

# healthpoints

ALL THE POSSIBILITIES OF MODERN MEDICINE

 COLUMBIA UNIVERSITY  
MEDICAL CENTER  
Department of Surgery  
NewYork-Presbyterian



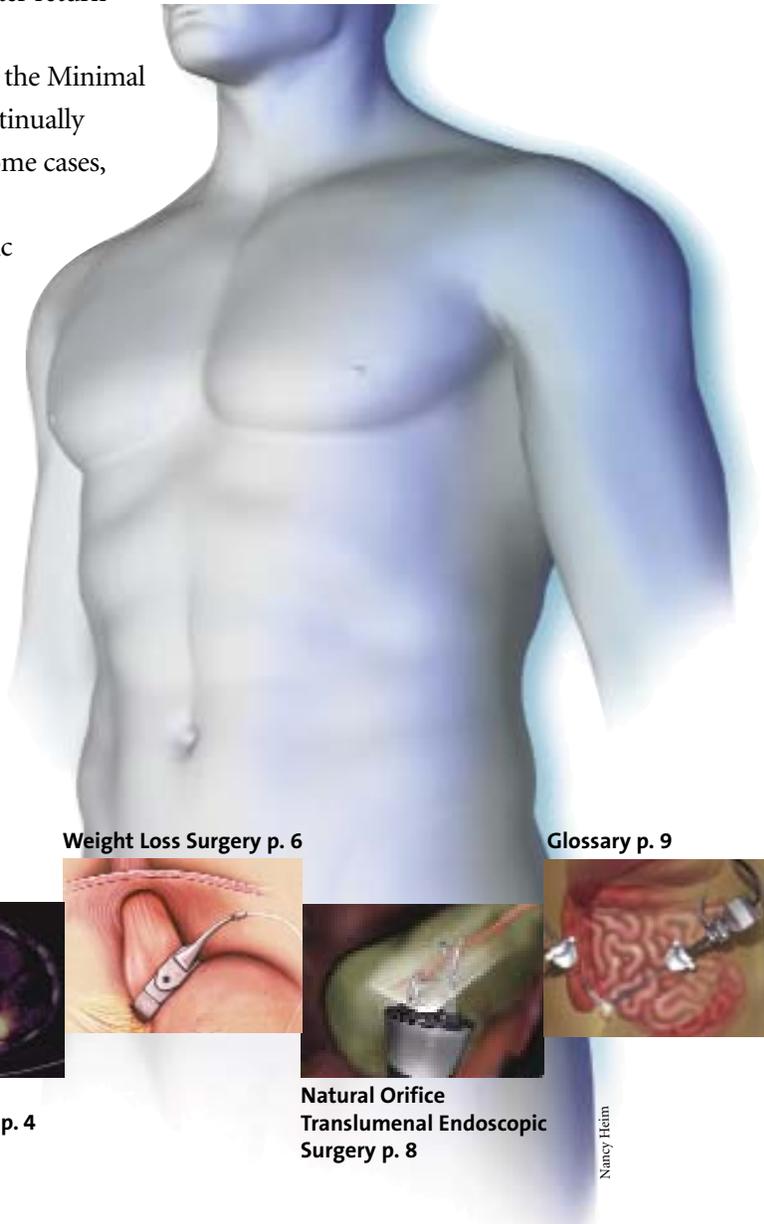
Dennis L. Fowler, MD, Director, established the Minimal Access Surgery Center in 2000 at the Weill Cornell and Columbia University campuses of NewYork-Presbyterian Hospital. Under his leadership, the center began by creating a state-of-the-art infrastructure. It recruited talented surgeons in a range of specialties, and developed a rigorous training program that has evolved into a nationally renowned fellowship for training laparoscopic surgeons. Today the Minimal Access Surgery Center is world renowned for its clinical expertise, its educational leadership, and its innovative research in surgical technique and immune activity.

## Minimal Access Surgery

Clinical Care, Research, and Innovation

Thanks to advances in imaging and surgical technologies, minimal access surgery is replacing open surgery in more and more diagnostic and therapeutic procedures every day. Laparoscopic surgery is now the routine method for diagnosing and treating many gynecologic, urologic, abdominal, thoracic, and other conditions. People can donate a kidney through a laparoscopic procedure, and can even undergo cardiac bypass through endoscopic surgery. For patients, minimal access surgery means a less invasive operation, significantly reduced pain and bleeding, less trauma to the immune system, quicker recovery time, and faster return to work and activity.

