

Cardiovascular Physician

A clinical practice and research publication.

VOL 17 | NO 1 | SPRING 2021



How inventive solutions for one translate to enhanced treatment for all.

Perspective from Stuart F. Seides, MD, physician executive director, MedStar Heart & Vascular Institute

Whether “horses” or “zebras” all patients benefit from **expansive knowledge and experience.**

We are all familiar with the well-worn diagnostic adage, “When you hear hoofbeats, think horses, not zebras.” The principle is quite simple—with any diagnostic presentation the odds favor the more common diagnosis rather than a rare one. As a busy referral center, we frequently focus on the more difficult cases. Still, whether “horse or zebra,” every patient receives our full attention and due diligence.

Our broad range explains the strong commitment to clinical research and to treatment innovation. Our goal is to provide every patient with care that produces the best possible outcome. Sometimes that means using de novo approaches to meet the needs of a small subset of patients—those zebras—for the ultimate benefit of the more commonplace. In this issue of *Cardiovascular Physician*, we highlight a bit of both—the rare and the commonplace diagnoses—and their successful treatment strategies.

Our feature story, on page 4, demonstrates the impact of our Advanced Heart Failure and Interventional Cardiology programs when their discrete areas of expertise are united toward expanding treatment options for a broader population.

Customizing the optimal approach for individual patients is a MedStar Heart & Vascular Institute hallmark. Our technology toolkit exists only to serve the best interests of each. On pages 10 and 11, we explore how our vascular surgeons carefully tailor their treatment of peripheral arterial disease (PAD). Jason Crouner, MD, employs a cutting-edge technique—retrograde pedal access—for many patients, even those with routine PAD. In another case, a patient with critical lower extremity ischemia faced amputation until Stephen Stanziale, MD, performed a limb-sparing bypass via traditional open surgery.

An uncommon approach is detailed in the story of one of our own: a MedStar Health nurse who was discovered to have an anomalous coronary artery—a condition that occurs in only one percent of the population. Ezequiel Molina, MD, treated her with an “unroofing procedure,” an approach not often used in adults. Read more on page 12.

On page 14, we share the story of one woman with coronary heart disease requiring bypass surgery. For her, surgery needed to be consistent with her religious convictions prohibiting the use of blood products. Through her community’s network, she was referred to MedStar Washington Hospital Center and Christian Shults, MD. He and other MedStar Health surgeons have been perfecting bloodless operations for years. While initially developed to benefit the region’s large Jehovah’s Witness community, the protocols and surgical techniques developed for that population are now routinely used for many patients so as to minimize or avoid blood transfusion.



You can also read about the work of Hayder Hashim, MD, in developing protocols for ultra-low (to nil) radiographic contrast use in patients undergoing percutaneous coronary intervention. While initially created to prevent further renal damage in patients with pre-existing kidney disease, we recognize that radiographic contrast poses some risk for all patients. The combination of advanced radiographic equipment, alternative coronary imaging modalities, and careful patient preparation and care allows for high-quality visualization of target lesions with markedly reduced renal jeopardy—a benefit for the broader patient population. See page 16.

This kind of innovation spans several generations at MedStar Health, where we performed the region’s first heart transplant in 1987. Since then, we have performed more than 350 procedures. We are now expanding the heart donor pool by including donor hearts from those with hepatitis C, as well as those located at greater distances, using a new cardiac transport system. Read more on page 3.

Finally, I am delighted to formally welcome Abeel Mangi, MD, to MedStar Health, as system chair of cardiac surgery (see page 8). His distinguished career and impressive clinical, research, and administrative credentials make him an exciting addition to our leadership team. He is well-poised to build upon our legacy of excellence in cardiovascular surgery, and I expect that many of you will have the opportunity to interact with him in the months to come.

Heart transplant roundup

Last year, in the midst of the pandemic and while many hospitals had to limit cardiovascular surgery, a record-breaking 29 heart transplantations were performed at MedStar Washington Hospital Center.

This year, **Ezequiel Molina, MD**, surgical director of VAD and heart transplantation, completed his **102nd heart transplant** since 2013.

As transplantation volumes rise, we actively seek new solutions and improved outcomes for our patients.



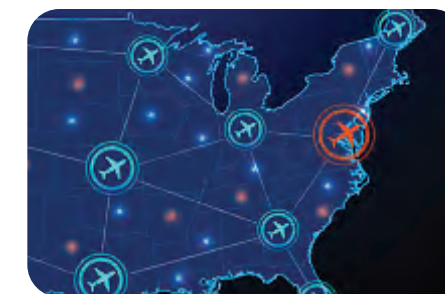
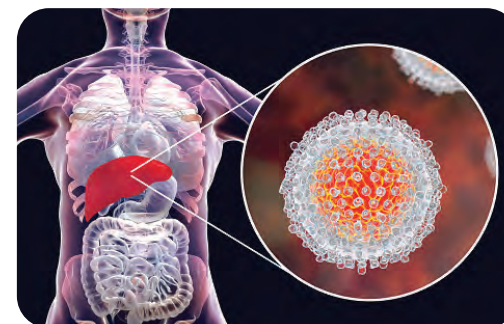
RECORD-BREAKING

29

Heart transplantations performed at MedStar Washington Hospital Center in 2020

More hearts.

We are now able to transplant hearts from **hepatitis C positive donors** without adverse impact on recipient outcomes. The expectation is that the number of usable hearts may **increase by more than 15 percent per year.**



Greater distances.

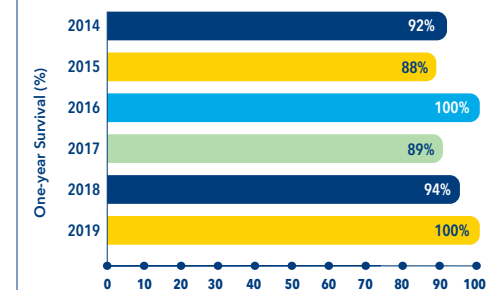
Through our use of the **Paragonix SherpaPak™ Cardiac Transport System**, the ischemic window for transplantation of a donor heart may potentially be extended. This provides greater opportunity for transplantation of donor hearts located at farther distances.



Longer lives.

Our patients continue to have excellent results, from their first-year survival rates to longer lives, overall. This year, we celebrate **nine patients who have passed their 25-year mark post heart transplantation**, nearly double the average life expectancy of a transplant recipient.

HEART TRANSPLANTATION ONE-YEAR SURVIVAL



New interventional heart failure service optimizes and expands treatment.



Subspecialty collaboration has always been essential in the management of heart failure. As patients experience progression of their disease, heart failure specialists guide them through a range of treatments—medication, implantable cardioverter-defibrillator (ICD), mechanical circulatory support, and heart transplantation—integrating electrophysiology and heart surgery at certain points.

