

Cardiovascular **Physician**

A clinical practice and research publication.

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**An assembly of experts with
a strategy of systemness.**

The future of cardiovascular surgery and medicine.

An assembly of experts with a strategy of systemness.



In 2021, we marked the 10th anniversary of the formation of MedStar Heart Institute, soon followed by MedStar Heart & Vascular Institute. In 2011, we recommitted to coordinating and enhancing patient access to exceptional, experienced, and innovative cardiac medicine and surgery, which had begun in earnest nearly 50 years ago as Washington Heart.

As the Institute concept has evolved, it has become a robust system of well-trained heart and vascular specialists, working together at 10 MedStar Health hospitals and dozens of ambulatory practices across D.C., Maryland, and Northern Virginia, and serving as a major hub for referrals from along the Eastern Seaboard.

The notion of “systemness” at MedStar Heart & Vascular Institute—and the broader MedStar Health—drives our current tactic of practicing as a collective team, rather than groups of individual physicians and clinics operating independently. We believe that this systematic connectivity provides a clear advantage for our patients.

In this issue, we highlight some of the ways in which that singular expertise has been organized and aligned across specialties to optimize treatment and management for each individual patient. The articles that follow reinforce an underlying concept that the finest patient outcomes result from accessing and applying specialized knowledge from multiple experts.

Our feature story on cardiac surgery details the deep reservoir of surgical expertise from the relatively straightforward to the most complex, even as new science and technology rapidly evolves. We describe state-of-the-art devices and approaches utilized—often developed de novo by our specially-trained teams.

Meanwhile, we continue to adjust to the changes demanded by a dynamic clinical environment through ongoing clinical research and evidence-based medical practice. On page 8, we assemble commentary from six specialists on their experience treating patients with COVID-19. Our participation in the novel MedStar Health COVID Recovery Program aligns our cardiovascular expertise with colleagues across the specialty spectrum toward the goal of understanding and caring for COVID “long-haulers.”

In other situations, we deliberately cluster talent from multiple specialties to address specific diagnoses. On page 10, we present a case study from our new Pulmonary Embolism Response Team (PERT). This core group of multidisciplinary providers draws from each of their own perspectives to make cooperative decisions on how to manage patients that present with suspected PE, a disorder that is frequently underdiagnosed and can be lethal, and which is seen in a wide variety of inpatient and outpatient settings. The team style of management results in quick and accurate diagnoses, more precise, tailored treatment plans and, ultimately, superior patient outcomes.

On page 12, the ability to draw upon wide and varying expertise is well-demonstrated in our novel approach to managing central sleep apnea (CSA). In this context, our cardiac electrophysiologists are using their specific procedural know-how in device implantation to offer first-line device therapy for CSA, complementing the traditional clinical practice of their physician colleagues.

The same principle of building specialty practice around patients’ needs has led to the creation of the MedStar Health Wound Healing Institute, now at three sites across the system. (See page 13.) Specialists from vascular surgery, plastic surgery and podiatric surgery provide integrated, multidisciplinary services to this patient population with complex non-healing wounds.

On page 14, we share the updated administrative structure of our cardiology programs, regionalized in Baltimore and Washington, and our commitment to coordinating efforts across the geographic footprint. Our overriding standard is one of “once a patient is inside our house, they are family.” It matters not how, when, or where they access us; we will guide each patient in navigating the complex clinical environment and take maximal advantage of the available knowledge and skills within our system.

Throughout this issue, we hope to exhibit our overarching goal of providing excellent and tailored care for patients. With every new collaboration and alignment, we aim to reaffirm the legacy that began 50 years ago, was formalized 10 years ago, and is continuously advancing today.

The future of cardiac surgery.



As the field of cardiac surgery evolves, so too does the future of our own program. From performing the first heart transplantation in Washington, D.C., to implanting one of the first four LVADs in the world, to being a part of many of the most pivotal trials and groundbreaking innovations, surgical excellence has been a part of our DNA for nearly 50 years.

As we look ahead to the next 50 years, we focus on key pillars of progress: the emergence of sub-specialization, enhanced multidisciplinary collaboration, energized clinical research, compassionate care, and ready access.

On the four pages that follow, you’ll find an overview of our cardiac surgery services, including new surgeons, state-of-the-art capabilities, and above all, our resolute commitment to the best possible outcomes for our patients.

The emergence of subspecialties.

A program of this breadth and depth fosters the ability for surgeons not only to create, but to deepen their subspecializations. While each surgeon is well-trained in general cardiothoracic anatomy and physiology, they are empowered to strengthen their unique areas of focus, which results in a truly elite team of providers, each at the forefront of innovation in their specialty. To that end, we continuously support each specialist with the latest available tools.

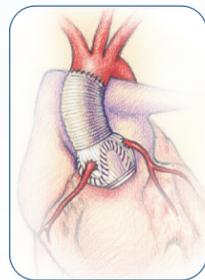
These snapshots of each subspecialty provide recent highlights within our program, as well as volumes in 2021.

For a more comprehensive review, please visit: [MedStarHealth.org/Info/Care/MHVI-Cardiac-Heart-Surgery](https://www.medstarhealth.org/Info/Care/MHVI-Cardiac-Heart-Surgery).

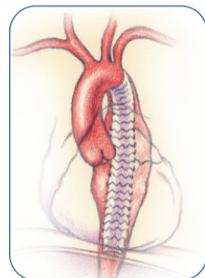


Aortic disease

Our aortic disease program is one of the largest in the mid-Atlantic region and offers the full spectrum of available options, including open, minimally invasive, and endovascular approaches including the Endospin NEXUS™ Aortic Arch Stent Graft System for the treatment of aortic arch aneurysms and the Gore® TAMBE multi-branched graft for the treatment of thoracoabdominal aortic aneurysms.



186
Open aortic procedures



150
Endovascular procedures, in collaboration with vascular surgery



Arrhythmias

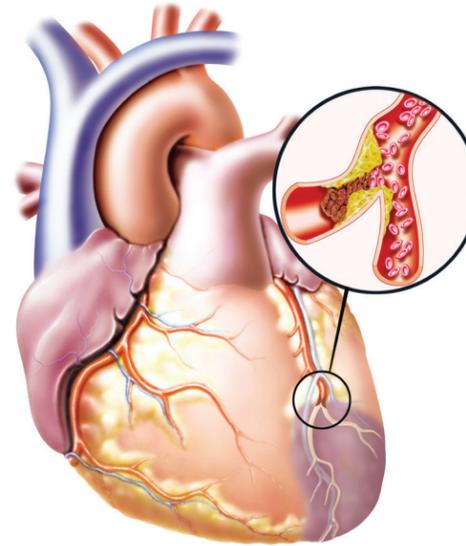
We have well-established expertise in all aspects of surgical ablation including concomitant and stand-alone ablation in all of its minimally invasive varieties. Since introducing convergent ablation technology to the region in 2011, we have expanded its application to treat atrial fibrillation and are now offering it as a first-line therapy for long-standing, persistent AFib.



