NewYork-Presbyterian
Columbia University Medical Center
ColumbiaDoctors

Winter 2015

healthpoints

In This Issue

1 **Colorectal Surgery:**
Single dose of intraoperative radiation therapy replaces weeks of radiation therapy after surgery

3 **Heart Valve Disease:**
COAPT trial now enrolling patients with functional mitral valve regurgitation

4 **Thyroid Cancer:**
The promise and perils of molecular testing

5 **HeartMate III Trial:**
Left ventricular assist device study now enrolling

healthpoints is published by the Department of Surgery at NewYork-Presbyterian/ Columbia University Medical Center as a service to our patients. You may contact the Office of External Affairs for additional information and to request additional copies.
Please call: **212.304.7810**

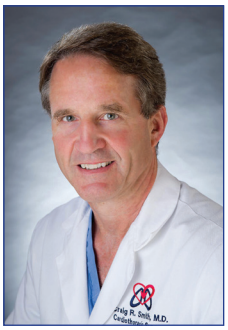
For physician referrals, please call:
1.855.CU.SURGE
or email:
info@columbiasurgery.org

Visit us and sign up for the healthpoints eNewsletter at:
columbiasurgery.org

Deborah Schwarz, RPA, CIBE
Executive Director, Office of External Affairs

Jada Fabrizio
Design and Photography

Sherry Knecht
Managing Editor



Message from the Chairman

Greetings,

As you may already know, research is a critical component in how we advance the frontiers of medicine. If you or a loved one is currently receiving treatment at the Department of Surgery, I would like to encourage you to learn about–and consider participating in –one of the many open clinical trials our physician researchers are conducting. We are enrolling patients in many significant studies, including a trial of the new HeartMate III left ventricular assist device; numerous breast cancer trials; studies on metabolic syndrome and weight loss surgery; and many others. These trials, including many in which Columbia is the only participating center in New York, often give patients early access to the most advanced therapeutic options.

With the New Year still fresh in our minds, I encourage all of us to consider ways we might commit to a single new healthy habit. After all the holiday festivities have been enjoyed and gifts given and received, this could be the very best gift of all.

Best wishes for a happy, healthy year ahead.

Craig R. Smith, MD, FACS, ***Chairman, Department of Surgery***

P. Ravi Kiran, MBBS, MS, Msc, FRCS, FACS
Chief and Program Director of the Division of Colorectal Surgery

Colorectal Surgeons Perform First Pelvic IORT Procedure

One-time treatment replaces weeks of radiation therapy.

NewYork-Presbyterian/Columbia University Medical Center is finding new ways to use individualized, internal radiation delivered in the operating room immediately after a cancerous tumor is removed. Intraoperative radiotherapy, or IORT, represents an effort to reduce the chance of a cancer recurrence, shorten the duration of conventional postoperative external radiation, and reduce the risk to healthy tissue associated with external radiation.

In 2012, NewYork-Presbyterian Hospital became the first hospital in New York City to offer IORT to women with certain breast cancers. In this therapy, a spherical applicator is used to deliver a single, even dose of radiation to the inside surface of a rounded cavity after a lumpectomy.

Continued on page 2

More from the Department of Surgery experts at:

www.facebook.com/columbiasurgery www.twitter.com/columbiasurgery www.columbiasurgery.org

Pelvic IORT ~ Continued from page 1

Now, physicians at NewYork-Presbyterian/Columbia are expanding these pioneering efforts by offering IORT for other types of cancer in the abdomen and pelvis. Unlike in the breast, the tumor bed in the abdomen and pelvis may not be as clearly defined after surgery, and several sites at risk for recurrence may need to be treated.

Earlier this year, the hospital first used IORT for a woman with recurrent colon cancer in the pelvic cavity. **P. Ravi Kiran, MBBS, MS, Msc, FRCS, FACS,** *Chief and Program Director of the Division of Colorectal Surgery at NewYork-Presbyterian/Columbia*, removed the tumor, but could not cut too close to vital blood vessels and other organs. Due to the limitations of surgery, and because the patient had already received a high lifetime cumulative dose of radiation therapy in previous treatments, Dr. Kiran and **Clifford Chao, MD**, the *Chu H. Chang Professor of Radiation Oncology and Chair, Radiation Oncology at NewYork-Presbyterian/Columbia*, decided to use IORT to "mop up" any leftover tumor cells. Dr. Chao used a flat radiotherapy applicator to deliver radiation to areas close to blood vessels along the pelvic wall and a spherical applicator to treat a region lower in the pelvic cavity. "We also used a protective wrap, or draping, made of material that shields organs like the bowel or blood vessels from scatter radiation," Dr. Chao said.

