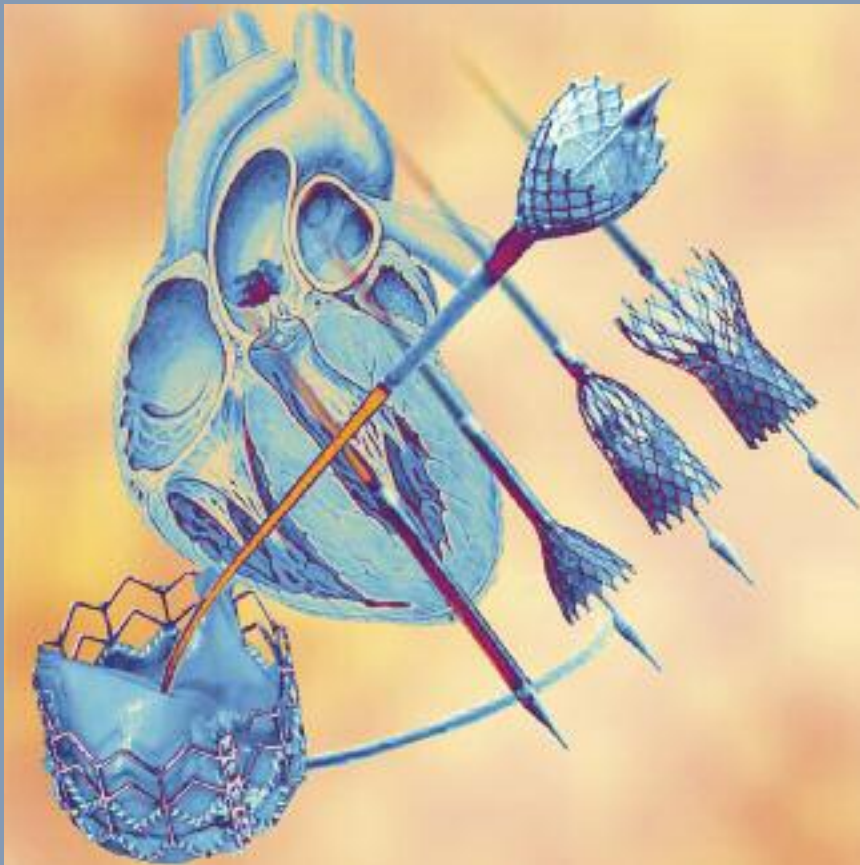


# CARDIAC CATH LAB

## 2011 CLINICAL OUTCOMES REPORT



# A MESSAGE FROM DR. SHARMA



Samir K. Sharma, MD,  
FSCAI, FACC

Professor of Medicine, Cardiology

Director, Cardiac Cath Lab  
& Intervention

## Dear Colleague:

All of us here at the Cardiac Catheterization Laboratory at Mount Sinai Heart take great pride in presenting our 2010 outcomes report, a comprehensive overview of the work being done at the nation's largest and finest cardiac catheterization laboratory to treat a variety of cardiac diseases. Public reporting of quality and patient safety data is increasingly mandated for transparency by a variety of organizations and stakeholders and we offer our data in comparison to various regional and national standards. Technical achievement in percutaneous interventions has resulted in a relentless drive for procedural excellence and near-perfect results. Our outcomes data from the last five years will convince you that we, at Sinai, have *perfected the art of PCI*.

The strategy of CAD patients referral to invasive procedure has been rapidly changing in recent times with medical therapy playing a major role in the management of stable CAD patients. Achieving a stable growth rate with declining complications despite the increasing complexity of cases has been made possible by our dedicated teamwork and caring for each patient as an individual. We are also committed to developing and adopting the universal use of innovative, evidence-based standardized medical protocols and this has contributed to our extraordinary success. For these reasons, it is not unusual for patients in the region, many who have been deemed "inoperable for advanced care," to come to us, where they will receive successful treatment and return home smiling.

In order to remain at the top, cutting-edge technology and techniques remain the hallmark of success. We will provide details of innovations we have developed, which have contributed to our national and international recognition. Patients who can benefit from ongoing clinical trials at our center are routinely offered the opportunity to participate with the goal of achieving the best possible outcome. The first CoreValve® implantation in the US was done in our Cath Lab.

In our Cath Lab the following famous saying of Albert Einstein is constantly uttered: "Strive for excellence and success will automatically follow." This belief has placed us on the top in the field of interventional cardiology in the nation.

# TABLE OF CONTENTS

An Overview of Services	4
Results	8
Innovations	15
Research and Clinical Trials	34
Patient Success Stories	38
Full-Time Senior Faculty	44
Full-Time Affiliate Faculty	49
Voluntary/Part-Time Faculty	51
Annual Symposium	58
Live Case Symposium	59
Mount Sinai Cath Lab Partners and Affiliates	60
Mount Sinai Heart Directory	61

Mount Sinai Hospital  
Cardiac Cath Lab:  
Clinical Outcomes 2011



# DEAR COLLEAGUES



Kenneth L. Davis, MD  
President and Chief Executive Officer  
The Mount Sinai Medical Center



Dennis S. Charney, MD  
Anne and Joel Ehrenkranz Dean  
Mount Sinai School of Medicine



Wayne E. Keathley  
President and Chief Operating Officer  
The Mount Sinai Hospital

The Mount Sinai Cardiac Catheterization Laboratory stands at the forefront of clinical quality and research innovation. We are honored to share with you the third edition of the Cardiac Cath Lab Clinical Outcomes Report and hope that it provides a look into the outstanding caliber of care that patients receive at Mount Sinai.

A New York State Department of Health report published in December 2010 singled out the Cath Lab and one of its doctors – Samin Sharma, MD – for having the lowest death and complication rates for percutaneous coronary interventions (PCI) among 54 hospitals. This is the first time that any hospital has been awarded the two-star safety rating in all cases since New York State began publicly reporting PCI statistics in 1995.

This rating demonstrates our Cath Lab's ability to treat the most complex cases with virtually no complications. Carefully tested and practiced protocols enable the lab's world-class physicians and surgeons to treat every facet of cardiovascular disease at any hour of the day or night, and guide the delivery of care from the moment a patient enters the Medical Center until they return home. Patients turned away by other institutions that lack the capacity to deliver these advanced therapies come to Mount Sinai.

The Cath Lab's team of interventionalists, nurses, technicians, and support staff is committed to continuous quality improvement and providing excellent patient care. Several world-class research physicians recently joined the team to help further the lab's efforts to uncover the underlying causes of heart disease and develop targeted tools and procedures to treat its many permutations. This teamwork and dedication to providing superior outcomes for our patients exemplify Mount Sinai's commitment to excellence.

We hope you find this edition of the Cardiac Cath Lab Clinical Outcomes Report informative, and we are pleased to have this opportunity to salute the Cath Lab once again.

# A MESSAGE FROM VALENTIN FUSTER, MD, PHD, MACC

Since it was established roughly five years ago, Mount Sinai Heart has earned a reputation as one of the world's leading centers for cardiovascular medicine and advanced diagnosis, treatment, and therapeutic technologies.

As you will learn in reading this latest edition of the Cardiac Cath Lab Clinical Outcomes Report, one of the truly outstanding contributors to Mount Sinai Heart's rise to recognition has been the Cardiac Catheterization Laboratory under the exemplary leadership of Dr. Samin Sharma. Dr. Sharma's passion for excellence and his extraordinary attention to detail through carefully developed and tested protocols of care, have attracted to Mount Sinai Heart a team of world-class catheterization specialists.

The busiest catheterization laboratory in New York State is justly known as a place where patients are assured the most timely diagnosis and treatment with the most advanced tools and techniques night and day, every day of the week. The talented men and women who staff the lab regularly perform the near impossible in treating the most complex and challenging medical cases. Perhaps less well known is the fact that our Cath Lab colleagues are frequently selected to participate in the most important clinical trials in the intervention field, providing carefully selected patients with early access to promising new life-saving treatments. The outcomes detailed in the pages that follow give undeniable evidence of their remarkable successes.

I am glad to have this opportunity to signal another great year of achievements and growth in Mount Sinai Heart's Cardiac Cath Lab.



Valentin Fuster, MD, PhD, MACC

Director, Zena and Michael A.  
Wiener Cardiovascular Institute

Director, Marie-Josée and  
Henry R. Kravis  
Cardiovascular Health Center

Richard Gorlin, MD,  
Heart Research Foundation  
Professor of Cardiology

# AN OVERVIEW OF SERVICES

## The Cardiac Catheterization Lab



Left to Right:  
Pedro Moreno, MD,  
Annapoorna Kini, MD,  
Prakash Krishnan, MD,  
Samin Sharma, MD,  
Michael Kim, MD

It is said, "Individuals play the game but a team wins championships." This concept of teamwork defines what we do in the Cath Lab and it is the principle reason for our success.

Mount Sinai Heart, which encompasses clinicians, scientists, nurses and associated caregivers under the leadership of visionary director Valentin Fuster, MD, PhD, has emerged as a premier center for cardiovascular care. We deliver an extraordinary range of clinical and research care to patients

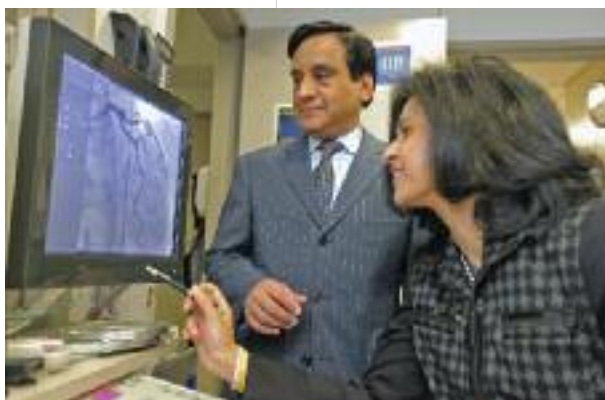
suffering from a variety of cardiovascular ailments with a goal of bringing the best cardiovascular care to our patients. These extraordinary services have resulted in the ascent of our national reputation from 50th in 2007 to 13th in 2010 (*U.S. News & World Report* 2010).

The Cardiac Catheterization Laboratory at Mount Sinai Heart is the busiest interventional catheterization laboratory in the United States. Our Cardiac Cath Lab, made up of five adult cath rooms (two equipped for endovascular procedures) and one shared pediatric cath room, has become established as a tertiary center for complex coronary, valvular, and vascular interventions. All cath rooms are equipped with intravascular ultrasound (IVUS) and three rooms have fractional flow reserve (FFR) capability. We embrace new technology as soon as it becomes clinically accessible, such as optical coherence tomography (OCT) and infrared spectroscopy. In this competitive environment, only the best can flourish and that is exactly what our Cath Lab has done, delivering the best and the safest invasive/interventional care to cardiac patients, with innovation and procedural excellence. Some of the important aspects of the Cardiac Cath Lab follow:

**Procedural Volume:** The volume at Mount Sinai Heart Cath Lab continues to rise each year as illustrated in the chart on page 8, with volume stabilizing in 2010 with a significant increase in vascular and valvular interventions (highest in the country). The majority of PCIs (94%) are done using stents (DES in 84%; BMS in 16%) with adjunct 9% rotational atherectomy and 1.5% thrombectomy/distal protection device and remaining 6% PTCA only. Some of the growth is attributed in part to our various outreach activities – allowing community physicians, the integral part of the Mount Sinai referral network, to offer tertiary care to their patients in the local catchment area. Like previous years, affiliate and voluntary attendings contributed about 24% of Cath/PCI volume in 2010 with similar low complications as with full-time attendings. Due to our established reputation for handling complex coronary and valvular cases with great success and safety, about one third of our interventional patients are referred by physicians (cardiologists & interventionalists) outside our network.

**Interventional Outcomes:** The system of established standard protocols, rigorous attention to minute details, and a strong sense of teamwork has helped us achieve the best interventional outcomes in the country. We continue to improve our outcomes every year, with unprecedented extremely low procedural complications in 2010. This remarkable growth has been achieved despite high complexity and co-morbid medical conditions of patients being treated in the Cath Lab. Reports of risk-adjusted PCI mortality over the last 10 years by the NYS Department of Health have consistently placed the Mount Sinai Heart Cath Lab amongst the lowest for in-hospital and 30-day risk-adjusted mortality for all cases as well as emergency cases. The recent New York State DOH report of 30-day risk-adjusted mortality for 2007 has shown our incidence of 0.64% for all cases, 0.47% for elective cases and 1.62% for emergency PCI cases;

The system of established standard protocols, rigorous attention to minute details and a strong sense of teamwork have helped to achieve the best interventional outcomes in the country.



the lowest in the state and about 30% lower than the statewide average and the only center to receive a double star notation of superior safety in both PCI categories. This lower 30-day risk-adjusted mortality is largely due to the experience and high volume of the five senior full-time interventionalists. In the 2007 report, Dr. Sharma and Dr. Kini were awarded the double star notation by NY State denoting significantly lower 30-day risk-adjusted mortality amongst approximately 600 interventionalists practicing in NY State. It was the first time two interventionalists from one hospital received this safety accolade.

**Clinical Research:** In addition to clinical success, the Cath Lab has participated in numerous investigator-initiated trials and multi-center trials in the field of coronary interventions. The results of many of these endeavors have resulted in approval of new drugs and devices by the FDA to improve the outcome and safety of percutaneous interventional procedures. The most notable research development of 2010 is the CoreValve® percutaneous valve; Mount Sinai Cath Lab was the first center in the US to implant this device. Also, key scientific publications on various PCI outcomes from our huge interventional database repository of approximately 35,000 patients since 2000 continue to advance the field of interventional cardiology in a safe and progressive manner. Five research coordinators and five database coordinators are constantly engaged in recruiting patients for research trials and obtaining detailed and comprehensive follow-up (in-hospital, at 30-day, and at one year) of all interventional patients.

The most notable research development of 2010 is the Corevalve percutaneous valve; Mount Sinai Cath Lab was the first center in the US to implant this device.



**Cath Lab Staff:** Increasing cath volume places extreme pressure on physical infrastructure and the Cath Lab staff. The numbers of both medical and non-medical Cath Lab staff have grown tremendously with the ultimate goal of delivering safe and superb care. Presently there are five full-time senior attendings,





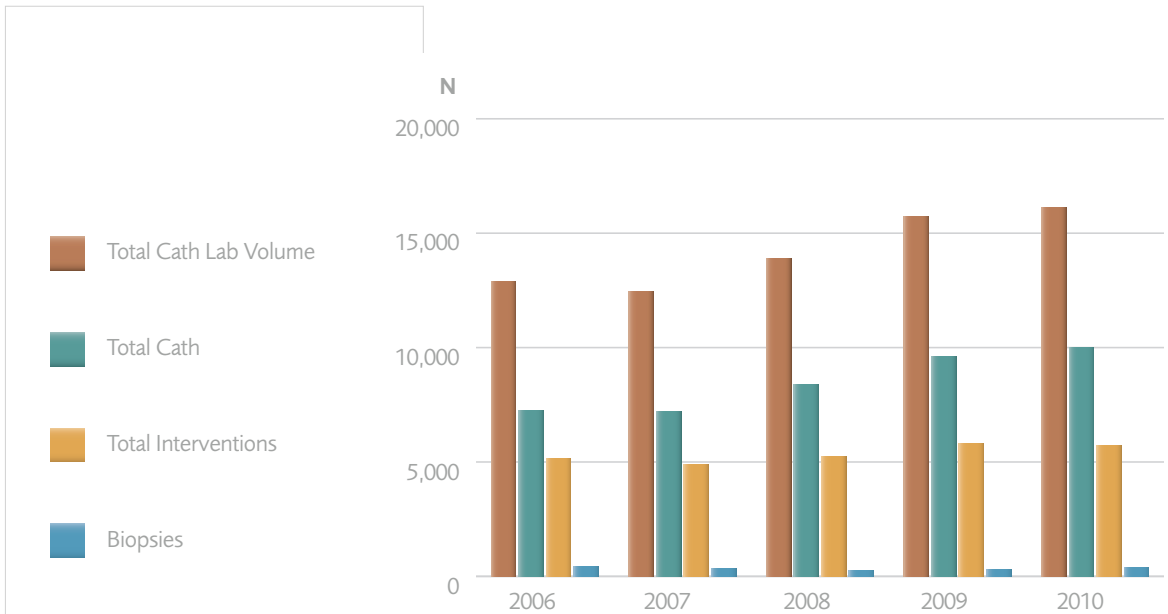
seven full-time affiliate attendings, 11 voluntary interventional attendings, four voluntary cath attendings, two CHF/Transplant attendings, one pediatric cath attending, eight interventional fellows and 14 cath lab nurse practitioners. The total number of Cath Lab staff including nurses, technician and support staff has grown to over 132, along with a nurse manager, operational manager and nursing director. Each member of the Cath Lab staff has a strong work ethic and takes pride in their contribution to the goal of the department – delivery of efficient and safe care to patients in need. As a result the Cath Lab consistently reports a very high level of patient satisfaction.