Now, a new interventional heart failure service at MedStar Heart & Vascular Institute brings together heart failure and interventional cardiology, drawing expertise from both fields of practice. The goal is to craft a common workflow, whereby patients benefit from a collaborative practice model.

“Medical management and intervention go hand in hand,” explains Samer Najjar, MD, director of Advanced Heart

Failure. “We’ve partnered before, but now there are more reasons and opportunities for interdependence of the specialties. Ultimately, this provides a comprehensive, full range of options for our heart failure patients.”

Lowell Satler, MD, medical director of the Cardiac Catheterization Lab at MedStar Washington Hospital Center, agrees. “Heart failure often requires multiple viewpoints and potentially multiple therapies. Harnessing our two subspecialties optimizes the outcomes. Together, we better understand the complexity of the disease—it’s not just devices and not just medical—it’s the combination. It’s technology and intellectual firepower working together.”

In the early stages of heart failure, a patient’s symptoms may typically be managed by medications. As the disease

progresses, cardiac electrophysiologists are often brought in to implant an ICD. Historically, the next steps were LVADs and heart transplantation. Now, interventional cardiology adds another step, offering better symptom relief and prolonging independence.

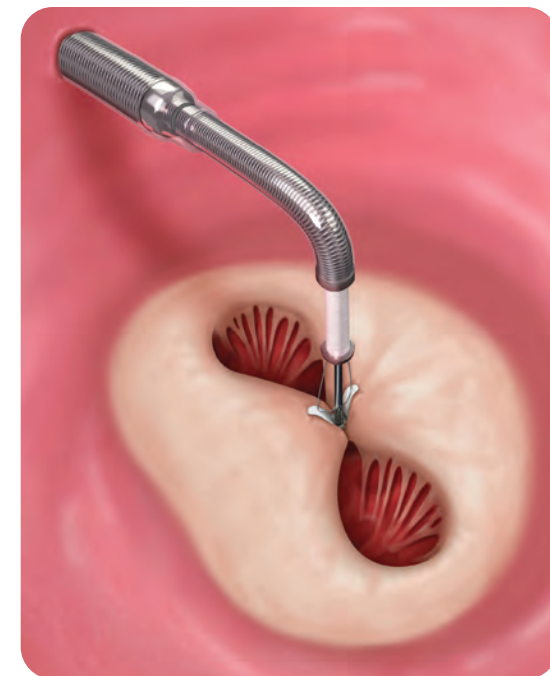
Many patients have aortic, mitral, or tricuspid valve defects, which either cause their heart failure, or develop as a result of it. In the past, only surgical options existed to correct valvular disease, but that was often risky and contraindicated in these very ill patients. With the advent of new interventional devices, there are now options for safer treatment. Valvular devices tend to be employed during intermediate stages of heart failure, when patients become symptomatic despite other treatments. These devices can correct mechanical dysfunction, enhance LV function, and improve forward blood flow.

“By adding this new component to the heart failure treatment spectrum, we enable patients to have an improved quality of life for a longer period of time, which may delay the need for LVAD and transplantation. It also allows for more independence, and potentially slows disease progression,” says Dr. Najjar.

Formalizing a natural collaboration.

Interventional heart failure was an informal collaboration at first but has since become important to systematize. An increasing number of investigational studies require representation from both subspecialties; the use of the MitraClip™ for transcatheter edge-to-edge repair highlights this need for a formal partnership. The Centers for Medicare & Medicaid Services (CMS) recently expanded coverage for this device to include patients with secondary mitral regurgitation resulting from heart failure. The device works best on the back of medical therapy, therefore, is only reimbursable for secondary MR with a consult by a heart failure specialist.

In addition, several other approved or investigational devices have application to heart failure and therefore require collaboration between the subspecialties. Available options include transcatheter mitral valve replacement for severe MR, the AccuCinch® for left ventricular repair, the Corvia® interatrial shunt device for diastolic heart failure, and upcoming investigational devices for tricuspid valve regurgitation.



Broadening use of MitraClip™

MitraClip highlights the need for a formal partnership between heart failure and interventional cardiology. CMS recently expanded its coverage for this device to include patients with secondary mitral regurgitation resulting from heart failure. The device works best on the back of medical therapy; therefore, is only reimbursable for secondary MR with a consult by a heart failure specialist.

PROGRESSION OF HEART FAILURE TREATMENT

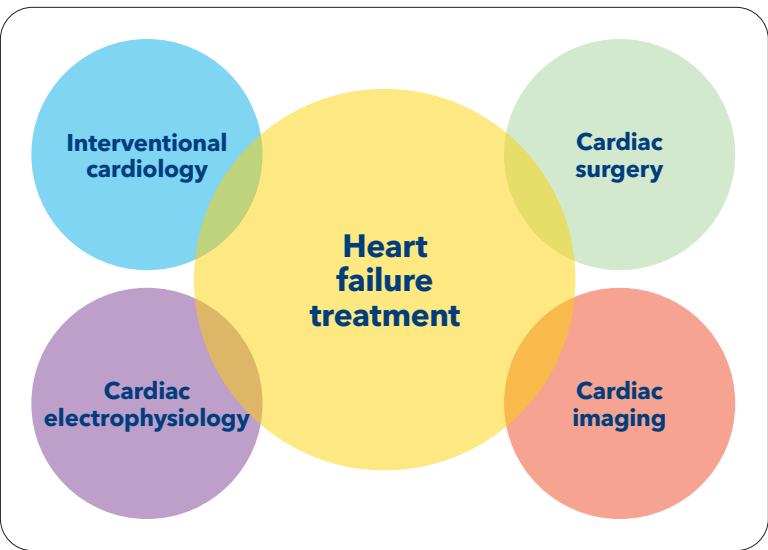




New NIH research collaboration spotlights novel applications of cardiac imaging.



Marcus Carlsson, MD, PhD



Progressive partnerships are the pathways to success.

Optimal heart failure treatment requires intersection with other subspecialties.

Cardiac electrophysiologists commonly implant ICDs during the early-to-mid stages of heart failure. Cardiac surgeons offer support for end-stage patients with temporary mechanical circulatory support devices such as the Impella® and ECMO, through minor procedures that obviate open-heart surgery. In addition, cardiac imaging specialists help guide diagnoses and treatments through advanced echocardiography, MR, and CT. The new Thome Advanced Cardiovascular Imaging Center at MedStar Washington Hospital Center supports the expansion of these capabilities. Read about one new study with the National Institutes of Health on page 7.

