

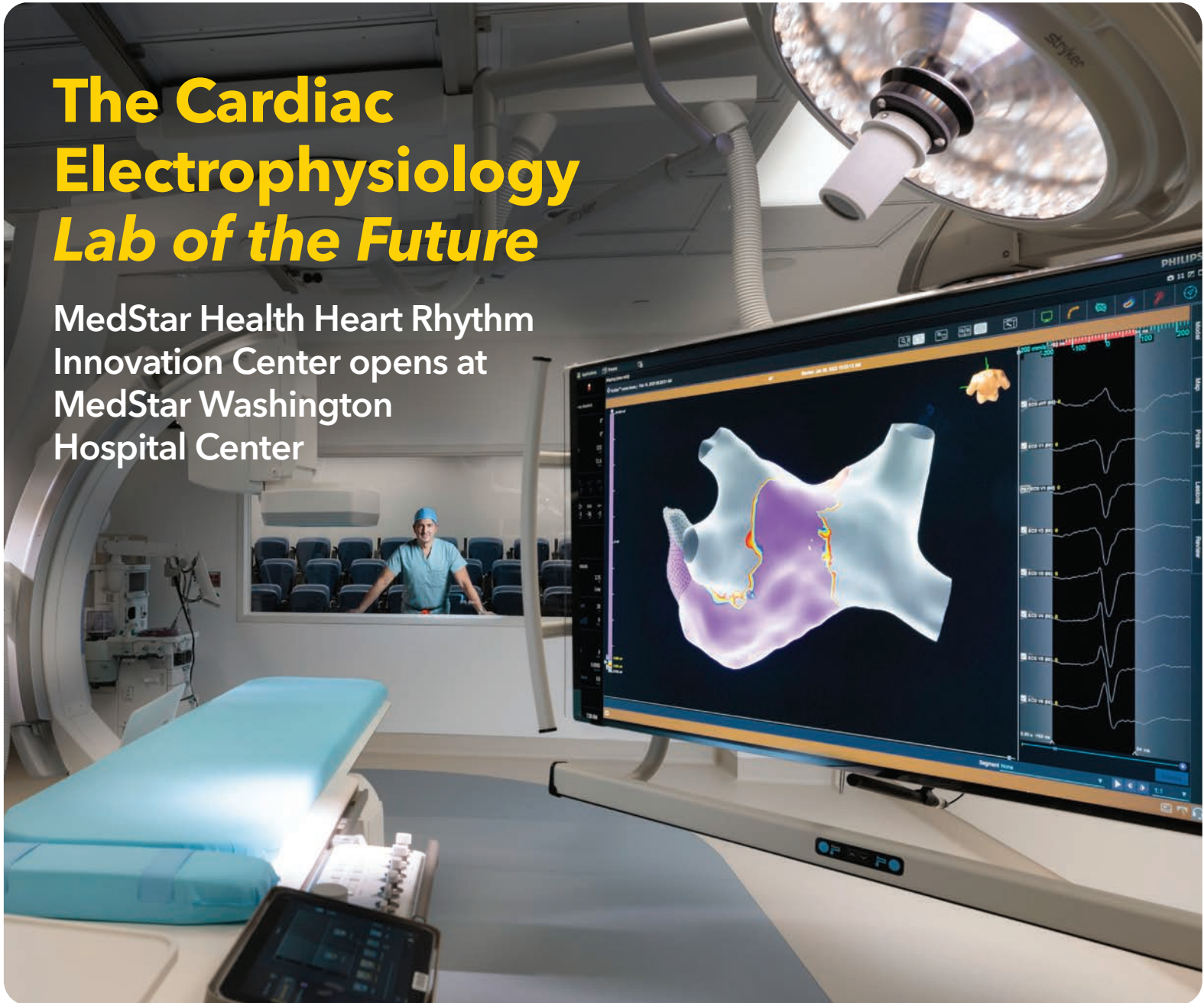
# Cardiovascular **Physician**

A clinical practice and research publication.

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## The Cardiac Electrophysiology *Lab of the Future*

MedStar Health Heart Rhythm Innovation Center opens at MedStar Washington Hospital Center



**Also inside:**

**Five recent innovations bring broader solutions for patients with heart failure.**



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## More than patient centered: Medicine designed around each person.

At MedStar Heart & Vascular Institute, everything begins and ends with the individual entrusted to our care. The customized therapies, the geographic locations, and the experience we provide are intentionally developed with the patient at the center of our strategy.

Every technology in which we invest and each clinical trial we pursue is selected because of our hope that it will offer significant value to our patients. Beginning on page 7, we share a number of these innovations for those with heart failure. Each offering prioritizes the person, their longevity, and their desired quality of life. These new devices not only measurably improve cardiac function, but also provide symptom relief, which is often chief among patient concerns. Two monitoring devices (discussed on pages 10 and 11) remotely measure pulmonary arterial pressure, providing early warning of decompensation, relieving patients of the burden of extra clinic visits and additional hospitalizations. This tailored approach to the patient is particularly evident in the case study on page 14, in which Javairiah Fatima, MD, uses a physician-modified endograft customized specifically to her patient’s unique anatomy in treating a complex thoracoabdominal aneurysm.

In addition to these novel methodologies and treatments, our distributed care delivery network and patient-first approach brings state-of-the-art expertise into the communities which we serve. A recent example is the Advanced Heart Failure program expansion to MedStar Southern Maryland Hospital Center. We recognized the critical need for experienced specialists, advanced imaging technology, and support services in this part of our region, and now patients with chronic and serious illness can receive care closer to home. (Read more on page 13.)

Key to the successful implementation of community-based care and innovative treatments is a foundational underpinning of teamwork that exists throughout MedStar Heart & Vascular Institute. The collaboration of multidisciplinary experts—advanced heart failure specialists, cardiac electrophysiologists, interventional cardiologists, cardiac imaging specialists, cardiac and vascular surgeons—is what enables us to provide the most effective therapy in a manner which considers each patient and their needs.



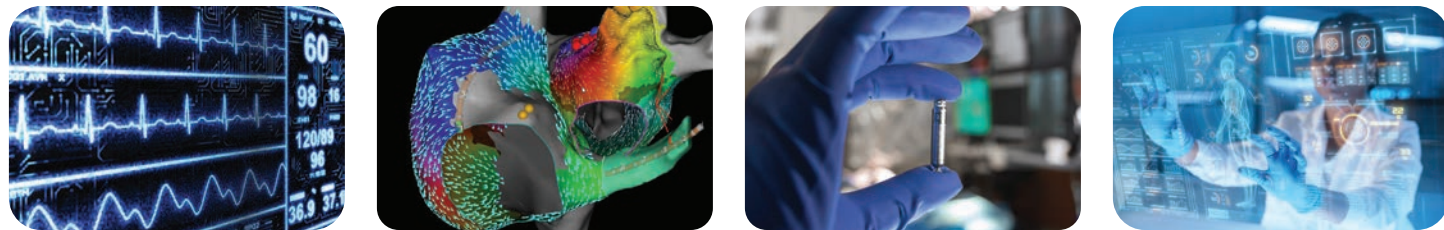
Finally, we share details of the brand new, state-of-the-art MedStar Health Heart Rhythm Innovation Center at MedStar Washington Hospital Center. Here, patients receive all their cardiac electrophysiology services—preparation, interventions, and recovery—in a suite designed to enhance their comfort and access. In addition to augmenting patient care, the center will also serve as a hub of research and education. (See pages 4-6.) This momentous project demonstrates the ongoing synergy between MedStar Health and our community. As we strive to deliver world-class care to the residents of our region, we are also humbled by how they give back in gratitude. The Center was generously funded, in part, by the Morris and Gwendolyn Cafritz Foundation, which has supported our clinical programming for many years.