Left to Right:  
Usman Baber, MD,  
Sumit Tickoo, MD,  
Sandeep Chhabra, MD,  
Mitchell Weinberg, MD,  
Vinod Patel, MD,  
Annapoorna Kini, MD,  
Shyam Poludasu, MD,  
Jeffrey Bander, MD,  
Anuj Shah, MD

**Interventional Cardiology Fellowship:** Mount Sinai Heart Cath Lab takes pride in educating future clinical cardiology and interventional cardiology specialists by establishing a rigorous academic and hands-on training program. Our interventional fellowship program is the largest in the country, with eight fellows (seven ACGME and one non-ACGME). Our graduate trainees have become noted leaders in community and academic medical centers; some of our graduates are serving as directors of cardiac cath labs across the nation.

# RESULTS

## Growth and Trends in Cath Lab Volume and Procedures

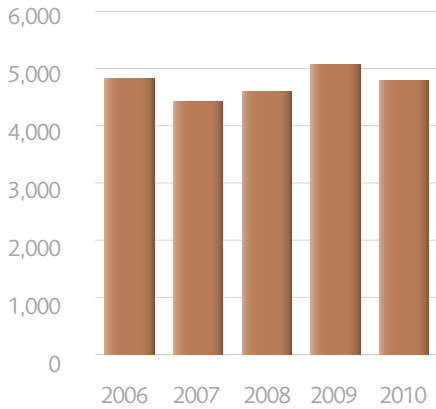


With over 5,000 interventions each year for the last three years, our Cath Lab is the leader in intervention in the US.

The volume of diagnostic cath and interventional procedures at the Mount Sinai Cardiac Catheterization Laboratory has experienced substantial growth over the last five years in every aspect of cardiac procedures. Total percutaneous interventions encompass coronary interventions (PCI), endovascular interventions (for diseased limb, cerebral or renal arteries), valvuloplasties (for stenosed aortic or mitral valve), alcohol septal ablation (for hypertrophic obstructive cardiomyopathy) and interventions for other structural heart diseases (such as closing of ASD, PFO or paravalvular leak). This last category, performed by our pediatric cardiologist Dr. Barry Love, is not counted in our interventional numbers. In 2009 we carried out a record 5,718 interventions of which 4,799 were PCI, 758 were endovascular interventions, 147 were balloon aortic valvuloplasties, seven were balloon mitral valvuloplasties, and seven alcohol septal ablations for HOCM. Carotid stenting is currently being performed in the special neuro-interventional radiology suite by our interventionalist, in conjunction with neuro-interventionalists, or vascular surgeons.

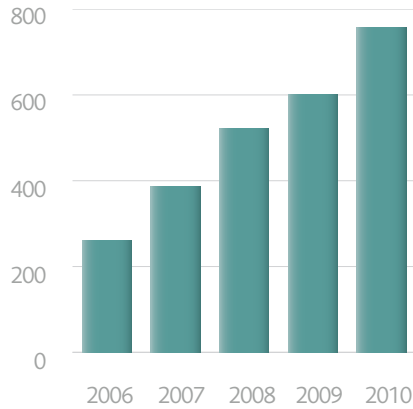
## PCI

Major complication (N):  
22 24 26 27 29



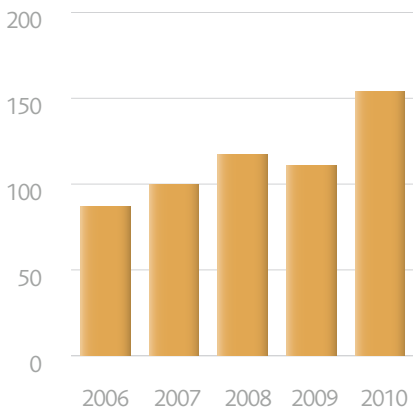
## Endovascular Interventions

Major complication (N):  
0 1 2 0 1



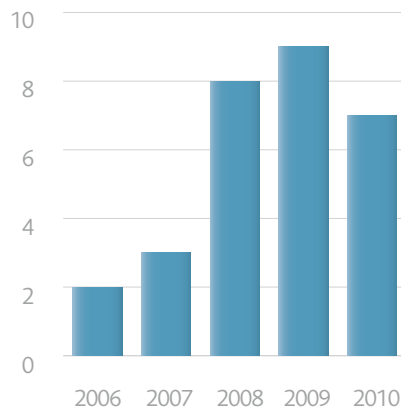
## Valvuloplasties

Major complication (N):  
2 4 5 3 3



## Alcohol Septal Ablations

Major complication (N):  
0 0 0 0 0



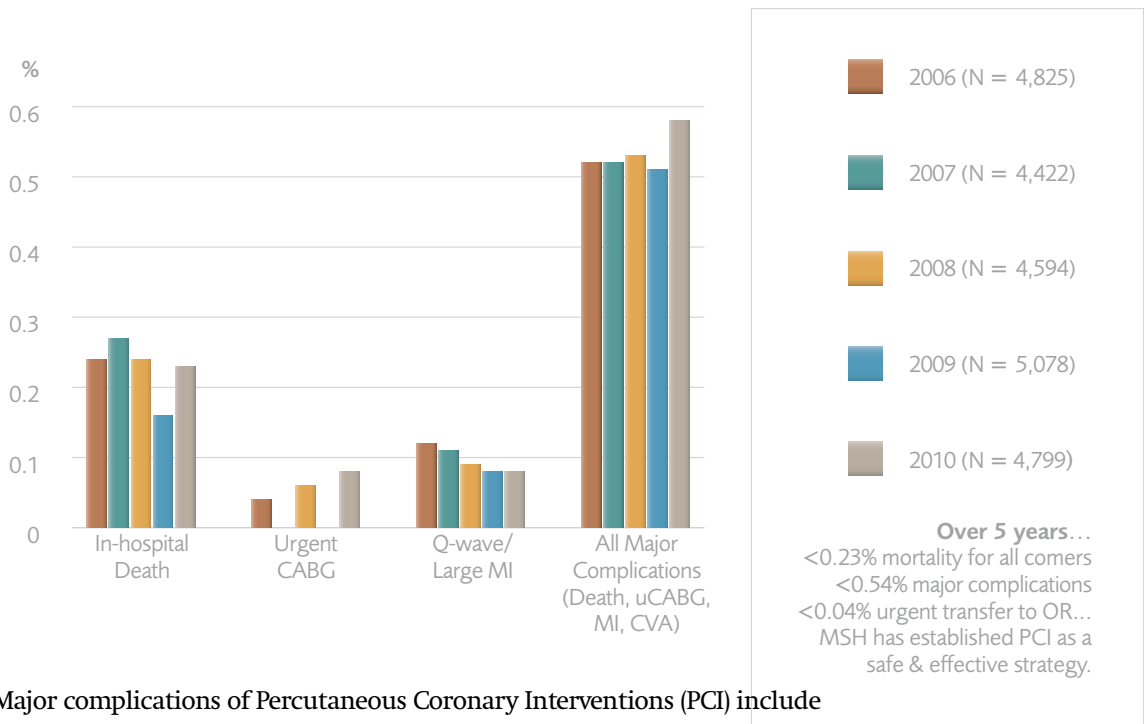
## NYS DOH Reported PCI volumes



Recent reports from the NYS DOH on PCI procedures for 2005-2007 identify Mount Sinai Cath Lab as having the highest volume in the state, and as the only center to have significantly lower 30 day mortality, with two of its physicians receiving double-star safety status.

**Mount Sinai Hospital’s Cardiac Catheterization Laboratory remains one of the busiest cath labs in the US, with tremendous growth in all types of interventions over the past five years, as the above chart shows. Our lab rose to the top position among New York State hospitals in 2005 and since then has held a commanding lead of more than 1,000 interventions over any other center since 2006, with growth occurring in both coronary and non-coronary interventions. Data is taken from the New York State Department of Health’s own statistics.**

## Temporal Trends in Complications of PCI at MSH



Major complications of Percutaneous Coronary Interventions (PCI) include death, a heart attack (MI), stroke, or an urgent need for open-heart surgery (CABG) as a result of the procedure. The sum of those numbers for the past five years represents less than 0.56% and in-hospital mortality less than 0.26%. PCI outcomes published in 2010 by the New York State DOH representing procedures from 2005-2007, identified Mount Sinai Cath Lab as the only center to have statistically significant 30-day risk-adjusted mortality rate amongst all PCI centers in NY State. These low complication rates, credited to a uniform protocol across all staff, are all the more remarkable for the fact that our Cath Lab accepts the most difficult coronary and valvular cases, many of them deemed too risky or “not-doable” elsewhere. The comparative data of patients’ clinical characteristics, as shown in the table on page 12, confirms significantly higher adverse features of PCI patients treated at MSH compared to New York State. Also, the graphs on the following pages show complication rates of PCI at MSH Cath Lab in comparison with New York State, ACC-NCDR and Cleveland Clinic for 2009, showing that our complication rates are one-third to half of the reported national and regional standards.

## Baseline Demographics and Risk Factors of PCI

Comparison of Mount Sinai Hospital 2010 vs. NY State 2007

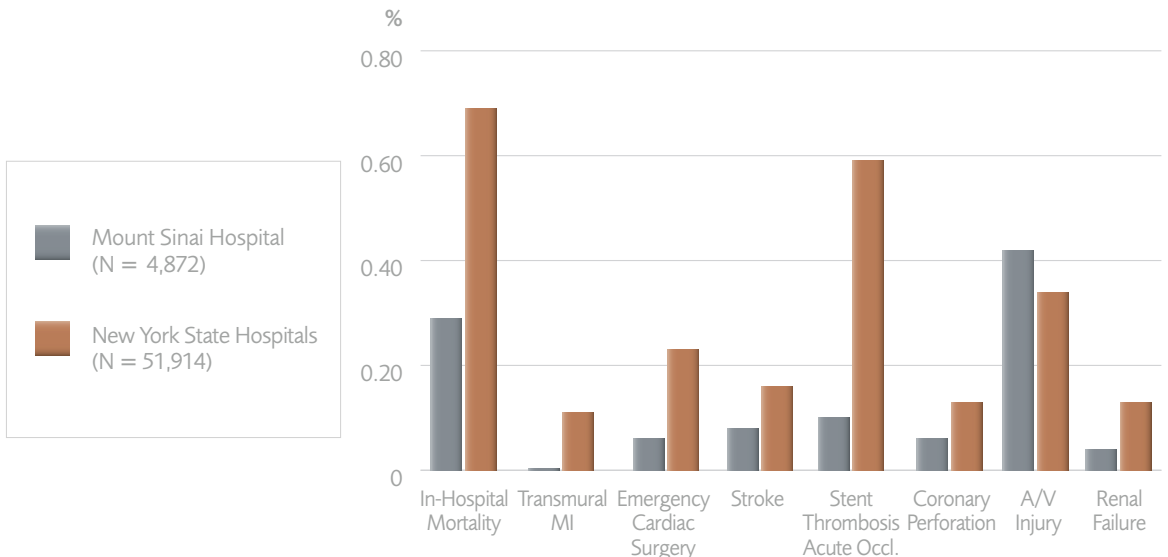
Excellent outcomes are achieved despite a high volume of challenging complex cases with high baseline risk factors.

	MSH (N = 4,872)	NYS (N = 51,914)
<b>Ethnicity, Hispanic/South Asian (%)</b>	26.6/8.8*	12.5/3.5*
<b>Primary Payor; Medicaid</b>	37.3*	14.5
<b>Age &gt;80 yrs (%)</b>	10.8	11.6
<b>Peripheral vascular disease (%)</b>	16.0*	7.3
<b>DM on medication (%)</b>	45.6*	32.8
<b>Renal failure on dialysis (%)</b>	3.8*	2.0
<b>Prior CVA (%)</b>	11.6*	7.8
<b>Left main disease (%)</b>	5.8*	3.7
<b>Rotational atherectomy (%)</b>	9.1*	1.8
<b>DES use (%)</b>	84.7*	70.2

\* P <0.05% For Mount Sinai Hospital vs. New York State.

## Major Complications Following PCI

Comparison of Mount Sinai Hospital 2010 vs. NY State 2007



## NYS DOH Report of PCI 2005-2007

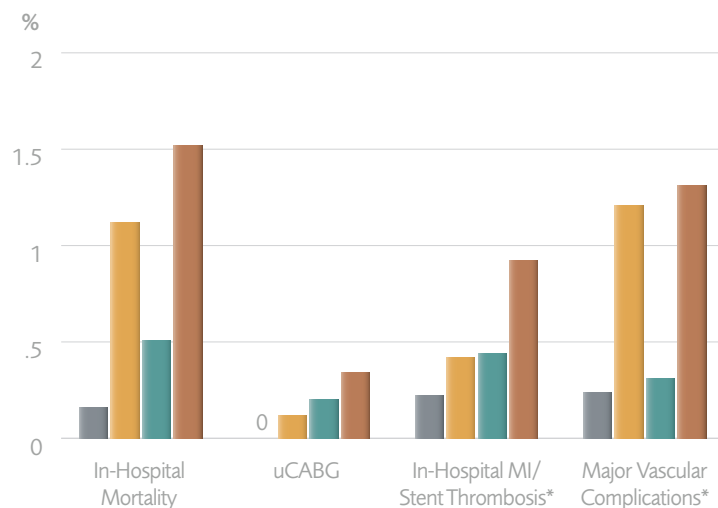
Data on Top 10 Volume Centers in NY State – 30-Day Risk Adjusted Mortality

PCI Statistics for 2005-2007	# Cases	Mortality Rates All Cases	Mortality Rates Emergency Cases
Mount Sinai Hospital	13,030	0.64**	1.62**
North Shore Hospital	9,954	0.69	1.58**
Saint Francis Hospital	9,531	0.81	3.04
Columbia Presbyterian Hospital	9,149	0.88	2.47
Lenox Hill Hospital	8,188	0.88	2.94
Rochester General Hospital	7,222	1.04	3.56
Saint Josephs Hospital	5,916	0.90	2.878
LIJ Medical Center	5,435	0.67	1.69
Stony Brook Hospital	5,106	0.78	2.31
Cornell Medical Center	5,059	0.69	1.48**
<b>NYS Total</b>	<b>51,695</b>	<b>0.95</b>	<b>2.90</b>

\*\* RAMR significantly lower than statewide rate.

## In-Hospital Mortality and Major Complications of PCI 2009

Comparison of Mount Sinai Hospital vs. Cleveland Clinic, NY State and ACC-NCDR Data



Across all categories, major complications are one-third to half of published state and national benchmarks.

- Mount Sinai Hospital (N = 5,078)
- Cleveland Clinic Hospital (N = 1,865)
- New York State Hospitals 2009 (N = 58,644)
- ACC-NCDR Hospitals (N = >150,000)


\* Some definitions may vary  
Source: NYS DOH statistics, ACC-NCDR and 2009 Cleveland Clinic outcomes brochure.

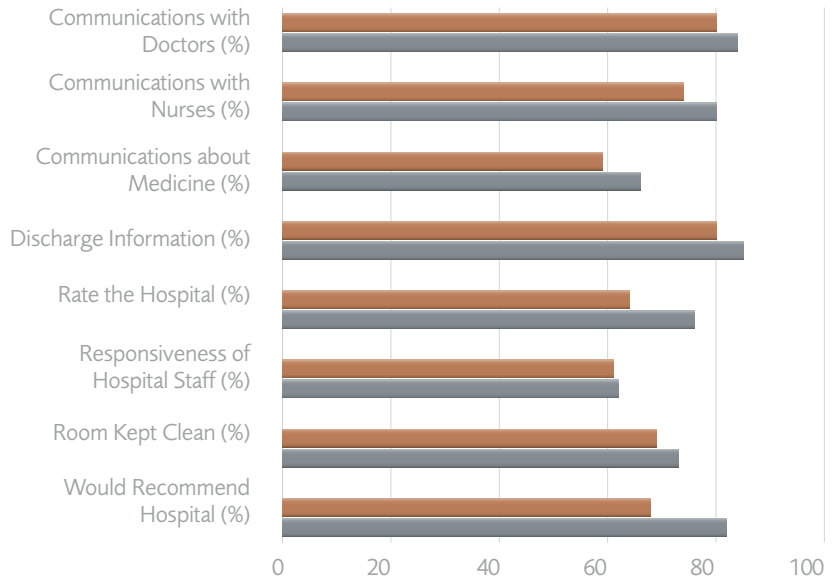
## Other Quality Indicators of the Interventional Unit

### Patient Satisfaction: 2010 HCAHPS Survey

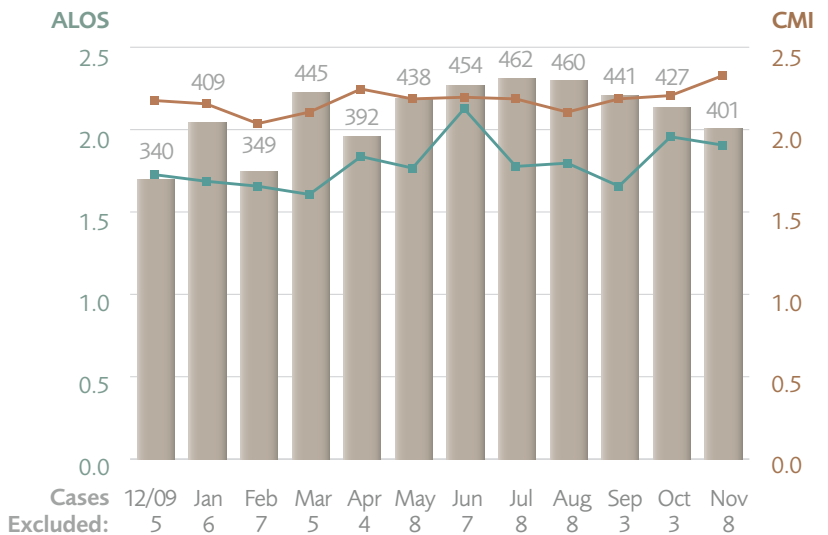
Across all categories, Mount Sinai Heart HCAHPS scores are higher than the national average.

