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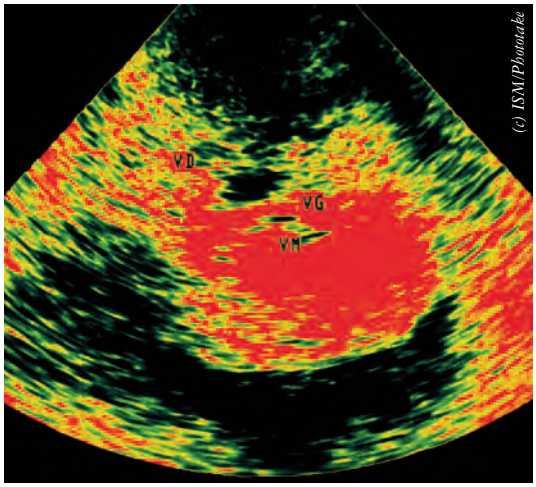
Perkin Center for Heart Failure Opens

The newly named Perkin Center for Heart Failure at Weill Cornell Medical College has expanded its program to provide medical and surgical management of heart failure. According to Evelyn Horn, MD, Director, this program provides management of advanced heart failure (both systolic and diastolic), congenital heart disease, as well as perioperative management of conventional cardiac surgical patients (such as high-risk patients and valve surgeries) and ventricular assist devices. The center also offers rare expertise in the management of pulmonary hypertension. This includes patients with idiopathic pulmonary hypertension and pulmonary hypertension associated with diseases such as connective tissue disease, congenital heart disease, as well as a large number of patients who have pulmonary hypertension in association with left heart disease, lung disease, certain hematological diseases, liver disease and other conditions.

Overall, pulmonary hypertension and right heart failure complicate the management of about one third of patients with heart failure. In many, right heart failure follows left heart failure, and management of difficult cases may require a special expertise and understanding of the interdependence of the right and the left ventricles. Yet very few centers are prepared to handle these extra complications with the same degree of expertise, according to Dr. Horn.

Most cardiologists are comfortable treating patients with the most common type of heart failure, left ventricular dysfunction. If cases become complicated by secondary pulmonary hypertension or right heart failure, most of Dr. Horn's colleagues seek out the "right heart doctor," as she is sometimes called.



Ultrasound of the heart, axial section, showing left ventricular hypertrophy

Before accepting her position at the Perkin Center in November 2007, Dr. Horn served as Clinical Director of Heart Failure in the Division of Circulatory Physiology, Co-Director of the combined Pediatric and Adult Pulmonary Hypertension Center, and Director of the High-Risk Cardiac Obstetric Service at NewYork-Presbyterian/Columbia. Most recently, Dr. Horn was Director of Pulmonary Vascular Disease at the Center for Advanced Cardiac Care. There, cardiologists and cardiac surgical faculty joined in close collaboration to provide the full spectrum of care for patients with heart failure. Dr. Horn now draws on this experience in directing the expansion of the Perkin Center, and in fostering invaluable cross-campus collaboration. "There is growing awareness that hospitals need to offer treat-

see Perkin Center, page 5

Ventricular Assist Devices

Left ventricular assist devices (LVADs) have become an established therapy for patients with refractory heart failure. The most commonly used LVADs today are pulsatile volume-displacement devices that fill with blood and eject it in a cyclic fashion, mimicking the systole and diastole of the native heart. These devices provide excellent support and improve survival rates, but they require major surgery and large percutaneous leads, and patients must have a large chest cavity. In addition, the devices last for approximately a year and a half due to limitations in their long-term durability.

Extensive research is underway at the Cardiac Assist Device Program to improve LVAD technologies and outcomes, and to extend their availability to underserved patient populations.

According to Yoshifumi Naka, MD, PhD, Direc-

see Ventricular Assist Devices, page 2

continued from **Ventricular Assist Devices,** page 1

tor, Cardiac Transplantation and Mechanical Circulatory Support Programs, the trend is moving toward smaller devices, and placing them in healthier patients for longer term use. Increasing numbers of patients are receiving LVAD as a bridge-to-transplantation while they are in healthier condition, or they are receiving small pumps as destination therapy. The Cardiac Assist Device Program is currently investigating many devices.

