful of medical facilities, and uses less than one millisievert of radiation per procedure, far less than background radiation that we get from just living on earth (New York City has a background radiation of 3 or 4 millisieverts a year).

Dr. Donnino is also using advanced cardiac CTs in research that probes the interrelationship between scar tissue within the ventricle, or within the heart, and the interplay of that with diastolic function.

NYU Langone radiologists have ready access to all standard types of MRI, but CVI offers patients and their cardiologists highly advanced forms of MRI, such as stress perfusion MRI, which can indicate areas of the heart muscle not receiving adequate perfusion. Nationally, only a few large medical institutions offer stress perfusion MRI.

Researchers at NYU Langone are extending the applicability of MRI technology. Radiologist **Leon Axel, MD, PhD,** professor of radiology, medicine, neuroscience and physiology, for example is studying the MRI images of patients' heartbeats to find better ways of characterizing the diastolic function of the heart. This in turn could improve the ability to provide more detailed information and segment patients who have different kinds of heart failure. He is also using imaging in the presence of arrhythmias to acquire detailed images of the heart and ideally to indicate more effective treatments tailored to each individual patient.