 National Average

 Mount Sinai Average



## Inpatient Volume, CMI, and ALOS 2010 YTD (for 12 Months)



Risk-adjusted average LOS: expected LOS is consistently less than 0.8.



# INNOVATIONS

## **Samin K. Sharma, MD, FSCAI, FACC, Director, Director, Cardiac Catheterization Laboratory & Intervention; Co-Director, Cardiovascular Institute, on New Approaches to Complex Lesions, Stents, and Valve Interventions**

Mount Sinai Cath Lab continues to provide the latest techniques and technological advances to patients referred for cardiac intervention. Our reputation for efficiency and quality of care, along with our unmatched low rate of complications provides the basis for the ongoing referral stream for advanced and complex procedures. Furthermore, our innovative approach to handling the most complex cases and the volume with which we see them makes us effectively a tertiary center for Cardiac Intervention – we are able to take on a much larger pool of patient candidates, most notably those with unique circumstances that can pose barriers to treatment. Our expertise in all aspects of Cardiac Intervention includes extensive experience with:

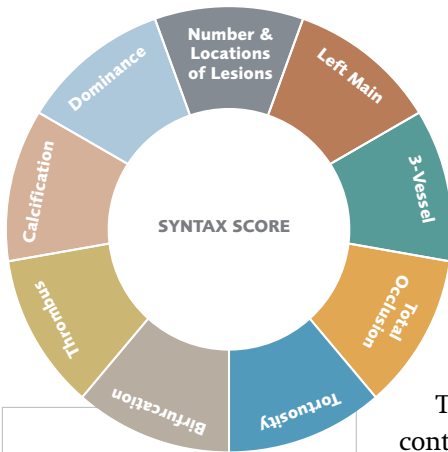


Live footage of interventions, including ULM procedures, can be viewed at [www.ccclivecases.org](http://www.ccclivecases.org).

### **Complex Lesions**

Complex coronary interventions can be defined as those in which the risks are high, either because of the patient’s age and general health, or because access to the blockage or valve is difficult. With so many technological advances in the treatment of complex lesions, the question is no longer whether an intervention can be done safely, but which intervention – percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG) – is best for each patient in the long run. Sometimes there will be an immediate benefit in favor of one intervention, only to be followed by a higher risk of adverse events many months later.

The SYNTAX Trial was launched in 2005 to address the issue of lack of optimal revascularization strategy in multi-vessel and LM disease and to make changes in practice guidelines. Some 1,800 patients with previously untreated three-vessel or left main coronary artery disease were randomly assigned to undergo PCI or CABG. Patients, for whom only one of the two treatment options would be beneficial, either because of anatomical features or co-morbidities, were entered into a parallel CABG or PCI registry.



- SYNTAX score is an anatomic score of the extent of CAD (>50%) in a patient
- Each lesion is assigned a numerical number and the sum of all lesions score for a patient is used to calculate the SYNTAX score
- Patients are divided into 3 groups:
  - Low <22
  - Intermediate 23-32
  - High >32

The SYNTAX trial showed that surgeons and interventionalists could determine fairly conclusively which patients are likely to benefit from open-heart surgery, and which can do as well or better with less-invasive percutaneous intervention. The SYNTAX score, as it has come to be called, assigns numbers to each lesion based on anatomical location, degree of occlusion, tortuosity, calcification, dominance, and other factors.

The scores of all the lesions are then totaled. Barring contraindications, patients with a score of 33 or greater are preferentially referred for open-heart surgery; practice based on the 3 year data from the SYNTAX Trial suggesting that patients with high SYNTAX score have lower death/MI/CVA after CABG then after TAXUS (DES) PCI. Some of the absolute contraindications for CABG are acute myocardial infarction, age of >80 years, prior CVA, severe COPD or BMI >50. Since January 2010, the Mount Sinai Cath Lab has incorporated the SYNTAX Score in stratifying patients for revascularization treatment and about 15% of CAD patients have SYNTAX Score >32 and are being referred for CABG as their best long-term option.

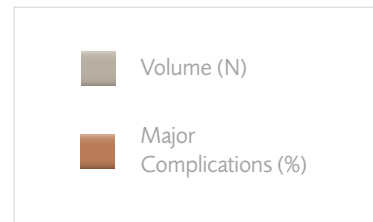
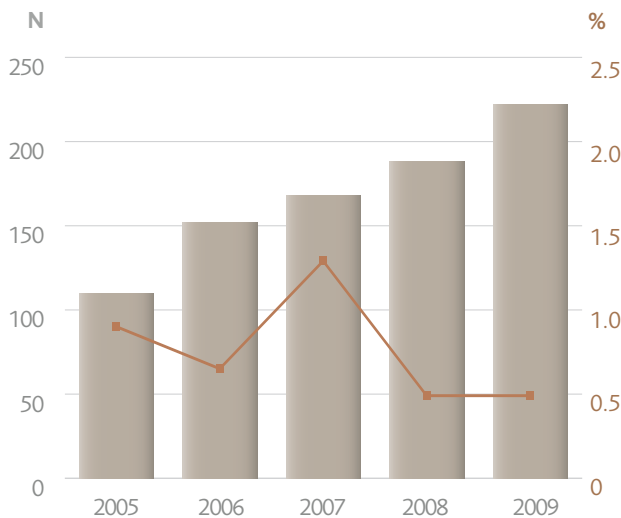
Unprotected left main (ULM) disease continues to remain technically challenging and our Cath Lab remains the leader for ULM PCI in the nation (both in volume and safety), largely because of referrals from outside interventionalists to us for this complex PCI.

### Calcified Lesions

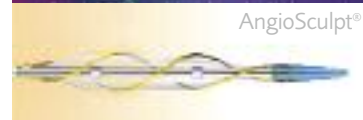
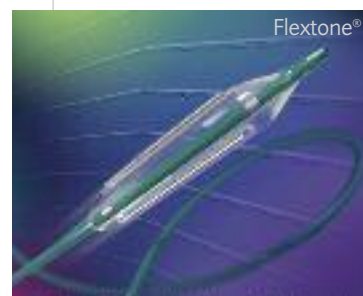
To treat calcified lesions, we have a choice of two coronary atherectomy balloons – the cutting balloon and the sculpting balloon – as well as rotational atherectomy. Our decision regarding which device to use depends on the resistance of the calcification but the underlying fact is that we can treat any complex and calcified blockage.

The Flextome® Cutting Balloon has 3-4 sharp metal microsurgical blades mounted longitudinally on the balloon’s surface to provide controlled removal of mild to moderate calcified lesions. For these types of lesions, we may alternately use the AngioSculpt® balloon, a helically mounted element that scores lesions circumferentially.

## Volume and Major Complications of Unprotected Left Main Coronary Artery PCI at MSH



When the calcification is very hard and heavy, we resort to rotational atherectomy, Rotablator®. We are currently the highest user of rotational atherectomy in the country. It consists of a very high-speed drill with a selection of very abrasive microdiamond-coated burrs at the tip that revolve at 130,000 -170,000 RPMs. In the hands of an experienced interventionalist it gently pulverizes the calcified blockage in 1-3 minutes, turning the blockage into a powder that safely flushes downstream through the bloodstream before being discarded from circulation by the liver and spleen. After the blockage is removed, inflating either a regular balloon or a cutting or sculpting balloon can further open the vessel. Finally, we deploy a stent, compressing any residual plaque between it and the inner vessel wall. Having this choice of devices allows us to treat any complex calcified blockage with very low complications or need for open-heart surgery. Currently we use an atherectomy balloon catheter in approximately 8% of coronary lesions and rotational atherectomy in about 9% of cases, with a major complication rate of <0.5% and a success rate of >99% in these complex lesions.



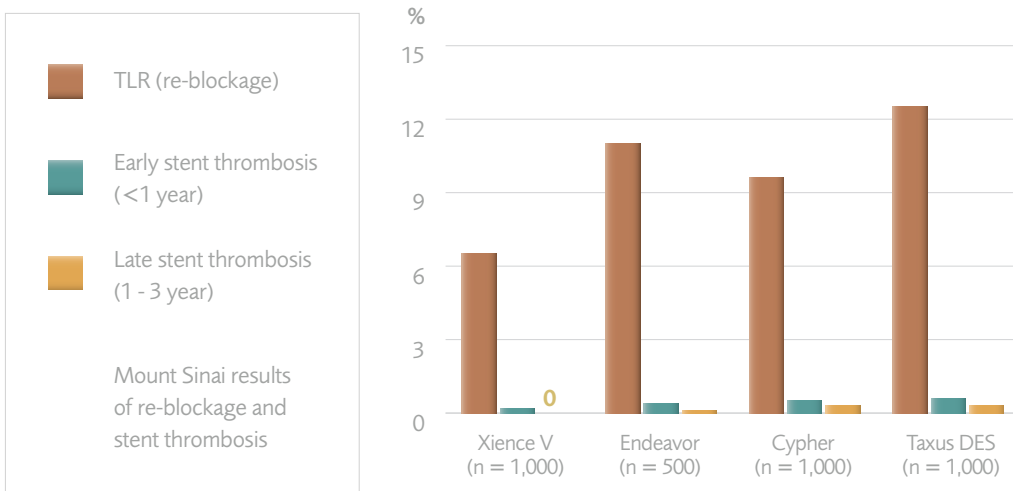
Technical details of three of our recent calcified ULM procedures using Rotablator can be seen in the archives of our monthly web series of live coronary interventions at [www.ccclivecases.org](http://www.ccclivecases.org).

## Drug-Eluting Stent Choices and Outcomes

In 2006, some negative press regarding late-stent thrombosis related to drug-eluting stents (DES) came out of Europe, and for a brief time many interventionalists went back to the older bare-metal stents (BMS). But on closer examination by the FDA, it was shown that DES and BMS have similar risk factors for this late-developing crisis (thrombosis) and that DES are, in fact, superior in many other ways. Meanwhile, the manufacturers of DES have continued to innovate, with the second generation now on the market and in late-stage trials. The differences among the newer stents (Xience<sup>®</sup>, Promus<sup>®</sup> and Endeavor<sup>®</sup>) compared to first generation stents (CYPHER<sup>®</sup> and TAXUS<sup>®</sup>) lie in their polymer construction, stent strut thickness/architecture and delivery systems (see graph), and in the drug elution used for coating (various compounds that inhibit critical molecular and cellular events associated with the pathology of restenosis).

Many studies have shown that of the current choices the Xience V stent is better in terms of decreased chance of re-blockage and of early and late stent thrombosis. In 2010 we used the Xience V (or Promus) in approximately 82% of our cases. For the remainder of procedures we used Endeavor in 10%, Taxus in 5%, and Cypher in 3%.

### Short and Long-Term Outcomes After Various DES Types at MSH Over the Past 3-7 Years



## Percutaneous Aortic Valve (TAVI: Transcatheter Aortic Valve Implantation)

We see many patients with severe aortic valve stenosis, with other medical problems that make them unsuitable for conventional surgical valve replacement. These co-morbidities may include severe aortic stenosis associated with renal failure, CVA, COPD, and advanced age (>85 years). What is needed in these patients is a safe and effective, minimally invasive, catheter-based approach. Currently, two of these percutaneous aortic heart valves are under FDA-approved clinical trials: Edwards SAPIEN Valve™ and Medtronic CoreValve®.

The PARTNER Trial investigated transcatheter aortic valve implantation (TAVI) in high-risk and inoperable aortic stenosis patients using the Sapien Valve. This study tracked 358 patients with severe, symptomatic aortic stenosis deemed inoperable for traditional open-heart surgery. The patients were randomized to receive either the Edwards SAPIEN™ heart valve or standard therapy (medical management and/or balloon aortic valvuloplasty). The highly promising results showed a mortality rate 20 percentage points lower for the transcatheter method. The SAPIEN heart valve is now awaiting FDA approval before it is clinically available to patients in the United States.

The second valve replacement technology for high-risk inoperable aortic stenosis cases is the CoreValve® Revalving percutaneous aortic bioprosthesis from Medtronic. Already approved in Europe, the CoreValve has recently entered its US pivotal clinical trial to determine safety and efficacy. This revolutionary alternative to open-heart surgery for patients with severe aortic stenosis is thinner than the SAPIEN valve, facilitating its deployment entirely as a percutaneous procedure. The first CoreValve TAVI procedure was performed here at Mount Sinai Cath Lab with excellent results. We expect to be the leader in the nation for this new technology.



Many patients with severe aortic stenosis have other medical problems that make them unsuitable for conventional surgical valve replacement.

Mount Sinai Heart is involved in FDA-approved clinical trials of percutaneous aortic heart valves, using Medtronic CoreValve®





Developing a well-designed and well-supported technique for clearing CTOs has become the last frontier in PCI.

## **Annapoorna S. Kini, MD, MRCP Associate Director, Catheterization Laboratory & Intervention, on Complex Coronary Total Occlusions: Retrograde Approach**

A chronic total occlusion (CTO), found in 15 to 20% of all patients undergoing coronary angiography, is a complex blockage of a coronary artery that has lasted for more than 3 months. Because of their length and composition, which includes calcium and other fibrous materials, CTOs are technically challenging for even experienced interventionalists. Currently, benefits of opening these complex blockages include relief of angina; eliminating ischemia in asymptomatic patients, and improved left ventricular (LV) function.

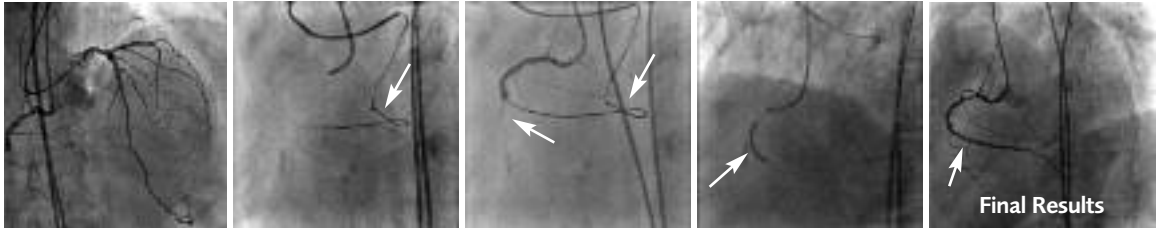
The guidelines of the American College of Cardiology recommend coronary artery bypass graft (CABG) for cases with CTO in more than two vessels. Patient selection is also very important. Younger patients with normal left

ventricular function in the presence of ischemia are also usually referred for CABG. However, within the elderly population, evidence of LV dysfunction and other co-morbidities, CABG can be a high-risk, highly invasive operation with a long, often difficult recovery. For these patients, Mount Sinai's Cath Lab has been working toward developing better methods of PCI.

The traditional method of PCI intervention for those who meet the guidelines in a CTO has been the antegrade approach. Our success rate for antegrade intervention is similar to that of other experienced cath labs, approximately 85%. However, recent instrumental and technical developments (including a wide selection of both thin "floppy" and "stiff" wires) have allowed interventionalists at Mount Sinai to perform PCI on another 10%, whose blockages prove resistant to the antegrade approach.

These patients return to the Cath Lab after they have healed completely, usually about 6-8 weeks later, for the second alternative procedure. Using what is termed the retrograde approach, we penetrate the blockage from both ends to achieve recanalization.

## Retrograde Technique for CTO Recanalization

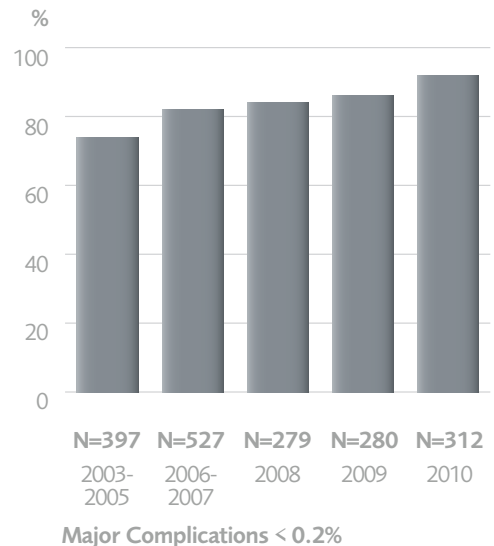


The key feature that makes this novel approach possible is the part played by collateral vessels. Normally dormant and very small, one or more collaterals are called into play when CTOs develop. The collateral(s) enlarge to let blood flow from an open coronary artery to an adjacent one or farther downstream on the same artery to create a necessary detour around the blocked artery. And it is this collateral that provides the back door by which the retrograde procedure can be successfully initiated.