"Because of the way the tumor needs to be removed, or because the spaces between a tumor and large vessels and nerves are too small, microscopic lesions are more likely to be attached to the surface of blood vessels and nerves. IORT allowed us to treat those areas and lower the risk of recurrence," said Dr. Chao, who is leading the hospital's IORT efforts.

Other surgeons at the hospital have since used IORT, delivered by tailored applicators, to treat patients with a bile duct tumor and a gynecologic cancer.

In certain breast cancer cases, IORT has eliminated an additional 6–7 weeks of radiation therapy and, according to a 10-year randomized trial published in 2010, yielded the same results as conventional full-breast radiation. Dr. Chao is hopeful that similar benefits will be seen in other types of cancer cases, and he sees this as another step forward for personalized cancer care.

"The possibilities are encouraging," said Dr. Chao. "We could see patients ahead of time and then work with the surgeon to develop a personalized radiation treatment for the specific tumor."

"When you open up the abdomen to remove a tumor from the liver, bowel, or pancreas, the terrain of the surgical bed is a more open, uneven surface," he said. "So we need

Photo: Courtesy of ZEISS

IORT applicators can be positioned in any direction in order to precisely target cells in any part of the body.

radiotherapy applicators that suit the specific anatomical terrain. In some areas of the body, the applicator could be a half sphere, an irregular shape for uneven surfaces, or a tiny device that fits into a small space where we have anatomic challenges. We can devise personalized therapy based on a patient's specific anatomy."

According to Dr. Kiran, "The availability of IORT offers an opportunity to surgically treat more advanced colorectal cancers. When surgical margins are questionable, local IORT may reduce the chance of cancer recurrence even in advanced cases."

Dr. Chao is currently working with engineers and physicists from NYP/Columbia and NYP/Weill Cornell Medical Center to design and develop applicators for colorectal, head and neck, lung, and gynecologic cancers. ■

Learn more about IORT at: www.columbiasurgery.org

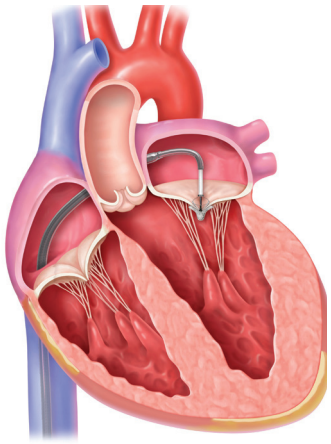
Heart Valve Disease: COAPT Trial

Trial of MitraClip expands to more patients with mitral regurgitation.

The **Heart Valve Center** at NewYork-Presbyterian/Columbia is currently enrolling patients in the COAPT Trial,* which is evaluating a catheter-based (non-surgical) treatment for mitral valve regurgitation (often called a 'leaky valve').

Mitral valve regurgitation is a common disease in which the mitral valve, one of the heart's four valves, fails to close properly due to changes in the valve tissue. As a result, blood leaks back into the upper chamber (left atrium) on the left side of the heart. This leakage impairs the normal flow of blood to the rest of the body, causing symptoms such as shortness of breath, irregular heartbeat, chest pain, and fatigue.

If a patient's mitral valve disease is mild, symptoms may be controlled by medication, according to **Tiffany Wong**, **PA**, an expert in valve disease at the Heart Valve Center. If the disease is more severe, the valve may need to be surgically repaired or even replaced. Mitral valve repair and replacement can both extend life expectancy and improve patients' quality of life by regulating the heartbeat and blood flow.



MitraClip is the world's first percutaneous procedure available to repair the mitral valve.

NYP/Columbia University Medical Center is regarded as a national leader in the development and use of minimally invasive approaches to treating heart valve disease. One well-known minimally invasive therapy, the MitraClip mitral valve repair system, has gained much traction since its development a decade ago by a team at NYP/Columbia (under the direction of **Dr. Mehmet Oz** at that time). Based on the results of the multicenter *EVEREST* and *EVEREST II* trials, MitraClip was approved in January 2014 for patients who have a form of mitral regurgitation called degenerative regurgitation and who are at high surgical risk. Now, MitraClip is the subject of a new trial among a broader population of patients — including those at high surgical risk whose mitral disease results from the typical aging process.