As your partners in caring for *people*, we hope to continue elevating their experience and improving their outcomes as patients, through each and every one of our contributions to medicine, be it a service, innovation, or location.



# The Cardiac Electrophysiology

# Lab of the Future



The MedStar Health Heart Rhythm Innovation Center opened this spring at MedStar Washington Hospital Center, launching a new era of advanced heart rhythm care, teaching, and technology development.

This new facility, also known as the MedStar Health Cardiac Electrophysiology (EP) “Lab of the Future,” expands the existing Morris and Gwendolyn Cafritz Foundation Cardiac EP Suite.

MedStar Health offers the region’s most established and dynamic heart rhythm program. At 24 hospital and ambulatory sites across Maryland, Washington, D.C., and Virginia, internationally renowned cardiac electrophysiologists manage the full spectrum of heart rhythm conditions for thousands of patients each year. While it is the team’s intention to provide as many services as possible close to the communities where patients live and work, highly technical and complex therapies must be delivered in the sophisticated setting of the medical center.

“Cardiac electrophysiology is among the most technology-driven specialties in modern medicine,” says Zayd Eldadah, MD, PhD, Director of Cardiac Electrophysiology at MedStar Health. “Early adoption of computers, robotics, three-dimensional mapping, as well as miniaturization of devices, integration of artificial intelligence, and many other advances, highlight how EP innovation has transformed heart rhythm care. A state-of-the-art specialty deserves a state-of-the-art innovation center, and we hope that this EP Lab of the Future will deliver tomorrow’s therapies to patients who need them today.”

## A unique incubator for training and research.

The lab is specifically designed to facilitate in-person and remote teaching and research. It will serve as a knowledge and product-development hub for industry, academic centers, government agencies, medical societies, and other local, national, and international visitors.

A key component is the integrated audiovisual system, which allows for the recording and transmission of procedures in real time. ❶ Strategically placed cameras, including those in overhead surgical lights, capture optimum views of procedures as they are performed. A 27-seat auditorium, separated from the operating theater by a smart-glass wall that can transform from transparent to opaque with a flip of a switch, offers unique access for clinicians and researchers.

❷ The lab’s inaugural procedure, for example—performed in April by Susan O’Donoghue, MD, a senior member of the EP team—was viewed from the auditorium by MedStar Health leadership, Heart Rhythm Society executives, and Georgetown University School of Medicine faculty. ❸

## Next generation technology for optimal patient care today.

The central feature of the new facility is a large (850 square-foot), hybrid, interventional procedure/operating room with adjacent control room. ❹

—Continued on next page







**“Seeing this facility come to life is a dream come true for us. MedStar Health brought the National Capital Region its first dedicated cardiac electrophysiology laboratory 40 years ago, and this Lab of the Future is the latest leap forward for our region and beyond.”**

—Zayd Eldadah, MD, PhD, Director of Cardiac Electrophysiology at MedStar Health



It offers complementary cardiac surgical capabilities as well as the very latest technology for therapies that include implantation of pacemakers, defibrillators, cardiac resynchronization devices, and cardiac monitors, as well as cardiac ablation, ranging from simple to highly complex.

The lab’s advanced technology includes the next-generation Philips AZURION 7 image-guided therapy system, which allows for maximum flexibility during either hybrid or interventional procedures. From its ceiling mount, the platform’s flexible arm can be maneuvered around the operating site for precise view and focus in eight different planes, avoiding the risk and disruption of repositioning the patient. ⑤



The lab is part of a 6,000 square-foot expansion that also includes a dedicated Heart Rhythm Same-Day Care Suite designed to enhance patient safety and comfort by ensuring that the entirety of the procedure day is managed under specialized EP associates in one area. ⑥

“Coupled with the recent expansion of our research and clinical teams, plus the addition of new, geographically dispersed ambulatory sites, this facility will supercharge our dedicated caregivers in their mission to prolong and improve human life,” Dr. Eldadah says. “We’re humbled by the support of grateful patients, philanthropic partners, health system leadership, and tireless associates, who have built an international destination center for advanced care.”



The multimillion-dollar project was funded in part by the Morris and Gwendolyn Cafritz Foundation, which has generously supported clinical programs at MedStar Health for the past two decades.

# Recent innovations bring broader solutions for some patients with heart failure.

Barostim™



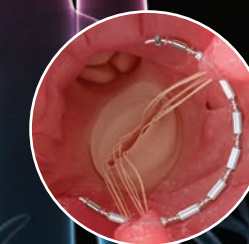
CardioMEMS™ HF System



Optimizer® Smart System



Cordella™ Heart Failure System



AccuCinch® Ventricular Restoration System

On the next five pages, we share a new suite of therapeutic and monitoring devices now available for patients with heart failure. Adding to the existing array of medical and interventional strategies, these options offer our clinicians even more choices, as they consider each person's unique anatomy, cardiac deficiencies, symptoms, and goals.



# The growing role of electrical therapies in advanced heart failure.

For many patients with heart failure, symptom relief seems unattainable, even when drug and device therapy have been optimized. Providers are often challenged to find effective alternatives for those who are neither well managed by, nor good candidates for, cardiac resynchronization therapy (CRT) and implantable cardioverter defibrillators (ICD). Until recently, there were no FDA-approved electrical devices for this subset of patients. Now, physicians at MedStar Washington Hospital Center are offering two new therapies to address the need: Barostim™ baroreflex activation therapy and Optimizer® cardiac contractility modulation (CCM).

## Baroreflex activation therapy

In heart failure, the cardiac baroreflex—a natural pathway in the body that regulates blood pressure and flow, balancing the sympathetic and parasympathetic reflexes that control the heart and circulation—no longer works properly. This results in autonomic dysfunction, with deregulated blood pressure and often increased heart failure symptoms. The Barostim™ system stimulates that baroreflex. Unlike ICDs or CRT, this therapy does not touch the heart. It employs an electrode that is placed on the patient's carotid artery, in the region of the baroreceptors, just behind the collarbone. Electrical impulses sent from the device stimulate the baroreflex to regulate blood pressure and flow, balancing sympathetic and parasympathetic regulation of the heart.

At MedStar Washington, Cardiac Electrophysiologist Cyrus Hadadi, MD, and Vascular Surgeon Steven Abramowitz, MD, collaborate with clinical cardiologists and advanced heart failure specialists to identify possible candidates who might benefit from the device.

"In advanced heart failure, the sympathetic 'fight or flight' reflex kicks in, and increases heart rate and blood pressure," explains Dr. Hadadi. "It essentially gets stuck in sympathetic overdrive and Barostim corrects it. The goal is to reduce the heart's workload and help it pump more efficiently."

"Barostim helps the body rest. It tells the heart, 'Calm down, take a break,'" adds Dr. Abramowitz.

During the procedure, Dr. Abramowitz makes a small incision in the neck to expose the carotid bulb, which provides access to the target nerves. The Barostim leads are sutured at the carotid bifurcation which contains the baroreceptors. Dr. Hadadi creates a pocket for the implant and tests it for appropriate physiologic response in the patient before closure. The outpatient procedure lasts about an hour.

It is worth noting that most systolic heart failure patients don't qualify for CRT, and of the patients who do qualify, some may have a suboptimal therapeutic response. Barostim is FDA approved for these patients with systolic heart failure who are not candidates for CRT, and for those who already have a CRT or ICD device and continue to have symptoms. It is anticipated that many patients will have ICDs, CRT, and Barostim.

"We believe there is likely a large unmet need for this therapy," says Dr. Hadadi. "We are looking for every advantage we can find to help restore the patients' quality of life. Before, we had little to offer if CRT and medication failed. Now we have this novel therapy that can make a major difference."