Catheters are inserted over guidewires in both the groin and femoral arteries. The first and far smaller catheter approaches the blockage from the distal or back end, sliding the guidewire up the collateral until it reaches the blockage which is typically softer and more penetrable at the distal end. The wire continues delicate manipulation until it creates a small opening in the dense and calcified proximal cap.

Once the blockage has been breached, a second wire is inserted through the still very slender channel from the antegrade end. A balloon and stent can then be delivered, consistent with the direction of blood flow, to the lesion to clear the channel lengthwise. Blood begins to flow again in the artery and within 24 hours the collaterals, no longer needed for circulation, begin to recede and go dormant again. In terms of the time involved in carrying out the retrograde procedure it takes roughly twice as long as the antegrade approach. Also key is having exceptional hand-eye coordination and a well-developed tactile sensibility to negotiate through the passageways.

## Case Volume, Procedure Success and Major Complications of CTO at Mount Sinai Hospital





What has been mostly ignored until recently is the importance of minimizing bleeding complications after percutaneous coronary interventions.

## Michael Kim, MD, Director, Coronary Care Unit, on The Importance of Minimizing Bleeding in the Cardiac Cath Lab

Since the advent of coronary angioplasty over 30 years ago, interventional cardiologists have focused their research efforts predominately on the prevention of ischemic events, notably acute vessel closure and more recently stent thrombosis. Beyond the foundation of antiplatelet agents such as aspirin and antithrombotic agents such as heparin, more recent cocktails including more powerful agents such as clopidogrel, prasugrel, factor Xa inhibitors, and glycoprotein IIb/IIIa inhibitors have significantly decreased in the incidence of acute ischemic complications in the Cardiac Cath Lab.

What has been mostly ignored until recently is the importance of minimizing bleeding complications after percutaneous coronary interventions. It has become apparent from both observational and trial data that major bleeding after an interventional

procedure clearly leads to worse outcomes, both acutely and long-term. Because bleeding leads to the cessation of antiplatelet agents in the very important periprocedural time period and to multiple blood transfusions, the end result from the bleeding episode is paradoxically increased thrombotic events. The incidence of myocardial infarction, repeat revascularizations, and even mortality are all significantly increased after a major bleeding episode.

At Mount Sinai, our team has always been a step ahead of the curve when it comes to preventing major bleeding events in the Cath Lab. For over a decade, we have replaced the combination of heparin and GP IIb/IIIa inhibitors with bivalirudin (Angiomax). Multiple high-level trials have shown that by using bivalirudin in lieu of heparin and GP IIb/IIIa inhibitors not only decreases the incidence of major bleeds but also the incidence of death in a range of patient risk levels. We have decreased the incidence of vascular complications, blood transfusions, and overall length of stay in the hospital with the use of bivalirudin. Since 2006, when bivalirudin became the standard antithrombotic regimen used in



the Cath Lab, we have noticed a 30% drop in vascular complications including the near elimination of retroperitoneal bleeds, which are potentially fatal. Our lab is now using Angiomax in less studied scenarios such as endovascular interventions, aortic valvuloplasties, and chronic total occlusions.

More recently, our team of interventionalists has increasingly adopted the use of radial artery access for both routine diagnostic catheterization procedures and percutaneous interventions.

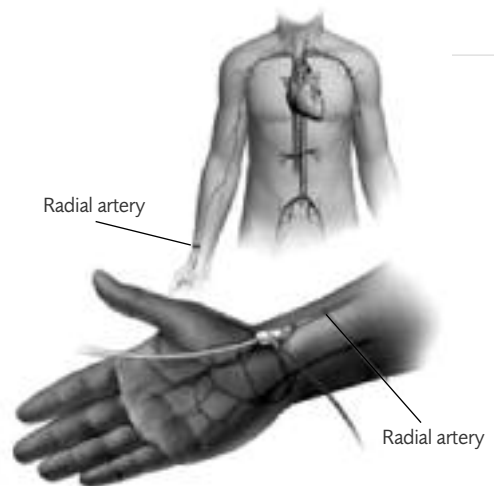
In Europe, Canada, and Asia, the incidence of radial artery catheterizations has skyrocketed as this technique has been demonstrated by numerous studies to almost completely eliminate vascular complications

and improve time to ambulation and patient satisfaction. I have personally increased my usage of the radial artery to over 35% of my procedures and the entire lab has jumped on the bandwagon.

I believe over the next decade, radial artery access will become the dominant vascular access site for our procedures. Ideal patients for radial artery access include obese patients, men and women with urinary retention, those with peripheral vascular disease, those who have had prior complications from femoral artery catheterizations, and those patients especially at risk for bleeding complications (eg. patients with chronic renal insufficiency or patients with coagulopathic disorders).

The combination of radial artery access and the use of bivalirudin has proven to be ideal for ambulatory (same-day) PCI, which represents another area where the Mount Sinai Cath Lab has taken the lead nationally. This past year we opened an 6-bed ambulatory recovery unit for individuals going home hours after their percutaneous coronary interventions. As the busiest cardiac cath lab in New York State, and one of the busiest labs in the world, it is imperative to increase the number of ambulatory PCI patients. Currently 35% of our patients go home the same day after PCI and we foresee over half of our patients going home in a few days.

Radial artery access is increasingly used at Mount Sinai.





## **Pedro Moreno, MD, Director, Translational Research, Cardiac Cath Lab, on New Concepts in Inflammation and Plaque Stabilization**

Inflammation is one of the body's principal defense mechanisms. Any injury can trigger an inflammatory response that sends leukocytes (white blood cells) to engulf or destroy the invaders. But when inflammation fails to resolve the invasion, disease can develop.

Within the last year we began to understand that though inflammation by itself is not harmful, the lack of resolution of inflammation is linked to several pathways of atherosclerotic plaque progression. First of all, the persistence of macrophage infiltration mediated by the action of aggressive neovascularization takes place within

the vessel wall. Neovascularization is another kind of inflammation, bringing oxygen to oxygen-starved (hypoxic) cells within the plaque via a compensatory network of tiny capillaries. Plaque neovascularization — a kind of angiogenesis — becomes a problem because the tiny capillaries that develop under these circumstances do not have strong vessel walls like other capillaries. Rather, they are porous and allow for leakage of quantities of red blood cells into the encapsulated plaque. This creates what is called intraplaque hemorrhage, illustrated in the Figure on the following page. This hemorrhaging is evolving as a major factor in the progression of atherothrombosis, especially in patients with diabetes mellitus (DM), for whom CVD is the leading cause of disease.

Under ordinary circumstances the arteries are protected from the cascade of events leading to intraplaque hemorrhage by what is known as the hemoglobin-haptoglobin complex. In this defensive process, haptoglobin (Hp) attaches to hemoglobin (Hb), the protein in red blood cells that transports oxygen. This Hb-Hp complex is then scavenged by the macrophage receptor CD163, which facilitates rapid clearance of iron from the plaque. When the complex fails and the scavengers do not function effectively, the red blood cells cannot be removed from the atherosclerotic plaque, releasing free heme or iron component into the plaque. Heme causes oxidation, and this oxidative stress, leads to the production of Reactive Oxidative Species (ROS), and apoptosis.

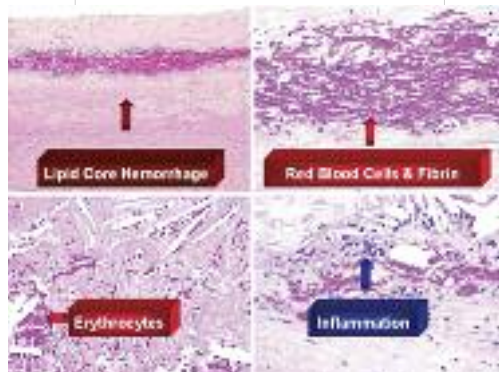
Though inflammation by itself is not harmful, the lack of resolution of inflammation is linked to several pathways of atherosclerotic plaque progression.

The plaque then becomes unstable and ruptures leading to a cardiovascular event.

Research has revealed that haptoglobin proteins are not all created equal, and consequently patient risk to disease progression varies. Uniquely in the human species, the Hp gene is polymorphic, with two common alleles giving rise to three possible genotypes: homozygous Hp1-1 and Hp2-2 and heterozygous Hp2-1 and Hp1-2. Each of these potential three-allele pairs is significantly different both structurally and functionally in its ability to protect against heme-driven oxidation and inflammation. We have learned that in diabetics, in particular, persons with the homozygous haptoglobin gene Hp2-2 are at significantly higher risk of vascular complications than the others. Whereas an individual with Hp1-1 might clear 980 of 1,000 molecules of hemoglobin in 30 seconds, the individual with Hp2-2 may only clear 450 molecules of hemoglobin in 2-4 minutes. This leads us to understand that the bearer of haptoglobin 2-2 has much more iron in his plaque, more inflammation in his arteries, a higher percentage of cells suffering from cell death, and that his or her level of the scavenger receptor CD163 is lower. Using experimental transgenic models, we have seen that when a heart attack occurs to Hp2-2 animals it tends to be much larger in terms of the amount of heart muscle affected. All these findings create a clear pathway from intraplaque hemorrhage, extravasation, iron deposition, and cell death. We have also explored the pathway inside the macrophage itself and find that there is a significant reduction of heme-oxygenase, an enzyme that catalyzes the degradation of heme.

The long-term value of these findings may lead to a reexamination of the antioxidant therapy, which was at one time widely prescribed as a preventive against cardiovascular disease, especially in patients with DM, but later abandoned because it was determined to offer no protection in genetically unselected populations. However, it now seems possible that for the subgroup of genotype Hp2-2 patients, whose innate antioxidant protection is inferior, that in the coming era of pharmacogenomics the reintroduction of antioxidant therapy to these patients may find a place.

Intraplaque hemorrhage is common in advanced coronary atherosclerotic lesions.





## Prakash Krishnan, MD, Director, Endovascular Intervention, on Carotid Stenting

Stroke is the third leading cause of death and first leading cause of serious long-term disability in the United States. It accounts for 12% of all death in industrialized countries with 750,000 strokes occurring annually in the United States. Thus, 1 out of every 4 men and 1 out of every 5 women aged 45 years can expect to have a stroke if they were to live to the current life expectancy of 85 years.

Starting in 2011, CAS will be offered in the Cath Lab through the Carotid Intervention Program.

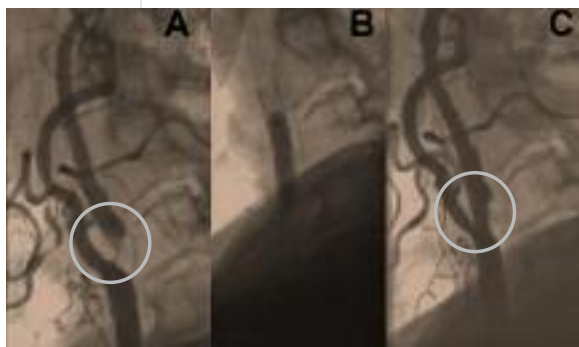
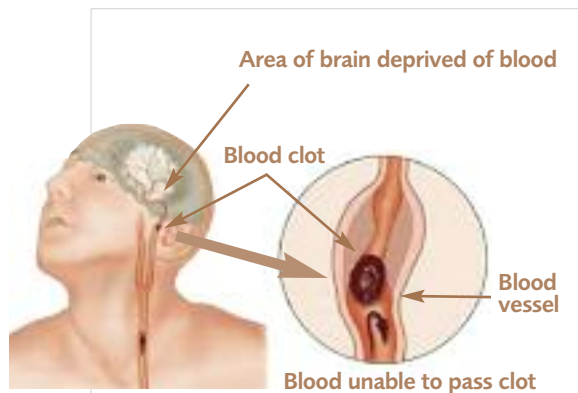
Most strokes are ischemic, accounting for 80% of all strokes (30% caused by atherosclerotic carotid artery disease). The remainder, intra-cerebral hemorrhage and subarachnoid hemorrhage are responsible for 10% and 5%, respectively.

Carotid Endarterectomy (CEA) has historically been the treatment of choice for both symptomatic and asymptomatic high-grade carotid artery lesions. In 1998, two landmark trials, NASCET (North American Symptomatic Carotid Endarterectomy Trial), and ACAS (Asymptomatic Carotid Atherosclerotic Study) paved the way for the American Heart Association to recommend CEA in symptomatic  $\geq 50\%$  carotid stenosis and asymptomatic  $\geq 60\%$  carotid stenosis as long as their perioperative risk of stroke and death be  $< 6\%$  and  $3\%$ , respectively.

In 2002, the SAPHIRE (Stenting and Angioplasty with Protection in Patients at High Risk for Endarterectomy) Trial randomized high-risk patients with  $\geq 50\%$  symptomatic carotid disease and  $\geq 80\%$  asymptomatic carotid disease to CEA or carotid artery stenting (CAS) with embolic protection. At 30 days, the risk of stroke in the two groups was almost identical (CEA, 3.1%; CAS, 3.1%;  $P > .99$ ). Significantly more patients in the CEA arm had periprocedural MI (6.6%) than the CAS group (4.4%) ( $P < .05$ ). At 1 year, both ipsilateral stroke and MI reached statistical significance; ipsilateral stroke (CEA, 3.3%; CAS, 0%;  $P = 0.03\%$ ) and MI (CEA, 7.9%; CAS, 2.5%;  $P = .04$ ).

This trial supported the FDA approval of CAS utilizing embolic protection in symptomatic high-risk  $\geq 70\%$  carotid disease. Other subsequent trials conducted in the US have supported the fact that CAS with embolic protection is at least non-inferior to CEA in high-risk asymptomatic  $\geq 80\%$  carotid stenosis or  $\geq 50\%$  high-risk symptomatic carotid artery disease. More recently, in 2010 a National Institutes of Health (NIH)-sponsored study, CREST (Carotid Revascularization Endarterectomy versus Stent Trial) concluded that CEA and CAS are similar in outcome (periprocedural stroke, MI, death or subsequent ipsilateral stroke) ie. (CEA, 6.8%; CAS, 7.2%;  $P=0.051$ ) although individual risk may vary, lower stroke with CEA, but lower MI with CAS. Patients that are younger have better outcomes with CAS and older patients' better outcomes with CEA.

As part of the comprehensive endovascular intervention program at Mount Sinai Heart, the Carotid Intervention Program will begin in the Cardiac Catheterization Laboratory in 2011. Prior to this, these interventions were performed in the Radiology Department. Doctors Krishnan, Wiley, and Dargas will perform the Carotid Stent procedures. To find out more information or make an appointment please contact Katherine Quiles at 212-241-4643 or email at [Katherine.quiles@mountsinai.org](mailto:Katherine.quiles@mountsinai.org).



(A) An 86-year-old man had 90% stenosis in the ostium of the left internal carotid artery (ICA). Note the heavy posterior calcification. A 2.0 x 40-mm Ranger and 4.0 x 40-mm Cobra 18 balloon (SciMed/Boston Scientific Corp.) were used for pre-dilatation.

(B) A 10 x 20-mm Wallstent (Schneider/Boston Scientific Corp.) had been deployed and with 5 x 20-mm Savvy balloon (Cordis Corp). The calcification prevented full expansion of the stent.

(C) Final angiographic image. Contrast within the ulceration is of no significance.



Percutaneous treatment of valvular heart disease using Evalve and TAVI are poised to change the future landscape of interventional cardiology.

## **George Dangas, MD, PhD, Director of Cardiovascular Innovation, Zena and Michael A. Wiener Cardiovascular Institute, on Cardiovascular Innovations on the Horizon**

A distinguishing characteristic of the team at Mount Sinai Cath Lab is their involvement in bringing together innovative devices, techniques, and collaborations. This can be attributed in part to a culture of collaboration between many departments, specialists, and researchers.

Our work with interventional transcatheter valve repair is an outstanding example. We are one of the leading clinical sites in the US for testing the much-anticipated CoreValve<sup>®</sup>. Very large in scope, the trial will include one patient group composed of those who qualify as high-risk for aortic valve surgery and a second group for whom surgery cannot be offered at all. At the same time, the Cath Lab is collaborating overseas with valve developers who are not yet eligible for clinical testing here in the US, because their devices have not reached a state of full maturity. This involvement, while not immediately applicable to our patients, is key to keeping abreast of innovations worldwide.

Other devices with which we are allied concern the mitral valve. One is the MitraClip<sup>®</sup>, which can repair a regurgitating valve through the transcatheter insertion of small staples to the leaflets. One other, with which I have been personally involved, applies compression of the annulus ring at the base of the valve. This could some day be used independently in clinical trials.

Additionally, we are working with our vascular surgery, interventional radiology, and vascular medicine colleagues. Mount Sinai's advanced imaging abilities are vital to understanding and planning complex procedures.

We are also partnering in multidepartment-based training programs and tracks that will further enhance future collaborations. Additionally, we can benefit from the transfer of discoveries made in Mount Sinai's molecular cardiology lab in the areas of stem cell therapy and other basic sciences. In the future, we expect these developments to add options to the treatment of certain complex heart problems.