Yet physician researchers at the Minimal Access Surgery Center are continually working to improve, and in some cases, transform these procedures to provide even better therapeutic options. The Center stands at the forefront of research into new techniques of performing surgery without any external incisions, and it leads the scientific community in its research on the immune effects of surgery. This issue highlights a few of these outstanding efforts and the newest options available to patients today. 



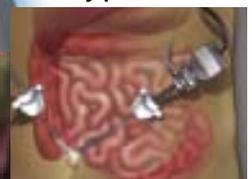
Endocrine Surgery p. 3



Weight Loss Surgery p. 6



Glossary p. 9



Colorectal Surgery p. 2



PET for Pancreatic Cancer p. 4



Natural Orifice Transluminal Endoscopic Surgery p. 8

# Colorectal Cancer

## Reducing Recurrence, Making Surgery Safer

**W**e hear a lot about the benefits of laparoscopic surgery today, and for good reason. Patients clearly recover faster than after open surgery, experience less pain, and have better cosmetic results. Ninety percent of colorectal surgeries are performed laparoscopically at the Colorectal Care Program at NewYork-Presbyterian Hospital/Columbia University Medical Center. Yet even minimally invasive surgery inflicts trauma on the body, according to **Richard L. Whelan, MD**, Chief, Section of Colon and Rectal Surgery and Associate Director, Division of Surgical Oncology. Dr. Whelan and colleagues are aggressively working to reduce this downside of surgery through a host of cutting-edge studies.

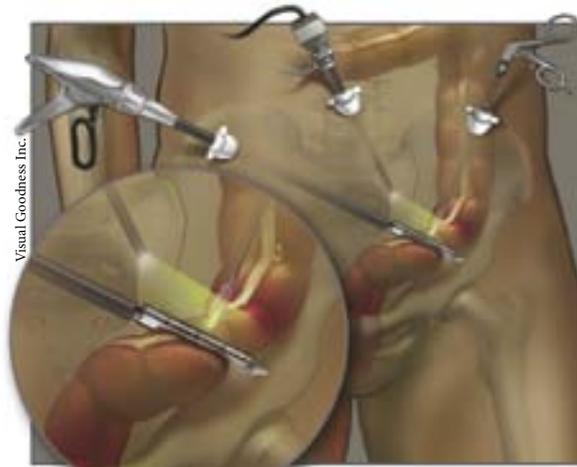
Colon cancer is the third most common cancer in the U.S., affecting over 130,000 people and responsible for 57,000–60,000 deaths per year. In 80–90% of cases, the diseased portion can be successfully removed surgically.

Compared to open surgery, patients tolerate laparoscopic surgery better than they do open surgery, says Dr. Whelan. It shortens patients' stay in the hospital by one to two days, reduces the need for pain medication, promotes faster bowel recovery, and allows 85% of patients to walk the day following surgery. "Some of the complications associated with surgery are related to being in bed, immobility, and narcotics; laparoscopic surgery avoids or limits these detrimental factors," Dr. Whelan explains.

Despite the benefits of laparoscopic surgery, however, minimally invasive procedures still place significant stress on the body. Research at the Laparoscopic Physiology Laboratory has

demonstrated that after surgery, the body primes itself for wound healing in order to repair the tissue damaged during the procedure. Angiogenesis, the formation of new blood vessels, is an important part of the wound healing process. Unfortunately, the conditions that are conducive to surgical wound healing, especially angiogenesis, are also ideal for tumor growth. "Up to a month after surgery, blood levels of Vascular Endothelial Growth Factor (VEGF), an important stimulant of angiogenesis, are notably elevated. This increase may stimulate the growth of any tumor cells remaining in the patient after the surgery. This is true after both laparoscopic and traditional "open" or big incision surgery. Even in the hands of the best surgeons, cancer cells remain in up to 40% of patients. The presence of residual tumor cells, in combination with elevated levels of VEGF and other tumor stimulatory proteins, provides a recipe for metastatic tumors in the following years.