SCCOR Grant

In March 2005, the National Institutes of Health (NIH) awarded Columbia University College of Physicians and Surgeons a $17 million SCCOR (Specialized Centers of Clinically Oriented Research) grant to investigate LVADs for end-stage heart failure patients. The grant seeks to transform LVADs into a safer and more widely accepted therapy by funding multiple basic and clinical studies to investigate adverse effects, with the three main arms of the study focusing on infection, coagulation, and recovery of the native heart while supported by a device. As part of this grant, researchers performed the first bone marrow cell transplant in conjunction with LVAD implantation in September 2007, to investigate methods of promoting restoration of the native heart's function.

Extensive research is underway at the Cardiac Assist Device Program to improve LVAD technologies and outcomes, and to extend their availability to underserved populations.

Continuous Flow Pump

Several new pumps have been developed using continuous-flow, rotary pump technology. They include Thoratec's HeartMate II, Jarvik's 200 Heart, and Ventracor's VentrAssist® Left Ventricular Assist System. Because they are smaller than older devices, they may provide options for women or adolescents who are too small for the older pumps. Other benefits of continuous flow pumps include better long-term reliability, no noise, and greater comfort for patients compared to pulsatile devices.

Yoshifumi Naka, MD, PhD, with patient Wylie Jenkins, who continues to have excellent results with his LVAD (implanted in 2005).

At the Cardiac Assist Device Program, Dr. Naka and Donna Mancini, MD, Medical Director, Cardiac Transplantation, are coinvestigators of a pivotal clinical trial of the HeartMate® II as bridge-to-transplant and destination therapy. The bridge-to-transplant trial demonstrated the efficacy of the device and the results, coauthored by Drs. Naka and Mancini, were published in the New England Journal of Medicine in November 2007. Enrollment of the destination therapy trial is complete, and results are scheduled for publication in 2009.

Centrimag® Device Trial

New in 2007, the CentriMag® is an external biventricular pump that is powered by a levitating magnet rather than moving internal parts. Approved by the FDA as a short-term triage device, CentriMag is a lifesaving option for patients suffering acute heart failure, particularly those who need immediate support or who are not eligible for implantable devices. After stabilization with CentriMag, some patients recover their native heart function, while others may go on to receive a longer-term device or transplantation. According to Dr. Naka, "If a patient is acutely sick, there is often not enough time to determine what kind of device they need, or whether he or she is a good candidate for an implantable device or transplantation. CentriMag fills that need." Some patients have retained the pump for over a month with no ill effects, he adds.

Jonathan M. Chen, MD, recently adapted the CentriMag device for use in children with acute heart failure, primarily to avoid the high morbidities associated with ECMO in children ages one to ten. To do this, he changed the size of the cannulae and reduced the speed of the pump. Four children aged three to ten received support from the

altered pumps at NewYork-Presbyterian/Columbia, three of whom have been able to proceed to transplantation.

VentrAssist®

The Cardiac Assist Device Program is participating in a trial of the VentrAssist® device, a miniaturized centrifugal pump, made by Ventracor. This small pump may be used as bridge-to-transplantation or destination therapy. Because the pump operates by a centrifugal fluid dynamic bearing rather than mechanical parts that wear down, the device is designed to last 15 years.

DuraHeart™

The Cardiac Assist Device Program will participate in a new trial to test DuraHeart™, a magnetically levitating, implantable device, made by Terumo Heart, Inc. This device combines a centrifugal rotary flow pump with a magnetically levitating impeller. This pump is available in Europe but has not been approved in the U.S.. Similar to the VentrAssist® device, this pump has no wearing parts, and is designed to last 15 years. Yoshifumi Naka, MD, PhD will serve as the national Principal Investigator of this trial.

IMPELLA

This small axial flow pump can be placed in the left ventricle via the ascending aorta, the femoral artery, or axillary artery. Both surgeons and interventional cardiologists at NewYork-Presbyterian Hospital are participating in the first U.S. trial of the Impella device, which is designed to help patients during high-risk coronary artery intervention and post-cardiotomy shock.

CARGO

The Cardiac Allograft Rejection Gene Expression Observation (CARGO) study, conducted by Mario C. Deng, MD, FACC, Director of Cardiac Transplantation Research, Department of Medicine, Division of Cardiology, represents a groundbreaking advance in the use of genomic techniques. The study identified a specific pattern of genes that may be used as a reliable marker to predict organ rejection after cardiac transplantation. Building upon the results of that study, Dr. Deng is now conducting a parallel study in LVAD recipients to determine a genetic profile that may predict rejection.