39
Convergent hybrid atrial fibrillation ablations

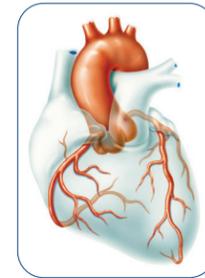


160
Surgical ablations

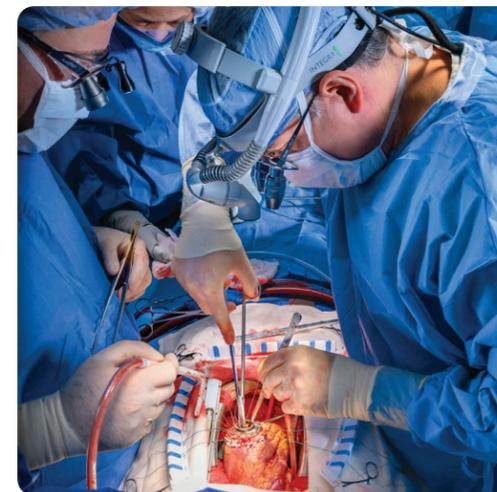
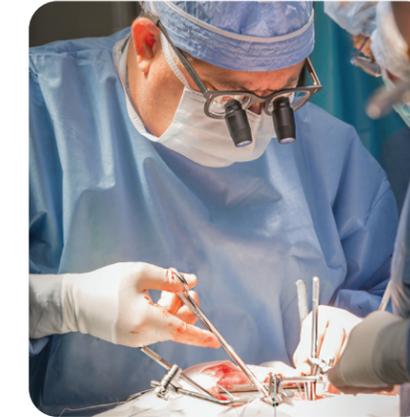


Complex coronary disease

Coronary cases have become more challenging and nuanced, due to the increasing number of patient comorbidities. We find a multidisciplinary approach most effective in providing custom solutions for complex cases, including minimally invasive CABG surgery and hybrid revascularization.



733
Coronary surgeries

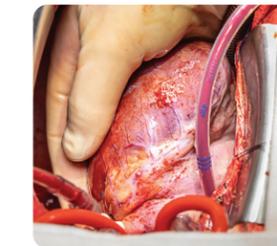


Advanced heart failure

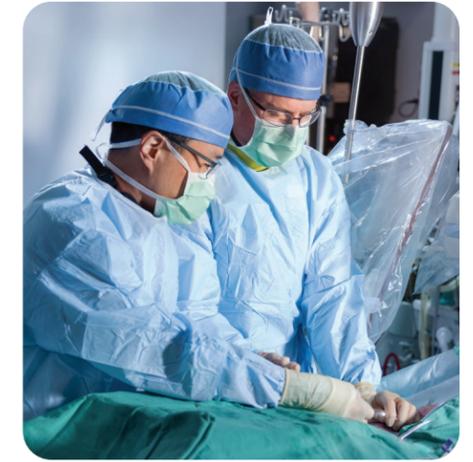
The large majority of our LVADs are now implanted with minimally invasive techniques. For heart transplant patients, we provide greater opportunities by allowing retrieval of donor hearts from further distances through our use of the Paragonix SherpaPak™ Cardiac Transport System.



71
Durable LVAD implantations



21
Heart transplantations

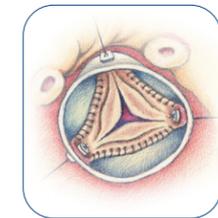


Valvular disease

Our surgeons are experts in valve-sparing aortic root replacement, complex aortic and mitral valve repair, multiple reoperation, minimally invasive valve repair and replacement, robotic mitral repair and replacement, and transcatheter repair and replacement.



120
Isolated mitral valve repairs and replacements



65
Isolated aortic valve repairs and replacements



619
Transcatheter valve replacements



Multidisciplinary collaboration.

The field of cardiac surgery has evolved significantly, with increasing multidisciplinary collaboration among vascular surgeons, interventional cardiologists, electrophysiologists, heart failure clinicians, and imaging specialists. New technology and multidisciplinary approaches are constantly emerging, enabling MedStar Health cardiac surgeons to more effectively tailor operations and achieve optimal results for each patient. One recent example of an innovative and robust partnership is that of convergent ablation—a hybrid approach combining epicardial and endocardial ablation, performed collaboratively with an electrophysiologist, now approved for first-line therapy to treat longstanding, persistent atrial fibrillation.



A robust research program.

There is a prevailing undercurrent of innovation that runs throughout our program. Our commitment to offering the best, most personalized treatment necessitates constant advancement. Our ongoing clinical investigations include:

- minimally invasive insertion of the TriClip™ device for symptomatic patients with severe tricuspid regurgitation,
- CorMatrix® Cor Tricuspid ECM® Valve to treat tricuspid dysfunction,
- Tendyne™ transcatheter mitral valve replacement system as an alternative to open-heart surgery,
- Transcatheter mitral valve replacement with the Medtronic Intrepid TMVR System in patients with severe symptomatic mitral regurgitation,
- HeartMate 3™ LVAD implantation using techniques other than full median sternotomy,
- clinical outcome after heart transplant using donor hearts transported via the Paragonix SherpaPak® Cardiac Transport System,
- Relay Pro® thoracic endografts in the treatment of acute, complicated type B aortic dissection.



Quality care across the board.

We know that low mortality and morbidity are a result not only of surgical expertise, but of the finely tuned skills of the entire team—nursing, advanced practice providers, OR technicians, cardiovascular critical care and imaging specialists, dietitians, and therapists. Our goal is to ensure that every interaction provides the highest quality of care possible.

A distributed care delivery network.

The work of our surgeons extends outside the OR walls, into the communities where patients live and work. As our cardiac surgery service continues to grow, it will do so around the needs of the community. Community sites allow for more straightforward and convenient access for the entire patient-provider community.



Washington region team



Ammar S. Bafi, MD

Key specialties:
Mitral valve surgery
CABG



Jeffrey E. Cohen, MD

Key specialties:
Transcatheter valve replacement
Aortic surgery



Gabriele M. Iacona, MD
**See page 19.*

Key specialties:
Complex coronary revascularization



Yuji Kawano, MD
**See page 19.*

Key specialties:
Minimally invasive surgery
Robotic heart surgery



Ezequiel J. Molina, MD

*Interim Co-Chair, Cardiac Surgery
Surgical Director, Advanced Heart Failure Program,
VAD and Heart Transplantation Program
MedStar Washington Hospital Center*

Key specialties:
LVAD implantation
Heart transplantation



Christian C. Shults, MD

*Interim Co-Chair, Cardiac Surgery
Co-Director, Complex Aortic Center
MedStar Washington Hospital Center*

Key specialties:
Complex aortic disease
Arrhythmia surgery

Baltimore region team



Brian T. Bethea, MD
*Chief, Cardiac Surgery
MedStar Union Memorial Hospital*

Key specialties:
Minimally invasive valve treatments
Structural heart disease



Rachel E. Harrison, MD
**See page 18.*

Key specialties:
Lead extraction and management
LVAD implantation
Heart transplantation



Ricardo O. Quarrie, MD
*Co-Director, Complex Aortic Center
MedStar Union Memorial Hospital*

Key specialties:
Complex aortic disease

To discuss a case with one of our cardiac surgeons, please call:

**202-877-7464 (Washington region) or
410-554-6550 (Baltimore region)**

A roundtable conversation on COVID-19 and cardiovascular health.