"Both open and minimally invasive surgery are associated with increased blood levels of this protein which encourages tumor growth," says Dr. Whelan. In a key study scheduled to be published in November 2006 in the *Annals of Surgery*, Dr. Whelan's team determined that the level of VEGF rises twice as high in the first three days after open surgery when compared to results after laparoscopic surgery. A second study of laparoscopic colon cancer patients determined that despite the delayed increase in VEGF levels after surgery, VEGF levels remained elevated for at least three weeks. "Since cancer patients with higher pre-surgery levels of



**Laparoscopic Colon Resection**

VEGF have a worse prognosis than those with lower VEGF levels, it is safe to assume that blood levels matter." Armed with this observation, his team is now working to develop drug therapies to tackle the problem posed by rising VEGF levels.

In another study, Dr. Whelan's team is using genomics to understand both the beneficial and detrimental effects of major surgery. Using a DNA microarray, they will determine how surgical trauma affects the expression of over 43,000 genes in key immune cells found in the bloodstream. By identifying which genes are up- or down-regulated, the researchers hope to identify targets for anti-cancer therapy and also to find ways to limit the negative impact of surgery. They also hope to find other protein "markers" that may reveal which patients are at high risk for operative complications or a poor outcome. This study, organized by Columbia University, involves the Cleveland Clinic, the Ferguson Clinic in Michigan, and the University of Vermont.

Yet another line of study has focused on the search for "safe" chemotherapy that can be used before and immediately after surgery. Traditionally, chemotherapy has been administered six weeks after surgery to target any cancer cells

continued on page 9

# Insulinomas

Creative adaptation enables one patient to avoid major pancreatic resection.

Insulinomas are rare tumors of the pancreas that produce too much insulin. Usually less than two centimeters in size, insulinomas are benign (noncancerous) in 90% of cases. Without treatment, however, the extra insulin causes patients' blood sugar to drop, and can cause symptoms such as weakness, tremors, anxiety, hunger, headache, and in severe cases, coma or even death.

Surgical removal of insulinomas can be performed laparoscopically depending on the size and location of the tumor. The preferred approach, *enucleation*, involves excising the tumor without removing (resecting) adjacent pancreatic tissue.

Yet if a tumor is located very close to the main pancreatic duct, it may be necessary to resect normal pancreatic tissue with the tumor in order to avoid an injury to the pancreatic duct. When tumors are located in the head of the pancreas, occasionally an operation called the Whipple procedure is necessary. This is a major operation involving removal of tissue from both the pancreas and the duodenum. "This is a complex reconstruction involving weeks of recovery," explains **William B. Inabnet, MD**, Chief, Section of *Endocrine Surgery*.

In a recent case, Dr. Inabnet was able to spare a patient from having to undergo the Whipple procedure by devising a completely novel solution. The patient's tumor was located directly over the pancreatic duct, which carries pancreatic juices into the duodenum. Performing a routine enucleation would have presented a high risk of injuring this duct, potentially causing leakage

and requiring additional surgery. But Dr. Inabnet believed that it might be possible to take steps to protect the duct and perform laparoscopic surgery safely. The case was discussed at the Pancreas Center's weekly clinical conference to gain a consensus for the treatment plan. After the treatment plan was finalized, **Peter Stevens, MD**, of the Division of Interventional Gastroenterology, placed a temporary stent into the pancreatic duct to protect it from injury during the

also enhanced by the use of intraoperative insulin assay — a blood test to measure insulin levels — to confirm that the tumor was completely removed. Providing real-time information to the surgeon, such monitoring provides clear measurements of the level of insulin in the blood during surgery. Once an insulinoma is removed, a patient's insulin returns to a normal level and the surgeon knows that the tumor has been completely removed.



**Endocrine surgeons have excellent views of anatomical structures during laparoscopic surgery like the adrenalectomy performed here.**

planned operation. "The stent was placed into the main pancreatic duct without difficulty four days prior to surgery," Dr. Inabnet explains.

The solution worked beautifully. The insulinoma was successfully enucleated, and the patient did not have to undergo a major pancreatic resection. The patient experienced no complications and went home two days after surgery.