## Roxana Mehran, MD, Director of Interventional Cardiovascular Research and Clinical Trials, Zena and Michael A. Wiener Cardiovascular Institute, on Duration of Antiplatelet Therapy after Drug-Eluting Stent Implantation



Drug eluting stents (DES), which substantially reduce restenosis compared with bare metal stents, represent one of the major breakthroughs in percutaneous coronary interventions (PCI). However, DES are not without their limitations. For most patients, stent implantation is followed by 12 months of dual antiplatelet therapy (aspirin plus clopidogrel or Plavix). This substantially reduces the risk of stent thrombosis or MI, but it also commits the patient to a higher risk for bleeding complications. This can prove challenging for older patients who may need surgical procedures for gastroenterologic disorders or joint replacement, for example, within the same time frame. To prepare for this second surgery, the antiplatelet therapy would have to be interrupted or discontinued to avoid increased bleeding during the procedure, with morbidity/mortality consequences that have as yet not been extensively studied or evaluated.

At Mount Sinai we always look at the whole patient and how treatment decisions enhance his or her longevity and quality of life.

The innate conflicts between antiplatelet therapy and no antiplatelet therapy can pose a challenge for the interventionalist. Here at Mount Sinai we always look at the whole patient and how treatment decisions enhance his or her longevity and quality of life. To help us improve our decision-making, we meticulously follow our patients for up to two years, collecting data and results, to better understand what happens in those cases when a patient does have to discontinue antiplatelet therapy for a short or long duration. But to move beyond the anecdotal to the broad picture, we are engaged in a large multi-center clinical study of which Mount Sinai is the clinical coordinating center. Known as the Paris Study, it involves over 5,000 patients and will take two years to complete.

When the data is in, all PCI interventionalists will have an enriched understanding of the comparative effects of guidelines' usage of antiplatelet drugs versus interrupted usage, with the possibility that we may find the differences to be minor or that dosages can be safely reduced in most patients. Following this portion of the study we will then seek to identify in advance the patients who, for whatever reasons of individual fitness or genetic make-up or some other factor, can readily tolerate shorter regimens of antiplatelet therapy.



Mount Sinai has been an innovative leader in the search for alternative advanced therapies that will offer hope to a greater number of patients with heart failure.

## Sean Pinney, MD, Director, Advanced Heart Failure and Cardiac Transplant Program, on Developing Advances in Heart Failure Management

We offer a full range of therapies for advanced heart failure, from ventricular assist devices (VADs) to cardiac transplantation. Our program has grown consistently – in 2010 we performed 24 adult heart transplants and implanted 38 VADs. Four years ago we performed half that volume. We expect to see continued growth in 2011.

We are investigating several innovative devices designed to improve the field of mechanical circulatory support. We are participating in a clinical trial of Terumo's DuraHeart, a third generation centrifugal flow device for bridging patients to cardiac transplantation. This pump provides flow with a magnetically levitated impeller, which may be more biocompatible than earlier generation devices. We are also working with HeartWare® to offer third generation technology for destination therapy. The HeartWare device promises better hemocompatibility, implantation through less invasive methods, and superior functional as well as quality-of-life results.

We are also exploring regenerative technologies for the failing heart. We were one of 22 participating centers in the CUPID Trial of gene therapy to repair damaged hearts. This trial aimed to determine the safety and feasibility of delivering the gene for SERCA2a, an intracellular protein involved in calcium handling. This new therapy offers the hope that physicians will one day be able to re-engineer damaged hearts without the need for surgery. We have also enrolled a small group of patients in an NIH-sponsored trial to study the safety and efficacy of injecting human mesenchymal stem cells into the hearts of patients receiving an LVAD. These cells have shown early promise of heart repair for patients with chronic myocardial ischemia with heart failure.

Our research efforts are focused on better understanding the mechanisms that produce advanced heart failure syndrome; the best heart repair techniques whether it be through gene therapy or cell therapy; expanding eligibility for heart transplant; and implantation of newer VADs. We are engaged in an NIH-sponsored trial to better understand the development of cardiac allograft vasculopathy (CAV), a progressive narrowing of blood vessels, and the determinants of long-term outcomes for heart transplant recipients. Finding a cure for CAV would allow heart transplant recipients to live longer, healthier lives.



## Barry Love, MD, Director, Congenital Cardiac Catheterization Laboratory, on Hybrid Closure of Post-Infarction Ventricular Septal Defect



The hybrid closure technique for VSDs holds promise for very high-risk patients.

Despite advances in care of patients with myocardial infarction, ventricular septal rupture continues to develop in 0.2% of patients. This acquired ventricular septal defect (VSD) typically develops several days after the initial infarction, and is more often seen in patients who present outside the window of revascularization. Without treatment, this condition is fatal in over 90% of cases. Once a portion of the ventricular septum becomes necrotic, a channel can form between the left and right ventricle. The left ventricle, already compromised by infarction, is now subjected to a further acute strain as output is diverted through the VSD to the lungs rather than to the body, and cardiogenic shock usually develops.

The “standard” therapy for this lesion has been surgical patching of the VSD on cardiopulmonary bypass (CPB), but this approach is associated with mortality as high as 70%. Facing these odds, physicians began experimenting in the mid-1990s with closing these defects in the cath lab, using devices designed to close other septal defects. This technique proved helpful for patients who make it out several weeks or months with their post-infarction VSD, as patients with acute post-infarction VSD and cardiogenic shock fare poorly with transcatheter methods.

Facing limited treatment options and a high mortality rate for untreated cases, Dr. Barry Love and Dr. Farzan Filsoufi decided to innovate. Borrowing a technique used to close congenital VSDs in infants, they reasoned that a large device could be used to patch the septum more effectively if it could be delivered directly through the right ventricle wall – perventricular delivery. They also thought that if the right-sided disk could be delivered on the outside of the right ventricle, that the wall of the right ventricle could help close the VSD. This hybrid technique of device placement in the operating room is done on the beating heart using a sternotomy, but without the need for CPB. It is mainly applicable to those patients with VSDs towards the apex of the heart – the most common site. The procedure is done using a nitinol/dacron occluder designed to close atrial defects. “The first patient we tried this in was intubated, on a balloon pump and starting to slide into multi-organ failure,” says Dr. Love. “The procedure itself took 15 minutes. He rapidly improved and went home in five days.” Subsequent procedures have had equally gratifying results. While it is too early to tell how this technique will fare in the long-run, it appears to hold promise for this group of very high-risk patients.



Great strides have been made to institute evidence-based, protocol driven practices in the day-to-day operations of patient management.

## Haydee Garcia, MSN, ACNP and Gloria Manzanilla, MA, ACNP, on Utilizing Current Guidelines to Optimize Quality in A High-Volume Cath Lab: Appropriateness Criteria and the Syntax Scoring System

Cardiovascular Disease (CVD), the leading killer in the US, costs the nation approximately \$274 billion each year, and that number will only continue to grow as the population ages. Prevention and

treatment strategies have focused on the traditional approach, mending the ischemic heart with medication and coronary revascularization. The popularity of angioplasty, the less-invasive answer to increasing life expectancy, reducing cardiac events and prolonging survival, has led the medical profession to re-examine the decision process for coronary revascularization.

In January 2009, appropriateness criteria guidelines for coronary revascularization were released and published in the *Journal of the American College of Cardiology* (JACC), as well as in *Catheterization and Cardiovascular Interventions and Circulation: Journal of the American Heart Association*. These guidelines, which were developed jointly by the American College of Cardiology Foundation (ACCF) and its partners, were presented as a set of four criteria: clinical symptoms, non-invasive test results, coronary anatomy, and medical therapy use, by which common, everyday clinical scenarios were deemed appropriate ('A'), inappropriate ('I'), or uncertain ('U').

Similarly, the SYNTAX Score, another tool grading the complexity of coronary artery disease (CAD), has been developed to guide in the selection of the ideal revascularization procedure. PCI vs. CABG in patients with multivessel CAD remains a subject of great debate. Patients with SYNTAX score >32 are usually referred for CABG. While studies have shown that CABG has remained the standard of care for patients with 3-vessel or left main CAD, PCI has reduced the gap in event-free survival rates and is performed in high-risk surgical patients.

At the Mount Sinai Heart Cardiac Cath Lab, great strides have been made to institute evidence-based, protocol driven practices, and have incorporated both the appropriateness criteria and SYNTAX scoring systems in the day-to-day operations of patient management. As of December 2010, a total of 360 appropriateness criteria and 274 SYNTAX patients have been reviewed, respectively. Outcomes have shown that instituting such rigorous guidelines has allowed us to maintain exceptional quality, despite high volumes. Our efforts remain ongoing and these tools allow us to measure our performance as effectively, efficiently and financially resourceful as possible.

## Yasmine Lee, NP and Surekha Patel, NP, on Patient Satisfaction and the Role of the Nurse Practitioner in Hospital-Based Outpatient Care

Patient satisfaction is a highly desirable outcome of clinical care in the hospital outpatient care. Changes occurring in the healthcare environment in the 21st century require healthcare delivery systems to provide high-quality care services with increased efficiency and cost-effectiveness.

The American College of Physicians (ACP) recognizes that nurse practitioners (NPs) and their collaborating physicians have common goals of providing patient-centered, high-quality care and improving the health status of those they service. ACP acknowledges that NPs are healthcare professionals with the capability to provide important and critical access to primary care. In an article by Weston, NP, and Bennett, NP, it was found that NPs improved outcomes and patient satisfaction in cardiology settings and physicians were generally happy for their help.

Here at Mount Sinai, NPs are utilized to provide superiority of medical management while maintaining or increasing quality of patient care. NPs not only focus on the illness, but on the person's overall well-being. The individual emphasis on health promotion and health education, as well as the prevention of disease, contributes to improved patient satisfaction.

Mount Sinai's hospital-based outpatient clinics are high-volume areas and the NP's function has a positive impact on quality of care. NPs serve as front-line caregivers initiating patient management using protocols with collaborating physicians. Integrated patient assessment by NPs and physicians provides safe, timely, and efficient patient-centered care.

Effective interdisciplinary care is crucial to ensure that all patients receive the high-quality collaborative care they deserve, and when NPs are teamed with physicians, patients are generally happier.



NPs not only focus on the illness, but on the person's overall well-being.

## Top Ten Major Publications: Mount Sinai Cardiac Cath Lab

1. Creatine Kinase-MB elevations after coronary intervention correlates with diffuse atherosclerosis and low-to-medium level elevation has a benign clinical course: Implication for early discharge after coronary intervention. Kini A, Marmur J, Kini S, Dangas G, Wallenstein S, Cocke T, Brown E, Ambrose J, Sharma S. *J Am Coll Cardiol* 34:663, 1999.

**Clinical Implications:** This observational study was the first report in the literature to document that minor post-procedure enzyme elevation are common after otherwise successful PCI and are not associated with any higher mortality at 12-15 months follow-up. We also established by careful follow-up, that patients with elevated CK-MB but declining value can safely be discharged home without any untoward events.

2. Plaque neovascularization is increased in ruptured atherosclerotic lesions of the human aorta: Implications for plaque vulnerability. Moreno P, Purushothaman K, Fuster V, Echeverri D, Truszczyńska H, Sharma S, O'Connor William. *Circulation* 110: 2032, 2004.

**Clinical Implications:** We are the pioneers in making the observation that one of the mechanisms of plaque rupture is mediated by new vessel formation in the adventitia and is exaggerated in diabetic patients and in lesions with high lipid contents.

3. A simplified approach to bifurcation lesions in medium-to-large size vessels: Simultaneous kissing stents (SKS) technique. *Am J Cardiol* 94: 913, 2004. Also SKS-DES in large bifurcation lesions. Sharma S, Ahsan C, Lee J, Kim M, Fisher E, Steinhilber A, Kini A. *Cathet Cardiovasc Interv* 65:10, 2005.

**Clinical Implications:** There are various techniques for PCI of large bifurcation coronary lesions but none of them is perfect. We invented a simplified bifurcation technique of placing two stents side-by-side with excellent short-term outcomes and lower restenosis (<5%) at 15 months of follow-up.

4. Results of repeat balloon valvuloplasty for treatment of aortic stenosis in patients aged 59 to 104 years. Agarwal A, Kini A, Attanti S, Lee P, Ashtiani R, Steinheimer A, Moreno P, Sharma S. *Am J Cardiol* 95:43, 2005.

**Clinical Implications:** While aortic valve replacement (AVR) is a standard treatment for symptomatic aortic stenosis (AS), many elderly patients are high-risk for AVR and functionally limited by AS. In these patients, opening the aortic valve by percutaneous balloon procedure (BAV) and repeating up to three times if needed, can provide effective symptomatic improvement for 3-5 years with low complication rates.

5. A risk score to predict in-hospital mortality for percutaneous coronary interventions. Wu C, Hannan E, Walford G, Ambrose J, Holmes D, King S, Clark T, Katz S, Sharma S, Jones R. *J Am Coll Cardiol* 47:654, 2006.

**Clinical Implications:** By interrogating a large NY State PCI database, independent factors influencing in-hospital mortality were identified with creation of a simple risk-score from 0-40 predicting in-hospital mortality from 0.05 to 99% after PCI. A simple handout for calculating PCI risk-score has been generated for use in daily clinical practice.

6. Bolus-only vs. Bolus + infusion of Glycoprotein IIb/IIIa inhibitors during percutaneous coronary intervention. Kini A, Chen V, Krishnan, P, Kim M, Suleman J, Mares A, Moreno P, Sharma S. *Am Heart J* 156:513, 2008.

**Clinical Implications:** While GP IIb/IIIa inhibitors are routinely used to improve PCI outcomes, their use is associated with higher vascular and bleeding complications. We reported that infusion of GP IIb/IIIa inhibitors after PCI could safely be eliminated (give bolus only), with decreasing vascular and bleeding complications yet maintaining anti-ischemic benefit up to 12 months follow-up.

7. Changing outcomes and treatment strategies for wire induced coronary perforations in the era of bivalirudin use. Kini A, Rafael O, Sarkar K, Rajdev S, Jakkula M, Mares A, Kaplish D, Krishnan P, Kim M, Sharma S. *Cathet Cardiovasc Intervent* 74:700, 2009.

**Clinical Implications:** This publication challenges the common practice of deferring bivalirudin use in cases of potential coronary perforation (largely due to lack of an antidote). Our systematic analysis showed that guidewire induced coronary perforation if occurs with bivalirudin use had benign course compared to occurring with heparin. This can simply be explained on the basis of short bivalirudin half life.

8. Culprit vessel percutaneous coronary intervention versus multivessel and staged percutaneous coronary intervention for ST-segment elevation myocardial infarction patients with multivessel disease. Hannah E, Samadashvili Z, Walford G, Holmes D, Jacobs A, Stamato N, Venditti F, Sharma S, King S. *J Am Coll Cardiol Interv* 3:22, 2010.

**Clinical Implications:** Analyzing various approaches of PCI in STEMI patients with multivessel disease, staged PCI after hospital discharge was the best approach for 2 year survival and non-culprit vessel PCI at the time of primary PCI had the worst outcome.

9. Efficacy of modified dual antiplatelet therapy combined with warfarin following percutaneous coronary intervention with drug-eluting stents. Baber U, Akhter M, Kothari S, Sharma S, Kini A. *J Invasive Cardiol* 22:80, 2010.

**Clinical Implications:** Triple therapy involving dual antiplatelet therapy in patients with long-term anti coagulation is a standard recommendation post-DES but is associated with high bleeding rates. Our paper suggested that low dose (81mg) aspirin daily with clopidogrel (75 mg) every other day for 1-3 yrs for DES in patients with warfarin may be the preferred approach and is associated with lower bleeding rates, and stent thrombosis compared to platelet mono-therapy or triple therapy.

Mount Sinai Heart Cath Lab has advanced the field of interventional cardiology by establishing appropriateness of interventional procedures and improving procedural outcomes by conducting and participating in well-designed clinical research trials and the publication of major clinical findings from an extensive interventional database of over 30,000 patients.

10. Outcomes of Patients Discharged the Same Day Following Percutaneous Coronary Intervention. Patel M, Kim M, Karajgikar R, Kodali V, Kaplish D, Lee P, Moreno P, Krishnan P, Sharma S, Kini A; *J Am Coll Cardiol Interv*, 3:851, 2011.

**Clinical Implications:** This largest series of same-day discharge of PCI patients (n=2,400) provided the system process for safe discharge of selected PCI patients with extremely low (<1%) major or minor cardiovascular and bleeding events at 30 days.