Though we have learned a great deal about COVID-19's connection to the cardiovascular system, the learning phase is lingering. What we're doing today, we'll probably be doing a little differently in the next few months as more data comes in and case numbers fluctuate. Our specialists continue to share data and ask questions, in order to evolve in their practice. Here you will find perspectives on what's been learned so far about COVID's relationship with cardiovascular health, the evolution of treatment strategies, and what the future may hold.



Clinical cardiology

"As the medical community works toward a full solution to COVID, it's essential that we get people with cardiac conditions back to normal preventive care. Many were understandably hesitant to visit health facilities during the initial months of the pandemic, and our telehealth services proved valuable in helping keep them connected.

Still, our hospital protocols have been extremely effective at keeping patients safe. With rare exceptions, we've been able to work in this environment for two years with amazingly low infection rates, despite a high level of continuous contact. When virus exposure was detected, we moved aggressively to contain it with attention to best practices in our safety protocols.

We should also remember that throughout the pandemic, heart disease has remained the primary cause of death in the U.S. It hasn't gone away. We're eager to help patients with cardiac issues find the best path toward managing their condition, and achieving their own sense of normalcy."

Allen J. Taylor, MD, Chief Cardiology, Washington Region

Heart failure

"For the most part, SARS-COV-2 has been a predominantly respiratory illness, which means patients present with dyspnea. But when a heart failure patient also complains of shortness of breath, you have to ask if it's due to progression of their original condition, such as decompensation, or a manifestation of COVID. This requires us to be mindful of when to screen for the virus.

There's also a dilemma associated with heart transplants, the best therapy available for eligible patients with end-stage heart failure. Transplants require patients to be immunosuppressed, increasing their risk of both getting the infection and experiencing more severe effects. Published data indicate that heart transplant patients with COVID do much worse than non-transplant patients who get the virus.

So the question becomes, when should we offer a transplant, and when should we not? We don't want to withhold a valuable and effective treatment option, nor do we want patients to undergo that surgery and be put at risk for the virus. All heart transplant centers, including ours, are struggling with this issue, and have had to adjust, as COVID cases have surged and ebbed. We want to do the right thing for our patients, but it's a dynamic balancing act that gets readdressed every time there's a change."

Samer Najjar, MD, Chief, Cardiology, Baltimore Region



Interventional cardiology

"Early in the pandemic, concerns about contracting COVID kept patients from seeking medical care, causing them to present later in their myocardial infarctions—sometimes hours or even days into it. That made repairing blockages more difficult and heightened the likelihood of mechanical complications and long-term heart damage.

One lesson learned was in regard to initial treatment for these patients. Early on, fibrinolytics were considered to be safer and more beneficial for COVID patients than taking them to the cardiac catheterization lab, where there was also risk of exposure for other patients and staff. We soon found that fibrinolytics were not always effective, and in some cases—severely ill patients and those with multi-organ failure, for example—fibrinolytics' blood-thinning properties could be harmful. Based on these insights and new protocols to minimize exposure to COVID, all patients with ST-elevation myocardial infarction, as well as high-risk patients with non-ST elevation, now undergo an early invasive strategy in the cath lab with plans for primary percutaneous coronary intervention. We also have a cath lab dedicated to COVID patients, and those patients under investigation. Further, as we gained more understanding of COVID's connection with the heart, we realized that myocardial injury did not always result from coronary blockages. There were cardiac manifestations such as stress-induced cardiomyopathy, myocarditis, or ST-segment elevation resulting from a supply/demand mismatch mimicking an acute myocardial infarction. This discovery emphasizes the need for multi-modality imaging to ensure the proper diagnosis and management.

Many questions remain, including about patients with lingering myocardial inflammation or fibrosis, and the varying inflammatory responses to the virus. We need to understand what triggers this detrimental inflammatory cascade. Trials are also underway to determine the best long-term management for hypercoagulable COVID patients, whether they would benefit from prophylactic anticoagulation to treat a thrombosis clot, and how long such treatment should last."

Brian C. Case, MD, Interventional Cardiologist



Cardiac electrophysiology

"COVID-induced arrhythmia disorders are not common, but we've seen the whole spectrum of cases. Most involve atrial fibrillation and atrial flutter, which can lead to the formation of clots inside heart and heighten the risk of stroke. In 80 percent of the younger COVID patients who develop irregular heart rhythms, there's no pre-existing heart condition. For them, the arrhythmia is a new diagnosis.

We've also seen instances of significantly slowed heartbeats, with the electrical signal to sinoatrial node blocked due to inflammation and swelling. This typically occurs in the most severely ill patients and can often be resolved by aggressive anti-COVID treatment and systemic steroids. Other patients, however, may require temporary or even permanent pacemakers. Instances of ventricular tachycardia or ventricular fibrillation and flutter, have so far been rare, occurring in about one percent of cases according to published literature.

We're now seeing more cases of postural orthostatic tachycardia syndrome (POTS), where even minuscule stimuli can cause the autonomic system to overreact and send the heartbeat racing. We think the condition will improve as the COVID-related inflammation resolves, but the process can take months, and we're still unsure as to what the optimal therapy should be. No doubt these patients will benefit from research underway into other facets of COVID's long-haul symptoms and treatments.

Another question is whether atrial fibrillation and flutter patients who develop fast heartrate-induced cardiomyopathy will recover heart strength and function after treatment of the arrhythmia, as is the case with most other diseases, or will they require defibrillator and advanced heart failure therapies."

Cyrus A. Hadadi, MD, Associate Director, Cardiac Arrhythmia Research



Vascular surgery

"We know that high blood pressure, diabetes, and other vascular-related disorders place COVID patients at a higher risk for complications and poor outcomes. We've seen this in patients with peripheral arterial disease (PAD), specifically. When endothelial cells become inflamed from viral replication, an inflammatory state can occur and cause clotting. Direct damage to blood vessels can cause clots and compromise flow, as well.

I have treated several patients with COVID who presented young and otherwise healthy, often in their 30s and 40s, and developed deep vein or aortic thrombosis. Some of these patients have even had strokes secondary to their COVID infection.

Thrombotic thrombocytopenia has also been reported—mostly in middle-aged women—after receiving Johnson & Johnson's Janssen vaccine, but it remains exceedingly rare. The COVID infection itself produces a far greater risk of clotting than does the vaccine.

So as providers, we need to ensure patients with PAD stay vigilant, get vaccinated, and take appropriate social precautions to avoid contracting the virus. Importantly, when symptoms do occur, medical care should not be delayed. We've used blood thinners to prevent some of the clotting problems that occur with the infection and can intervene quickly, when needed."