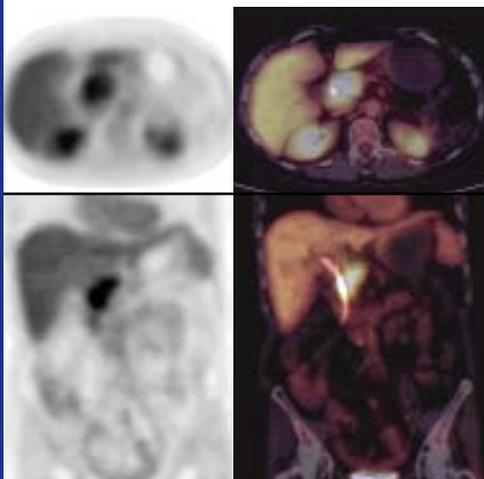
The success of this procedure was

Intraoperative hormone monitoring is particularly useful in helping surgeons rule out the possibility that multiple tumors may be present. While most insulinomas are solitary, some patients have multiple tumors that are too small to be detected through imaging. In the past, if additional tumors remained undetected after surgery, symptoms would continue and a patient would

continued on page 9

# Pet Imaging Guides Treatment for Pancreatic Cancer Patients

*Pancreatic cancer is the fourth leading cause of cancer death in the U.S. Each year, approximately 33,000 Americans develop cancer of the pancreas. If it is confined to the pancreas and hasn't spread to surrounding organs or lymph nodes, the cancer can sometimes be cured through surgery. But because it is difficult to diagnose, the disease is frequently undetected in its earliest stage, and has already spread, or metastasized, by the time it is diagnosed. Once pancreatic cancer has spread to the liver, median survival for patients is five to six months. At NewYork-Presbyterian/Columbia, new treatments developed in the laboratory have doubled this survival period in initial studies.*



Top (cross-sectional view): PET and fused PET/CT show a “hot spot” in the pancreas of a patient with obstructive jaundice. The kidneys also appear as hot spots because of their high metabolic activity, although they are not cancerous. Bottom (frontal view): PET and fused PET/CT show stents placed in the patient’s bile ducts (to relieve the obstruction) and the tumor, with no evidence that it has spread beyond the pancreas.

The Columbia University Pancreas Center, nationally known for its superior surgical procedures, innovative chemotherapy treatment, and pioneering prevention program, routinely relies on PET imaging (positron emission tomography), to guide treatment decisions. For tracking pancreatic cancer and its metastases to other organs, say Columbia faculty, PET’s sensitivity is often superior to any other type of imaging procedure.

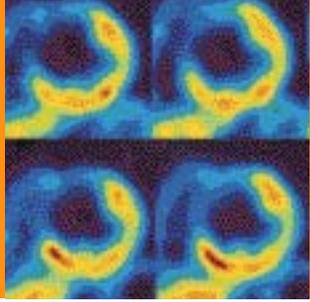
## PET FOR POST-CHEMOTHERAPY EVALUATION

Columbia’s **Robert Fine, MD**, *Herbert Irving Associate Professor of Medicine and Director of the Experimental Therapeutics Program*, is an oncologist who works with the Pancreas Center to

treat its patients. Dr. Fine says PET is able to identify changes that are not detectable with CT (*computed tomography*), the routine imaging method for observing tumors. While CT scans show anatomical structures including tumors, PET visualizes the chemical activity of cells (their metabolism). Cancer cells, which metabolize more sugars than normal cells, appear on a PET scan as bright “hot spots.” Dr. Fine says that when chemotherapy has begun to work, the tumor does not physically shrink right away, and improvement cannot therefore be detected by a CT scan. “But PET can detect a response two or three months earlier than a CT scan, by indicating that the tumor’s metabolic activity has

***Pancreatic cancer is known to resist chemotherapy, forcing oncologists to use second and third lines of defense. To meet this challenge, Dr. Fine has developed several multiple-drug chemotherapy regimens.***

- Developed by Dr. Fine’s laboratory, the GTX chemotherapy regimen consists of three drugs — Gemzar, Taxatere, and Xeloda — and is currently in Phase II clinical trials. As a first-line therapy for advanced pancreatic cancer, GTX is routinely combined with radiation to shrink tumors so that they are operable. Dr. Fine calls GTX a “smart” regimen because it circumvents mechanisms of drug resistance by specifically inhibiting pathways active in pancreatic cancer. Of all the options available today, GTX has produced the highest response rates (40%) and rates of survival in the U.S. and Europe in early studies.
- Dr. Fine’s laboratory found that pancreatic cancer cells can become resistant to GTX by activation of specific signaling pathways called MAPK. In response, the team developed a specific sequence of the drugs that inhibits this activation and leads to the death of cancer cells. Clinical studies to date show that approximately 40% of GTX failures can be salvaged by this chemotherapy regimen.
- The team has also created and perfected two novel therapies in their laboratory that will enter testing in pancreatic cancer patients in the near future. One is a gene therapy approach which selectively targets cells with mutations that occur in many pancreatic cancers. The other is a peptide that selectively binds to mutated proteins found in pancreatic cancer cells and then restores them back to a normal state, resulting in cell death. If the peptide is delivered endoscopically into the pancreatic duct, where 95% of all pancreatic cancers develop, it may be possible to eradicate pre-malignant pancreatic growths which contain this mutation (approximately 75%). Both novel therapies will be tested in patients with PET and CT scans.