Cardiac Electrophysiologist David Strouse, MD

## Cardiac contractility modulation

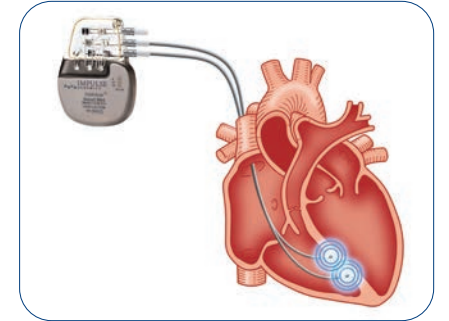
The safety and efficacy of cardiac contractility modulation has been established through decades of investigation. Now, CCM is FDA approved through the Optimizer® Smart System for heart failure patients ineligible for CRT. CCM therapy delivers pulses of energy during the absolute ventricular refractory period based on an algorithm customized for each patient, improving the efficacy and force of natural contraction. Myocardial contractility is directly improved. The impact is enduring—regular CCM therapy may have a sustained effect on contractile proteins that provides a reverse remodeling effect on the heart.

David Strouse, MD, cardiac electrophysiologist at MedStar Washington, estimates there may be a substantial population of heart failure patients who may benefit from the Optimizer implant.

"From an imaging and anatomical standpoint, things may not look too bad for these patients," Dr. Strouse explains. "They have evidence of diastolic dysfunction, and the heart muscle is slightly weakened, but not terribly so. The problem is that they are really suffering from significant symptoms and medications aren't providing adequate relief."

Through a minimally invasive procedure, the Optimizer system is implanted in a small pocket under the skin and attached to the right ventricular septum with pacemaker-like leads. The device is externally rechargeable and can be managed by the patient at home.

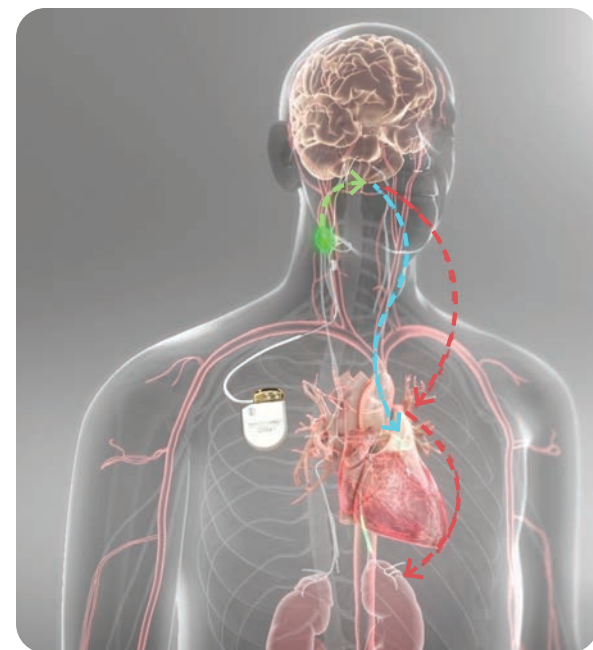
"Once the heart begins to perform more effectively, patients experience marked symptom relief," says Dr. Strouse. "When used as adjunctive therapy with medications, this has the potential to greatly improve someone's quality of life."



The Optimizer® Smart System delivers pulses of energy during the absolute ventricular refractory period, improving the efficacy and force of natural contraction.



(l to r) Vascular Surgeon Steven Abramowitz, MD, and Cardiac Electrophysiologist Cyrus Hadadi, MD



Indeed, studies of the Optimizer show both improved functional status and left ventricular ejection fraction, as well as reduced hospitalization rates as compared with patients' prior histories.

At this point, the Optimizer is commercially available to patients with NYHA Class III heart failure and a LVEF between 25 to 45 percent, who are not candidates for cardiac resynchronization therapy, and whose symptoms are not well managed by guideline-directed medical therapy (GDMT). Additional studies are expected to examine Optimizer use in patients with differing clinical profiles, which may expand its use.

"This therapy is already having an impact on a large number of patients, and that population is growing," says Dr. Strouse. "We now have a variety of strategies and mechanisms for improving quality of life for highly symptomatic patients, and it's likely that some of the devices and therapies may be combined in the future, providing even more comprehensive treatment based on the patient's particular situation."

**Determining the appropriate therapy for each patient is a nuanced decision. Our team can provide guidance and discuss the various options.**

**To reach us, please call:  
Advanced Heart Failure: 202-877-4698  
Cardiac Electrophysiology: 202-877-7685  
Vascular Surgery: 202-877-0275**



# Remote monitoring of pulmonary arterial pressure in patients with heart failure.



(l to r) Advanced Heart Failure Specialist Phillip Lam, MD, with Interventional Cardiologist Hayder Hashim, MD



Dr. Hashim and Itsik Ben-Dor, MD, perform a CardioMEMS™ implant



(l to r) Advanced Heart Failure Specialist Erika Feller, MD, with Interventional Cardiologist John Wang, MD



Dr. Wang performing a Cordella™ implant procedure

Heart failure is one of the leading causes of hospitalization worldwide, and with each heart failure-related hospitalization, a patient's risk of mortality rises significantly.

Medication advancements, cardiac implantable electronic devices (CIED), and a collaborative, multidisciplinary approach to treatment aid earlier intervention and can prevent worsening symptoms, reduce hospitalizations, and avoid or postpone the need for left ventricular assist devices or cardiac transplantation.

Among the most promising recent developments is a permanent CIED that measures pulmonary arterial pressure (PAP) through remote monitoring. Since PAP can serve as an early indicator of exacerbated heart failure, it is advantageous to observe this metric regularly, rather than waiting for symptoms, weight, and blood pressure changes to emerge.

"Data from regular PAP measurement is key," explains John Wang, MD, medical director of the Cardiac Catheterization Laboratory at MedStar Union Memorial Hospital and MedStar Franklin Square Medical Center and scientific director of Cardiovascular Research in the Baltimore region. "By the time a patient reports a weight or BP change, it is often too late to avoid hospitalization."

Advanced heart failure specialist Phillip Lam, MD, agrees. "With this technology, patient care can be 100 percent guided by their clinician and not dependent on self-reporting symptoms."

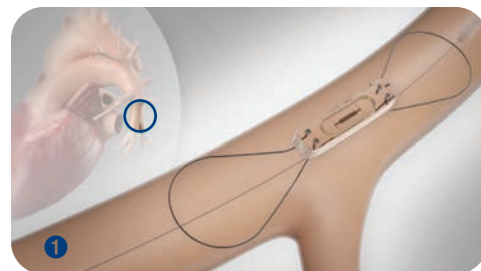
Indeed, the data show that remote hemodynamic monitoring ultimately improved all-cause mortality and reduced hospitalization among participating patients. Studies for the technology have also found significantly improved survival in heart failure with reduced ejection fraction (HFrEF) patients, a 25 percent reduction in mortality at two years, and a 36 percent decrease in heart failure hospitalizations at 12 months.

## CardioMEMS™ HF System

At MedStar Washington Hospital Center, Dr. Lam and his advanced heart failure colleagues, along with Interventional Cardiologist Hayder Hashim, MD, and the team, monitor patients using Abbott's CardioMEMS™ HF System. Indications for use include class III or IV heart failure and hospitalization within the previous 12 months.

The CardioMEMS PA sensor is permanently implanted in the distal pulmonary artery through a 15-minute right-heart catheterization procedure. ① Once in place, the patient lies on a sensor pillow for 30 seconds to collect a reading at home. ② All PAP measurements are transmitted to the provider for review. With regular access to the data, physicians can better titrate medications or intervene further, as necessary.