"We saw the importance of cross-specialty partnerships in the management of patent foramen ovals (PFOs) by the Heart-Brain team," recalls Dr. Satler. "By cooperating with neurologists, we were able to determine that PFO closure was an optimal treatment for patients with stroke. We know that future collaboration is the pathway to success in other areas of cardiovascular care."

What's next?

As interventional heart failure becomes increasingly applicable, MedStar Health is ensuring that future physicians are well-positioned to bridge the two disciplines. Next year, one of our heart failure fellows will cross-train in the combined approach.

Progressive treatments for heart failure continue to rapidly emerge. The chart on the left highlights a few of the devices currently available. Furthermore, small percutaneous pumps are being developed now and may soon lead to LVAD placement via less invasive, catheter-based techniques.

"I remember when the notion of changing the structure of the heart from the outside—without open surgery—seemed like magic," recalls Dr. Najjar. "Now, those dreams have become reality. The prospect of further developing treatments, such as percutaneous LVAD implantation, is incredible—but that day is nearly here."

As magnetic resonance imaging (MRI) and other imaging technology has grown in sophistication, so too has its value for aiding diagnosis of heart disease, and evaluating the effectiveness of treatment strategies. Thanks to a new research collaboration, our heart failure patients, in particular, can benefit from the latest advancements in cardiac imaging.

This collaboration brings physicians and researchers from the National Heart, Lung, and Blood Institute, part of the Bethesda, Md.-based National Institutes of Health (NIH), together with cardiologists at MedStar Washington Hospital Center to perform cardiac MRI as a research focus. Gaby Weissman, MD, director of cardiac imaging at MedStar Washington, serves as the MedStar Health principal investigator.

The program will focus on developing and implementing new techniques using cardiac MRI and other technologies to understand, diagnose, and guide treatment for heart failure. Testing these emerging approaches in a clinical setting will provide valuable data for quantifying factors, such as pumping physiology, myocardial perfusion, intraventricular blood flow, tissue viability, and valvular function. Marcus Carlsson, MD, PhD, is NIH's principal investigator for the study.

"Studies such as this play an important role in validating and refining these techniques so that they can be made available to other hospitals, as well as broadening our overall understanding of heart failure," says Dr. Carlsson, a native of Sweden and an associate professor of Clinical Physiology at Lund University. He joined NIH this past January as investigator and chief of the Laboratory of Clinical Physiology; this new program continues his more than two decades of research in understanding heart disease and heart physiology.

Collaborating with MedStar Health to test NIH-developed imaging techniques, "will hopefully help us learn more about how the heart works that we didn't know before," he adds.

One particularly exciting application, Dr. Carlsson explains, is the use of cardiac MRI to measure myocardial perfusion—a factor routinely evaluated when patients experience chest pain. New imaging techniques could also provide insights into other symptoms related to decreased blood flow through the heart for patients with various types of heart diseases.

"There are instances where the coronary arteries appear normal, but perfusion is abnormal—a sign of something happening on the microvascular level," he says. "Through our investigation, we hope to expand our knowledge about how changes in perfusion drive the disease process, and how it responds to various types of treatment." The study will be evaluated annually to gauge progress and evaluate the potential of new techniques for investigation. A critical component to the effort's success, Dr. Carlsson says, is ensuring a strong cross-section of patients for the research protocols.

"We want to work with cardiologists throughout the region to find patient groups with heart failure that we can include in our study," he says.

The cardiac imaging technology study is the latest collaboration in the longstanding research partnership between NIH and MedStar Health. In addition to hosting several extensive NIH-funded clinical trials related to prevention and management, MedStar Washington recently led a study aimed at optimizing patient medications following percutaneous coronary intervention procedures.

"This collaboration is yet another example of MedStar Health's innovation within the cardiovascular space," says Dr. Weissman. "It will bring even more cutting-edge technology to our patients, and help us learn how to better care for them, particularly those with heart failure."

To learn more about the study, or to refer a patient, please contact Dr. Carlsson at marcus.carlsson@nih.gov.

HEART FAILURE DEVICES AND INDICATIONS

Device/Approach	Condition
Balloon aortic valvuloplasty (BAV)	Aortic stenosis (AS)
MitraClip™ and CLASP (investigational)	Severe mitral regurgitation (MR) Degenerative & secondary MR
TAVR	Symptomatic severe AS
Early TAVR	Asymptomatic severe AS
TAVR UNload	Moderate AS
TMVR (transcatheter) (investigational)	Severe MR
AccuCinch (investigational) (Ventricular Restoration Therapy)	HFrEF
Corvia InterAtrial Shunt Device (investigational)	HFpEF
Mitral Cerclage Annuloplasty (investigational)	Functional MR with HFrEF
Alcohol septal ablation	Hypertrophic cardiomyopathy



New cardiac surgery chair eager to piece together the big picture.

Abeel A. Mangi, MD, MedStar Health's new chair of cardiac surgery, has a simple, straightforward vision for the program: to be the best cardiac surgical team in the world.

It's an ambitious goal, but one that Dr. Mangi believes is already well within reach for MedStar Heart & Vascular Institute. He likens his year-long interview and familiarization process to examining pieces of a jigsaw puzzle spread across a tabletop. To get the Institute to that aspirational next level, Dr. Mangi says, "it's my job to put these pieces together in an organized manner."

"We're very fortunate to have absolutely extraordinary, world-class surgeons—leaders in so many areas," he says.

Supporting the surgeons, he adds, are fantastic groups of advanced practice providers, intensive care physicians, operating room nurses and technicians, perfusionists, and surgical assistants. In MedStar Health, he says, "we have an administration that is very closely attuned to the needs of a cardiac surgical program."

He previously served as professor of surgery at the Yale University School of Medicine, surgical director of the structural heart and cardiac valve program at the Yale New Haven Heart and Vascular Center, and managing director of its cardiac surgery network.

Practical problem-solving.

Puzzles of all kinds have fascinated Dr. Mangi since his childhood in the United Kingdom. He also enjoyed working with his hands, particularly when it came to building model ships and airplanes. With both of his parents as physicians, medicine was always a strong influence in the household. He recalls, at age 14, opening a copy of his parents' *New England Journal of Medicine*, and finding himself immersed in a feature story about a clinical pathological conference.



MedStar Health Cardiac Surgery Chair Abeel A. Mangi, MD

"It combined everything I loved—detective stories, solving problems, hands-on work," he says, adding that while he'd always considered becoming a surgeon himself, "that article hooked me."

After graduating from the Warren Alpert Medical School of Brown University, Dr. Mangi began his residency at Massachusetts General Hospital/Harvard Medical School, intending to become a surgical oncologist. That changed after his first rotation in cardiac surgery. Dr. Mangi says he became fascinated with everything the field offered—the range of technical expertise, opportunities to work closely with physicians in other specialties, and regularly drawing on his knowledge of physiology. He continued his training with a fellowship in cardiac surgery at Columbia University Medical Center.

