

Windows into the Heart: The New Frontier of Coronary Disease Research

By Philip Berroll

When asked about the impact of cardiovascular disease on world health, Jagat Narula, MD, PhD replies calmly but bluntly: “It is the most important scourge against mankind – the same for developing countries as for developed countries, and the same for men as for women.”

Dr. Narula does not make such pronouncements lightly. A dedicated researcher, educator and clinician – he is Philip J. and Harriet L. Goodhart Professor of Medicine and Cardiology and Associate Dean for Global Health at Mount Sinai School of Medicine, and in May of this year was named Director of Cardiovascular Imaging Program in the Zena and Michael A. Wiener Cardiovascular Institute and the Marie-Josée and Henry R. Kravis Center for Cardiovascular Health – he has devoted his professional life to studying and combating heart disease. In his current research, he is working to develop potent new tools for cardiologists worldwide: sophisticated molecular imaging techniques which can provide a window into the heart – and predict and prevent heart attacks before they occur.

“The levels are becoming epidemic,” he says, “and basically, prevention is the only way that we will be able to reduce them. I think that prevention through personalized medicine will have the biggest influence on cardiology in the next ten years.”

From detection to prevention

Dr. Narula emphasizes prevention because heart disease is often a “silent killer,” undetected until it is too late. “The disease, in its most serious form, is asymptomatic,” he explains. “More often than not, patients don’t come to you and ‘declare themselves’ or present with chest pains – instead, there can be an acute coronary event, including sudden cardiac death.”

Over the years, researchers have pinpointed the most common factors that put people at high risk for the disease, such as smoking, diabetes, high blood pressure and hypertension. When those factors are treated and modified, the incidence of the disease is reduced.

However, Dr. Narula notes, some people are more in need of preventive measures than others. “In the United States and Western Europe, you could say the population is divided into three tiers,” he says. “About 50% are at low risk for coronary disease; 10% are at high risk; but 40% are intermediate – they may have a problem, or they may not. So we need to glean them further, into those who are low-risk and those who are high-risk. Basically, I would like to have a two-tier rather than a three-tier system. You want to identify those who have a problem. And imaging can enable us to do this.”

In his research, Dr. Narula focuses on cost-effective measures that are especially suitable for this intermediate group – in his view, costly, time-consuming procedures such as MRIs and angiographies are not necessary in these cases – and can be used to screen large groups of people. One technique involves taking an ultrasound image of the carotid arteries, which supply blood to the brain, or blood vessels in the iliofemoral region of the legs, in order to find signs of atherosclerosis – a condition, commonly known as “hardening of the arteries,” which if left untreated can eventually cause cardiac infarctions or strokes. A second procedure is taking a CT scan of a patient’s heart and using the scan to determine the amount of calcium in the coronary artery. “If the calcium is more than what is good for your age and gender,” says Dr. Narula, “that’s a very good indication that [coronary] disease is there.”

Dr. Narula says that advances in coronary disease studies in recent years have helped open the door to new avenues of research.

“There’s been a gradual evolution in the knowledge of the disease,” he notes. “For example, until a few years ago, we used to see a chest pain as just a simple strangulation of the coronary arteries. Now we have started to realize that atherosclerosis, which affects the blood vessel walls, is equally important when it comes to acute coronary events.”

The next step, in Dr. Narula’s view, is to subject imaging procedures to “rigorous clinical and outcome-based trials” so that cardiologists have a better idea of how to apply the results of imaging to specific preventive measures.

“As the knowledge is evolving,” he says, “that kind of investigation or studies need to be there before we are able to say, ‘this is the way we should be evaluating our patients,’ and then suggesting means of prevention.”

Fighting ‘diseases of affluence’

Dr. Narula is also working on a global scale to prevent heart disease, through his involvement in international-oriented programs such as the Heart Attack Prevention Program for You (HAPPY). Co-founded by Dr. Narula and Dr. Leonard Hofstra of the University of Maastricht in The Netherlands, HAPPY provides free cardiovascular screenings for people in developing countries. He is also the founding Editor-in-Chief of a new journal – *Global Heart*, published by the World Heart Federation – which aims to narrow the coronary disease research gap between the West and the developing world. Heart disease has increased sharply in those countries in recent years, as rapid urbanization has led to the erosion of traditional diets and the spread of Western habits like smoking cigarettes and consuming high-fat meals.

“In these countries, where we were used to dealing with things like infectious and post-infectious diseases and child health issues, there is now a tremendous increase in diabetes, hypertension and other coronary risk factors,” Dr. Narula observes. “These countries already are burdened with the diseases of poverty; now they also have the diseases of affluence.”

Asked about his goals for the future, Dr. Narula says simply: “I want Mount Sinai to be the world’s best imaging center – the hub of imaging.” He adds, “I’m very keen to develop the imaging fellowship here, so that we can bring in cardiologists from outside and train them in integrated cardiovascular imaging, so that they can use imaging tests to improve the quality of patient care. Then they can become the partners of the invasive cardiologists, the surgeons, etc., to help them deliver the best results.”

In addition, he would like to see imaging training become an integral part of the basic medical school curriculum, both at Mount Sinai and other schools.

“Imaging has got to become part of a patient’s standard physical examination,” he asserts. “Therefore, I feel that imaging should be taught from day one of medical school. Because

I believe, and I have often said – though people have not always liked to hear it – that if you're not an imager, you're not a physician.”

But in terms of his specific research, Dr. Narula prefers not to speak of short- and long-term goals. “Your goals are driven by your strategy, and my strategy is the use of imaging for better definition, management and prevention of a disease,” he says. “That’s what I’ve been working towards for many years now – and the sooner I get there, the better.”