"Referring cardiologists are partners and can expect to co-manage their patients," notes Dr. Lam. "We'll make care recommendations to the referring cardiologist, who will communicate directly with the patient and continue providing direct care."



## Cordella™ Heart Failure System

At MedStar Union Memorial Hospital, Dr. Wang and Erika Feller, MD, advanced heart failure specialist and director of heart failure outreach in the Baltimore region, recently completed a clinical trial using the Endotronix Cordella™ Heart Failure System for class III HF patients hospitalized within the past 12 months.

The Cordella PA pressure sensor ③ is inserted in the pulmonary artery through standard venous access, confirmed with angiography, and anchored into place. ④ Once in place, a hand-held reader positioned externally records a patient's pulmonary artery pressure, weight, blood pressure, heart rate, and blood oxygen saturation, which is then downloaded daily and transmitted wirelessly to their physician, together with self-reported symptom data. ⑤ The study aims to test whether such monitoring can optimize medical therapy. The trial also measures the impact of patient engagement and compliance by giving patients access to an app and website with daily results, real-time feedback, and tools to self-monitor their health metrics.

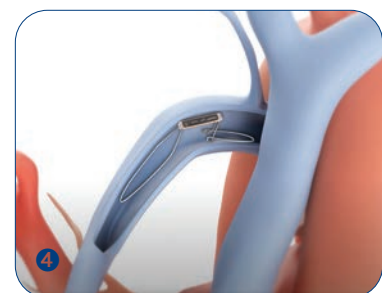
The investigation of such technology is continuing to expand, reports Dr. Feller. "MedStar Union Memorial is invited to join the next phase of the trial, evaluating the Cordella device in class II and class III heart failure patients."

Ultimately, PAP remote monitoring represents a significant advance along the entire care spectrum. For physicians, it provides better clinical data allowing for more informed decision making, earlier intervention, and improved outcomes. For hospitals, it allows for optimization of resources by reducing unnecessary emergency department visits, admissions, and costly readmissions. For patients and families, these innovations offer a better quality of life, less urgency in seeking care, and, potentially, a longer life. Moreover, patients seen at MedStar Health's community clinics—not just at the hospitals—also have access to these and other heart failure services, further reducing barriers to care.

**For more information, please contact our heart failure service:**

**Baltimore region: 410-554-6550**

**Washington region: 202-877-4698**





## Transcatheter “cinching” device aiming to treat enlarged left ventricle enters final, pivotal study.



**(l to r) Advanced Heart Failure Specialist Sriram Rao, MD, with Interventional Cardiologists Lowell Satler, MD, Itsik Ben-Dor, MD, and Toby Rogers, MD**

A novel percutaneous therapy to aid in remodeling the dilated left ventricle in people with heart failure is being studied at MedStar Washington Hospital Center.

The AccuCinch® Ventricular Restoration System is an implantable, durable ring inserted percutaneously and anchored in the LV, just below mitral valve. The ring is then “cinched” to reduce the LV circumference and secured into place. Over time—typically 6 to 12 months—the LV size reduces, allowing the ventricle to slowly remodel without abrupt changes for which flow and pressures cannot compensate. The study evaluates the device’s prolonged effect and strengthening the heart muscle toward providing progressive and sustained improvement. Objectives include relief of heart failure symptoms, and ultimately, LV ejection fraction and overall cardiac function recovery.

The AccuCinch device has been in development for almost a decade and has now received Breakthrough Device Designation and this is its final, pivotal study.

The ideal candidates have an EF of 20 to 40 percent, are on maximum guideline-directed medical therapy but still have significant symptoms, and are not yet sick enough to require a left ventricular assist device or cardiac transplantation. Advanced heart failure specialist Sriram Rao, MD, the principal investigator at MedStar Washington Hospital Center, explains.

“While traditional surgical options have long been available, people in this stage of their heart failure are in this in between period of not well enough to manage on medications alone but not sick enough to warrant surgical interventions. With AccuCinch, we now have another therapeutic option to consider.”

Evaluations and implantations are managed in collaboration with MedStar Washington’s Interventional Cardiology service. The advanced heart failure specialists determine suitability based on other therapies that the patient is receiving, whether all other options are fully optimized, and if they are positioned to do well after device placement. The interventionalists assess the anatomical fit and confirm suitable access. By bringing together the perspectives of these two areas of expertise, patients are offered appropriate and individualized recommendations based on their specific circumstances.

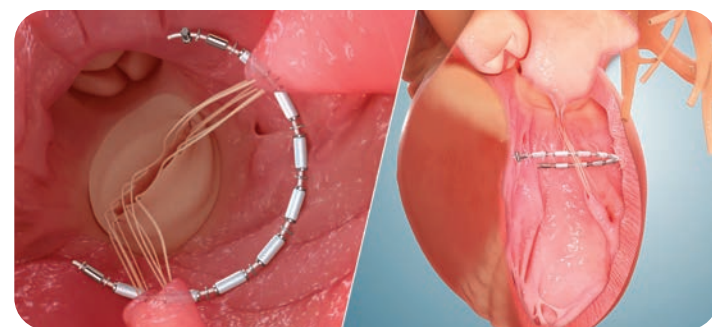
The procedure is typically tolerated quite well, with patients leaving the hospital after just one or two days. Afterwards, they return for imaging studies every six to twelve months for five years. The first AccuCinch case at MedStar Washington was performed by medical director of the Cardiac Catheterization Lab, Lowell Satler, MD, and scientific lead for the Structural Heart Disease program, Toby Rogers, MD.

“Since patients are seen by heart failure and interventional cardiologists, plus advanced imaging specialists, we try to arrange evaluations and follow up in a way that minimizes the impact on the patient,” says Dr. Rao. “Often that means collaborative visits—something that our patients find refreshing.”

MedStar Health is uniquely positioned to significantly contribute to the body of knowledge surrounding AccuCinch as a high-volume center with broad bandwidth in four key areas: leading advanced heart failure specialists with extensive experience managing all stages of heart failure, a world-class interventional cardiology program experienced in working with novel devices, an Echo Core Lab with longstanding expertise in advanced imaging, and the infrastructure provided through MedStar Cardiovascular Research Network. In addition, the diverse population served by MedStar Washington may provide unique data and perspective.

“Ultimately, we are excited to offer another possible treatment option for our patients,” says Dr. Rao. “The AccuCinch system may present an important proof of concept: that implantable therapies are effective in this situation. This is vital, as it provides a potential solution other than cardiac transplant. And in heart failure, we know there are not enough hearts to go around—so these new devices targeted at this specific population are urgently needed.”

**For more information about AccuCinch, please contact Research Coordinator Megan Fuller at [megan.a.fuller@medstar.net](mailto:megan.a.fuller@medstar.net).**



## Advanced heart failure services now in Southern Maryland.

For some suburban and rural residents, access to truly comprehensive and multidisciplinary care can be challenging, as it is often found at large academic medical centers in major cities. But with the recent addition of advanced heart failure services to MedStar Southern Maryland Hospital Center, people living throughout the vast region of Southern Maryland can stay closer to home for their care.

Rania Kaoukis, MD, the hospital’s new director of the Heart Failure program, is passionate about expanding access and options for these patients.

“Having a heart failure program in this region allows us to identify people who need more advanced or disease-specific therapies and offer them diagnostic testing in their own community,” says Dr. Kaoukis. “For example, we’ve found a significant population with infiltrative cardiomyopathies, such as cardiac amyloidosis or cardiac sarcoidosis, who can benefit from local evaluation and treatment.”