PET scan showing  
blood-flow in the heart  
(cardiac perfusion)

been slowed by treatment, or that the tumor is dying or dead.” The opposite is true as well, he says. “PET can detect relapse months before it appears on a CT scan.”

### PET FOR POSTOPERATIVE EVALUATION

**Beth Schroppe, MD, PhD**, *Assistant Professor of Surgery*, who performs pancreatic surgery, also relies on PET in her treatment of pancreatic cancer. For many patients, she uses PET imaging post-operatively to find out if a pancreatic cancer has recurred, or if it has metastasized. “We first follow up surgery with periodic blood testing. If tumor markers are elevated in the tests, we move to imaging, including PET,” she says. Any kind of previous surgery leaves behind scar and fibrosis that are difficult to distinguish from cancer with a CT scan, she says. “But unlike cancer, a scar is not metabolically active, so on a PET scan we can tell if it’s cancer or not.”

Dr. Schroppe also uses PET to determine whether to operate or not. The presence of metastasis is a key factor in deciding whether a patient is a candidate

for surgery. A dilated bile duct in the liver can look like a metastasis on a CT scan. “A dilated bile duct viewed on a PET scan won’t light up, whereas a metastasis in the liver will,” she says. If the cancer has metastasized to other organs, surgery is not indicated — surgical resection has not been shown to have a survival benefit under these circumstances. “Pancreas operations are complex, so we really want to make sure there’s no metastasis before we operate,” she says.

“PET/CT imaging is adding a new dimension to the care and treatment of patients with pancreatic cancer,” says **Ronald L. Van Heertum, MD**, *Professor of Radiology and Director, Columbia Kreitchman PET Center*. “We are very pleased with the additional information that this technology offers our patients and physicians.” 

**If you are a physician and would like to refer a patient for an oncology PET scan, please call the Columbia Kreitchman PET Center at 212-923-1555.**

**If you are a patient and would like to get a PET scan, please discuss a referral with your physician.**

---

### A Shorter Cardiac Perfusion Test

A cardiac perfusion test enables the physician to detect coronary artery disease by revealing how well blood flows to the heart. The test is actually two consecutive images: a “rest” image at resting heart rate, and a “stress” image at peak heart rate. While PET is among the most accurate non-invasive techniques for perfusion testing because of its high resolution, it is also the best choice for certain patients:

- It is ideal for obese patients or women with large breasts, because soft tissue does not distort PET images.
- It is the test of choice for patients with certain heart conditions.

With multiple image tests, the *half-life* of the tracer (the drug that is tracked by the scanner) is decisive to the length of the test. For its perfusion scans, the Kreitchman PET Center is now using Rubidium, a tracer with an extremely short half-life—75 seconds. The result is a very quick scan, enabling patients to complete the PET perfusion test in only 30 minutes.

### PET IMAGING FOR CANCER: MEDICARE COVERAGE

The good news for patients: through participation in the National Oncologic PET Registry (NOPR), patients can receive Medicare coverage of PET scans for many cancers — including pancreatic cancer — that were not previously covered. With the information obtained through this confidential research study, Medicare will evaluate PET’s effectiveness as a part of cancer treatment planning.

Medicare routinely covers PET scans for the following cancers: colorectal, esophageal, head and neck, non small-cell lung, lymphoma, melanoma, and thyroid. As long as the patient’s doctor provides a referral for the PET scan, neither the patient nor the physician will need to take any further steps to obtain Medicare coverage.

However, Medicare coverage for a PET scan of a cancer not listed above requires enrollment in the NOPR. Participation in this confidential study requires the patient’s physician to fill out and submit two check-box forms. Staff at the Columbia Kreitchman PET Center routinely work with physicians to complete the process of enrolling the patient in NOPR. To read more about the NOPR, go to [www.cancerPETregistry.org](http://www.cancerPETregistry.org).