Contributing faculty for this article:
Yoshifumi Naka, MD, PhD

NewYork-Presbyterian Heart is a publication of NewYork-Presbyterian Hospital and is at the forefront of research and practice in the diagnosis, treatment, and rehabilitation of patients with cardiovascular disease. NewYork-Presbyterian Hospital/Columbia University Medical Center and NewYork-Presbyterian Hospital/Weill Cornell Medical Center are respectively affiliated with Columbia University College of Physicians and Surgeons and Weill Cornell Medical College.

5TH ANNUAL

ADVANCES IN THE TREATMENT OF CORONARY ARTERY DISEASE

a comprehensive review

A successful CME course was held May 2, 2008 in New York, NY.

Cardiovascular disease remains the leading cause of death in the U.S.. More than 14 million Americans have CAD. Physicians must remain current in the optimal diagnosis and treatment of CAD and its varied natural history.

Course Overview

This program provided:

- A review of state-of-the-art interventional and surgical therapeutic options
- The latest information about imaging modalities for CAD
- An update on prevention and risk factor modification
- Advances in therapy for acute coronary syndromes and myocardial infarction
- Advances in pharmacotherapeutics and lipid management
- Treatment options for patients with CAD and diabetes

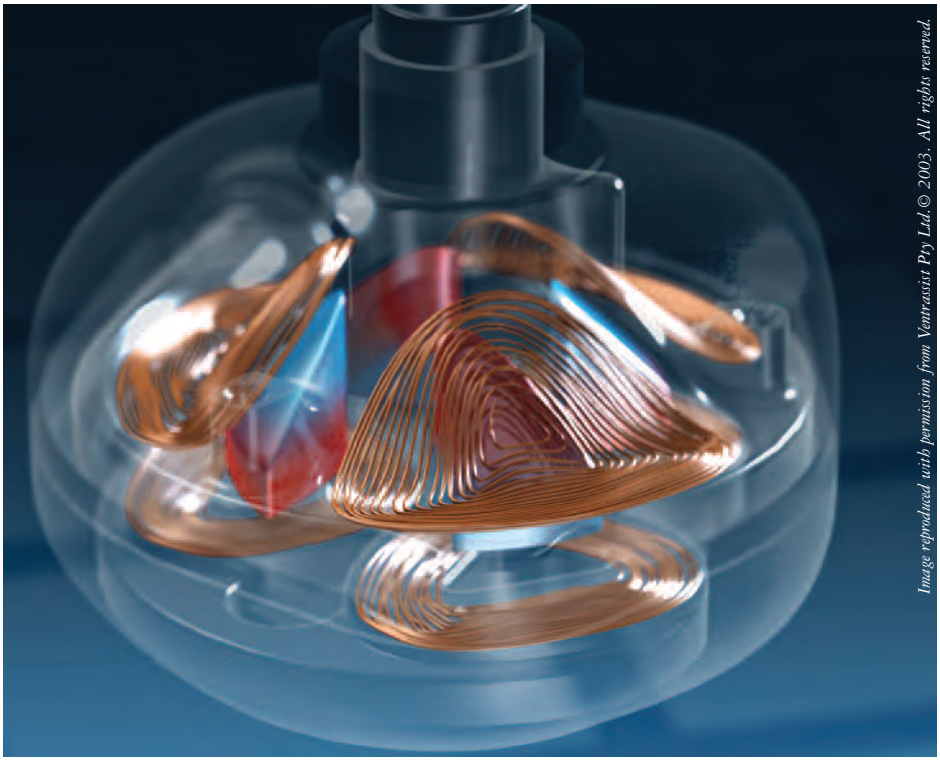
This course was attended by clinical cardiologists, interventional cardiologists, internists, and emergency medicine physicians with a special interest in diagnosing and treating patients with coronary artery disease. Nurses, physician assistants, technologists, and fellows who specialize in cardiovascular care also found the program highly useful. Participants were eligible to earn 6.0 AMA PRATM Category 1 credits.