Optimal heart failure care can be life long and requires a variety of specialists, advanced imaging technology, and diligent follow up. At MedStar Southern Maryland Hospital Center, the team provides this through:

- Outpatient care for patients with cardiomyopathies, whether they be ischemic, nonischemic, infiltrative, genetic/hereditary, or others;
- Gold-standard imaging technology—such as cardiac MRI, pyrophosphate (PYP) scans, and cardiac biopsy—allows for diagnosis of inflammatory and infiltrative cardiomyopathies;
- Genetic testing and telemedicine consults with a cardiac genetic counselor;
- Close collaboration with the cardiac cath lab—offering diagnostic and therapeutic procedures when appropriate;
- Consults on the inpatient service for cardiogenic shock and decompensated heart failure;
- Dedicated support from social workers and case managers to help patients navigate other areas of their care, including medication prior authorization and other insurance issues.

Dr. Kaoukis’ team provides individual and family support, symptom management, and education about heart failure, while approaching each patient as a whole person.

“I believe that in order to recommend and deliver the most appropriate care, it’s essential to understand both the medical needs as well as the psychosocial needs of each of my patients,” she explains. “I take the time to ask the right questions, and actively listen to their concerns and treatment goals.”

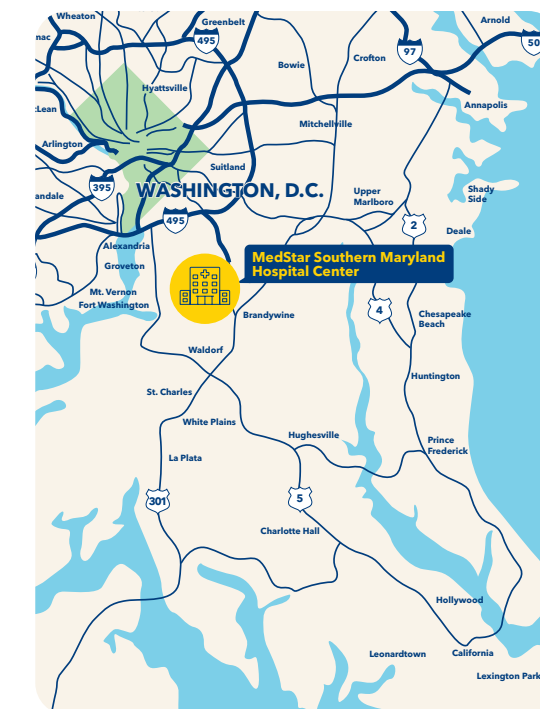
Dr. Kaoukis is also looking forward to developing relationships with the local cardiologists and referring physicians who are caring for those with confirmed or suspected heart failure.

“Physicians throughout Southern Maryland can refer patients to us for co-management. They can trust that whether their patients are admitted or seen in clinic, they will be getting thorough, high-quality, and multidisciplinary clinical care.”

Patients receiving routine care in Southern Maryland are part of the greater MedStar Health family, which has the largest heart failure program in the Baltimore/Washington region. Patients benefit from the elite expertise available for even the most complex, uncommon, or advanced conditions. Plus, they have access to the full array of drug and device therapies through clinical trials. When patients need therapies such as cardiac resynchronization, intervention for complex structural heart disease, LVAD, or cardiac transplantation, they are seamlessly connected to MedStar Washington Hospital Center’s electrophysiology, interventional, or surgical teams, providing true continuity of care.



**MedStar Southern Maryland Hospital Center Heart Failure Director Rania Kaoukis, MD**





## Case Study

# Complex aortic aneurysm requires a multi-stage treatment plan with a customized endograft.



Patients with complex abdominal aortic aneurysm (AAA) may have few treatment options due to concomitant factors such as age, comorbidities, and unique anatomical challenges that preclude the use of both open and conventional endovascular repair procedures. As a result, these patients may be excluded from conventional treatment options and are at risk for sudden rupture.

A 69-year-old male patient diagnosed with a complex thoracoabdominal aneurysm secondary to aortic dissection might well have been one of them had he not been referred to Javairiah Fatima, MD, co-director of the Complex Aortic Center at MedStar Washington Hospital Center.

A principal investigator on several studies related to branch and fenestrated graft technology, Dr. Fatima holds an FDA-approved Investigational Device Exemption (IDE) to study the use of physician-modified endografts (PMEGs) that are tailored to each patient's individual anatomy.

"These endografts extend our ability to offer minimally invasive aortic repair to patients who are considered high risk for open thoracoabdominal aortic repair," Dr. Fatima says. "Our study examines the safety and effectiveness of the PMEG device to repair complex aortic aneurysms because we want this treatment to be available to everyone who would benefit."

Despite the high-risk nature of patients offered this treatment, the death rate has been exceptionally low—less than 2 percent, Dr. Fatima says. By contrast, a study found that nearly 7 percent of patients who had open surgery to repair a complex aortic aneurysm died within 30 days of surgery, often as a result of underlying heart, kidney, or lung disease.

"The implanted stents are durable, and patency is greater than 95 percent," she

adds "It is not an exaggeration to call these results 'fantastic.'"

### A multifaceted treatment strategy

This patient was deemed a candidate for inclusion in the IDE study. While some of his anatomic challenges were attributed to the nature of his pathology and aortic dissection, others were the result of multiple previous bowel operations that had affected several key arteries.

MedStar Health's multidisciplinary aortic experience would prove critical to his treatment. With too many complexities to address safely in a single procedure, Dr. Fatima and her colleagues coordinated a multi-stage minimally invasive approach carried out over a few months.

To prepare the patient for the fenestrated repair of the thoracic AAA, the patient first underwent a redo arch repair with the frozen elephant trunk technique, followed by a thoracic endovascular aortic repair (TEVAR) using commercially available stent grafts, and a bypass of a hypogastric artery to preserve pelvic flow, which had been jailed during a previous surgery. Because the patient had dissection extending into his superior mesenteric and renal arteries, Dr. Fatima had to coil the false channels in order to insert a stent into his true channels and prevent future endoleaks.

Dr. Fatima was then ready to perform the PMEG procedure. Using a sophisticated centerline creation software, she measured and mapped the abdominal aorta and its branches, and used the data to design a new stent graft that precisely mirrored the patient's anatomy toward maintaining blood flow to all his organs while excluding blood flow to the aneurysm itself. During the procedure, she introduced the PMEG via a small 2-to-3mm incision in the patient's groin into the aortic aneurysm to reroute



blood flow while placing smaller stents through fenestrations and branches into each of the arteries to his intestine and kidneys to support blood flow within these vessels.

After a few weeks, to ensure the stent graft was performing as designed with no complications, the patient returned for the final interventions—insertion of an iliac stent to seal the aneurysm and coiling the lumbar artery to prevent endoleaks from a set of large lumbar arteries.

### Recovery and follow-up

Multiple steps were required to address the very complex anatomy and mitigate the risk of spinal cord ischemia. Since the procedure, the patient has done remarkably well with no complications. Follow-up monitoring has demonstrated that the PMEG is performing as designed, with adequate perfusion and blood flow to all the branches. Dr. Fatima notes that the use of precision endovascular tools to perform both the preparatory

procedures and the PMEG insertion afforded the patient the benefits of significantly shorter recovery time, less discomfort, smaller incisions, and less stress on the heart and lungs.