Raghuveer Vallabhaneni, MD, Director, Vascular Surgery, Baltimore Region



Post-COVID recovery program

"One of the most challenging and often perplexing facets of the pandemic has been the persistence of COVID symptoms long after patients have recovered from the infection, often resulting in a 'jagged curve' of recovery that slows their return to normal activity.

We know pre-existing cardiovascular conditions increase one's vulnerability to COVID, but we're finding that 'long-haul' symptoms such as exercise intolerance, palpitations, shortness of breath, and chest discomfort can affect anyone, including young, previously healthy people. Cohort studies have revealed ongoing myocardial inflammation and other damage to the heart and circulatory system in recovered patients unrelated to their original condition, although most patients with persistent symptoms demonstrate no signs of permanent cardiac damage. There's also evidence suggesting COVID may trigger dysautonomia, causing abnormal heart rhythms in many recovered patients. Because these conditions can heighten the risk of type 2 myocardial infarction and other long-term cardiovascular damage, it's essential that long-haul post-COVID patients be evaluated for the most appropriate approach to manage their condition.

To that end, MedStar Health's COVID Recovery Program provides a convenient referral pathway to connect these patients with the appropriate team of specialists who can map out an appropriate—and evolving—plan of care for their condition."

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



(l to r) Vascular Surgeon Jason Chin, MD, and Cardiothoracic Surgeon Ricardo Quarrie, MD, co-founders of the Pulmonary Embolism Response Team at MedStar Union Memorial Hospital. Other team members include: Director of Vascular Surgery Raghuvver Vallabhaneni, MD; Interventional Radiologist Brian Swehla, MD; Cardiac Surgical ICU Director Nimesh Shah, MD; and Advanced Heart Failure Specialist Mrinalini Krishnan, MD.

Case Study

A middle-aged man arrived at MedStar Union Memorial Hospital via air transport. He was intubated, severely hypotensive and acidotic, with elevated lactate levels and depressed right heart function. He had also sustained an injury to his mouth and was bleeding profusely. His CT scan showed a large, bilateral pulmonary embolism. The MedStar Union Memorial Pulmonary Embolism Response Team was activated upon his arrival to the ICU. Their review considered his complicated presentation, including contraindications for anticoagulant therapy, and determined that the clot burden warranted intervention. In the OR, he underwent a successful catheter-based thrombectomy to remove a large amount of clot burden. His high pulmonary pressures decreased immediately to more normal levels. The following day, the patient was extubated in the ICU and he was discharged home four days later.

The Pulmonary Embolism Response Team:

A potent, multidisciplinary approach.

The patient in this case, and others with pulmonary embolisms (PE), have benefited from the new Pulmonary Embolism Response Team (PERT) at MedStar Union Memorial Hospital, which provides rapid, comprehensive, and multidisciplinary intervention.

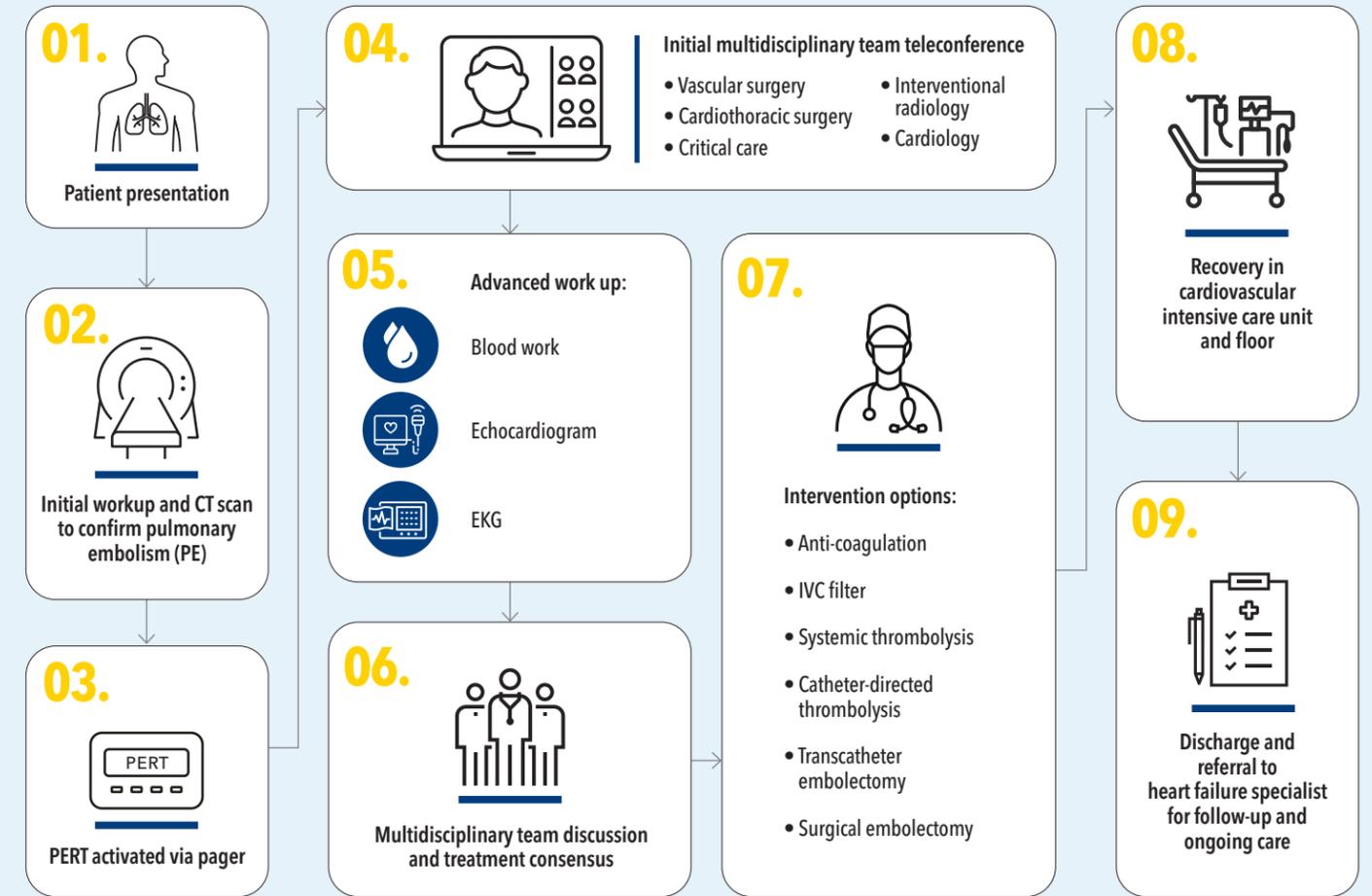
Recognizing the value of clustering a variety of specialists around a particular diagnosis, Cardiothoracic Surgeon Ricardo Quarrie, MD, and Vascular Surgeon Jason Chin, MD, formalized the team last fall.

“Our PERT merges the expertise of vascular surgery, cardiothoracic surgery, interventional radiology, critical care, cardiology, and heart failure,” explains Dr. Quarrie. “Each time a PE is discovered, the team immediately comes together via teleconference to review the case and determine the treatment plan.”