Tiffany Wong, PA answers commonly asked questions about MitraClip and the COAPT trial.

How does MitraClip treat mitral regurgitation?

A metal clip is advanced through the femoral vein in the groin and is guided to the heart with the aid of fluoroscopy (a special type of X-ray). Once it reaches the mitral valve with the aid of a transesophageal echocardiogram, the device then clips the leaflets of the mitral valve together to reduce the amount of blood that can flow back into the left side of the heart.

What are the advantages of MitraClip?

Some patients are not able to undergo surgery because they are too ill or frail to withstand an operation. The catheter-based alternative is far less traumatic, allowing for effective treatment without a chest incision, and sparing patients the pain and risks associated with surgery and post-operative recovery.

What are the risks associated with MitraClip?

While most people tolerate the procedure very well, there are risks including bleeding, infection, and vascular complications. The procedure requires the use of general anesthesia, which also carries risks.

What is the purpose of the COAPT trial?

The COAPT trial aims to evaluate the safety and effectiveness of the MitraClip system in patients who have moderate-to-severe functional mitral regurgitation and who are at too high risk to undergo mitral valve surgery. In this multicenter trial, patients will receive either medical therapy or MitraClip. The study will include 350 patients across North America, and patients will be followed for five years.

Who is eligible for inclusion in the COAPT trial?

Eligible patients include patients who have moderate-to-severe or severe functional mitral regurgitation (FMR), a form of mitral regurgitation in which the valve is structurally normal but leaks because of changes to the size and/or shape of the heart commonly associated with aging—and who are too high risk to undergo mitral valve surgery.

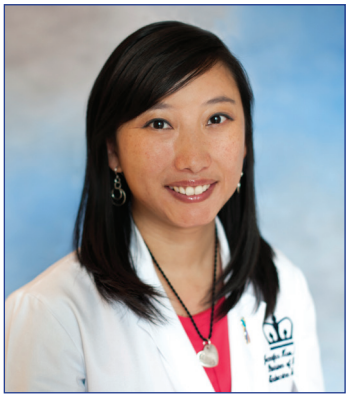
According to Ms. Wong, results from the COAPT trial could lead to expansion of the use of MitraClip to many more patients with mitral regurgitation. "This could represent a meaningful difference for many people, because MitraClip is so much less invasive than surgery."

For further information, visit www.columbiaheartvalve.org or contact the Heart Valve Center at 212.342.0444.

**Clinical Outcomes Assessment of the MitraClip Percutaneous Therapy (COAPT) for High Surgical Risk Patients Trial: Use of the Mitraclip system® in treating both high risk and prohibitive risk surgical candidates with moderate to severe, centralized mitral regurgitation. Principal Investigator: William A. Gray, MD.*

Molecular Testing for Thyroid Nodules

What patients need to know



Jennifer H. Kuo, MD
Director, Thyroid Biopsy Program

The incidence of thyroid cancer has been steadily rising for the past decade. Thyroid nodules, which can harbor cancer, are very common, affecting half of women by age 50 and 30% of the population overall. While most thyroid nodules are non-cancerous, between 5 and 15% are malignant, making it important for everyone to have thyroid nodules properly evaluated. Doctors are now able to diagnose thyroid cancer at much earlier stages than they could in the past, because ultrasound technology enables the detection of small thyroid nodules that could not be easily detected before.

According to **Jennifer H. Kuo, MD**, who directs the multidisciplinary **Thyroid Biopsy Clinic** at NewYork-Presbyterian/Columbia Department of Surgery, fine needle aspiration biopsy (FNA) evaluation can reliably determine whether a nodule is benign or cancerous about 65-82% of the time. But in about 22% of patients, test results are indeterminate, meaning that based on FNA testing, doctors can not say for sure whether a nodule is cancerous or not. Approximately 15-30% of nodules with indeterminate results actually have cancer, and due to this risk, many patients undergo diagnostic surgery (diagnostic thyroid lobectomy). After surgery, most patients are relieved to learn they do not have cancer—but they have been unnecessarily subjected to the risks and costs of surgery, albeit low, and a quarter of these patients progress to needing life-long thyroid hormone replacement as a result of their surgery.

