NewYork-Presbyterian
Clinical and Scientific Innovations in Cardiovascular Services
SPECIAL ISSUE

Advanced Heart Failure: Pursuing Progress on Many Fronts

According to the American Heart Association, of the more than six million Americans living with heart failure, about 10 percent have advanced heart failure, a field that has grown dramatically in the last two years. "Unfortunately, more and more patients are suffering from heart failure, and not every patient is able to access the level of care they need," says **Nir Uriel, MD**, Director of Advanced Heart Failure, Cardiac Transplantation and Mechanical Circulatory Support Programs at NewYork-Presbyterian. "There are options today that can help improve quality of life and increase longevity. Our goal is to reach as many of these patients as possible, regardless of where they live or their means, and provide them with the most advanced care so that they can enjoy life and have more time with their families and loved ones."

Dr. Uriel oversees heart failure programs at NewYork-Presbyterian's campuses in Manhattan, Queens, Brooklyn, and Westchester. The expanded program builds on an initiative begun in 2017 to standardize care for patients with heart failure across all the campuses of NewYork-Presbyterian. "We have created a uniform pathway for the treatment of heart failure, which is applied at every NewYork-Presbyterian hospital," says **Paolo C. Colombo, MD**. "Each hospital was actively engaged in reviewing the clinical dashboard to guide practice improvements. This culminated in implementation of guidelines and evidence-based standards for inpatient care, outpatient management of heart failure, and transitions of care."

Trials and Triumphs in Heart Transplantation

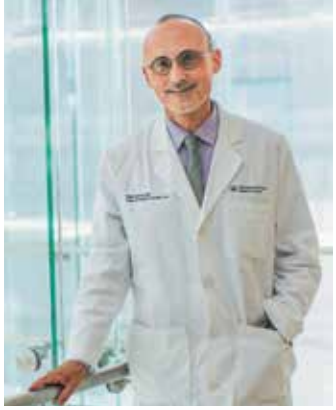
"For more than three decades NewYork-Presbyterian has had one of the largest heart transplant programs in the country," says Dr. Uriel. "This program has a long history with great success performing heart and multiorgan transplants such as heart-kidney, heart-liver, and heart-lung transplantation."

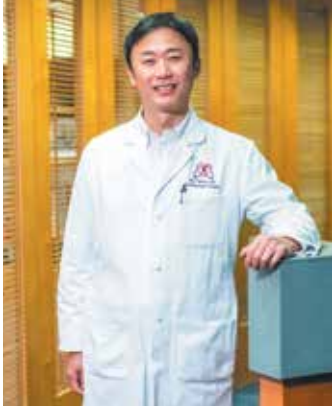
"2019 marks the 42nd year of our heart transplant program," says **Koji Takeda, MD, PhD**. "In 2018, we performed 84 transplants bringing the total number of transplants at this center to more than 2,000. Data as of July 2019 show a one-year survival of 90 percent and three-year survival of 85 percent."

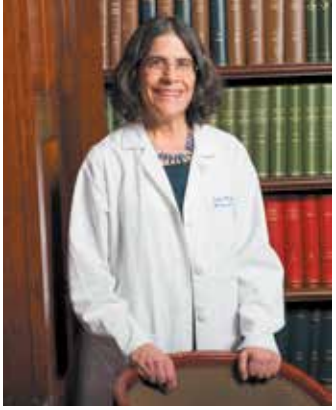
Dr. Nir Uriel

NewYork-Presbyterian heart transplant specialists continue to pursue improvements in protocols for high-risk populations and define new approaches to increase heart transplantation as an option for patients in end-stage heart failure. "To some extent we're pursuing a precision medicine approach," says **Maryjane A. Farr, MD**. "As we learn more about immunosuppressive therapies and ways to monitor the immune system, we are able to give patients only what they need for immunosuppression. We hope that this will translate into longer-term survival and a better quality of life."

"We also are trying to see how we can transplant patients who are considered to be too high risk for heart transplantation in other programs," says **Gabriel Sayer, MD**. "Patients


Dr. Paolo C. Colombo


Dr. Koji Takeda


Dr. Evelyn M. Horn


Dr. Erika S. Berman Rosenzweig

with a high level of antibodies who, historically, couldn't receive heart transplantation, are being transplanted at NewYork-Presbyterian/Columbia University Irving Medical Center following novel desensitization protocols and the use of eculizumab, a new medication that allows us to overcome these immunological challenges. Furthermore, we were a pioneering center in transplanting HIV patients, and demonstrated these patients do not carry a higher risk and should be eligible for advanced therapies."