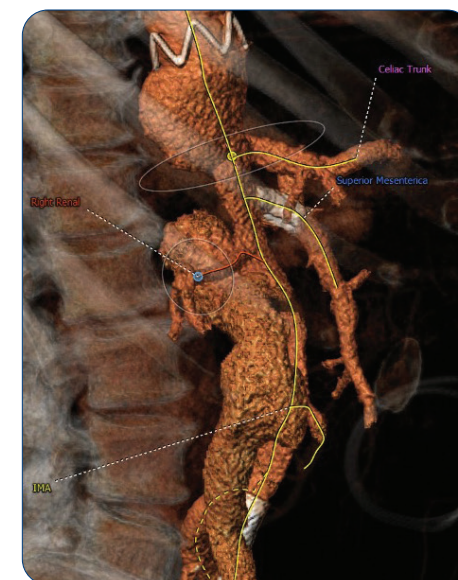
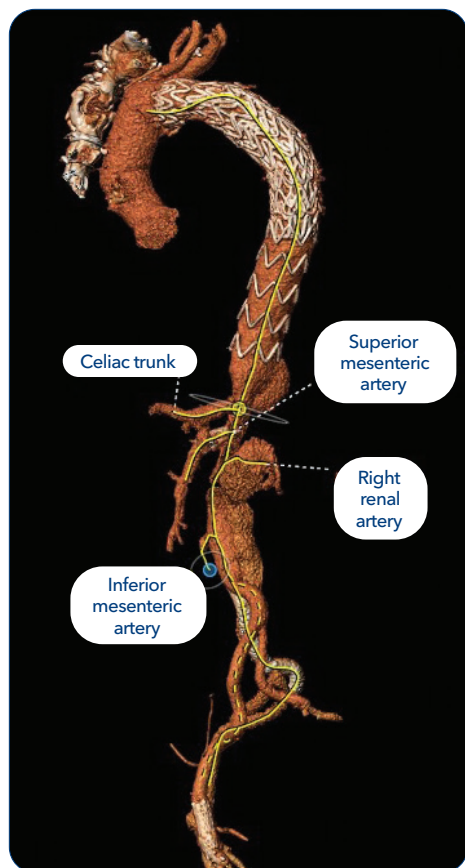
As with other participants in the FEVAR study, the patient will be closely monitored for at least five years to assess stent function and his quality of life. Dr. Fatima is hopeful that continued data from the trial will help make the treatment available to even more patients, particularly as the overall population ages. Studies have found that a ruptured aortic aneurysm is the tenth leading cause of death in patients older than 55 and the country's fifteenth most common cause of death overall.

"Every case is different," Dr. Fatima says. "The combination of MedStar Health's leading-edge research collaboration with FDA and our multidisciplinary cardiovascular expertise helps us bring advanced treatment options to patients throughout the region."



**Vascular Surgeon and Co-Director of the Complex Aortic Center at MedStar Washington Hospital Center Javairiah Fatima, MD**

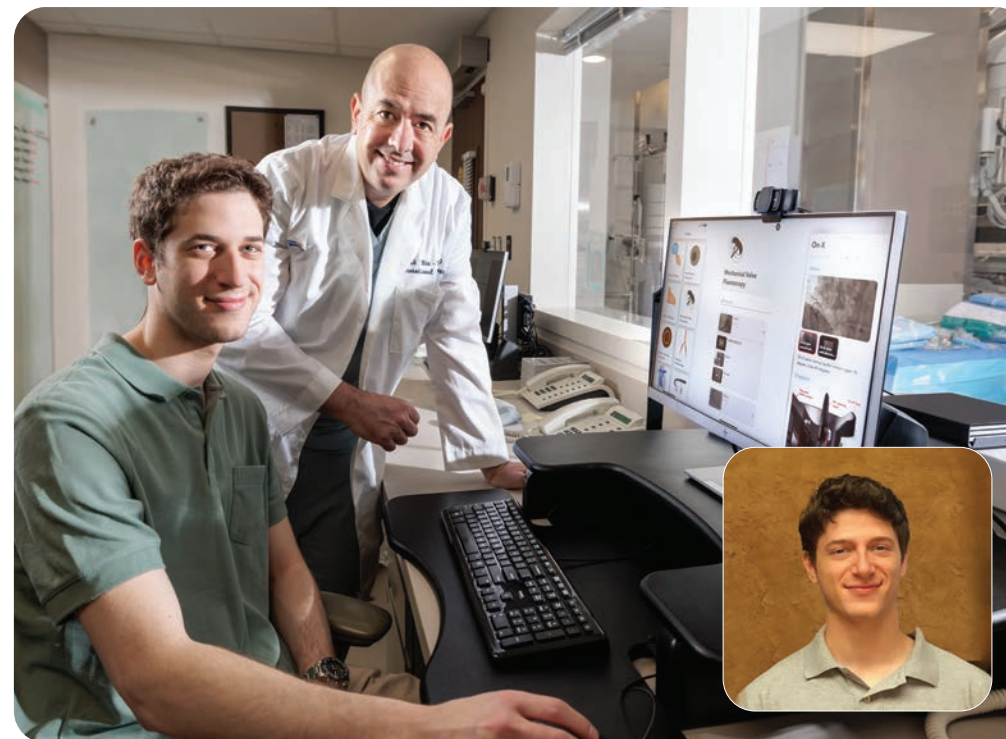
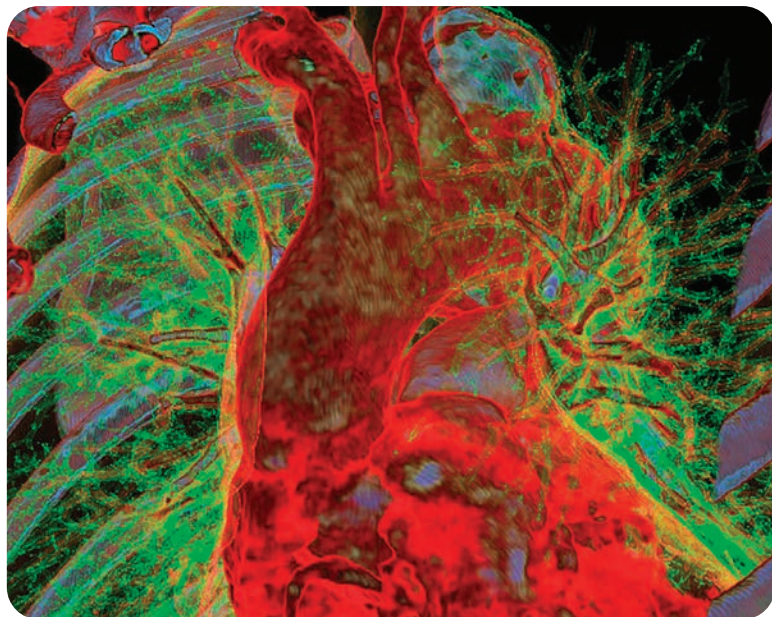
MedStar Health continues to enroll patients in the FEVAR study and welcomes inquiries from area cardiologists and vascular surgeons. Participants must be over age 18, with complex aortic aneurysms. Contact Dr. Fatima at [javairiah.fatima@medstar.net](mailto:javairiah.fatima@medstar.net) or (507) 250-5160 for more information. Referring cardiologists may also call (202) 877-0812 to schedule a consultation.