“PE treatment can sometimes take a scattershot approach,” says Dr. Chin. “We realized that a multidisciplinary process combining all the specialties, affords us—and the patients—centralized knowledge and decision-making. We produce a more rapid diagnosis, and a much more effective and tailored therapy for each patient.”

PERTs have been gaining momentum in some medical centers across the country, but this is the first organized program in the Baltimore region. MedStar Washington Hospital Center also has a protocol for prompt response for its patients with PE.

The Pulmonary Embolism Response Team Process



Often difficult to diagnose due to nonspecific symptoms, PEs can be fatal and may result in significant long-term sequelae for survivors. And though a common problem throughout the country, the evolution of treatment has largely been stagnant.

The PERT aims to correct these problems. Starting with the initial diagnosis, the benefits of multidisciplinary collaboration are seen throughout the patient’s entire experience. By streamlining clinical decision-making, the team rapidly determines and delivers the optimal treatment option. For most patients, anti-coagulants or catheter-based lytics will be sufficient; on rare occasions, an IVC filter is used for patients who cannot receive blood thinners. The biggest benefits of the PERT, though, are often felt by the patients who require advanced and immediate intervention. For these people, the prompt action is often lifesaving. Drawing from an array of subspecialty expertise, the full spectrum of interventional options is available, including new transcatheter devices

for thrombectomy. These minimally invasive devices require experience and knowledge of the subtle advantages and disadvantages of each, to know which approach is better suited to the patient. With all hands and all specialties working together from the onset, the PERT prevents patients from reaching a critical point where the options are more invasive, with greater risk.

Upon hospital discharge, PE patients are referred to the Advanced Heart Failure program for further imaging studies, and ongoing monitoring and management of serious long-term sequelae, such as pulmonary hypertension and right heart dysfunction.

“PE, when it’s not an instant killer, can be brushed aside at times,” explains Dr. Chin. “Patients typically receive blood thinners for a short period of time, and then only when decreased respiratory capacity or a recurrent clot is noticed again, do they receive therapy. Our team takes ownership and gets them plugged in with cardiology and heart failure colleagues, making sure they progress in their treatment.”

The team continues to collect and review data on the program, but early results and outcomes are encouraging.

“We’re seeing quicker recoveries and shorter ICU stays, likely due to the reduced strain on the right heart through rapid intervention,” says Dr. Quarrie. “Looking ahead, we’ll be watching the outcomes data in patients with massive PEs—those who may have been treated only with anticoagulants before—to confirm reduced mortality due to more appropriate interventions.”

Dr. Chin agrees. “There is a lot more literature being published, and a lot more data with which to get acquainted. We need multidisciplinary programs like this to stay on the cusp of all that knowledge—to keep treating PEs in the most modern and patient-centered ways.”

To refer a patient to MedStar Union Memorial, call 410-554-2332.

Breakthrough therapy for central sleep apnea in heart failure patients.

Implantable device now first-line treatment.

Whether they know it or not, approximately 18 million Americans suffer from obstructive sleep apnea (OSA), the most common form of the serious breathing disorder and a leading contributor to arrhythmias and heart failure. But while OSA can cause heart dysfunction, there's another, less well-known condition that can actually result from it: central sleep apnea (CSA).

"Unlike obstructive sleep apnea, which typically is caused by a physical blockage of the airways, CSA occurs because the brain doesn't send proper signals during sleep to the muscles that control breathing, resulting in a lack of respiratory effort," says Walter Atiga, MD, a cardiac electrophysiologist at MedStar Heart & Vascular Institute. "Eventually, the repeated interruption in breathing imposes a chemical, mechanical, and inflammatory burden on the heart and circulation. This can result in worsening of heart failure and/or the development of heart rhythm abnormalities, and is a strong independent predictor of cardiac death and hospital readmission."

Up to 50 percent of patients with heart failure—approximately one million people—are at risk of developing CSA. The disorder can also be caused by other conditions, including stroke and brainstem/spinal cord disorders. Symptoms are similar to the classic complaints of OSA: excessive daytime sleepiness, headache, irritability, and diminished attention span or mental acuity.

Previously, the only known therapy for CSA was the adaptive servo-ventilation device which, ironically, has recently been shown to aggravate some cases of the condition. In fact, its use is now contraindicated for heart failure patients with CSA and an ejection fraction of less than 45 percent.

Now, a new approach is giving specialists a much more sophisticated, effective, and safer way to treat moderate to severe central sleep apnea—the remedē® System.

"Basically, remedē is an implantable device that reestablishes the line of communication between the brain and phrenic nerve for regular, rhythmic respiration," says Dr. Atiga, who performed the area's first procedure in June at MedStar Washington Hospital Center. "It's a potential game-changer for CSA patients, many of whom experience diminished heart health and quality of life."

The remedē system features a pulse generator, similar to a pacemaker in function and size, that is implanted subcutaneously in the upper thoracic area. The generator is attached to a lead that runs inside the pericardiophrenic vein, adjacent to the phrenic nerve. When the system senses apnea or a pause in breathing, the lead stimulates the phrenic nerve to activate the diaphragm. Altogether, the procedure takes between two and four hours, depending upon the patient's unique anatomy.

Before the device is activated, sleep specialists monitor remotely the patient's breathing pattern for three to four weeks to determine the extent and severity of apnea. Findings from the monitoring period guide adjustments to the device, as needed to effect a personalized therapeutic outcome.

Unfortunately, many patients remain undiagnosed or misdiagnosed, mostly due to a general unfamiliarity with the rare condition.

"In the presence of unexplained, excessive fatigue, I recommend that physicians conduct a sleep study to get to the root of the problem," Dr. Atiga concludes. "If the diagnosis is central apnea, we can help prolong and improve your patient's life."

Currently, Dr. Atiga and Sarfraz Durrani, MD, director of Technology and Innovation at MedStar Washington's heart rhythm section, are the only specialists to have successfully used the new system in the Baltimore/Washington region.

For more information, please call 202-877-7685.



(l to r) Sarfraz Durrani, MD, and Walter Atiga, MD, offer a new treatment for central sleep apnea.



When the remedē® System senses apnea or a pause in breathing, the lead stimulates the phrenic nerve to activate the diaphragm.

MedStar Health Wound Healing Institute: Unified expertise for wound care and limb salvage.

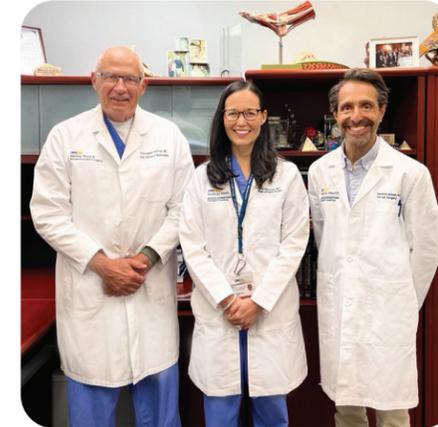
Case Study

A diabetic patient presented to the MedStar Health Wound Healing Institute with an extensive foot infection involving the dorsal and lateral aspects. Antibiotics and surgical intervention resolved the infection, but a large open wound overlying extensive bone remained. The vascular surgeon proceeded with prompt angiography, which showed absent blood flow to the top of the foot. He performed a balloon angioplasty on the occluded anterior tibial artery to restore blood flow. A podiatric surgeon performed a tendon transfer to prevent further breakdown. Because of the large wound on bone, microsurgical tissue flap reconstruction was performed by a plastic surgeon to cover and close the wound. The foot was salvaged, and the patient returned to full ambulation.