Importantly, he adds, was the ability to forge a strong bond with each patient—something he considers unique to cardiac care. "In many of my transplant and LVAD cases, the patients saw me as their primary care physician," he says. "That's how close our bond was."

It's why Dr. Mangi sees uncompromising rigor and fortitude in patient care as fundamental. Other elements include working as a single team, creating new knowledge, demanding excellence in all things, and deepening MedStar Health's roots within the community. "These things are critical for us to evolve, grow, and expand our regional, national, and international footprints."

Dr. Mangi plans to continue building on the collaborative and unified organization—capitalizing on the existing clinical enterprise, developing a world-class research program, and strengthening local and regional ties.

"We are committed to wholly and thoroughly addressing the best treatment for each type of patient," he explains.



Cardiac surgery team (l to r, standing) Jeffrey E. Cohen, MD; Ammar S. Bafi, MD; Christian C. Shults, MD; Brian T. Bethea, MD; Ricardo O. Quarrie, MD; Hiroto Kitahara, MD; (seated) Michael Fiocco, MD; Abeel A. Mangi, MD; Ezequiel J. Molina, MD

"Just because you refer a patient to a cardiac surgeon doesn't always mean that they're going to wind up getting cardiac surgery. We work very closely with colleagues in interventional cardiology, imaging, and other subspecialties, to try to get the best option for a patient."

Education will also play a key role in broadening the Institute's profile. Dr. Mangi plans to establish training programs that include inviting outside experts to share their knowledge and help inform practices and procedures.

"Given our location in one of the world's most important and prominent regions," he adds, "we're looking at other areas in which we can exert influence, in terms of high-quality outcomes and policy, to take care of the most patients in the most effective manner."

Having also served as professor of surgery at the Yale University School of Medicine, Dr. Mangi looks forward to sharing his own knowledge through recently launched fellowship programs. One will be focused on advanced heart failure, left ventricular assist devices, and heart transplantation, while the other will concentrate on aortic disease and transcatheter therapy for valvular heart disease.

"It's been some time since the nation's capital had a formal program to train cardiac surgeons, and we're excited to be bringing it back," he says.

Broadening perspectives and influence.

Complementing his medical training, Dr. Mangi is a graduate of the MBA program at the Massachusetts Institute of Technology's Sloan School of Management. That experience, he says, helped him better understand that science and technical excellence alone aren't enough to help organizations realize their vast potential.

"As surgeons, we should be thinking about how to broaden our influence, thinking not simply locally and regionally, but nationally and globally as well," he says.

One of the pandemic's positive lessons, he adds, has been refining the ability to communicate and collaborate virtually anywhere, without the need to travel.

"These are things we're hoping to leverage on a macro level," Dr. Mangi says, "not just to benefit our staff and patients, but also do things like give patients outside our immediate area the opportunity to consult with our surgeons virtually."

Bringing it home.

Dr. Mangi is married to Basmah Safdar, MD, a professor of emergency medicine and attending physician in Yale University's Department of Emergency Medicine, and director of the Yale New Haven Hospital Chest Pain Center. Dr. Safdar has a special interest in women's access to health care, both as patients and as physicians, and is one of the world's leaders on sex and gender, as it pertains to cardiovascular health. The couple has four children, ranging in age from 5 to 18.

Dr. Mangi has combined his personal interest in strength training with a research study at Yale evaluating the benefits of exercise on cardiovascular surgery outcomes. One of his true passions is lifting in his garage gym, where he is proud of a 1,500 pound deadlift, squat and bench total. "Lifting is a lot like cardiac surgery," he says. "It demands mental and physical discipline and commitment."

Another love is his Harley-Davidson Heritage® Softail Classic motorcycle, which, he says with a tinge of wistfulness, remains garaged in Connecticut.

"I need to get myself established here first," he says, "but I can't wait to bring it down and start exploring the area."

A second look saves a patient's limb.

David Lee, of Baltimore, Md., presented with symptoms predisposing to limb loss: areas of ulceration, reddish discoloration, and chronically cold feet. With advanced peripheral arterial disease and lack of flow to his foot, Lee had been suffering from unrelenting pain for two years and was unable to even sleep through the night. After three unsuccessful interventions at another institution, revascularization appeared unlikely.

He arrived in the office of Stephen Stanziale, MD, chief of the Division of Vascular Surgery at MedStar Franklin Square Medical Center, and asked for his right leg to be amputated.

Dr. Stanziale, well-versed and highly experienced after decades of medical practice, chose to initiate a full review of Lee's case before amputation.

"Though Mr. Lee was anxious to be rid of his debilitating pain, the report from his previous interventions indicated patency of distal foot vessels. So we agreed on an angiogram to obtain a better picture," recalls Dr. Stanziale.

With the angiogram, he confirmed complete occlusion of all three tibial vessels. But what else he found changed Lee's life: a blood vessel in his foot that seemed to be a reasonable target for bypass.

Within a few weeks, Dr. Stanziale performed a posterior tibial bypass to Lee's dorsalis pedis vessel (calf to foot) via traditional 'open' vascular surgery. The procedure successfully revascularized the limb and Lee's pain dissipated immediately.

"I felt the healing begin before I was even out of the hospital," reports Lee, who remained inpatient for a few days post-procedure before returning home.



(Above) Vascular Surgeon Stephen Stanziale, MD
(Below) Patient David Lee



The vascular surgery team at MedStar Health specializes in the diagnosis and treatment of all vascular disorders, from the common to the esoteric, from the merely uncomfortable to the life-threatening. With care now provided at 20 sites, it is the largest vascular program in the Baltimore-Washington region, and continues to expand access.

"We started this program at MedStar Franklin Square to provide consummate care," explains Dr. Stanziale. "It's not just about performing procedures—it's about seeing the patient as a whole person. Sometimes this means traditional surgery and sometimes it means employing the latest and greatest technology. Our program has the expertise and the range of approaches to offer the best option to every patient, every time, close to home."

Since his procedure, Lee has indeed received "whole person" care from the vast array of cardiovascular specialists at MedStar Franklin Square and the broader MedStar Health system. With comorbidities of atrial fibrillation, hypertension, and cardiomyopathy, his care team continues to evaluate the best treatments for each circumstance. Dr. Stanziale recently put a stent in his left leg, preventing further deterioration. And this spring, treated by MedStar Health's cardiac electrophysiologists, Lee received a WATCHMAN™ device.