**Before imaging (left):** 3D reconstruction of the thoracoabdominal aortic aneurysm secondary to aortic dissection

**After imaging (right):** Post-operative 3D reconstruction demonstrating successful exclusion of the aneurysm with the PMEG implant with preservation of blood flow to all the vital organs via fenestrations and branches





Itsik Ben-Dor, MD, with sons Yair (left) and Shahar (inset photo)

## New ACC/AHA guideline recommends earlier intervention for thoracic aortic aneurysms.

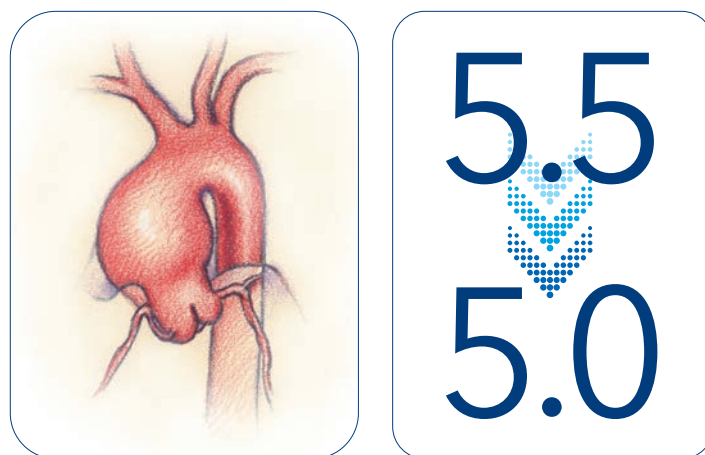
One of the key takeaways in the recently released 2022 ACC/AHA aortic disease treatment guidelines is the lowering of the recommended threshold for surgical intervention for sporadic root and ascending aortic aneurysms from 5.5 cm to 5.0 cm in select patients.

What does this mean in clinical practice?

“For the ‘watchful waiting’ patients, the scientific evidence shows that earlier intervention can be both a safe and effective strategy for thoracic aneurysms,” says Thomas MacGillivray, MD, MedStar Health Physician Executive Director of Cardiac Surgery. “These new guidelines present an opportunity for patients to be treated more promptly—reducing stress, anxiety, and impediments of daily living.”

However, there is an important caveat. The guidelines state that since “outcomes for patients with aortic disease are enhanced at programs with higher volumes, experienced practitioners, and extensive management capabilities, multidisciplinary aortic team care is considered in determining the appropriate timing of intervention.”

At MedStar Health, we have such infrastructure. Steven Abramowitz, MD, Physician Executive Director of Vascular Surgery, explains. “Our cardiac and vascular surgeons work closely together and perform more aortic interventions than any other team in the mid-Atlantic region. We already follow the new guideline of shared decision-making, which involves each patient and our multidisciplinary team determining the optimal medical, endovascular, or surgical therapies.”



ACC/AHA recommends lowering the threshold for surgical intervention for sporadic root and ascending aortic aneurysms from 5.5 cm to 5.0 cm in select patients

**If you are following a patient who may be eligible for early intervention, we would be pleased to partner with you in their care and provide an assessment of their candidacy. You may contact our team directly, via email:**

**MedStar Washington Hospital Center, Washington, D.C.**  
Christian Shults, MD, Cardiac Surgeon: christian.shults@medstar.net  
Javairiah Fatima, MD, Vascular Surgeon: javairiah.fatima@medstar.net

**MedStar Union Memorial Hospital, Baltimore, Md.**  
Ricardo Quarrie, MD, Cardiac Surgeon: ricardo.o.quarrie@medstar.net  
Raghuvveer Vallabhaneni, MD, Vascular Surgeon: raghuveer.vallabhaneni@medstar.net

## New app from MedStar Health physician provides comprehensive library for interventional cardiologists.

Cathlas, as its name implies, is a new application designed to be a comprehensive, coronary angiography “atlas” for interventional cardiologists with large collections of video clips and imaging pictures.

Itsik Ben-Dor, MD, associate director of the Cardiac Catheterization Laboratories and director of the interventional cardiology fellowship program at MedStar Washington Hospital Center, worked with his sons to develop the free app. His son Shahar Ben-Dor developed it, while another son, Yair Ben-Dor, drew the images that depict categories of videos, such as acute coronary syndrome, anomalies of coronary origin, congenital heart disease, and structural imaging.

“By creating access to this collection of rare and important videos and images in a practical way that cannot be delivered via textbooks or peer-reviewed journals, my intention is to aid physicians in acquiring fundamental knowledge as well as to promote better decision-making in the clinical setting,” explains Dr. Ben-Dor.

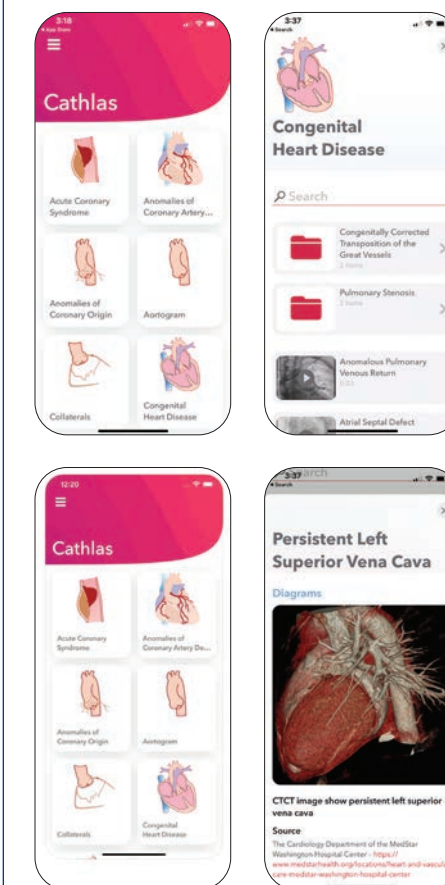
Dr. Ben-Dor points out that board exams for both general and interventional cardiology include videos of uncommon cases that are not often found in general textbooks or online supplements, making Cathlas an effective study resource, as well.

Even for the experienced interventional cardiologist, Cathlas can serve as a reference when dealing with unusual complications or anatomical anomalies.

In an effort to continue expanding the collection, the app allows interventional cardiologists to email their own images and video clips to the library.

**The Cathlas app allows users to:**

- view high-quality heart catheterization images
- study the anatomy of coronary arteries with focus on coronary anomalies
- explore and learn to recognize complications
- discover rare and important incidental findings on fluoroscopy
- practice diagnostic skills with set of heart catheterization videos



**Cathlas is available in the Apple App Store.**



# CRT Meeting roundup.

# CRT 23

# Welcome new medical staff.

Cardiovascular Research Technologies (CRT) 2023 set a record with more than 2,600 registered attendees. The conference, which took place Feb. 25-28 at the Omni Shoreham Hotel in Washington, D.C., also set records with a total of 24 Late-Breaking Trial and Featured Clinical Science presentations, 290 abstracts accepted, and 46 entries for the annual Best Innovations Competition.

The annual meeting features 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. It consists of concurrent meetings in six main areas of interest: Coronary, Valve and Structural, Endovascular, Technology and Innovation, Atherosclerosis and Research, and Nurses and Technologists. CRT attendees share ideas and knowledge, collaborate on solutions, receive training, and network with other professionals.



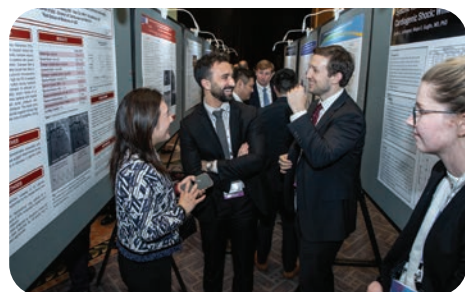
CRT 2023 Course Chairman Ron Waksman, MD, and former U.S. Secretary of State Hillary Clinton had a conversation in front of a packed auditorium for the meeting's **keynote**. Secretary Clinton spoke on the progress made by women across various fields, and the need to continue advancing their positions and influence.



Spencer B. King, III, MD, received the **CRT Award** in recognition of his distinguished career as an interventional cardiologist. Among his many accomplishments, Dr. King served as Emory University Hospital's first director of the Cardiac Catheterization Laboratory, is the founding editor-in-chief of the Journal of the American College of Cardiology (JACC): Cardiovascular Interventions and associate editor of the JACC, and is a past president of the American College of Cardiology.