In addition, a program for donors with hepatitis C viremia is increasing the availability of heart transplantation for patients with longer waiting times. A course of antiviral therapy is administered at 12 weeks after transplant to cure the transmitted hepatitis C virus.

A Landmark Change for LVADs

NewYork-Presbyterian offers one of the largest and most innovative ventricular assist device (LVAD) programs in the nation. The program led the original study to assess LVADs in patients with advanced heart failure who were not candidates for heart transplantation (the REMATCH study) and was a leader of the recent, seminal MOMENTUM 3 study – the largest randomized trial in the history of mechanical circulatory support assessing the use of the HeartMate 3™ LVAD. The study was conducted in more than 60 centers across the United States and led to the FDA approval of the device. "MOMENTUM 3 was an important step forward for patients living with advanced heart failure," notes Dr. Uriel, who served as the National Principal Investigator for the trial. "The study results will allow for wider use of the technology thanks to a significantly improved adverse event profile."

Columbia surgeons and cardiologists were among the first nationwide to offer patients access to HeartMate 3 and enrolled the largest number of patients into the trial," adds **Yoshifumi Naka, MD, PhD**. "HeartMate 3 proved to be superior to previous LVADs as it eliminates the risk of pump thrombosis and dramatically reduces the risk of stroke."

Addressing Clinical Challenges

Pulmonary hypertension is present in about one-third of patients with heart failure. "Management requires expertise and understanding of the interdependence of the right and the left ventricles," says **Evelyn M. Horn, MD**. "The phenotype of heart failure has multiple etiologies and, because of the subtleties involved, identifying the optimal timing of interventions is challenging. It is essential to understand when therapies will or will not work, and when one has to move on to mechanical assist devices or heart transplantation for heart failure and lung transplantation for pulmonary hypertension."

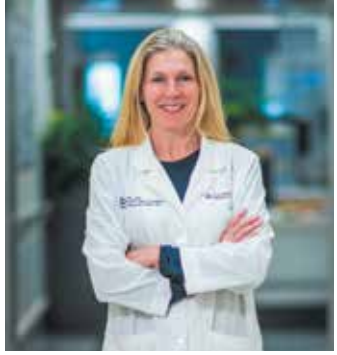
The pulmonary hypertension programs at Columbia, led by **Erika S. Berman Rosenzweig, MD**, and NewYork-Presbyterian/Weill Cornell, led by Dr. Horn, serve as two of the seven centers in the country participating in the National Heart, Lung, and Blood Institute's PVDOMICS (Redefining Pulmonary Hypertension through Pulmonary Vascular Disease Phenomics) program. "The program will augment the current classification based on shared biological features of 1,500 participants that place them at increased risk of developing pulmonary hypertension," says Dr. Horn.

"By systemically characterizing patients utilizing clinical, biochemical, imaging, and physiological and pathological assessments, combined with genomic and RNA technology, we can improve our mechanistic and pathobiological understanding of the pulmonary vascular disease process," says Dr. Berman Rosenzweig. "The goal is to be able to better target the right patient for the right therapeutic intervention."

Dr. Takeda's expertise includes pulmonary thromboendarterectomy (PTE), a complex procedure to address chronic thromboembolic pulmonary hypertension. "This a chronic condition in which patients develop pulmonary hypertension that can become life-threatening. PTE has been shown to be the best treatment in extending a patient's survival," says Dr. Takeda. "When we remove the obstructing thromboembolic material, symptoms such as shortness of breath, edema, and fatigue dramatically improve."


Dr. Erin Iannacone


Dr. Parag Goyal


Dr. Maryjane A. Farr

The Weill Cornell team is also committed to a multidisciplinary approach to patients with chronic thromboembolic pulmonary hypertension. **Erin Iannacone, MD**, believes the best short-term and long-term outcomes following complex PTE surgery come from a collaborative effort between the medical and surgical teams. "Without the expertise of both the heart failure and postoperative critical care teams, a perfectly executed operation is unlikely to succeed," says Dr. Iannacone, who knows that a thorough preoperative evaluation and meticulous postoperative care are the keys to success. "Patients can benefit tremendously from PTE surgery but a successful operation is just the beginning. Ongoing communication between the heart failure and surgical teams reassures the patients that they are receiving the most up-to-date, innovative therapies long after their operation is completed."

"The expansion of the advanced heart failure entity across the NewYork-Presbyterian enterprise comes at a time when we are growing additional heart failure services such as the Heart Failure with Preserved Ejection Fraction – HFpEF – program," says Dr. Horn. "Our HFpEF program is the first and only subspecialty program in New York dedicated to this unique subtype of heart failure. Patients with HFpEF develop heart failure symptoms despite normal heart pump function." The HFpEF program, led by **Parag Goyal, MD, MSc**, combines treatment options with research in order to improve the care of this vulnerable population.