## Top Ten Key Clinical Trials:

Study Title	Study Details	Sponsor	Principal Investigator(s)	Target Enrollment & Study Sites	Current Status/ Enrollment MSH
FREEDOM Trial	Randomized trial comparing CABG vs. PCI in diabetic with multi-vessel disease. To evaluate whether PCI with DES is more or less effective than the existing standard of care CABG. Multicenter, two-arm, open-label prospective randomized superiority trial with equal allocation of three yrs duration.	National Heart, Lung and Blood Institute (NHLBI)	S. Sharma	2,058 (global)	Completed/ 71 subjects enrolled. 35 PCI/ 36 CABG
IMPELLA PROTECT II Trial	PROTECT II: A prospective, multi-center randomized controlled trial of the IMPELLA <sup>®</sup> RECOVER <sup>®</sup> LP 2.5 System versus intra-aortic balloon pump (IABP) in patients undergoing nonemergent high-risk PCI.	ABIOMED Inc.	S. Sharma	650 (USA)/ Terminated after 465 patients	Completed/ 25 subjects enrolled
SPIRIT Trial	Prospective, two-arm, open-label, multicenter registry using Xience Prime EECSS and Xience Prime LL EECSS in de novo native coronary artery long lesions (length = 32 mm) with reference vessel diameters (2.25 mm to = 4.25 mm).	Abbott Vascular Inc.	S. Sharma	500 (global)	Completed/ 10 subjects enrolled
ABCD-PCI Trial	Early ambulation and discharge vs. overnight hospital stay for patients undergoing successful vascular closure after PCI.	St. Jude Medical MSSM	M. Kim	600 (USA) 6 Centers/ Terminated after 256 patients	Completed/ 222 subjects enrolled
VWF Study	To determine if BAV and AVR is effective at reversing the acquired Type 2- vWF syndrome seen in severe AS. Deficient vWF and Factor-VIII complex is responsible for bleeding.	MSSM	J. Bander	100/Single Center MSSM	Ongoing/ 86 subjects enrolled

Study Title	Study Details	Sponsor	Principal Investigator(s)	Target Enrollment & Study Sites	Current Status/ Enrollment MSH
BOSS Trial	Evaluation of Sodium Bicarbonate to reduce the incidence of contrast-induced Nephropathy (CIN) in patients with chronic kidney disease (CKD) who are undergoing angiography and interventions	MD Scientific	M. Kim	450 (USA)	Ongoing/ 1 subject enrolled
YELLOW Trial	Chronometric observations of lipid core containing plaques of interest in native coronary arteries registry using the LipiScan Coronary Imaging System.	InfraReDx Inc. MSSM	A. Kini	80/Single Center MSSM	Ongoing/ 26 subjects enrolled
RESOLUTE-Long Trial	Endeavor resolute zotarolimus-eluting coronary stent system in the treatment of long de novo lesions in native coronary arteries with a reference vessel diameter of 2.25 mm to 4.25 mm; 38 mm stent	Medtronic Inc.	M. Kim	1,574 (USA) 80 Centers	Ongoing/ 12 subjects enrolled
Definite Calcium Study	Study to evaluate the short-term (30 day) safety and effectiveness using the SilverHawk LSC (RockHawk) with the SpiderFX embolic protection device for endovascular treatment of moderate to severely calcified lesions in femoropopliteal arteries.	EV3 Inc.	P. Krishnan	120 (USA) 18 Centers	Completed/ 14 subjects enrolled
Medtronic CoreValve Trial	Medtronic CoreValve; US Pivotal clinical trial of patients with severe aortic stenosis, who are high risk or extreme risk for cardiac surgery.	Medtronic Inc.	S. Sharma D. Adams	1,350 (USA) 40 Centers	Ongoing/ 3 subjects enrolled

# PATIENT SUCCESS STORIES

**Patient: Richard Melosh, 81-year-old male**

**Diagnosis:** Class 3 congestive heart failure due to severe aortic stenosis

**Treatment:** Medtronic CoreValve® procedure



"Dr. Sharma is a very smart doctor, and extremely skilled. His expertise made the whole experience so wonderful."

"For a while now I've been dealing with shortness of breath and fatigue. I was referred by my Cardiologist Dr. Arthur Weisenseel to Dr. Sharma for BAV (Balloon Aortic Valvoplasty), which helped me feel better for a while. But by November of 2010, my symptoms returned and I came in for a consultation with Dr. David Adams and Dr. Sharma at Mount Sinai. They told me that I had class 3 congestive heart failure due to a narrowing of my aortic valve, and that I qualified as a candidate for a new procedure that could save my life. I was told that this new approach, CoreValve, would allow them to actually replace my aortic valve without having to open my chest.

"I decided that I wanted to go ahead with the new procedure because I did not want open-heart surgery." On December 17, 2010, Richard Melosh was the first patient in the United States to undergo this revolutionary procedure. "After staying in the hospital for five days, I felt like a new person. I was very happy with my

choice and after the 30-day follow up I couldn't stop expressing how happy I was that I did not have to undergo the post-operative rehabilitation that goes hand-in-hand with open-heart surgery. I was even able to go back to my daily activities such as swimming and attend Dr. Sharma's fundraiser!

"Dr. Sharma is a very smart doctor, and extremely skilled. He explained the whole procedure thoroughly to me before the implantation day, and his expertise and skill made the whole experience so wonderful. I am grateful for Dr. Sharma, Dr. Adams, and the staff at Mount Sinai Medical Center."



**Patient: Carmelo Vonoflorio, 74-year-old male**

**Diagnosis:** Unstable angina and severe coronary atherosclerosis of left main artery

**Treatment:** Percutaneous coronary interventions of left main and insertion of three drug-eluting stents

“I had my first incident with circulatory problems in 1982 with a blockage of one of the arteries in my leg. I was told it was related to my diabetes, high cholesterol, and cigarette habit, and that I needed to do something about all of them. In late 2009 I began to experience frequent heartburn and chest pain and one day it was enough to send me to the ER. They took some pictures and said that I had developed severe coronary artery disease, and that the blockages could cause a heart attack or stroke if I didn’t get them removed.”

Because of his career in the clothing industry, he explained that he couldn’t afford the time that surgery required. His doctor suggested a specialized procedure practiced at Mount Sinai Cath Lab, which would require virtually no recovery time.

After being treated by Dr. Sharma, Vonoflorio was able to go back to work in two days. He has now changed his eating habits and spends 20 minutes a day on the treadmill. “I feel better every day. Dr. Sharma saved my life. No question about it.”



“I feel better every day. Dr. Sharma saved my life. No question about it.”

**Patient: Stuart Schloss, 68-year-old male**

**Diagnosis:** Coronary atherosclerosis, angina, restenosis of earlier stent insertions

**Treatment:** Rotational atherectomy of three arteries, replacement of one stent

“For years I have been coping with heart problems. I had a ‘silent heart attack’ 20 years ago, a stronger one more recently, and I’ve had several stents put in. But in 2009 I began having problems with everyday tasks. My doctor said he couldn’t do more for me because the affected arteries were smaller than the smallest stents available. I would just have to live with it.”

After contacting Dr. Sharma and learning of his “experience and expertise,” Schloss immediately made an appointment.

“Dr. Sharma put stents in three of my narrowed arteries and the next morning I already felt better,” explains Schloss. “It’s been more than a year now and I feel great. I am back to work and can do just about anything a healthy man my age can do. I am eternally grateful to Dr. Sharma for giving me my life back.”



“If he were to call me at 2 a.m. and say he needed change of a dollar, I would drive down and give it to him gladly, no questions asked. That’s what I think of him!”

## Patient: Marie Purvey, 64-year-old female

**Diagnosis:** Right coronary artery blockage

**Treatment:** PCI and stenting of proximal right coronary artery



"Dr. Kini is a regular 'Angel of Mercy' — calm and natural with a nice sense of humor."

"I've had two procedures at Mount Sinai in the last two years," Marie Purvey explains. "I really lucked out, all things considered, as that's how I met Dr. Kini.

"The first time was in November 2008 when I collapsed on the street while shopping nearby. Someone sent for an ambulance and in no time at all I was in Mount Sinai's ER and a lot of friendly people were hovering over me saying reassuring things. They told me I had a heart attack and that they were sending me upstairs

to the Cath Lab to 'clear my heart.' Those first minutes were all so unreal; Then out comes this very businesslike but smiling doctor who explains what she's going to do and tells me that when I wake up I will feel a lot better. And she was right."

With hypertension, hyperlipidemia, and a long history of smoking, Purvey's right coronary artery had gradually reached the point where it was no longer able to deliver adequate blood flow leading to the MI. Dr. Kini inserted a stent to reopen the clogged lumen and told Ms. Purvey that she would need to be watched in case the condition returned.

"When I began to feel chest pain again last summer I didn't hesitate to go right back to Dr. Kini," Ms. Purvey continues. "She's even better than I remembered, a regular 'Angel of Mercy' — calm and natural with a nice sense of humor. The second procedure was a breeze and I went home the next day. She's instructed me to eat more fiber and vegetables, to cut back on fats, and to take my meds without fail. I am trying harder as I don't want to disappoint her."

## Patient: Jongwon Son, 62-year-old male

**Diagnosis:** Myocardial infarction, unstable angina and severe three-vessel and left main disease; severe coronary atherosclerosis of left main artery

**Treatment:** Percutaneous coronary intervention of three-vessel with drug-eluting stents

“Ten years ago, when I lived in Flushing, Queens, I was told that I had severe coronary artery disease. One of the doctors I visited back then highly recommended that I undergo open-heart surgery. I neglected to take his advice because in the Korean culture we are opposed to medical procedures of this nature.

“I started experiencing chest pain everyday, but I ignored it and tried treating myself by taking sublingual nitroglycerin.” However, in 2010, the chest pain became so severe that I called my son in a panic and made him take me to the hospital. We went straight to Mount Sinai Hospital because we had heard about the reputation of their great Korean medical team who took very good care of their patients.

“When I first met Dr. Michael Kim I was extremely pleased and relieved that I could put my life in his hands. I trusted him very much. Dr. Kim and his medical team evaluated me and gave me the incredible news that I could be treated by not having to go through open-heart surgery. After the procedure I felt good immediately and I was able to walk, drive, and work without experiencing any chest pain. I had to go through a few more procedures but it has been three months since I visited the hospital and I am back to feeling young and alive again!”



“Dr. Kim was just incredible — I took a big leap of faith and entrusted my life to him and his medical team. I was not let down!”

## Patient: Fernando Tovar, 58-year-old male

**Diagnosis:** High risk post-MI with extensive anterior/anterolateral ischemia following stress test; severely diminished LV ejection fraction

**Treatment:** Reevaluation with diagnostic coronary and peripheral angiographies, left ventriculography, aortogram and intravascular ultrasound

"I am comforted to know that Dr. Moreno is there if I need him. To my amazement he's called me in Miami to see how I'm doing several times."



"I've had three heart attacks, beginning in 1988," explains fine artist Fernando Tovar. "The latest was in August 2010. My doctors in Miami inserted four stents to open up blocked arteries. But when I returned for a checkup they determined that I still had ischemia and that the ejection fraction in my left ventricle was dangerously low, all of which put me at high risk.

"I was really scared. I had no family history of heart disease and was otherwise healthy," Tovar continues. "With this dire outlook I wanted a second opinion." When the artist called his friend, a doctor in New York, he was told that Mount Sinai had the best interventionalists around. "I called Dr. Moreno immediately and he agreed to see me in less than a week."

When he arrived at Mount Sinai, Tovar recalls that Dr. Moreno's manner gave him a tremendous sense of confidence. On September 30th a series of diagnostic angiograms showed that the patient's stents were not restenosed after all. Three days later he took a high-risk positive stress test and coronary MRI. He was given the good news within an hour: His EF was up to 42%, indicating that a defibrillator would not be needed. Dr. Moreno's treatment plan focused on more exercise, weight loss, and better prescription adherence. "I've lost 65 pounds by exercising 45 minutes most days. I feel great, and Dr. Moreno is there if I need him. To my amazement he's called me in Miami to see how I'm doing several times."

## Patient: Barbara Mullins, 61-year-old female

**Diagnosis:** Blockage in left leg artery with resulting ulcerated toe and potential amputation

**Treatment:** Percutaneous transluminal angioplasty

“Last spring I developed an infection in my little toe that wouldn’t go away,” Mullins relates. “I’m an ex-smoker and I’ve had diabetes for several years now so I know that my feet are particularly prone to trouble. I went to see a vascular surgeon here in New Jersey and he found that I had a major blockage in a particular artery in my leg. He attempted to create a bypass of the blockage, but it didn’t take. Later, when my foot became more and more painful and was turning black, he said my only choice was to have a below-the-knee amputation.

“When I consulted my heart surgeon, he suggested that I go to New York and see Dr. Prakash Krishnan at Mount Sinai. If anyone could save me from life in a wheel chair, he could. I made an appointment almost immediately. Dr. Krishnan assured me I was not going to lose my leg.”

“Amputation is associated with terrific mortality,” Dr. Krishnan explains, “and in a patient like Barbara with diabetes, hypertension, and partial disability as a result of childhood polio, the outlook would have been very poor. Statistically, she would have a 50-50 chance of needing more amputations, developing infections as a result, and dying within five years.

“Our imaging showed that the femoral artery was severely blocked between hip and knee, so we recannulated the original blocked artery. Then we used a thrombolytic to further clear the pathway. The next day she had a bounding pulse and we brought her back to the Cath Lab to do an atherectomy of the popliteal artery, too.” Mullins was able to go home shortly after the second procedure. Within a month her foot ulcer had healed.



“Dr. Krishnan was just great, very warm and caring in the way he treated me.”

# FULL-TIME SENIOR FACULTY



## **Samin K. Sharma, MD, FSCAI, FACC**

**Zena & Micheal A. Wiener Professor** Medicine, Cardiology  
**Director** Cardiac Cath Lab & Intervention

### **Education and Training**

MBBS: SMS Medical College Jaipur, India

Residency, Internal Medicine: New York University Downtown Hospital

Fellowship, Cardiology: City Hospital Center at Elmhurst

Fellowship, Interventional Cardiology: Mount Sinai Hospital

### **Clinical Interests**

Coronary Artery Disease,  
Interventional Cardiology,  
Valvuloplasty

Samin K. Sharma, MD is well known for complex coronary interventions, performing over 1,600 interventions a year (the highest volume in the country) while achieving an extremely low rate of complications. According to the reports of the New York State Department of Health, he has the highest success rate of angioplasty (lowest mortality of <0.2%) in the entire group of interventional cardiologists in New York State from 1994 to 2003 and 2007-08, a remarkable feat considering the complexity of cases referred. Dr. Sharma has authored over 130 articles, over 300 abstracts, 12 book chapters and has been the editor of *Cardiology Clinics*, (December 2006 issue and February 2010 issue). Most of the publications describe the innovative procedural techniques to improve the interventions' success and reduce complication rates. Every year, a large number of interventionalists learn from Dr. Sharma's masterful teaching to become safe operators. He has been dubbed the 'master of rotablator,' a tool especially designed to tackle complex calcified blockages. He has been regularly featured on national and local TV channels and in various newspapers and magazines such as *Newsday*, *Newsweek*, *New York Times*, *New York Post*, *Forbes*, *Wall Street Journal*, *Barron's*, *Daily News*, *Washington Post*, *New York Resident*, *New York Sun*, *New York Magazine*, *Earthtimes*, *India Abroad*, and *India Today*. He has been continuously featured in the America's Top Physicians (by Castle Connolly) and *New York's Best Doctors & New York's Super Doctors* listings and in national *Who's Who* publications. Dr. Sharma also has a passion for teaching, sharing his expertise with fellows every day — who have awarded him the Simon Dack Best Teacher in Cardiology in 2000 and the Fellow's Advocate award in 2009. Dr. Sharma has also served on New York State's Cardiac Advisory Board since 2004. For his unprecedented success and outcome of angioplasty for the last ten years, New York State Governor George Pataki awarded him the 'Governor's Excellence Award' on May 23, 2006. Dr. Sharma is also the recipient of the 'Physician of the Year' award given by MSH nurses and the 'Jacobi Medallion Physician' award given by MSH physicians, in 2007. Dr. Sharma has had the privilege of performing invasive procedures on various heads of states and countries.

**Phone: 212-241-4021 E-mail: [samin.sharma@mountsinai.org](mailto:samin.sharma@mountsinai.org)**

## **Annapoorna S. Kini, MD, MRCP, FACC**

**Associate Professor** Medicine, Cardiology  
**Director** Interventional Cardiology Fellowship  
**Associate Director** Cardiac Cath Lab & Intervention

### **Education and Training**

MBBS: Kasturba Medical College Mangalore, India  
Residency, Medicine/Cardiology: University of Wales Cardiology, United Kingdom  
Fellowship, Cardiology: Mount Sinai Hospital  
Fellowship, Interventional Cardiology: Mount Sinai Hospital

Dr. Annapoorna Kini performs over 1,000 coronary interventions annually (the highest number by a female interventionalist in the United States) with an extremely low complication rate of <0.3%. In August of 2009, a New York State report named her the safest operator among 350 other physicians. She is highly regarded for performing complex coronary interventions especially in chronic total occlusions for patients with advanced heart disease with utmost safety and excellent long-term results. She has become the national expert on heart assist devices, including Tandem Heart™ and Impella®, which are crucial for many of these high-risk cases. Dr. Kini also specializes in the non-coronary interventions of mitral and aortic balloon valvuloplasty, and alcohol septal ablation for obstructive hypertrophic cardiomyopathy. Besides being a superb interventionalist, Dr. Kini is an excellent teacher, educating both cardiology and interventional fellows.