To refer a patient for vascular treatment, call 443-777-1900 (Baltimore, Md.) or 202-877-0275 (Washington, D.C.).

Vascular Surgeon Jason Crowner, MD, performs an endovascular procedure with a pedal access approach.

Retrograde pedal access: An alternative approach for high-risk patients with peripheral arterial disease.

The incidence of peripheral arterial disease (PAD) continues to steadily increase, due to the prevalence of heart disease, hypercholesterolemia, obesity, diabetes, and smoking. Fortunately, many cases of PAD can be identified by transfemoral arterial percutaneous procedures—today's standard approach.

But what about those patients who are poor candidates for the approach?

"Not too long ago, they were simply out of luck," says Jason Crowner, MD, a vascular surgeon who joined MedStar Heart & Vascular Institute in 2020. "Without being able to open up blocked vessels and improve blood flow to the extremity, many high-risk patients developed severe ischemia, often leading to the loss of a limb."

That includes patients who've had aortoiliac interventions or other operations in the groin area that preclude femoral vascular access. Morbidly obese patients, those with significant comorbidities that prevent them from lying flat, and patients with blockages that are unable to be crossed with a catheter are also ineligible for the standard approach.

For such patients, MedStar Health vascular surgeons are now using another option for access that expands the number of lesions that can be treated successfully, improving limb salvage in the process.

It's called retrograde pedal access, and it has primarily been used as a "bail-



out" when the antegrade approach failed. Specialists like Dr. Crowner are expanding its application to high-risk patients and, increasingly, as a first-line diagnostic and interventional option for even routine PAD patients.

That's because retrograde pedal access removes the greatest difficulty with the antegrade approach—femoral artery access—and one of the procedure's greatest handicaps.

"Retrograde pedal access reduces the risk of access site bleeding and hematomas, resulting in less bruising, swelling, and patient discomfort," says Dr. Crowner, who is based at MedStar Union Memorial Hospital

and MedStar Good Samaritan Hospital in Baltimore, Md. "The amount of time that patients must remain flat on their backs is also cut by more than half: from two-to-six hours to only 60 minutes. For patients with back problems, that's a huge difference."

The shorter post-procedure period also gets patients up and moving more quickly, contributing to their rapid recovery.

In retrograde pedal access, vascular surgeons approach their target by going up the leg from the foot instead of down from the groin. Other than the change in route, the tools and techniques basically remain the same, although there is a definite learning curve.

"Switching to retrograde pedal access is comparable to moving to the radial approach for coronary disease," says Dr. Crowner, who has been using the pedal approach regularly for the past several years. "It requires a certain skill set, only gained from experience."

But the additional effort, he says, is worth it.

"With this approach, I've been able to save a lot of legs over the last few years."

Vascular surgeons across MedStar Health can assess your patient's candidacy for retrograde pedal access. To speak with a provider call 410-554-2950 (Baltimore, Md. region) or 202-877-0275 (Washington, D.C. region).



Cardiac Surgeon Ezequiel Molina, MD, with MedStar Franklin Square Medical Center nurse and patient Princesita Cezar.

A lifesaving unroofing procedure for one nurse with an anomalous coronary artery.

An anomalous coronary artery was discovered after a patient presented with ongoing chest pain. After a seamless progression of care through three MedStar Health hospitals, the patient had successful open-heart surgery a month later. In this case, the fairly rare condition involved the added responsibility of caring for one of our own—a nurse from MedStar Franklin Square Medical Center.



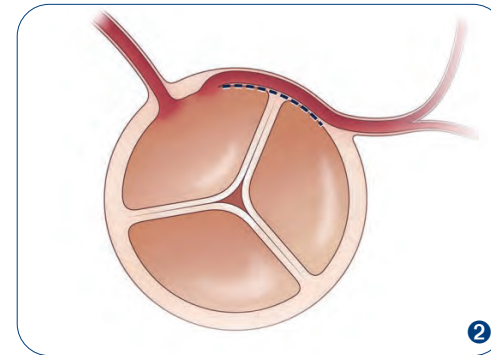
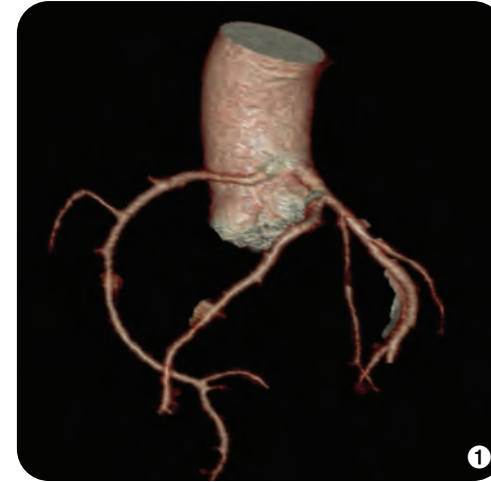
Initial assessment and treatment at MedStar Franklin Square Medical Center

MedStar Health Nurse Princesita Cezar, RN, 48, arrived at the Emergency Department of MedStar Franklin Square after the “gas pains” she experienced one evening evolved into crushing chest pain and shortness of breath early the next morning.

Doctors quickly assessed her with an EKG and blood work and began medical treatment with heparin and nitroglycerin for her unstable angina. As the initial diagnostic tests were performed, her blood pressure dropped, and the troponin was elevated. The ED physician contacted Interventional Cardiologist Antony Kaliyadan, MD, at MedStar Union Memorial Hospital.

Radial cath at MedStar Union Memorial Hospital

After reviewing diagnostic results, Dr. Kaliyadan suspected an ongoing myocardial infarction, and made the decision to emergently transfer Cezar across Baltimore, directly to the 24/7 cardiac cath lab at MedStar Union Memorial. There, Dr. Kaliyadan performed a radial cardiac catheterization and discovered the anomalous origin of the right coronary artery, along with physiologically inconsequential myocardial bridging of the left anterior descending artery. No other blockages accounted for her presentation.



1 Cardiac CT angiogram

2 This diagram shows the technique of coronary unroofing for an interarterial coronary artery with an intramural segment. The aorta is cut above the aortic valve, and the embedded portion of the right coronary artery is exposed to the aortic lumen, thereby creating a revised, wide neo-ostium.



Antony Kaliyadan, MD

Discovery of anomalous coronary artery

Normally, the right coronary artery originates from the aorta’s right coronary cusp, but in Cezar, the vessel came off the top of the left cusp. This anomaly is especially concerning when the coronary artery is compressed between the aorta and pulmonary artery, which can precipitate chest pain, myocardial infarction, and sudden cardiac death with exertion. “We worked through the entire differential, including consideration for myocarditis, but a cardiac MRI ruled that out,” Dr. Kaliyadan says. “The MRI was suggestive of myocardial infarction in the right coronary distribution, so we also pursued workup for coronary embolic phenomenon, looking for sources of a potential blood clot.”