Columbia's cardiac amyloidosis program offers novel therapies to patients in different phases of the disease. "We are conducting four phase 3 studies," says **Mathew Maurer, MD**, the lead investigator and the first author on the recent *New England Journal of Medicine* publication demonstrating the role of tafamadis in treating TTR amyloid patients. "By phenotyping patients with cardiac amyloid we can come up with new therapies that will change those patients' lives."

Novel protocols at Columbia and Weill Cornell are improving early identification and treatment of patients who develop heart disease due to cancer therapy. "This is an opportunity to help patients overcome the cancer and protect them from future myocardial injury," says **Jayant Raikhelkar, MD**.

"There needs to be a true appreciation that heart failure is life-threatening," states Dr. Farr. "In stage three and certainly for class four heart failure, the one-year prognosis is worse than some of the worst cancers. Patients in heart failure, even with early-stage symptoms, fare much better when managed together with heart failure programs. Advanced therapies should be considered earlier in disease progression and may be the best strategy for better long-term survival."

"Today, NewYork-Presbyterian can offer heart failure therapies across a wide variety of conditions and stages of disease, from diagnosis, medical management, and monitoring to heart transplantation and LVAD support," says Dr. Uriel. "We will make sure patients get the best chance to live a long life and enjoy a good quality of life."

Nir Uriel, MD, Director of Heart Failure, Cardiac Transplantation and Mechanical Circulatory Support Programs at NewYork-Presbyterian

Gabriel Sayer, MD, Associate Director of Heart Failure, Cardiac Transplantation and Mechanical Circulatory Support Programs at NewYork-Presbyterian

Evelyn M. Horn, MD, Director of Heart Failure and Pulmonary Hypertension at the Perkin Heart Failure Center at NewYork-Presbyterian/Weill Cornell

Yoshifumi Naka, MD, PhD, Surgical Director of Mechanical Circulatory Support at NewYork-Presbyterian/Columbia

Mathew Maurer, MD, Director of the Cardiac Amyloid Program at NewYork-Presbyterian/Columbia

Paolo C. Colombo, MD, Medical Director of Mechanical Circulatory Support at NewYork-Presbyterian/Columbia

Maryjane A. Farr, MD, Medical Director, Adult Heart Transplant Program at NewYork-Presbyterian/Columbia

Koji Takeda, MD, PhD, Surgical Director of Adult Heart Transplant Program, Surgical Director of the Adult Extracorporeal Membrane Oxygenation Program, and Director of the Pulmonary Thromboendarterectomy Program at NewYork-Presbyterian/Columbia

Erin Iannacone, MD, Surgical Director of Adult Extracoporeal Membrane Oxygenation Program, NewYork-Presbyterian/Weill Cornell

Erika S. Berman Rosenzweig, MD, Director of Pulmonary Hypertension, NewYork-Presbyterian/Columbia

Jayant Raikhelkar, MD, Advanced Heart Failure and Transplant Cardiology Specialist, NewYork-Presbyterian/Columbia

Parag Goyal, MD, MSc, Director of the Heart Failure with Preserved Ejection Fraction Program, NewYork-Presbyterian/Weill Cornell

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Cardiology and Heart Surgery
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NewYork-Presbyterian
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New York's #1 Hospital
19 Years in a Row

Emile A. Bacha, MD
Chief
Division of Cardiac, Thoracic, and Vascular Surgery
NewYork-Presbyterian/
Columbia University
Irving Medical Center

Leonard N. Girardi, MD
Cardiothoracic Surgeon-in-Chief
NewYork-Presbyterian/
Weill Cornell Medical Center

Allan Schwartz, MD
Chief
Division of Cardiology
NewYork-Presbyterian/
Columbia University
Irving Medical Center

Bruce B. Lerman, MD
Chief
Maurice R. and Corinne P. Greenberg Division of Cardiology
NewYork-Presbyterian/
Weill Cornell Medical Center

Clinical Care

241
Physicians

17,887
Adult Patient Discharges

149
Dedicated Cardiovascular Beds

99
Cardiovascular ICU Beds

Research

$14.8 million
received from the National Institutes of Health and other organizations to support basic, translational, and clinical research

>325
clinical trials encompassing all areas of heart disease, with more than 3,900 patients enrolled

112
Clinicians and Research Scientists

Graduate Medical Education

273
internal medicine residents who rotate through cardiology programs

16 residents
in cardiothoracic surgery residency programs

80 fellows
in cardiology, interventional cardiology, and surgical fellowship programs

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