To help avoid performing unnecessary procedures, experts have sought to improve the detection of cancer in thyroid nodules through the development of new molecular based tests. Experts are hopeful that molecular testing can detect specific gene mutations that play a role in thyroid cancer or may help to reveal whether thyroid cancer is present within a thyroid nodule. This diagnostic avenue is gaining momentum, and many patients now come to the Thyroid Center requesting molecular testing for thyroid nodules. However, according to Dr. Kuo, it is important that patients understand the limitations of these tests.

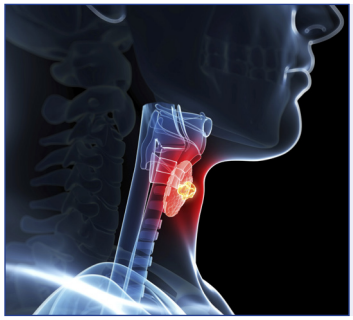
At this time, two approaches for molecular testing for thyroid cancer are currently available. The first type tests for specific DNA mutations, and the most commonly used version detects seven genetic mutations known to be involved in thyroid cancer. The second approach, called a *gene classifier,* uses RNA to look at differential gene expression rather than specific mutations. The DNA approach has a sensitivity of 60% and specificity of 98%, while the gene classifier test has a sensitivity of 92% and specificity of 52%.

Sensitivity, also called the *true positive rate*, refers to the number of patients who actually have the disease within the group of patients who test positive for the disease. The high sensitivity of the gene classifier test means it can detect 92% of cancers in thyroid nodules with indeterminate cytology, but there is a false negative rate of 8-15%, meaning that the test can miss 8-15% of cancers that are present in thyroid nodules. In addition, the test has an overall high false positive rate of 53%, meaning that it identifies many people at risk of thyroid cancer, but who do not actually have the disease. This limits the test's ability to help guide appropriate management of the disease.

Specificity, also called *true negative*, measures the proportion of negative test results that are correctly identified–in this case, the proportion of patients who do not show markers of thyroid cancer. A test with a high specificity rate may help to guide surgical management of thyroid cancer, but is not a good test to rule out the presence of cancer. Ideally a test would have 100% sensitivity and 100% specificity, but both tests clearly fall short of that mark.

What do these limits mean for the usefulness of molecular testing? Is it at all helpful in guiding treatment plans? Given the high rate of false positives with one test and false negatives

Continued on page 5



The term thyroid nodule refers to an abnormal growth of thyroid cells that forms a lump within the thyroid gland. Although the vast majority of thyroid nodules are benign (noncancerous), a small proportion of thyroid nodules do contain thyroid cancer. In order to diagnose and treat thyroid cancer at the earliest stage, most thyroid nodules need some type of evaluation.

Thyroid Cancer ~ Continued from page 4

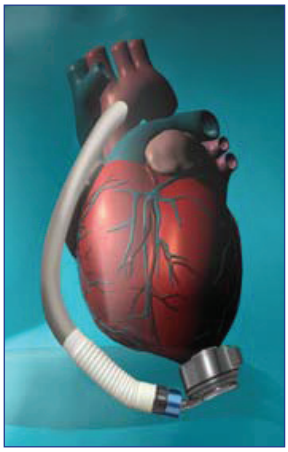
with the other, the Thyroid Biopsy Clinic uses them with caution. "The predictive value of the current tests is not as useful as we would like them to be," says Dr. Kuo. "We know the gene classifier test misses cancers, but for patients at high risk of surgery, it can give a little more clinical information with which to make good judgment." Instead of relying on either test as a foolproof indicator, she and her colleagues at the Thyroid Center consider them along with many other factors when forming their patients' treatment plans.

In addition to the limitations in accuracy of the tests, another problem with the gene classifier test is that it must be sent away for processing, which can take up to a month in some cases. Given the anxiety that patients experience while waiting for test results, along with the limitations in accuracy described above, Dr. Kuo and colleagues have decided to develop a better test that can be processed right at NYP/Columbia. They have formed a 10-member multidisciplinary team including specialists in endocrine surgery, medical endocrinology, molecular cytology, and surgical pathology. At this time, the team is working to optimize their technique and determine the design of their molecular panel. When the test is ready, it will be validated in a clinical study before becoming widely available.

A better molecular test is unlikely to improve mortality rates from thyroid cancer, since thyroid cancer so rarely causes death, explains Dr. Kuo. However a molecular test with strong predictive capability could potentially save a significant number of patients from undergoing thyroid surgery and needing thyroid replacement hormone. "This is a very promising tool in the evaluation of thyroid nodules, but it is currently a work in progress and still an evolving field," she says. ■

Watch a video about the Thyroid Biopsy Program at bit.ly/1CCfhZn or visit; columbiathyroidcenter.org for more information.