During her hospitalization, Cezar underwent several diagnostic tests, including a coronary CT angiogram that confirmed the congenital anomaly. After discharge, despite medical therapy, her symptoms continued.

Unroofing procedure at MedStar Washington Hospital Center

While certain anomalous coronary arteries (ACAs) can be treated successfully with medical therapy, Cezar’s required surgical attention. She was referred to Ezequiel Molina, MD, surgical director of LVAD and Heart Transplantation, at MedStar Washington Hospital Center.

Dr. Molina says, “An ACA affecting the right coronary artery is considered less dangerous than if it affects the left coronary artery, but it’s trickier to treat because not all patients need surgery. There are also several possible treatment options, and you want to choose the best one for each patient. For Ms. Cezar, we used the classic unroofing procedure, in which we relocate the opening of the coronary artery in the right side of the aorta, eliminating the dangerous course in between the aorta and the pulmonary artery, so it’s no longer compressed.”

In addition to unroofing, Dr. Molina also released an artery on the surface of the front of her heart that was covered with muscle (a myocardial bridge), potentially constricting blood flow.

Cezar spent five days at MedStar Washington, and three months recovering at home. She has since made a full recovery and returned to her work, caring for patients.

A rarely detected condition

ACAs occur in approximately one percent of the population, and are most often found incidentally. Even at MedStar Health’s high-volume program, only two or three adult patients with ACA are seen each year. Some patients never suffer symptoms at all. But for those who do, it can lead to sudden death, especially in young athletes under exertion. Because the most critical cases of ACAs are often detected in infants born with congenital cardiac issues, Dr. Molina usually partners with Children’s National Hospital Cardiac Surgeon Pranava Sinha, MD, to perform these challenging operations. “He does many of these cases a year in children, so it makes sense to have a collaborative approach in adults,” says Dr. Molina.

One seamless system for care delivery

“We have a seamless method to deliver appropriate care for our patients, including the very sick, no matter where they enter our system,” explains Dr. Kaliyadan. “Our shared electronic medical record and imaging systems allow for real-time access to vital patient information. It is truly a privilege to care for each of our patients, especially when it is one of our own.”

Dr. Molina agrees, “It is indeed a wonderful feeling to work in a system that can successfully handle this kind of complexity across a broad geography.”

Application of "bloodless" surgery protocol achieves optimal care for all.

In January 2021, Vondalear Powell, a 72-year-old Baltimore woman, faced a complex diagnosis: three occluded vessels and an aneurysm in her ascending aorta that posed a very present danger. As a woman of faith, she needed an even more complicated procedure—"bloodless" surgery to adhere to a Jehovah's Witness tenet, which does not permit blood transfusion.

Upon Powell's arrival at her local hospital's emergency department, it was evident the facility was not experienced in performing these specialized procedures. Fortunately, through her religious community, she was aware of MedStar Health's expertise.

Within days, she was transported to MedStar Washington Hospital Center where Cardiac Surgeon Christian Shults, MD, performed the complex procedure. Dr. Shults and other members of the surgical team at MedStar Heart & Vascular Institute have performed many "bloodless" cardiac surgeries, and recently became a dedicated part of MedStar Health's regional Bloodless Medicine and Surgery Program, which also includes MedStar Georgetown University Hospital and MedStar Franklin Square Medical Center. (To learn more, visit [MedStarBloodless.org](https://www.MedStarBloodless.org).)

"The principles of bloodless surgery are really just good patient care," says Antoine Williams, Jr., RN, nurse coordinator, Bloodless Medicine.

"There is a lot of literature that demonstrates avoiding transfusion improves outcomes. We apply those principles of bloodless surgery as broadly as possible," says Dr. Shults.

Pre-operative management is paramount.

Bloodless surgery strategies begin with good patient-provider communication, Williams explains. "We need to clarify their personal choices after offering a clear explanation of the procedure and options. It's very proactive patient care that is planned out and documented for everyone involved."

"Many patients bounce around looking for someone to perform their surgeries," says Dr. Shults. "But when they come to us, I think they feel that they have found a home."

Prior to surgery, the team works to identify patients who are anemic or at higher risk for bleeding. Phlebotomy frequency and quantity of sampling is limited to necessary diagnostic testing; micro-sampling is used when possible. "We ask 'do we really need this blood draw?'" says Williams. "We also encourage the use of pediatric vials."

"We optimize patients with anemia before surgery," says Dr. Shults. "When needed, we stimulate blood hemoglobin with oral or IV iron supplementation, as well as erythropoietin. Additionally, we stop any medications that inhibit hemostasis to limit intraoperative bleeding."

"Being proactive is so important," says Williams. "A person who is anemic is at risk for complications." In this case, the patient was anemic, but not severely, Williams explains. "Her hemoglobin was hovering around nine and she was put on iron supplementation for several days to increase that level."

Technique, technology are key in OR.

During surgery, the team optimizes oxygen levels by keeping the patient's body at a normal temperature and extremities warm. Demand for oxygen is minimized and techniques are used to help deliver oxygen to vital organs and help the body efficiently utilize oxygen it already has.

"We minimize blood loss through meticulous surgical technique, oversewing potential sites of bleeding, and the use of electrocautery. We also use acceptable hemostatic agents," Dr. Shults adds.

In almost all instances, cell salvage—the process by which blood from the surgical field is collected, filtered, washed, and reinfused during the procedure—is also used when the patient has adequate preoperative hemoglobin. It is a "closed loop" system.

Most patients will undergo hemodilution while on cardiopulmonary bypass, in which some of their blood is removed at the beginning of the operation, put on rockers to prevent clotting, and diluted with non-blood liquid. This way, the patient loses fewer red blood cells. At the end of surgery, the blood removed at the beginning is reinfused to the patient. "While this is not an option for Jehovah's Witnesses, we do utilize hemodilution when appropriate," explains Dr. Shults.



Cardiac Surgeon Christian Shults, MD

During Powell's recent triple bypass procedure, her left internal mammary artery and greater saphenous vein were harvested and then used to bypass her blocked arteries. Her ascending aorta was then replaced with a Dacron® graft. The cell saver technique was used.

"Blood transfusion is employed in nearly 15 to 20 percent of bypass procedures and up to 30 to 40 percent of aortic procedures," says Dr. Shults. "But using a variety of practices, we were able to avoid this inevitability and successfully repair her heart."

Williams, who is actively involved in educating medical professionals about bloodless medicine, says with the increasing number of successful surgeries, "reliance on transfusion is shifting. It really does require a culture change in medicine."