*In addition, PET/PET CT is covered by many private insurers, which reimburse for PET on a case-by-case basis. Staff at the Columbia Kreitchman PET Center can work with physicians and patients to verify benefits and submit claims as needed.*

# Surgery for Weight Loss

## Advances in Adult Bariatric Surgery

**A**fter surgery for weight loss, 10–15% of patients may regain weight that they lost. To help such patients, the Center for Bariatric Surgery at NewYork-Presbyterian Hospital/Columbia now performs several types of revisional, or secondary procedures.

If weight regain occurs after a Lap-Band® operation, surgeons at the center leave the band in place and perform a gastric bypass, a technique the center innovated about three years ago. This allows them to operate on a fresh portion of the stomach rather than a scarred area, and saves the adjustability of the band to enhance the overall results. For patients who experience weight gain after gastric bypass, the center places a band on top of their bypass, another technique they developed. Such revisional procedures may have less risk than other revisional options, and they retain the option of band tightening to prevent weight gain in the future.



“In one year I have lost about 140 pounds and have gained so much more than a scale could ever measure. I have a new body, a new outlook on life and a new confidence in myself. Medically, physically, emotionally and mentally, I am like a new woman! I cannot imagine having these kinds of results without the undying support and unsurpassed care I received, and continue to receive, at the NewYork-Presbyterian Center for Obesity Surgery. If you want the best for yourself, you have to go to the best to get it.”

IRINA

“Not all places do revisional procedures,” according to **Marc Bessler, MD**, *Director, Center for Bariatric Surgery* at NewYork-Presbyterian Hospital/Columbia. “These are complex procedures. But our experience and reputation bring many people here for this.”

The Center for Bariatric Surgery was designated a Center of Excellence in April 2006 by the American College of Surgeons. This designation entitles patients who are treated at the center to be eligible for coverage by the Centers for Medicare and Medicaid Services (CMS). The only site in Manhattan to have received this designation, the center performs the full range of laparoscopic procedures, including Lap-Band®, gastric bypass, sleeve, and biliopancreatic diversion procedures.

To develop further options for patients with weight regain, Dr. Bessler and colleagues conduct numerous studies of surgical technique, outcomes, and quality of life. One study investigated the addition of a ring of mesh around the stomach at the time of gastric bypass. In patients 200 pounds or more overweight, the mesh was shown to improve outcomes with 20% more weight loss by preventing the outlet from the stomach to the intestine from stretching. In light of these results, the center is now beginning to use this technique in patients who are less than 200 pounds overweight.

A second study involves injections of sodium morrhuate, a sclerosing (scarring) agent, into the stomach pouch of patients who regain weight after gastric bypass. By causing scarring, the procedure narrows the exit from the stomach pouch, helping to restrict their food intake.

Pending approval by the FDA, a third study may evaluate yet another method: endoscopic insertion of a balloon-type device into the stomach, where it is filled with saline. During the six months it is in place, researchers believe the presence of the balloon may prevent patients from filling the stomach as fully with food, helping them to lose about 25% of their excess weight. Based on outcomes in Europe to date, Dr. Bessler expects that this trial could lead to FDA approval of the technique in the U.S.

The center is also one of six institutions participating in a pivotal NIH-funded study evaluating the outcomes of obesity surgery. Known as the Longitudinal Assessment of Bariatric Surgery (LABS), this is the first cross-sectional NIH study examining obesity surgery. It involves a web of analyses of factors before and after various surgical procedures to assess risks, benefits, improvement in quality of life, and understanding of how these operations work.

Dr. Bessler has devoted his career continued on page 10

## Lap-Band® Trial for Teens

**A**lthough adults have been able to choose laparoscopic adjustable banding surgery for weight loss since 2001, younger patients have had to rely primarily on non-surgical methods or higher risk operative procedures to lose their excess weight. Bariatric surgery has not been performed as commonly in adolescents largely because the long-term consequences have not been fully studied. Now, a FDA-approved study is evaluating the outcomes of one procedure in a strictly controlled study of teens. Beginning in 2006, this trial permits the Center for Adolescent Bariatric Surgery to perform “Lap-Banding,” a minimally invasive weight loss procedure, in select patients aged 14–18 years.