HeartMate III Trial Enrolling Patients



HeartMate III Left Ventricular Assist System

A trial of the HeartMate III Left Ventricular Assist System is now enrolling patients at NewYork-Presbyterian/Columbia University Medical Center, the only center in the New York area to participate in this trial. The device, also called a left ventricular assist device (LVAD), is intended to sustain patients with advanced heart failure whose symptoms are not sufficiently helped by medication.

HeartMate III is an implantable device that takes over the pumping action of the left ventricle. This device provides about the same support as currently approved FDA LVADs (HeartMate II and Heartware), pumping up to 10 liters of blood through the body per minute, but improves upon the earlier designs in several ways.

- The pump is smaller than prior versions, situated within the pericardial space, and does not require a pocket to be created in the chest for implantation.
- The device is fully magnetically levitated, which means that the parts 'float' rather than rub together. Without contact and friction in the rotor, the device is expected to have greater durability and a lower potential for complications.
- It is designed to periodically increase and decrease the speed of the pump, which has the effect of mimicking the natural pulse rate of 30 beats per minute. None of the other FDA-approved LVADs have this 'artificial pulse' ability.
- The design includes large pump flow gaps, which is expected to cause less damage to red blood cells than prior versions of the device with potential for reduced anticoagulation, thrombus and bleeding.
- The new device is more energy efficient and requires lower power consumption than prior versions.
- Unlike the earlier versions, the modular driveline design of HeartMate III allows doctors to exchange part of the driveline if necessary without removing the pump.

Candidates for HeartMate III trial may include patients with advanced heart failure who need a device either as a bridge to heart transplantation, or who are ineligible for transplant and who will use the device indefinitely (called 'destination therapy').

In the current study, eligible patients will receive either a Heartmate III or Heartmate II pump. Survival, quality of life, heart function, and incidence of device malfunction, need for rehospitalization or reoperation, and other factors will be evaluated to assess the safety and effectiveness of the new device. ■

For information about the HeartMate III Left Ventricular Assist System Clinical Trial and the Mechanical Circulatory Support Program at NYP/Columbia, visit www.columbialvad.org or call 212.305.6003.

Save the Dates

Register online:
www.columbiasurgery.org/events

Open to the public with our compliments

If you have not yet attended one of our department's community events, consider spending a few hours at one of our special programs. Designed to share information about the latest advances in medicine, these free events are a fantastic way to learn from our experts about diseases that affect so many of our loved ones and friends. *Upcoming programs include breast cancer, colorectal cancer, and lung cancer.*

BRIDGING THE GAP

Enhancing Breast Cancer Prevention, Screening, and Wellness

Saturday, February 28, 2015
8:30am –2:30pm

Club 101
101 Park Avenue, NYC (Between E. 40th & 41st Streets)

Lecture topics to include:

- Disparities in health care
- The role of genetics
- Innovative surgical techniques
- Holistic care & wellness

Colorectal Cancer Awareness Day

Saturday, March 14, 2015 • 10:30am to 1:00pm

Vivian and Seymour Milstein Family Heart Center
Myrna L. Daniels Auditorium
173 Fort Washington Avenue, NYC

Lecture topics to include:

- The importance of screening and early detection
- The latest treatment options
- Risk factors
- What to expect when going through the diagnosis and treatment process

Presentation by: Heather Dacus, New York State Department of Health

Lung Cancer Awareness Day

Saturday, March 28, 2015 • 10:00am to 12:45pm

Vivian and Seymour Milstein Family Heart Center
Myrna L. Daniels Auditorium
173 Fort Washington Avenue, NYC

LECTURE TOPICS TO INCLUDE:

Health and Fitness Empowerment • The Promise of Immune Therapy
Screening and Prevention Updates • Personalized Genetic Medicine
Treatment Options: 2015 • Personal Story by a Lung Cancer Survivor

BlogTalkRadio

Tune in to the Department of Surgery's BlogTalkRadio channel at:
www.blogtalkradio.com/columbiasurgery

Media Learning Center

Visit **columbiasurgery.org/media** to see interviews with our surgeons, animations of procedures, and more.
New videos are posted weekly.

Still can't find what you are looking for?

With almost 3000 pages on our web site, we probably have it covered. Use the search bar located on the top of every page at:

www.columbiasurgery.org

or email us at **info@columbiasurgery.org**