A former interventional cardiology fellow at MedStar Washington Hospital Center, Jaffar M. Khan, MD, PhD (center), won CRT's **Best Innovations Competition** with the TELLTALE transcatheter electrosurgery guidewire system, which can potentially be used in several different kinds of interventional cardiology procedures.



Attendees enjoying the conference's **Abstract Café**.



Exploration in the **BioSkills Lab**.



Hands-on learning in the **exhibit hall**.

**Save the Date for CRT 2024:**  
**March 9-12, 2024**  
**Washington Hilton Hotel, Washington, DC**



**Rania Kaoukis, MD**, is an advanced heart failure and cardiac transplant cardiologist and serves as Director of Heart Failure at MedStar Southern Maryland Hospital Center. Dr. Kaoukis is board certified in heart failure and transplant cardiology, cardiology, echocardiography, nuclear cardiology, and internal medicine. She specializes in the treatment and management of patients with congestive heart failure, end-stage heart failure, and ischemic and nonischemic cardiomyopathies, including guideline-directed medical therapy, the management of patients with mechanical circulatory support, and before, during, and after heart transplantation. Her research interests have focused on

the use of echocardiography to monitor changes in cardiac anatomy and function in patients on guideline-directed medical therapy for heart failure. Dr. Kaoukis is also passionate about bringing treatments to rural communities.

**Education and training:**

- **Fellowships:**
  - o Heart Failure and Transplantation, MedStar Washington Hospital Center, Washington, D.C.
  - o Cardiovascular Disease, Temple University Hospital, Philadelphia, Pennsylvania
- **Residency:** Loyola University Medical Center, Maywood, Illinois
- **Medical School:** Indiana University School of Medicine, Indianapolis, Indiana



**Ida Hui Suen, MD**, is a cardiologist at MedStar Southern Maryland Hospital Center and MedStar Health at Brandywine. She is board certified in internal medicine and board eligible in general cardiology. Dr. Suen treats patients for a wide variety of heart conditions including high blood pressure, heart failure, valvular diseases, and arrhythmia. As a non-invasive cardiologist, Dr. Suen uses tools such as transthoracic and transesophageal echocardiography, stress testing, nuclear myocardial perfusion interpretation, transvenous pacemaker insertion, and Swan Ganz catheter insertion to diagnose and

treat her patients. She is particularly interested in preventative heart care and building long-term relationships with her patients. When creating a treatment plan, she strives to identify and remove any barriers to care such as economic hardships, transportation issues, or insurance complications.

**Education and training:**

- **Fellowship:** Cardiovascular Disease, Coney Island Hospital, Brooklyn, New York
- **Residency:** Coney Island Hospital, Brooklyn, New York
- **Medical School:** St. George's University School of Medicine, Grenada, West Indies



**Nardos Temesgen, MD**, is an interventional cardiologist at MedStar Southern Maryland Hospital Center and MedStar Georgetown University Hospital. Dr. Temesgen is board certified in interventional cardiology, cardiovascular disease, and internal medicine. Dr. Temesgen treats patients with acute coronary syndrome, coronary artery disease, structural heart disease, and peripheral arterial disease. Her approach to treatment is guided by her desire to perform procedures based on necessity, as well as minimally invasively. To this end, she performs percutaneous coronary intervention using the radial approach. She also uses the latest technologies, such as intravascular imaging (IVUS, OCT)

and coronary physiology assessment (FFR, IFR), to understand lesion pathology and to optimize percutaneous interventions. Dr. Temesgen is passionate about preventive care and education regarding cardiovascular diseases, as well as managing heart disease in women and in young people.

**Education and training:**

- **Fellowships:**
  - o Interventional Cardiology, The George Washington University Hospital, Washington, D.C.
  - o Cardiovascular Disease, The George Washington University Hospital
- **Residency:** The George Washington University Hospital
- **Medical School:** Wright State University Boonshoft School of Medicine, Dayton, Ohio





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](mailto:karoline.m.hutson@medstar.net).

## MedStar Heart & Vascular Institute

**Stuart F. Seides, MD**  
Physician Executive Director

**Steven D. Abramowitz, MD**  
Chair, MedStar Health Vascular Program

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

**Zayd A. Eldadah, MD**  
Director, MedStar Health Cardiac Electrophysiology

**Sandeep M. Jani, MD**  
Medical Director, Advanced Heart Failure  
Baltimore Region

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

**Thomas E. MacGillivray, MD**  
Physician Executive Director,  
MedStar Health Cardiac Surgery  
Chairman, Cardiac Surgery,  
MedStar Washington Hospital Center

**Glenn R. Meininger, MD**  
Director, Cardiac Electrophysiology  
Baltimore Region

**Samer S. Najjar, MD**  
Regional Chief, Cardiology, Baltimore Region

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

**Lowell F. Satler, MD**  
Director, Interventional Cardiology  
Washington Region

**Farooq H. Sheikh, MD**  
Medical Director, Advanced Heart Failure  
Washington Region

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

**Raghuvver Vallabhaneni, MD**  
Director, Vascular Surgery, Baltimore Region

**Ron Waksman, MD**  
Director, Cardiovascular Research  
and Advanced Education

**John C. Wang, MD**  
Director, Interventional Cardiology  
MedStar Union Memorial Hospital  
MedStar Franklin Square Medical Center

## Department of Continuing Professional Education

Please visit [MedStar.Cloud-CME.com](http://MedStar.Cloud-CME.com) for updated conference information, or call **202-780-1655**. CE transcripts are available online. You can download, print or e-mail your CE transcript. Visit [CME.MedStarHealth.org](http://CME.MedStarHealth.org) and click on "View Your CE Transcript" for complete instructions.

## Upcoming conferences and courses

### Mastering Cardiac and Vascular Complications

August 11-12, 2023

Yours Truly Hotel  
Washington, DC

This case-based course will consist of didactic lectures, case presentations, panel discussions, and simulation sessions on coronary, structural heart, and endovascular procedures.

Information and registration at [MCVCMeting.org](http://MCVCMeting.org).

### Fellows Boot Camp

July 8-29, 2023

Saturdays, 9:00 a.m. to noon

Sessions in this virtual, 4-week course are interactive and will highlight a live case or hands-on demonstration followed by didactic lectures, panel discussions, and case presentations. Attendees will learn new techniques and how to incorporate the latest innovations into their clinical practice.

Information and registration at [CRTVirtual.org](http://CRTVirtual.org).

## Regularly scheduled series—AMA PRA Category 1 Credit(s)<sup>™</sup>

**Cardiac Catheterization Conference**  
Weekly, Wednesdays, 7:30 a.m.  
1 AMA PRA Category 1 Credit<sup>™</sup>  
**202-877-7808**

**Cardiac Surgery Grand Rounds**  
Weekly, Tuesdays, 7:15 a.m.  
2 AMA PRA Category 1 Credits<sup>™</sup>  
**202-877-3510**

**Cardiology Grand Rounds**  
Weekly, Tuesdays, 12:30 p.m.  
1 AMA PRA Category 1 Credit<sup>™</sup>  
**202-877-9090**

**Cardiac Ultrasound and Advanced Imaging Conference**  
Weekly, Thursdays, 7:30 a.m.  
1.25 AMA PRA Category 1 Credits<sup>™</sup>  
**202-877-6264**

**Electrophysiology Core Curriculum Conference**  
Weekly, Tuesdays, 7 a.m.  
1 AMA PRA Category 1 Credit<sup>™</sup>  
**202-877-3951**

Visit us at [MedStarHealth.org/Services/Heart-and-Vascular](http://MedStarHealth.org/Services/Heart-and-Vascular).