**Phone: 212-241-4181 E-mail: [annapoorna.kini@mountsinai.org](mailto:annapoorna.kini@mountsinai.org)**

## **Pedro R. Moreno, MD, FACC**

**Professor** Medicine, Cardiology  
**Director** Translational Research, Cardiac Cath Lab

### **Education and Training**

MBBS: Universidad Javeriana, Bogotá, Colombia  
Residency, Internal Medicine: Brigham and Women's Hospital  
Fellowship, Cardiology: Massachusetts General Hospital  
Fellowship, Interventional Cardiology: Massachusetts General Hospital

Dr. Pedro R. Moreno performs over one thousand cardiac coronary invasive procedures annually with >99% success rate and <1% major complications. Dr. Moreno is triple board certified in Internal Medicine, Cardiology, and Interventional Cardiology. As a world-renowned expert in atherosclerosis, Dr. Moreno has been a pioneer in the understanding of inflammation and acute coronary syndromes. Dr. Moreno was the first to describe the role of macrophages in living patients with acute coronary syndromes, and is a pioneer in atherosclerotic neovascularization and intra-plaque hemorrhage. He also identified a significant correlation between macrophages and tissue factor. These findings provided the rationale for revolutionary state-of-the-art therapies including anti-inflammatory and anti-proliferative drug-eluting stents, currently used in daily practice around the world.

**Phone: 212-241-3497 E-mail: [pedro.moreno@mountsinai.org](mailto:pedro.moreno@mountsinai.org)**



### **Clinical Interests**

General Cardiology,  
Interventional Cardiology,  
Hypertrophic Cardiomyopathy,  
Chronic Total Occlusions



### **Clinical Interests**

Clinical Cardiology,  
Cardiac Catheterization,  
Coronary Stenting,  
Vulnerable Plaque Imaging



## Michael C. Kim, MD, FACC

**Assistant Professor** Medicine, Cardiology  
**Director** Coronary Care Unit

### Education and Training

MD: Georgetown University School of Medicine, Washington, DC  
Residency, Internal Medicine: Mount Sinai Hospital  
Fellowship, Cardiology: Mount Sinai Hospital  
Fellowship, Interventional Cardiology: Mount Sinai Hospital

Dr. Michael C. Kim currently performs over 1,000 diagnostic catheterization procedures and over 650 percutaneous coronary interventions annually. He has quickly developed an outstanding clinical reputation within the tri-state area and boasts a superb safety record. Dr. Kim serves as both Director of the Coronary Care Unit and Director of Medical Education in the Cardiac Catheterization Laboratory at Mount Sinai Heart. As Director of the Coronary Care Unit, Dr. Kim is recognized as an expert in the management of critical care cardiology especially in the area of acute coronary syndromes, ambulatory PCI, and vascular access. He has published extensively and lectured frequently in multiple aspects of interventional cardiology.

**Phone: 212-241-6422 E-mail: [michael.kim@mounsinai.org](mailto:michael.kim@mounsinai.org)**

### Clinical Interests

Coronary Artery Disease,  
Cardiac Catheterization,  
Transradial Intervention,  
Interventional Cardiology



## Prakash Krishnan, MD

**Assistant Professor** Medicine, Cardiology  
**Director** Endovascular Intervention, Cardiac Cath Lab

### Education and Training

MBBS: Rajah Muthiah Medical College, India  
Residency, Internal Medicine: St. Vincent's Medical Center of Richmond  
Fellowship, Cardiology: Ochsner Clinic Foundation, LA  
Fellowship, Interventional Cardiology: Mount Sinai Medical Center  
Fellowship, Endovascular Intervention: North Central Heart Institute, SD

Dr. Prakash Krishnan is the Director of Endovascular Intervention at the Cardiac Catheterization Laboratory of Mount Sinai Heart. He is board certified in internal medicine, cardiovascular disease, endovascular medicine and interventional cardiology. His expertise includes non-surgical treatment of coronary and peripheral vascular disease including coronary stents, carotid stents, peripheral vascular angioplasty, laser atherectomy, directional atherectomy, renal stenting, and limb salvage.

Dr. Krishnan performs over 600 coronary and peripheral interventions annually. He is Director of the one-day Endovascular Symposium, a part of the annual Complex Coronary Symposium at Mount Sinai Medical Center. Dr. Krishnan also has a community-based outreach program that serves a vast population of patients with arterial disease.

**Phone: 212-241-6032 E-mail: [prakash.krishnan@mounsinai.org](mailto:prakash.krishnan@mounsinai.org)**

### Clinical Interests

Coronary Artery Disease,  
Interventional Cardiology,  
Peripheral Artery Disease,  
Endovascular Intervention



## George Dangas, MD, PhD, FACC

**Professor** Medicine, Cardiology  
**Director** Cardiovascular Innovation

### Education and Training

MD, PhD: National Kapodistrian University of Athens, Greece  
DHM: Naval School of Hyperbaric Medicine, Hellenic Navy, Athens  
Residency, Internal Medicine: Miriam Hospital, Brown University, Providence, RI  
Fellowship, Cardiology: Mount Sinai Medical Center  
Fellowship, Interventional Cardiology: Mount Sinai Medical Center

Dr. George Dangas performs 300 cardiovascular procedures annually. Dr. Dangas is a leading authority in the performance of nonsurgical cardiac and vascular interventions (e.g. stent, angioplasty, atherectomy) using both established and novel techniques and in the development of collaborative innovative approaches to treat complex problems across many specialties. He is currently serving as the Chair of the American College of Cardiology's Interventional Scientific Council and has previously held a position on the board of trustees of the Society for Cardiovascular Angiography & Interventions (SCAI). He is a co-director of the annual conferences Transcatheter Cardiovascular Therapeutics and Interventional Fellows' Courses in the US and Europe and a key faculty and program committee member for multiple international conferences including the ACCi2 Summit, ACCIS, and SCAI for many years. Dr. Dangas is the Director of Academic Affairs at the Cardiovascular Research Foundation.

**Phone: 212-241-7014 E-mail: [george.dangas@mountsinai.org](mailto:george.dangas@mountsinai.org)**



### Clinical Interests

Clinical Cardiology,  
Cardiac Catheterization,  
Coronary Stenting  
Endovascular Intervention

## Roxana Mehran, MD, FACC, FACP, FESC, FSCAI

**Professor** Medicine, Cardiology  
**Director** Interventional Cardiovascular Research and Clinical Trials

### Education and Training

MD, Internal Medicine: University of Connecticut  
Fellowship, Cardiology: Mount Sinai Medical Center  
Fellowship, Interventional Cardiology: Mount Sinai Medical Center

Dr. Roxana Mehran is internationally recognized for her work as a clinical trial specialist within the field of interventional cardiology. Her research interests range from mechanisms of restenosis to treatment and prevention of acute kidney injury in cardiac patients, as well as advancing treatments for acute coronary syndromes and acute myocardial infarction. Dr. Mehran is a widely published author and serves on the editorial board of multiple peer-reviewed journals. She is a regular speaker at national and international scientific conferences and has served as Course Co-Director of the annual Transcatheter Cardiovascular Therapeutics (TCT) for the last 13 years. She currently serves on the board of trustees of SCAI, as a member of the Program Committee for the AHA Scientific Sessions, and as Program Chair for the Society of Cardiac Angiography and Interventions – Women in Innovations (SCAI-WIN).

**Phone: 212-659-9691 E-mail: [roxana.mehran@mountsinai.org](mailto:roxana.mehran@mountsinai.org)**



### Clinical Interests

Restenosis Prevention,  
Advanced Cardiac Treatment,  
Kidney Injury After Contrast,  
Bleeding Prevention



## Sean P. Pinney, MD

**Assistant Professor** Medicine Cardiology  
**Director** Advanced Heart Failure and Cardiac Transplant Program

### Education and Training

MD: Georgetown University School of Medicine  
Residency, Internal Medicine: Beth Israel Deaconess Medical Center, Boston  
Fellowship, Cardiology: Columbia-Presbyterian Medical Center

Dr. Sean Pinney is a well-known cardiologist specializing in the management of patients with advanced heart failure. Together with Dr. Anelechi Anyanwu, Dr. Pinney established Mount Sinai's ventricular assist device program which offers a broad array of temporary and implantable devices for patients with cardiac failure. Under his leadership the heart transplant program at Mount Sinai has increased its clinical volume and improved patient outcomes. He has been recognized by his peers and Castle Connolly as being one of New York's best doctors. Dr. Pinney is an active clinical researcher who has led both NIH and industry-sponsored trials in the areas of cardiac transplantation and mechanical circulatory support. He serves on the American College of Cardiology Heart Failure and Transplant committee, the United Network for Organ Sharing (UNOS) MPSC committee and the medical advisory board for the New York Organ Donor Network.

**Phone: 212-241-7300 E-mail: [sean.pinney@mountsinai.org](mailto:sean.pinney@mountsinai.org)**

### Clinical Interests

Cardiac Catheterization,  
Cardiac Transplantation,  
Heart Failure,  
Endomyocardial Biopsy



## Barry A. Love, MD, FRCP

**Assistant Professor** Pediatrics and Medicine  
**Director** Congenital Cardiac Cath Lab

### Education and Training

MD: University of Western Ontario  
Residency: Pediatrics: McGill University Medical Center  
Fellowship: Children's Hospital Boston

Dr. Barry Love is director of the congenital cardiac catheterization laboratory at Mount Sinai Heart. Dr. Love holds a joint appointment in both the Department of Pediatrics and the Department of Medicine and is one of only a few physicians who perform interventional procedures on patients with congenital heart disease from infancy through adulthood. He has been a pioneer in extending many of the techniques used in the treatment of congenital heart disease to acquired heart lesions in adults such as perivalvular leaks and post-infarction ventricular septal defects. He has been recognized by Castle Connolly as one of America's Top Doctors for 2009 and 2010 and is listed as a *New York Times Magazine* Super Doctor from 2008 until 2011. Dr. Love's research interest is in new device technologies and he is a principal investigator for several device trials in congenital heart disease.

**Phone: 212-241-9516 E-mail: [barry.love@mssm.edu](mailto:barry.love@mssm.edu)**

### Clinical Interests

Pediatric Catheterization  
& Interventions,  
Pediatric and Adult  
Congenital Heart Disease

# FULL-TIME AFFILIATE FACULTY

## **Javed Suleman, MD**

**Associate Clinical Professor** Medicine, Cardiology

### **Education and Training**

MBBS: Sindh Medical College, Pakistan

Residency, Internal Medicine: Salem Hospital

Fellowship, Cardiology: Saint Vincent Hospital, Worcester, Massachusetts

Fellowship, Interventional Cardiology: Mount Sinai Hospital

### **Clinical Interests**

Clinical Cardiology, Coronary Intervention, CPORT, Primary PCI

**Phone: 718-297-0440 E-mail: [javed.suleman@mountsinai.org](mailto:javed.suleman@mountsinai.org)**



## **Robert Pyo, MD**

**Assistant Professor** Medicine, Cardiology

### **Education and Training**

MD: University of Illinois

Residency, Internal Medicine: Elmhurst Hospital

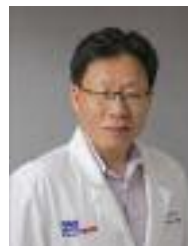
Fellowship, Cardiology: Mount Sinai Hospital

Fellowship, Interventional Cardiology: Mount Sinai Hospital

### **Clinical Interests**

Clinical Cardiology, Cardiac Catheterization, Coronary Interventions, Peripheral Interventions

**Phone: 212-241-9457 E-mail: [robert.pyo@mountsinai.org](mailto:robert.pyo@mountsinai.org)**



## **José Wiley, MD**

**Assistant Professor** Medicine, Cardiology and Radiology

**Associate Director** Endovascular Intervention

### **Education and Training**

MD: Universidad Central del Caribe, Bayamon, Puerto Rico

Residency, Internal Medicine: Tulane University School of Medicine

Fellowship Cardiology: Tulane University School of Medicine

Fellowship, Interventional Cardiology: Ochsner Clinic Foundation

### **Clinical Interests**

Interventional Cardiology, Cardiac Catheterization, Endovascular Intervention

**Phone: 212-241-9457 E-mail: [jose.wiley@mountsinai.org](mailto:jose.wiley@mountsinai.org)**



## **Joseph M. Sweeny, MD**

**Assistant Professor** Medicine, Cardiology

### **Education and Training**

M.D. Georgetown University School of Medicine, Washington, DC

Residency: Hospital of the University of Pennsylvania, Philadelphia, PA

Fellowship, Cardiology: Mount Sinai Medical Center, New York, NY

Fellowship, Interventional Cardiology: Mount Sinai Medical Center, New York, NY

### **Clinical Interests**

Acute Myocardial Infarction, Cardiac Catheterization, Coronary Stenting

**Phone: 212-241-7016 E-mail: [joseph.sweeny@mountsinai.org](mailto:joseph.sweeny@mountsinai.org)**





## **Ajith Nair, MD**

**Assistant Professor** Medicine, Cardiology

### **Education and Training**

MD: University of Texas, Southwestern, Dallas, TX

Residency: Mount Sinai Hospital

Fellowship: Mount Sinai Hospital

### **Clinical Interests**

Pulmonary Hypertension, Advanced Heart Failure & Mechanical Support, Cardiac Transplantation

**Phone: 212-241-7300 E-mail: [ajith.nair@mssm.edu](mailto:ajith.nair@mssm.edu)**



## **Claudia Serrano, MD**

**Assistant Professor** Medicine, Cardiology

### **Education and Training**

MD: Pontificia Universidad Javeriana, Colombia

Residency: Internal Medicine: Tulane University School of Medicine, New Orleans

Fellowship, Cardiology: Tulane University School of Medicine, New Orleans

Fellowship, Interventional Cardiology: St. Luke's – Roosevelt Hospital, New York

### **Clinical Interests**

Clinical Cardiology, Coronary Interventions, Endovascular Interventions

**Phone: 646-265-9802 E-mail: [claudia.serrano@mountsinai.org](mailto:claudia.serrano@mountsinai.org)**



## **Atul M. Limaye, MD**

**Assistant Professor** Medicine, Cardiology

### **Education and Training**

MBBS: MAMC, University of Delhi, India

Residency: Bronx Lebanon Hospital Center, NY

Fellowship, Non-invasive Cardiology: Brigham & Women's Hospital, Boston

Fellowship, Cardiology: Montefiore Medical Center, NY

Fellowship, Interventional Cardiology: Mount Sinai Medical Center, NY

### **Clinical Interests**

Clinical Cardiology, Coronary Interventions, Peripheral Interventions

**Phone: 914-423-8115 E-mail: [atul.limaye@mountsinai.org](mailto:atul.limaye@mountsinai.org)**



## **Jason Kovacic, MD**

**Associate**

### **Education and Training**

MD: University of Melbourne, Australia

PhD: Victor Chang Cardiac Research Institute through University of New South Wales, Australia

Residency, Internal Medicine: Prince of Wales Hospital, Sydney, Australia

Fellowship, Cardiology: St. Vincent's Hospital, Sydney, Australia

Fellowship, Vascular Biology: National Heart Lung and Blood Institute, NIH

Fellowship, Interventional Cardiology: Mount Sinai Hospital

### **Clinical Interests**

Coronary Interventions, Clinical Cardiology, Vascular Biology, Atherosclerosis

**Phone: 646-593-2552 E-mail: [jason.kovacic@mountsinai.org](mailto:jason.kovacic@mountsinai.org)**

# VOLUNTARY/PART-TIME FACULTY

## **José Meller, MD**

**Clinical Professor** Medicine, Cardiology

### **Education and Training**

MD: Catholic University of Chile, Santiago  
Residency, Internal Medicine: Mount Sinai Hospital  
Fellowship, Cardiology: Mount Sinai Hospital

### **Clinical Interests**

Clinical Cardiology, Fellows' Education, Cardiac Catheterization

**Phone: 212-988-3772 E-mail: josemeller44@gmail.com**



Master Teacher

## **Mazullah Kamran, MD**

**Associate Professor** Medicine, Cardiology  
**Director** Cardiac Cath Lab, Elmhurst Hospital

### **Education and Training**

MD: Albany Medical College  
Residency, Internal Medicine: University of Pittsburgh  
Fellowship, Cardiology: North Shore University Hospital at Manhasset  
Fellowship, Interventional Cardiology: Mount Sinai Hospital

### **Clinical Interests**

Clinical Cardiology, Fellows' Education, Cardiac Catheterization

**Phone: 718-334-5018 E-mail: mazullah.kamran@mountsinai.org**



## **Johnny Lee, MD**

**Associate Clinical Professor** Medicine, Cardiology

### **Education and Training**

MD: Mount Sinai School of Medicine  
Residency, Internal Medicine: Mount Sinai Hospital  
Fellowship, Cardiology: Mount Sinai Hospital  
Fellowship, Interventional Cardiology: Mount Sinai Hospital

### **Clinical Interests**

Clinical Cardiology, Non-Invasive Cardiology, Coronary Interventions

**Phone: 212-532-0888 E-mail: contactus@nyheart.net**



## **Paul S. Lee, MD**

**Associate Professor** Medicine, Cardiology

### **Education and Training**

MD: University of Minnesota  
Residency, Internal Medicine: Mount Sinai Hospital  
Fellowship, Cardiology: Mount Sinai Medical Center  
Fellowship, Clinical Heart Failure and Molecular Cardiology: University of Toronto  
Fellowship, Interventional Cardiology: Mount Sinai Hospital