Traditionally, blood transfusion is employed in:

15-20%
BYPASS PROCEDURES



30-40%
AORTIC PROCEDURES

BLOODLESS SURGERY PROTOCOL

Pre-surgery

- Patient-provider communication
- Identify patients with high risk of bleeding or anemia
- Only necessary blood draws
- Micro-sampling
- Cell stimulation with oral or IV supplements

During surgery

- Optimize oxygen levels
- Oversee incision line
- Electrocautery
- Cell salvage
- Hemodilution

Welcome new staff.

MEDICAL STAFF



Malick Islam, MD, is a cardiac electrophysiologist at MedStar Union Memorial Hospital and MedStar Franklin Square Medical Center. He specializes in treating patients with a wide spectrum of heart rhythm disorders, including atrial fibrillation, supraventricular tachycardias, ventricular tachycardias, heart block, and left atrial appendage occlusion with WATCHMAN®. He is particularly interested in the management of complex atrial arrhythmias. Dr. Islam is board certified in clinical cardiac electrophysiology and cardiovascular disease.

Education and training:

- **Fellowship:** Clinical Cardiac Electrophysiology, Baystate Medical Center, Springfield, Massachusetts
- **Fellowship:** Cardiovascular Disease, Saint Louis University Hospital, St. Louis, Missouri
- **Residency:** Internal Medicine, University of Louisville Hospital, Louisville, Kentucky
- **Medical School:** Baqai Medical University, Karachi, Pakistan; Aga Khan Medical College, Karachi, Pakistan



Abeel Mangi, MD, has been named the new chair of Cardiac Surgery for MedStar Health. A highly accomplished cardiothoracic surgeon, Dr. Mangi brings a distinguished record of clinical competency and expertise to the program. Dr. Mangi specializes in complex and re-operative cardiac surgery, aortic and mitral valve repair and replacement, and ascending aorta and aortic arch replacement. He is board certified in general and thoracic surgery.

Education and training:

- **Fellowship:** Cardiac Surgery, Columbia University Medical Center, New York, New York
- **Residency:** General Surgery, Massachusetts General Hospital/Harvard Medical School, Boston, Massachusetts
- **Medical school:** Warren Alpert Medical School of Brown University, Providence, Rhode Island

Read more about Dr. Mangi on page 8.



Monisha Kisling, MS, CGC, is a cardiac genetic counselor at MedStar Heart & Vascular Institute. Her practice focuses on patients whose cardiovascular conditions may have an underlying genetic predisposition. This subset may include those with heart failure, inherited forms of cardiomyopathy, arrhythmias, aortopathies, lipid disorders, and cardiac amyloidosis, as well as patients with family history of cardiac disease, cardiac arrest, or sudden death. When a genetic change is found to play a role, she helps manage medical care and guides screenings for family members.

Education:

- **Master of Science:** Human Genetics, Sarah Lawrence College, Bronxville, New York
- **Bachelor of Arts:** Biology and Society, Cornell University, Ithaca, New York

(l to r) Interventional Cardiologists Itsik Ben-Dor, MD, and Hayder Hashim, MD

Ultra-low contrast angiography reduces renal complications.

Coronary angiography has long been the gold standard for diagnosis of coronary artery disease, with benefits that vastly outweigh potential complications. However, the use of contrast media during angiograms is dangerous for those with existing renal disease, heart failure, diabetes, hypertension, and other comorbidities. In fact, contrast-induced nephropathy is the third leading cause of acute kidney injury (AKI) among hospitalized patients.

At MedStar Heart & Vascular Institute, Interventional Cardiologist Hayder Hashim, MD, has refined a technique that significantly reduces the use of contrast media. While this is particularly important for high-risk populations, including those needing clearance for kidney or liver transplantation, he routinely uses this protocol for all his patients. The technique reduces the risk of AKI in all patients undergoing angiography, not just those who already have compromised kidney function, heart failure, or other conditions. Additionally, it can shorten hospital stays, critical to prevention of infection and promotion of recovery.

Conventional angiography generally takes six-to-eight total images of the coronary anatomy, using about 60 to 80 mL of contrast, on average. With his new protocol, and if a prior angiogram is available, Dr. Hashim and his team can take fewer images—just four in total. They also dilute the contrast

to 50% contrast and 50% normal saline. This allows them to perform a full diagnostic angiogram with less than 20 mL of contrast. If more detail is needed, they use intravascular ultrasound (IVUS), which does not require contrast, to finalize and obtain a comprehensive evaluation of the artery in question. Finally, Philips SyncVision® precision guidance system is used to compare the IVUS and angiography images, creating a complete picture.

MedStar Heart & Vascular Institute is among a small number of programs in the United States using this technique. It is not widely available because the process can be time-consuming and requires a dedicated team of nurses and technicians with particular specialization.

Together with Interventional Cardiologist Itsik Ben-Dor, MD, Dr. Hashim performs about 80 percutaneous coronary interventions each month, all with reduced usage of contrast media. Among patients who have existing images of their coronary arteries, at least 10 receive no contrast at all; another 40 to 50 receive ultra-low contrast.

“Due to the sophistication of our technology and extensive expertise across our diverse patient base, we’re able to offer this extra level of support to avoid kidney injury in all patients,” Dr. Hashim concludes.

News and notes.

To Dr. Christian Shults, with gratitude.

On behalf of the leadership at MedStar Heart & Vascular Institute, we thank Christian Shults, MD, for serving as interim chair of Cardiac Surgery for the past 18 months. The entire team is grateful for his steady and thoughtful leadership during a particularly unusual time, all the while continuing his impeccable clinical work.

Stuart Seides, MD, physician executive director of MedStar Heart & Vascular Institute, reflects that "the pandemic has made for a challenging year, but it certainly would have been more challenging without Christian at the helm. He remains a key leader within the senior cardiac surgical team, and we will continue to depend on his skills, wisdom, and exemplary performance in the future."



First worldwide use of the ClotHunter™ device at MedStar Washington Hospital Center.



Late last year, Vascular Surgeon Steven Abramowitz, MD, at MedStar Washington Hospital Center, was first in the world to use the ClotHunter™ thrombectomy catheter, which allows for the more thorough removal of acute, subacute, and chronic clots.

Enhancing the ZelanteDVT™ thrombectomy catheter, which is used for treatment of deep vein thrombosis, the ClotHunter device increases circumferential rotation, and allows surgeons to remove more wall-adherent clot in a single-handed motion, optimizing single-session treatments and reducing procedure times.