For information about upcoming courses, email inquiries to: **medcourses@nyp.org**

Chronic Heart Failure

Congestive heart failure now represents an epidemic in the U.S., affecting approximately 550,000 new patients each year. Advances in drug therapies that target neurohormonal pathways have reduced the annual mortality rate from 52% to less than 20% in the last decade, and the majority of patients can now receive care from local cardiologists and primary care providers. Even the placement of pacemakers specifically targeting the heart failure syndrome has become a relatively routine procedure performed at a local level.

Yet a subset of patients fails despite optimum medical therapy, and this group requires the expertise of a multidisciplinary center that specializes in treating heart failure. "Heart failure is an extremely complex syndrome. The role of the heart failure specialist is to first determine that failure of medical therapy has truly occurred, and then investigate in a highly individualized fashion for each patient whether one of the available surgical treatments of heart failure will improve quality or prolong life," says Ulrich P. Jorde, MD, Medical Director of the Cardiac Assist Device Program and Assistant Professor of Clinical Medicine, Division of Cardiology, NewYork-Presbyterian Hospital/Columbia.



The VentrAssist® device is one among many under study at NewYork-Presbyterian Hospital. This image shows the interior coils and magnets that help power the device.

According to Dr. Jorde, the heart failure specialists at NewYork-Presbyterian/Columbia have particularly strong expertise in selecting patients for surgical therapies such as ventricular reconstruction ("reshaping the heart"), valve surgeries, left ventricular assist devices and cardiac transplantation.

> **"The role of the heart failure specialist is to first determine that failure of medical therapy has truly occurred, and then investigate… whether one of the available surgical treatments will improve quality or prolong life."**
>
> —Ulrich P. Jorde, MD

At NewYork-Presbyterian/Columbia, the Center for Advanced Cardiac Care has evolved from what was the very first U.S. program solely dedicated to the treatment of congestive heart failure. This program pioneered trials for beta blockers in the early 1990s, and has since led the nation in the development and research of left ventricular assist devices. Today the program offers the full range of treatments for heart failure including established as well as late generation investigational left ventricular assist devices. Under the direction of cardiac surgeon Yoshifumi Naka, MD, PhD, the LVAD program offers heart pumps both as destination therapy and as bridge-to-transplantation, with survival rates that significantly exceed national averages.

Research at the center targets some of the most promising areas in LVAD development. In 2001, Eric A. Rose, MD, then Chairman, Department of Surgery, and colleagues published findings from the landmark REMATCH trial, which proved that LVADs can prolong the lives of end-stage heart failure patients who are not eligible for transplantation. Now, the $17 million SCCOR grant, with Dr. Rose as Principal Investigator, is exploring the most critical challenges associated with LVAD therapy, including infection, coagulation, and neurologic events. As part of the trial, investigators are testing the combined use of an LVAD with stem cell injections in order to promote restoration of the heart's native function, potentially avoiding the need for transplantation.

In late 2007, Dr. Jorde received a $1.6 million NIH grant to study the relationship of exercise capacity and heart failure, and to better understand why people with heart failure fail medical therapy. "At this center, many treatment options are available beyond the very best medical therapy. When it comes to heart failure, and whether it is stem cell therapy, innovative cardiac surgeries to repair badly damaged hearts, LVADs or heart transplantation, our group is unique in that international leaders at the cutting edge of medical and surgical science came together not only to advance the field, but also practice at the bedside, " says Dr. Jorde. Physicians are encouraged to refer patients for evaluation in order to assess whether alternative medical therapy, surgical treatments, device therapy or cardiac transplantation may be warranted.

Contributing faculty for this article:
Ulrich P. Jorde, MD

continued from **Perkin Center,** page 1

ment of heart failure, but there are varying degrees of expertise available," says Dr. Horn. "At the Perkin Center, we are now offering every aspect of treatment of advanced heart failure."

Both Dr. Horn and Jonathan M. Chen, MD, Assistant Professor of Surgery, Department of Cardiothoracic Surgery, hold primary appointments at Weill Cornell while maintaining joint positions at the Columbia campus. Their relationships facilitate close teamwork and a strong cross-campus program, particularly in cases involving pulmonary hypertension, assist devices, and transplantation. The Perkin Center manages all stages of treatment up to the time of transplantation, which is performed by the transplant center at the Columbia campus.