A patient such as this is best served through a true multimodal approach. At the MedStar Health Wound Healing Institute, located at MedStar Georgetown University Hospital, MedStar Good Samaritan Hospital, and MedStar Franklin Square Medical Center, specialists from vascular surgery, plastic surgery, and podiatric surgery, with support from other services such as rheumatology and infectious diseases when needed, collaborate on each and every wound case.

"Multispecialty evaluation and constant communication are key to optimal outcome," explains Christopher Attinger, MD, founder and director of the MedStar Health Wound Healing Institute, which now treats over 18,000 patients each year. "No one algorithm works. Collaboration, combined with expertise in treatment, is what works."

Wound care patients see all team members in one visit, in one office suite, for an integrated evaluation and comprehensive treatment plan. Plastic Surgeon Karen Kim Evans, MD, puts



(Top, l to r) Washington Region Plastic Surgeons Christopher Attinger, MD, and Karen Kim Evans, MD, with Vascular Surgeon Cameron Akbari, MD; (Bottom, l to r) Baltimore Region Vascular Surgeons Suzanne Kool, MD, Stephen Stanziale, MD, and Jason Crowner, MD.

it simply: "When everyone is in the room together in real time, really good decisions are made."

Critical to this approach is the perspective of vascular surgeons.

"Nothing happens without blood flow," says Cameron Akbari, MD, a vascular surgeon at MedStar Georgetown.

"We know that adequate blood flow is essential to healing and saving limbs, but without the correct diagnosis and prompt treatment to restore blood flow, all efforts at limb salvage will fail. Most patients with chronic wounds have diabetes or atherosclerotic disease as an underlying cause. Because of those

dynamics, we have to ensure maximal blood flow to the wound."

Vascular Surgeons Jason Crowner, MD, Suzanne Kool, MD, and Stephen Stanziale, MD, take a similar "one-team" approach with specialists in the Baltimore locations.

"For any wound presentation, the team comes together," explains Dr. Crowner. "We order and review noninvasive labs, perform examinations of the wound, consider the patient's full clinical history, and decide if an angiogram or other intervention is required. Together we coordinate the work of debridement, infection removal, revascularization, and any further interventions that may be necessary."

Making this full scope of treatment accessible to patients is key. At the MedStar Health Wound Healing Institute, patients don't need to determine or coordinate their own specialist visits.

"We do everything together and thereby create a clear pathway for the patient, with a well-established timeline for their treatment," Dr. Crowner adds. "The patients have full access to experts in each field, who talk to each other every single day, all with the goal of making sure each patient gets what they need, at the right time, and ultimately, gets back to their baseline."

A continuity-of-care plan is also managed by the team. This ensures the healing process progresses positively, and that patients are not left to manage their own follow up.

Significant to the success of this program is the combined experience of its specialists.

"Our experience comes from the sheer volume of patients we see," Dr. Akbari says. "With thousands of patients each year, for many years, we know what works and what doesn't."

For a wound care or limb salvage consultation, please call 202-444-6161 (Washington) or 443-444-4275 (Baltimore).

Coordinating efforts across our geographic footprint:

Regionalized cardiology programs in Baltimore and Washington.

Staying at the forefront of heart and vascular care demands more than cutting-edge treatment and research capabilities. It also requires the ability to deliver responsive, efficient, and high-quality services to patients, while fostering collaborative relationships with referring physicians, particularly as the organization continues to grow.

For that reason, MedStar Heart & Vascular Institute has restructured its cardiology programs to capitalize on the resources and expertise in both of its major metropolitan areas. To oversee those efforts, Allen J. Taylor, MD, serves as regional chief of Cardiology for the Washington region, while Samer S. Najjar, MD, serves as regional chief of Cardiology for the Baltimore region.

Dr. Taylor, who has long headed cardiology services at MedStar Washington Hospital Center and MedStar Georgetown University Hospital, says that the new structure allows the organization to leverage the breadth and depth of its nationally recognized cardiology programs while also enhancing their ability to interact and support each other.

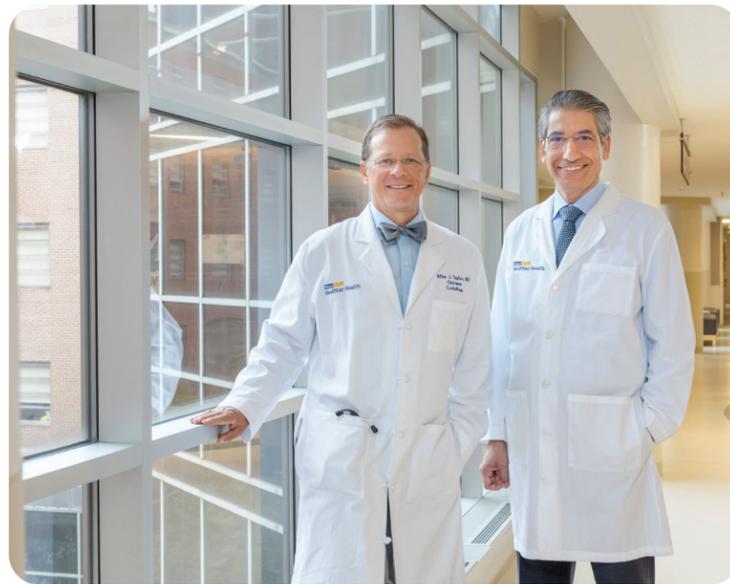
"We have premier programs in advanced heart failure, structural and interventional cardiology, electrophysiology, and many subspecialties within those areas," he says. "Creating one large multi-specialty cardiology group for each region facilitates that synergy while also allowing us to stay close to the communities we serve."

Dr. Najjar, previously director of the Advanced Heart Failure Program, adds that capitalizing on each region's local connections is particularly important, given projections of continued population growth and demographic change in the coming years.

"Currently, many of our general cardiology practices are headquartered around the hospitals, but that's not where the patients are," he explains. "This new structure makes us more nimble in terms of strategic planning and adapting to community needs."

This "parallel but connected" structure for cardiology services offers many other benefits as well, enabling patients to seamlessly transition between levels of care as needed, and allowing provider teams to work across organizations and extend their skills to other MedStar Health sites.

"The approach makes the entire system more operationally efficient, from the simplest to most complex care," Dr. Taylor adds. "It connects all MedStar Health activity so that we can work as a single team for the common purpose of innovation, high-quality care, and access—all those things that patients and referring physicians can hope for."