### **Clinical Interests**

Clinical Cardiology, Biostatistics, Interventional Cardiology

**Phone: 718-290-2918 E-mail: quantmann@yahoo.com**





## **Sameet Palkhiwala, MD**

**Assistant Clinical Professor** Medicine, Cardiology, Radiology

### **Education and Training**

MD: New York Medical College

Residency, Internal Medicine: St. Luke's – Roosevelt Medical Center, NY

Fellowship, Cardiology: St. Vincent's Medical Center

Fellowship, Interventional Cardiology: Mount Sinai Hospital

### **Clinical Interests**

Clinical Cardiology, Endovascular Interventions, Coronary Interventions

**Phone: 718-204-7200 E-mail: s\_palkhiwala@yahoo.com**



## **Anthony T. Shih, MD**

**Clinical Instructor** Medicine, Cardiology

### **Education and Training**

MD: State University of New York at Buffalo

Residency, Internal Medicine: Hospital of the University of Pennsylvania

Fellowship, Cardiology: Mount Sinai Hospital

Fellowship, Interventional Cardiology: Mount Sinai Hospital

### **Clinical Interests**

Clinical Cardiology, Endovascular Interventions, Coronary Interventions

**Phone: 914-963-0111 E-mail: tonyshih1972@yahoo.com**



## **Srinivas Kesanakurthy, MD**

**Assistant Clinical Professor** Medicine, Cardiology

### **Education and Training**

MBBS: Rangaraya Medical College, Kakinada, India

Residency: Lenox Hill Hospital

Fellowship, Cardiology: Lenox Hill Hospital

Fellowship, Interventional Cardiology: Lenox Hill Hospital

### **Clinical Interests**

Clinical Cardiology, Cardiac Catheterization, Coronary Interventions

**Phone: 646-335-2795 E-mail: kesana@yahoo.com**



## **Robert A. Zaloom, MD**

**Assistant Clinical Professor** Medicine, Cardiology

### **Education and Training**

MD: Ross University

Residency, Internal Medicine: Lutheran Medical Center

Fellowship, Cardiology: SUNY Downstate Medical Center

### **Clinical Interests**

Clinical Cardiology, Echocardiography, Cardiac Catheterization

**Phone: 718-238-0098 E-mail: robzaloom@gmail.com**

## **George Fernaine, MD**

**Assistant Clinical Professor** Medicine, Cardiology

### **Education and Training**

MD: SUNY, Health Science Center  
Residency, Internal Medicine: St. Vincent's Hospital  
Fellowship, Cardiology: St. Vincent's Hospital  
Fellowship, Interventional Cardiology: Lenox Hill Hospital

### **Clinical Interests**

Clinical Cardiology, Coronary Interventions, Peripheral Interventions

**Phone: 718-238-0098 E-mail: [george.fernaine@mountsinai.org](mailto:george.fernaine@mountsinai.org)**



## **Farah E. Atallah-Lajam, MD**

**Assistant Clinical Professor** Medicine, Cardiology

### **Education and Training**

MD: Universidad Autonoma De Santo Domingo, Santo Domingo  
Residency, Internal Medicine: Elmhurst Hospital  
Fellowship, Cardiology: Brooklyn Hospital  
Fellowship, Cardiac Catheterization, Nuclear Cardiology: Lenox Hill Hospital

### **Clinical Interests**

Clinical Cardiology, Cardiac Catheterization, Coronary Interventions

**Phone: 212-439-6000 E-mail: [falcardiology@gmail.com](mailto:falcardiology@gmail.com)**



## **William J. Schwartz, MD**

**Assistant Clinical Professor** Medicine, Cardiology

### **Education and Training**

MD: Albert Einstein College of Medicine, New York  
Residency, Internal Medicine: Bronx Municipal Hospital Center  
Fellowship, Cardiology: Bronx Municipal Hospital Center  
Fellowship, Cardiac Catheterization: New York University Medical Center

### **Clinical Interests**

Clinical Cardiology, Non-invasive Cardiology, Cardiac Catheterization

**Phone: 718-721-1500 E-mail: [wjsheartmd@aol.com](mailto:wjsheartmd@aol.com)**



## **Choudhury M. Hasan, MD**

**Assistant Clinical Professor** Medicine, Cardiology

### **Education and Training**

MBBS: Dhaka Medical College, Dhaka, India  
Residency, Internal Medicine: The Brooklyn Hospital Center  
Fellowship, Cardiology: The Brooklyn Hospital Center  
Fellowship, Interventional Cardiology: Deborah Heart and Lung Center

### **Clinical Interests**

Cardiac Catheterization, Coronary Interventions, Echocardiography

**Phone: 718-657-8003 E-mail: [cmmhasan03@gmail.com](mailto:cmmhasan03@gmail.com)**





## **Claude Simon, MD, PhD, FACC**

**Assistant Professor** Medicine, Cardiology

### **Education and Training**

MD: University of Massachusetts, MA

Residency, Internal Medicine: Yale, New Haven, Greenwich Hospital, CT

Fellowship, Cardiology: Yale-Bridgeport Hospital, CT

Fellowship, Interventional Cardiology, Bridgeport Hospital, CT

### **Clinical Interests**

Interventional Cardiology, Clinical Cardiology, Cardiac Catheterization

**Phone: 845-641-8920 E-mail: [claudio.simon@mountsinai.org](mailto:claudio.simon@mountsinai.org)**



## **Timothy G. Jayasundera, MD**

**Clinical Instructor** Medicine, Cardiology

### **Education and Training**

MD: Ross University School of Medicine

Residency: Georgetown University Medical Center

Fellowship, Cardiology: Drexel Hahnemann University Hospital, Philadelphia

Fellowship, Interventional Cardiology: The Mount Sinai Medical Center

### **Clinical Interests**

Interventional Cardiology, Aspirin and Clopidogrel Resistance, Acute Coronary Syndromes

**Phone: 718-763-6666 E-mail: [jayasunderamdpc@yahoo.com](mailto:jayasunderamdpc@yahoo.com)**



## **Lynne Glasser, MD**

**Assistant Professor** Medicine, Cardiology

**Director** Interventional In-Patient Service

### **Education and Training**

MD: SUNY Health Science Center

Residency, Internal Medicine: New York University Medical Center

Fellowship, Cardiology: Manhattan Veterans Administration Medical Center

Since joining Mount Sinai Medical Center in November 2008, Dr. Glasser is playing an important role in the treatment and management of interventional patients, before and after the procedure.

### **Clinical Interests**

Clinical Cardiology, Preventive Cardiology

**Phone: 212-241-4521 E-mail: [lynne.glasser@mountsinai.org](mailto:lynne.glasser@mountsinai.org)**



## **Rosario Marasigan, RN, CCRN**

**Clinical Nurse Manager**

### **Education and Training**

BS, Nursing: Philippine Women's University

Rosario Marasigan is the clinical nurse manager since 2006. In this role she manages a unit with complex staff of over 132 health professionals. Rosario has been an excellent clinical and charge nurse for 16 years prior to being the manager. She is a great teacher at the bedside and a role model for new nurses in the Cath Lab.

**Phone: 212-241-1835 E-mail: [rosario.marasigan@mountsinai.org](mailto:rosario.marasigan@mountsinai.org)**



## Cynthia Wilde, RN, CCRN

Network Program Manager

### Education and Training

BS, Nursing: Molloy College, NY

Cynthia Wilde has been the Network Program Manager since November 2008. She is responsible for the cath labs at North General Hospital and Lutheran Medical Center.

**Phone: 212-241-0459 E-mail: [cynthia.wilde@mountsinai.org](mailto:cynthia.wilde@mountsinai.org)**



## Gregory Gojkovich

Operations Manager

### Education and Training

AA degree: Moorpark College, CA

Greg Gojkovich currently oversees all the operational aspects of Mount Sinai Heart Cath Labs and its network of affiliates.

**Phone: 212-241-1548 E-mail: [gregory.gojkovich@mssm.edu](mailto:gregory.gojkovich@mssm.edu)**



## Nurse Practitioner Team

Mount Sinai's dedicated staff of nurse practitioners work closely with the physicians in planning and implementing care from the time of intake to discharge, ensuring a quality experience at all points in the patient's visit.



Antonietta Tolentino



Gloria Manzanilla



Rheoneil Lascano



Surekha Patel



Haydee Garcia



Yasmine Lee



Melissa Mattimore



Leticia Jakasal



Suzette Chan



Tanya Sullivan



Tia Coleman



Kevin Williams



Jennifer del Campo



Supawadee Pitakmongkolkul

## Interventional Cardiology Fellows

Mount Sinai Heart's interventional cardiology fellowship program is the largest in the country, educating the next generation of clinical cardiology and interventional cardiology specialists. This well-regarded program, which combines academic and hands-on experience, has graduated physicians who are serving as noted leaders in community and academic medical centers.



Usman Baber, MD



Sumit Tickoo, MD



Mitchell Weinberg, MD



Vinod Patel, MD



Shyam Poludasu, MD



Jeffrey Bander, MD



Anuj Shah, MD



Sandeep Chhabra, MD

## Interventional Database Team

(Left to Right) Roja Thapi, Birju Narechania, Delenia Gulle, Avineshwar Jaipersaud, Rucha Karajgikar, Vinita Vishnoi



## Interventional Research Team

(Left to Right) Theresa Franklin-Bond, EJ Fernandez, Eyal Levy, Arthur Tarricone, Kristin Falciglia, Asam Asif, Kameswari Vallabhajosyula, Maria Alu, Michael Fusilero



## Supporting Staff

(Left to Right) Jacqueline Nordstrom, Elena Ramos, Merlyn Blackwood, Shulandia Avila, Pearl Hernandez

## A Dedicated Team

The total number of cath lab staff including nurses, technicians and support staff has grown to over 132 dedicated employees. Each member of the cath lab staff has a strong work ethic and takes pride in their contribution to the goal of the department – delivery of efficient and safe care to patients in need.





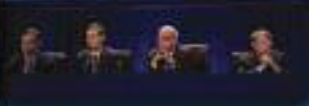
LIVE SYMPOSIUM OF  
**COMPLEX  
CORONARY & VASCULAR  
CASES**

14TH ANNUAL

**JUNE 15-18, 2011**

New York, New York

*Register by April 15th  
and save up to \$125*



• **Complex Coronary Cases**

*Calcified, Bifurcation and Total Occlusion*

• **Endovascular Intervention**

*Iliac, Femoral, Renal and Carotid*

• **Structural Heart Disease Intervention**

*Valvuloplasty, Percutaneous Valve Replacement,  
Septal Ablation, PAD/ASD Closure*

**CORONARY SYMPOSIUM  
DIRECTORS**

Samin K. Sharma, MD  
Annapoorna S. Kini, MD

**CORONARY SYMPOSIUM  
CO-DIRECTORS**

Pedro Moreno, MD  
Michael Kim, MD  
George Dangas, MD  
Roxana Mehran, MD  
Joseph Sweeney, MD  
Sameer Mehta, MD

**VASCULAR SYMPOSIUM  
DIRECTOR**

Prakash Krishnan, MD

**VASCULAR SYMPOSIUM  
CO-DIRECTORS**

J. Michael Bacharach, MD  
Peter Faries, MD  
Jeffrey Olin, DO  
Jose Wiley, MD  
Robert Pyo, MD

**NURSE TECHNICIAN  
SYMPOSIUM DIRECTORS**

Robin Krinsky, RN-BC, CCRN  
Antonietta Tolentino, ANP-C



**FELLOWS REGISTRATION FEES WAIVED!**

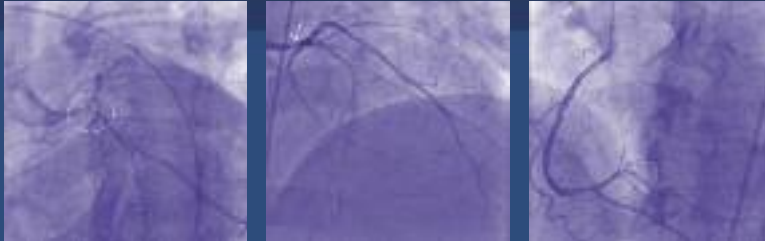
**[www.cccsymposium.org](http://www.cccsymposium.org)**





# CCC Live Cases

## Complex Coronary Cases



### PURPOSE

These live seminars will highlight in-depth procedural techniques for managing complex coronary cases. These live cases will be streamed in real time over the Internet and viewers can participate in our online didactic discussion.

### LEARNING OBJECTIVES

- Discuss the rationale for choice of percutaneous coronary intervention
- Discuss choices of antiplatelet therapy
- Demonstrate the use of plaque modification, especially Rotablator®
- Demonstrate the application of large, randomized drug-eluting stent clinical trials results within an interventional clinical practice

### TARGET AUDIENCE

Cardiologists, interventional cardiologists, fellows, cardiovascular technicians, and cath lab nurses

Please visit [www.ccclivecases.com](http://www.ccclivecases.com) or [www.theheart.org](http://www.theheart.org) to register.

## 2011 WEB CONFERENCE SCHEDULE

March 15  
April 19  
May 17

June 21  
July 19  
August 16

September 20  
October 18  
November 15

December 20

**8 TO 9 AM**

# MOUNT SINAI CATH LAB PARTNERS & AFFILIATES



**Mount Sinai of Queens, Astoria**



**Lutheran Medical Center, Brooklyn**



**St. John's Hospital, Yonkers**



**Good Samaritan Hospital, Suffern**

A great deal of Mount Sinai Cath Lab's success comes from strong relationships with our regional colleagues. We would like to thank these partners for their continued contributions.

**Cardiology Unlimited, Eliscer Guzman, MD**

**Broadway Cardiopulmonary, P.C.**

**Levit Medical Center, SSL Quality Care Diagnostic and Treatment Center, Inc.**

**Long Island Heart Associates, Steven Shayani, MD, & Associates**

**Family Health Cardiac Center, Niranjn Mittal, MD**

**Park Avenue Family Practice, L.L.C., James Sayegh, MD**

**Riverside Medical Group, Sudhakar Mettu, MD & Associates**

**Manhattan Medical Group, Shuja Qadir, MD**

**Mount Sinai of Coney Island, Gary Spektor, MD**

**Mount Sinai of Staten Island, Seshadri Das, MD**

**Westchester Health Associates, George Berk, MD & Associates**

**Midland Avenue Family Practice, P.C., Steven Franscone, MD**

**Manuel Velasquez, MD, P.C.**

**Hea-Shin Kang, MD, P.C.**

**Arshad Anwar, MD, P.C.**

**Saeed Siddiqui, MD, P.C.**

**Richmond Internal Medicine, P.C.,**

**Javier Chacon, MD**

**Brook Island Medical Associates, P.C., C.S. Govindaraj, MD**

**Bath Beach Medical, P.C., C.S. Govindaraj, MD**

**We Care Health & Medical Services, P.C., Carlos Diggs, MD**

**Heights Medical Care, P.C., Larry Neuman, MD**

**DOC Medical Office of Yonkers & Bronx, Rajeev Sindhvani, MD**

**Hamid and Aslam Medical Group, Inc.**

**North Shore Cardiac Imaging, P.C.**

**Westside Internal Medicine Associates, P.C.**

**Prime Care Medical Group, Jamaica, P.C.**

**Prime Care Medical of Brighton, P.C.**

**Satyavathi Sharma, MD, P.C.**

**Qazi Kamal Haider, MD, P.C.**

**Gondal Medical Care, P.C.**

**Multi Medical Care, P.C.**

**Knickerbocker Medical Care, P.C.**

**Northern Heart Specialists, P.C.**

**Seventh Avenue Medical, P.C.**

**MSHeart Voluntary/Full-Time Cardiology Faculty and Many More...**

# MOUNT SINAI HEART DIRECTORY

Area	Telephone
MS Heart Director	212-241-7911
Cardiac Nursing	212-241-3483
Cardiac Rehab Program	212-241-8597
Cardiology Administration	212-241-4030
Cardiology Appointments	212-427-1540
Cardiology Privileges	212-241-4029
Cardiothoracic Surgery	212-659-6800
Cardiovascular MRI and CT Imaging	212-241-3917
<b>Catheterization Laboratories</b>	<b>212-241-5881</b>
<b>Cath Lab Assistance ('any issues')</b>	<b>212-241-0935</b>
Catheterization Laboratory Events	212-241-0592
<b>Catheterization Laboratory Office</b>	<b>212-241-4021</b>
Catheterization Laboratory Research	212-241-0229
<b>Catheterization Laboratory Scheduling</b>	<b>212-241-5136</b>
Coronary Care Unit	212-241-7272
Echocardiography	212-241-1719
Electrophysiology/Pacemakers	212-241-7272
Genetic Disorders	212-241-3303
Heart Failure/Transplantation	212-241-7300
Lipid Management	212-241-7651
MS Heart Information Technology	212-241-4026
Nuclear Cardiology and Stress Testing	212-241-1718
Pediatric Cardiology	212-241-8662
Pulmonary Hypertension	212-241-7300
<b>To Transfer a Patient</b>	<b>212-241-6467</b>
Vascular Laboratory	212-241-6773
Vascular Surgery	212-241-5315

Written, designed and printed by  
 Onward Publishing Inc.  
 6 Bayview Avenue  
 Northport, NY 11768  
 631-757-8300  
[www.onwardpublishing.com](http://www.onwardpublishing.com)

©The Mount Sinai Medical Center  
 2011 Marketing & Communications



## MISSION:

The Cardiac Catheterization Lab at Mount Sinai Heart is advancing the field of interventional cardiology by pioneering new techniques and expanding existing applications, to broaden its scope through standardization, teamwork, and procedural excellence.