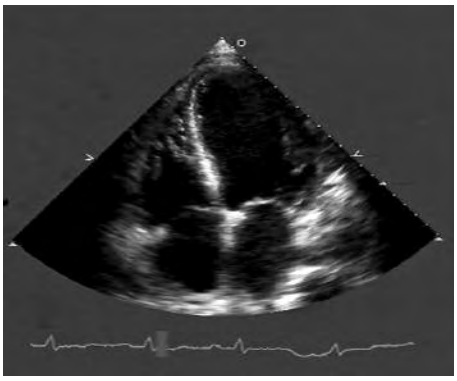
According to Dr. Horn, the phenotype of heart failure has multiple etiologies, and not all heart failure behaves the same way. Because

Cardiomegaly and pulmonary edema

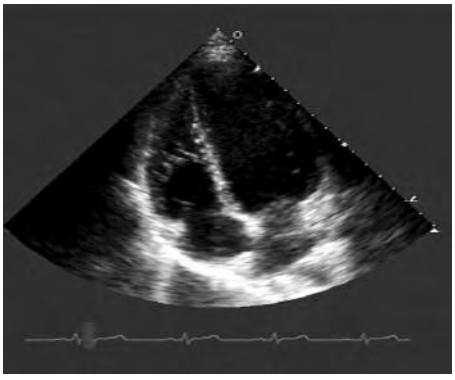
of the nuances and subtleties involved in advanced heart failure, she stresses the importance of the multidisciplinary, collaborative center. "Both campuses have the expertise in imaging modalities to appreciate the reversibility of cardiac function, to distinguish the etiologies of cardiac dysfunction, and to discern more subtle findings in the more esoteric types of heart failure, pulmonary hypertension, vascular abnormalities, and congenital heart disease."

Dr. Horn points to the center's expertise in identifying the appropriateness and the optimal timing of therapeutic interventions. "We have fantastic technologies and therapies available, but these may not be in every patient's best interest," she explains. "It is essential to understand when therapies will or will not work, and when one has to move beyond them – perhaps to mechanical assist devices or heart transplantation for heart failure and lung transplantation for pulmonary hypertension. If we wait too long, we may have missed the opportunity to treat a patient, but no one wants to resort to devices or transplantation before a patient absolutely needs it. We want to time things so that the patient has the best chance of doing well with such interventions. We need to recognize when to use advanced technology, and when patients would benefit more from the additional support from a multidisciplinary team approach including liason psychiatrists, social workers, nurse practitioners, and physical therapists in addition to the cardiology expertise. These are things our teams do exquisitely well," she says.

While the initial focus of Dr. Horn and her colleagues is on clinical matters at the Perkin Center, researchers at both institutions of the NewYork-Presbyterian Hospital are conducting research to better understand the etiologies of heart failure and pulmonary hypertension, and to develop targeted therapies based on this information. At Columbia, the SCCOR grant addresses complications of mechanical assist device support and the role of stem cells in heart failure under Eric A. Rose, MD, and collaborators. Mario C. Deng, MD, FACC, FESC, Director of Cardiac Transplantation Research, has developed a non-invasive blood test to detect organ rejection after heart transplantation. He now has a growing interest in applying similar genetic techniques to better describe the phenotypes of heart failure, and to develop an approach that is readily applicable to studies in pulmonary hypertension. "This approach will help unravel the mystery of these diseases, and, we hope, will be imminently applicable to therapeutic interventions," says Dr. Horn. At the Weill Cornell campus, Craig Basson, MD, Director of Cardiovascular Research, Department of Cardiology, leads the field of genetic research on the various forms of cardiac and vascular disease. Research by Drs. Richard Devereux and Mary Roman is helping to define the overlap between connective tissue disease and coronary and valvular heart disease, and work by Dr. Bruce Lerman, Chief, Division of Cardiology, continues to shed light on right ventricular dysplasia. Says Dr. Horn, "All of these areas are likely to produce exciting results as we attempt to move from bench to bedside in the field of heart failure and pulmonary hypertension."



Echocardiogram of a patient with congestive heart failure



Normal heart

"We have fantastic technologies and therapies available, but these may not be in every patient's best interest. It is essential to understand when therapies will or will not work, and when one has to move beyond them."

— Evelyn Horn, MD

Contributing faculty for this article:
Evelyn Horn, MD and **Jonathan M. Chen, MD**

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20TH ANNUAL

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www.tctconference.com

Contributing Faculty The following is a list of contributing faculty in this issue of the NewYork-Presbyterian Heart Newsletter. For more information on their work, please contact them at the email addresses listed.

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