(l to r) Allen J. Taylor, MD, serves as chief of Cardiology for the Washington, D.C. region, while Samer S. Najjar, MD, serves as chief of Cardiology for the Baltimore, Maryland region.

That includes ensuring consistent protocols across each region. "Patients will receive the same quality care regardless of where they go, and they will have easy access to all our general and subspecialty services," Dr. Najjar says.

The move also marks a homecoming of sorts for Dr. Najjar, who received his medical training at The Johns Hopkins Hospital and subsequently led the heart failure clinic at Johns Hopkins Bayview Medical Center before joining MedStar Health.

"I have strong roots in Baltimore, so coming back is like returning home," he says. "I'm kind of proud of the fact that I can drive to our four hospitals here without needing GPS."



Acute and ambulatory coverage across Baltimore and Washington regions.

News and notes.

Historic milestone for HeartMate 3™ LVAD implantations.

Physicians at MedStar Washington Hospital Center have completed their 300th implant of the HeartMate 3™ LVAD, placing it among the first four LVAD programs nationwide to reach this historic milestone. MedStar Washington participated in the MOMENTUM 3 clinical trial and its post-pivotal study Continuous Access Protocol (CAP), testing the efficacy of the HeartMate 3 LVAD for safety and sustainability as short- and long-term support for patients with advanced (stage D) heart failure. The FDA approved the HeartMate 3 device as both a bridge-to-transplant and as destination therapy. As a result of the trials, the HeartMate 3 pump became the most-often used LVAD therapy with high success rates and lower complication rates than its predecessors.

"Over the last two decades, LVADs have revolutionized the way we treat patients with stage D heart failure. With a modern technological design that includes full magnetic levitation of the impeller, this pump represents the best LVAD our field has ever seen," said Ezequiel Molina, MD, surgical director of the Advanced Heart Failure Program and interim co-chair of cardiac surgery at MedStar Washington Hospital Center. "The HeartMate 3 device is a small, more portable and quieter LVAD than previous generations. Patients enjoy longer survival, experience fewer complications, and return to a fairly active lifestyle. And that is our goal—to improve the quality of life of our patients."

MedStar Washington is one of the most experienced LVAD programs in the country. It has been at the forefront of all the major clinical trials to test new devices. To date, MedStar Washington has successfully implanted more than 830 VADs.

For more information or to schedule a patient consult, call us at 202-877-7464.



Ezequiel Molina, MD, surgical director of the Advanced Heart Failure Program, with a HeartMate 3™ LVAD.

300+

HeartMate 3™
LVAD implantations

Newly FDA-approved LAA occluder device reduces stroke risk in AFib patients.

Cardiac Electrophysiologist Manish Shah, MD, was a top enroller in the safety and efficacy study of the Amplatzer™ Amulet™ Left Atrial Appendage (LAA) Occluder for stroke prevention in patients with non-valvular atrial fibrillation compared to other implants. The device recently received approval by the U.S. Food and Drug Administration after showing superior LAA closure and noninferior safety and effectiveness. The device is the first and only minimally invasive treatment option to offer immediate and complete closure of the LAA, and is available for a wide range of anatomies.

Please contact us at 202-877-7685 if you'd like to discuss the possibility of the Amulet for your patient.



Cardiac Electrophysiologist Manish Shah, MD

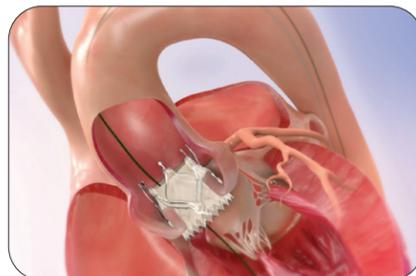
Trial begins on the first transcatheter treatment for severe aortic regurgitation.

Our interventional cardiologists are enrolling patients in JenaValve Technology's ALIGN-AR Pivotal PMA trial to study the Trilogy™ Heart Valve System for severe, symptomatic, high-surgical-risk aortic regurgitation.

Having pioneered the use of transcatheter aortic valve replacement (TAVR) for the treatment of aortic valve stenosis, we now offer this first transcatheter heart valve technology for the minimally invasive treatment of aortic regurgitation. The current treatment for high-risk patients who are not candidates for open heart surgery consists predominantly of medical management and/or off-label use of TAVR devices.

Ron Waksman, MD, director of Cardiovascular Research and Advanced Education, is serving as the principal investigator, with Lowell Satler, MD, medical director of the Cardiac Catheterization Lab at MedStar Washington Hospital Center. The program is one of the most experienced and highest volume centers in the United States.

To learn more about the study and eligibility criteria, please contact Erin Collins at 202-877-6622 or erin.c.collins@medstar.net.



(l to r) Interventional Cardiologists Ron Waksman, MD, and Lowell Satler, MD

Noninvasive detection of heart transplant rejection study wins AHA's 2021 best paper award.

Medical Director of Heart Transplantation Maria E. Rodrigo, MD, served as MedStar Washington Hospital Center's site principal investigator for the GRAfT consortium study, evaluating the use of a sensitive blood biomarker for alternative detection of acute rejection in heart transplant recipients. Historically, acute rejection has been assessed through endomyocardial biopsy (EMBx), which is invasive and has limitations. This study demonstrated excellent performance and confirmed that the biomarker leads to earlier detection than EMBx monitoring.

"These findings could have immense implications for our transplant patients, helping us differentiate between types of rejection, as well as allowing us to diagnose and treat earlier while avoiding an invasive test," explains Dr. Rodrigo.

The results were published in a paper entitled *Cell-Free DNA to Detect Heart Allograft Acute Rejection*, and won the American Heart Association's 2021 James T. Willerson award in Clinical Science for the best paper published in *Circulation* in the preceding 12 months.

View the full paper at [AHAJournals.org/doi/10.1161/CirculationAHA.120.049098](https://doi.org/10.1161/CirculationAHA.120.049098).



**Maria E. Rodrigo, MD
Medical Director, Heart Transplantation**

New study evaluates expansion of the VenaSeal™ Closure System for venous varicosities.

Vascular Surgeon Misaki Kiguchi, MD, is now enrolling patients in SPECTRUM, a post-market, prospective, randomized control trial of the VenaSeal™ Closure System. Approved for use by the FDA in 2015, VenaSeal is a non-thermal, non-tumescent, non-sclerosant closure system that uses adhesive to permanently close diseased superficial veins. Performed in an outpatient setting, the approach provides less peri- and post-procedural discomfort and faster recovery time than traditional thermal ablations.

In this new study, VenaSeal is being evaluated against endothermal ablation for the treatment of early and advanced stages of superficial venous disease.

"We are committed to being at the forefront of cutting-edge research," says Dr. Kiguchi. "Our goal is to continue expanding evidence-based options for our patients."

For more information on the SPECTRUM trial at MedStar Georgetown University Hospital, please contact Dr. Kiguchi at 202-444-2255.