The ClotHunter device attaches over-the-wire to the ZelanteDVT thrombectomy catheter. Once the two are fully connected, ClotHunter changes the shaft structure of the ZelanteDVT catheter into a helical shape, dramatically increasing its circumferential reach to enable removal of wall-adherent deep vein thrombus. Additionally, ClotHunter's handle design allows the physician to rotate the catheter in almost a full orbit inside the vein, which enables targeted clot removal with a wider range of catheter motion and a shortened procedure time. Boston Scientific's internal testing concluded that: compared to the ZelanteDVT catheter alone, ClotHunter increases clot removal by up to 240 percent. After the clot has been removed from the patient's vein, the entire device system can be removed from the patient's body.

Getting the O's ready for Opening Day.

Our MedStar Sports & Performance Cardiology team played an important role during spring training for the Baltimore Orioles: making sure they were ready to play ball on Opening Day. Ankit Shah, MD, director of MedStar Sports & Performance Cardiology, provided sports physicals and echocardiograms to the O's.

Ours is one of the few formal programs in the nation to focus on heart disease in the athlete—professionals and "weekend warriors" alike. The program offers specialized cardiopulmonary exercise testing, which provides each athlete with personalized data and insight into potential conditions.

MedStar Health is proud to be the official medical provider of the Baltimore Orioles. Dr. Shah also works with the Baltimore Ravens, Washington Capitals, and USA Swimming.



Dr. Ankit Shah (right), director of MedStar Sports & Performance Cardiology, Rodney Cobb (left), cardiology lead echo tech, and Ashley Small (center) echo tech, teamed up to provide sports physicals and echocardiograms to the Baltimore Orioles during spring training.

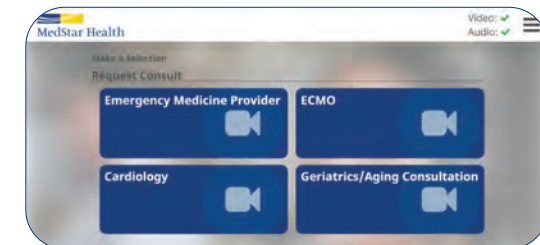
Cardiology eSupport: a new "bunker" offering remote consultations.

Cardiology eSupport is a new teleconsultation program which assists non-cardiology providers with real-time decision making regarding cardiovascular-related treatment and followup. This convenient, live, on-demand service is designed for MedStar Health primary, urgent, and emergency care providers, as well as hospitalists. Physicians can expeditiously share images, test results, and reports virtually, during the consult.

Use cases include:

- Diagnostic support
- Review and analysis of electrocardiogram or other test results
- Assistance with appropriate action steps (testing, specialist referral, or emergency care)
- Medication questions
- Assessment of discharge readiness
- Preoperative consults
- Coordination of testing before patient is seen by a cardiologist
- Direct coordination with cardiology office for prompt scheduling

Consults are available every day, from 8 a.m. to 8 p.m. The service is currently only available to MedStar Health providers and locations, with broader coverage to external providers coming soon.



MedStar Health Vein Centers expand to Annapolis and Bowie.

Annapolis and Bowie, Md., are home to our newest MedStar Health Vein Centers locations, dedicated to the treatment of venous disease, including cosmetic and functional. These boutique settings offer clients the comfort and luxury of a specialty clinic, paired with the expertise of vascular surgeons who provide comprehensive diagnostics and treatment in the event of a more serious underlying condition.

Annapolis
2002 Medical Pkwy., Ste. 520, Annapolis, MD 21401
P: 410-571-8430

Bowie
4175 North Hanson Ct., Ste. 100, Bowie, MD 20716
P: 301-809-6880 or 410-741-1835

Services are available at locations in Maryland, Virginia, and Washington, D.C. Learn more at [MedStarHeartInstitute.org/Programs/Vein](https://www.MedStarHeartInstitute.org/Programs/Vein).



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Cardiovascular Physician is a publication of MedStar Health and our experts at MedStar Heart & Vascular Institute. It is a forum to share clinical, research, and teaching information in cardiology, cardiac surgery, and vascular care.



Please submit any comments to Managing Editor Karoline Hutson, at karoline.m.hutson@medstar.net.

MedStar Heart & Vascular Institute

Stuart F. Seides, MD
Physician Executive Director

George D. Bittar, MD
Chief, Ambulatory Practices
Baltimore Region

Robert A. Lager, MD
Chief, Ambulatory Practices
Washington Region

Abeel A. Mangi, MD
Chair, Cardiac Surgery

Sriram Padmanabhan, MD
Chief, Cardiology
MedStar Franklin Square Medical Center

William O. Suddath, MD
Chairman, Cardiology
MedStar Southern Maryland Hospital Center

Allen J. Taylor, MD
Chairman, Cardiology
MedStar Washington Hospital Center
Chief, Cardiology
MedStar Georgetown University Hospital

Ron Waksman, MD
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and Advanced Education

Edward Y. Woo, MD
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MedStar Health Leadership

Kenneth A. Samet, FACHE
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Executive Vice President & Chief Operating Officer

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Department of Continuing Professional Education

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Upcoming virtual conferences and courses

DMV Cath Lab Case Review Monthly, 7:15 p.m.

Colleagues from hospitals in D.C., Maryland, and Virginia engage in thought-provoking conversation regarding unique, interventional-cardiology case reviews.

To request an invitation, please email lowell.f.satler@medstar.net.

CRTvirtual Fellows Course June 5 to July 17, 2021 Saturdays, 8 a.m. to noon

Each session will include a deep dive into devices, clinical techniques, and research data, as well as the opportunity to review interesting cases and challenging complications.

Register at CRTvirtual.org.

Regularly scheduled series—AMA PRA Category 1 Credit(s)[™]

Cardiac Catheterization Conference
Weekly, Wednesdays, 7:30 a.m.
1 AMA PRA Category 1 Credit[™]
202-877-7808

Cardiac Surgery Grand Rounds
Weekly, Tuesdays, 7:15 a.m.
2 AMA PRA Category 1 Credits[™]
202-877-3510

Cardiology Grand Rounds
Weekly, Tuesdays, 12:30 p.m.
1 AMA PRA Category 1 Credit[™]
202-877-9090

Echocardiography Conference
Weekly, Thursdays, 7:45 a.m.
1.25 AMA PRA Category 1 Credits[™]
202-877-6264

Electrophysiology Core Curriculum Conference
Weekly, Tuesdays, 7 a.m.
1 AMA PRA Category 1 Credit[™]
202-877-3951

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Some of the photos in this publication were taken prior to the COVID-19 pandemic. Photo editing techniques were used to create some group photos. All patients and providers are expected to follow the current MedStar Health guidelines for safety including proper masking and physical distancing where appropriate. Learn more at MedStarHealth.org/Safe.