Vascular Surgeon Misaki Kiguchi, MD

Welcome **new medical staff.**

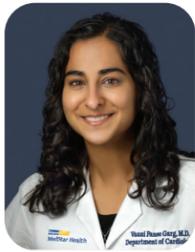


Erika Feller, MD, is an advanced heart failure specialist and the director of heart failure outreach in the Baltimore region. She is board certified in cardiovascular disease and advanced heart failure and transplant. Dr. Feller sees patients with any stage of heart failure—from early diagnosis to the advanced stages, including those with LVADs and heart transplants. She

often manages complex cases with multiple comorbidities, directing care and providing access to appropriate specialties, as needed. Prior to joining MedStar Health, Dr. Feller served as medical director of the heart transplant and LVAD programs at the University of Maryland Medical Center.

Education and training:

- **Fellowship:** Cardiovascular Disease, Temple University Hospital, Philadelphia, Pennsylvania
- **Residency:** Temple University Hospital
- **Medical School:** University of Maryland Medical School, Baltimore, Maryland



Vaani Garg, MD, is a cardiologist at MedStar Washington Hospital Center. She is board certified in internal medicine, cardiovascular disease, nuclear cardiology, and adult comprehensive echocardiography. Dr. Garg diagnoses and treats the full spectrum of cardiovascular diseases, from hypertension to heart failure. She is highly skilled at interpreting TEE,

TTE, and 3D echocardiography, which enhance her diagnosis of, and treatment decisions for, a variety of pathology. Prior to joining MedStar Health, Dr. Garg practiced at The Mount Sinai Hospital and served as a clinical assistant professor of medicine at the Icahn School of Medicine at Mount Sinai.

Education and training:

- **Fellowship:** Clinical Cardiology, The Mount Sinai Hospital, New York, New York
- **Residency:** Internal Medicine, The Mount Sinai Hospital
- **Medical School:** Tufts University School of Medicine, Boston, Massachusetts



Rachel Harrison, MD, is a cardiac surgeon at MedStar Union Memorial Hospital. She is board certified in general and thoracic surgery. Dr. Harrison treats ischemic cardiac disease, structural heart conditions, valvular disease, and rhythm disorders, often through minimally invasive approaches. She is uniquely skilled in complex lead extraction and

management, related to pacemaker and defibrillators, which may be necessary due to infections, device recalls, and other complications. Prior to joining MedStar Health, Dr. Harrison spent significant time managing patients with advanced heart failure, offering mechanical support and transplantation.

Education and training:

- **Fellowship:** Cardiothoracic Surgery, University of Texas Southwestern Medical Center, Dallas, Texas
- **Residency:** General Surgery, University of Texas Southwestern Medical Center and Parkland Hospital
- **Medical school:** University of Arkansas for Medical Sciences, College of Medicine, Little Rock, Arkansas



Gabriele Iacona, MD, is a cardiac surgeon at MedStar Washington Hospital Center. He is a member of the European Board of Cardiothoracic Surgery. Dr. Iacona's primary focus is coronary artery bypass grafting, or CABG. While CABG is a common procedure, it has grown increasingly more complicated as patients present with multiple comorbidities and with advanced stages of disease. Dr. Iacona's specialization offers nuanced perspective and sophisticated surgical skill. Prior to joining MedStar Health, Dr. Iacona practiced at Cleveland Clinic's Heart, Vascular & Thoracic Institute, as well as several major European hospitals.

Education and training:

- **Fellowships:**
 - Adult Cardiac Surgery, Mechanical Cardiac Support & Cardiac Transplantation, Yale New Haven Hospital, New Haven, Connecticut
 - Adult and Pediatric Cardiac Surgery, Policlinico San Donato, San Donato Milanese, Italy
- **Residency:** Cardiac Surgery, Institute of Cardiovascular Surgery, University of Padua, Padua, Italy
- **Medical school:** Catholic University of Sacred Heart, Rome, Italy



Yuji Kawano, MD, is a cardiac surgeon at MedStar Washington Hospital Center with a unique qualification in minimally invasive and robotic heart surgery. Dr. Kawano comes to MedStar Health from his advanced fellowship program at Emory University, where he received the full spectrum of training in robotic cardiac surgery under some of the first, and most experienced, robotic cardiac surgeons, worldwide.

Education and training:

- **Fellowships:**
 - Advanced Robotic Cardiac Surgery, Emory University Hospital, Atlanta, Georgia
 - Advanced Adult Cardiac Surgery, Brigham and Women's Hospital, Boston, Massachusetts
 - Minimally Invasive Cardiac Surgery, Tokyo Bay Urayasu Ichikawa Medical Center, Chiba, Japan
- **Residencies:**
 - Cardiovascular Surgery, Ichinomiya Nishi Hospital, Aichi, Japan
 - General Surgery, Musashino Red Cross Hospital, Tokyo, Japan
- **Medical school:** Osaka University Graduate School of Medicine, Osaka, Japan



Tarana Nekzad, DO, is a cardiologist at MedStar Health at Brandywine. She is board certified in internal medicine, adult echocardiography, cardiovascular nuclear medicine, and board eligible in cardiovascular medicine. She also holds a Registered Physician in Vascular Interpretation (RPVI) certification. Dr. Nekzad focuses on risk stratification, prevention, and management of the full spectrum of cardiovascular conditions, including coronary artery, valvular, peripheral arterial, and aortic diseases.

Education and training:

- **Fellowship:** Clinical Cardiology, Michigan State University at Beaumont Farmington Hills, Farmington Hills, Michigan
- **Residency:** Internal Medicine, Michigan State University at Beaumont Farmington Hills
- **Medical School:** Michigan State University College of Osteopathic Medicine, East Lansing, Michigan



Danielle Salazar, MD, is a vascular surgeon at MedStar Montgomery Medical Center. She is board certified in general surgery. In her practice, she sees patients with complex vascular pathology spanning aortic, carotid artery, venous occlusive, deep venous, and peripheral arterial diseases. Dr. Salazar is also trained in vascular hemodialysis access and provides an array of options for creating percutaneous fistulae, AV fistulae, and bypass grafts, using some of the most innovative, minimally invasive options available.

Education and training:

- **Fellowship:** Vascular Surgery, MedStar Washington Hospital Center/Georgetown University, Washington, DC
- **Residency:** General Surgery, MedStar Washington Hospital Center/Georgetown University
- **Medical School:** Boston University School of Medicine, Boston, Massachusetts



Cardiovascular Physician is a publication of MedStar Health. 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.

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Upcoming conferences and courses

CRT 2022: Annual Conference

February 26 to March 1, 2022
Omni Shoreham Hotel, Washington, DC
In person

Join interventional and endovascular specialists for the 25th annual Cardiovascular Research Technologies (CRT) conference, featuring focused educational and training sessions that discuss new trial data, explore evidence-based research, and demonstrate the most up-to-date techniques that can be directly applied to clinical and academic practices. Attendees have the opportunity to share ideas and knowledge, collaborate on solutions, receive training, and network with other professionals.

Visit CRTMeeting.org for agenda and registration information.

DMV Cath Lab Case Review

Monthly, 7:15 p.m.
Virtual

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.

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

Cardiac Ultrasound and Advanced Imaging Conference

Weekly, Thursdays, 7:30 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.