Columbia University Medical Center is one of only three U.S. centers presently approved to offer weight loss surgery to adolescents as part of this tightly regulated FDA study. First, patients must first complete a six-month program of rigorous weight loss



**The placement of an adjustable laparoscopic gastric band, or Lap-Band®, creates a smaller stomach pouch (above the band). By injecting or removing saline contained within the band, it is possible to tighten or loosen it as necessary.**

education and therapy. “The goal of this phase is to determine whether patients can lose 20% of their excess weight,” says program director **Jeffrey L. Zitsman, MD, FACS**, *Director, Center for Adolescent Bariatric Surgery* at Morgan Stanley Children’s Hospital of NewYork-Presbyterian. “If patients achieve this goal, they can continue with nonsurgical methods and avoid having surgery.”

The initial phase includes a comprehensive assessment consisting of a history and physical exam, extensive blood testing, bone age and bone density studies, evaluation by nutritionists and psychiatrists, and stress exercise testing to determine physiologic status. Patients then adhere to a strict program of diet, exercise, and behavior controls, and in rare cases, medical

therapy. This multidisciplinary care is provided by an integrated team including pediatricians, pediatric endocrinologists, pediatric gastroenterologists, pulmonologists, exercise physiologists, bariatric surgeons, anesthesiologists, pediatric nurse practitioners, and others. “Our goal is to help patients lose weight without surgery,” says Dr. Zitsman. “This requires discipline not only on the part of the patients, but strong support from their families as well.”

Only if patients fail to lose 20% of their excess weight after six months are they then considered for surgery. This FDA trial permits just one procedure in adolescents — laparoscopic adjustable gastric banding, or Lap-Band® — as part of its study of its safety and efficacy in adolescents. During this procedure, several small abdominal incisions are made. Through these incisions, the surgeon places and secures an adjustable silicone band around the upper stomach to create a small pouch. The band can be tightened or loosened by adjusting a saline-filled balloon which lines the inside of the band; at the time of surgery, a small access port is implanted deep below the abdominal wall fat for this purpose. In most cases, the port remains unnoticed by the patient. With the upper stomach pouch made smaller by the band, patients feel full sooner, reduce their food intake, and begin losing excess weight gradually. According to Dr. Zitsman, adverse effects have been minimal in adolescent patients to date, and include post-operative discomfort or nausea for several days.

While some U.S. hospitals perform gastric bypass surgery in adolescents, the Center for Adolescent Bariatric Surgery has elected not to do gastric bypass in such young patients. In gastric bypass surgery, a large portion of the stomach is stapled off, creating a smaller stomach pouch that can accommodate significantly less food than before surgery. In addition, some of the small intestine is bypassed, so that nutrients and calories are no longer fully absorbed. “Patients who undergo gastric bypass lose excess weight more quickly after surgery than those who undergo Lap-Banding, but by three years post surgery, weight loss is equal,” says Dr. Zitsman. “We consider Lap-Banding to be safer than gastric bypass for most adolescents because there is no risk of gastric or intestinal leak. Furthermore, gastric bypass is virtually irreversible, and chronic problems with nutrient malabsorption can have long-term effects on growth and development.” 

**To learn more about adolescent bariatric surgery, please visit [www.childrensnyp.org/bariatric](http://www.childrensnyp.org/bariatric) or call 212.305.8862.**



## Take NOTES

New surgical technique and technology may reduce the invasiveness of laparoscopic surgeries.

**T**oday about 75% of abdominal operations at NewYork-Presbyterian Hospital/Columbia University Medical Center are performed with minimally invasive techniques. Yet physicians and researchers are working to make these procedures even less invasive by gaining access through a natural orifice, thereby avoiding the need for incisions in the abdomen.

Natural Orifice Transluminal Endoscopic Surgery, or NOTES, is a new method of performing minimally invasive surgery through the mouth, anus, or vagina. *Trans* means “across,” and *lumen* refers to the space of an organ. Still in the investigational phase, NOTES has been successful in animal studies of gall bladder removal (cholecystectomy), appendectomy, tubal ligation, and other abdominal operations.

Researchers at the center hope that NOTES will afford patients an even faster recovery and less pain than today’s laparoscopic operations. “This may be as significant a leap forward in reducing invasiveness as the transition from open to laparoscopic surgery was,” says **Marc Bessler, MD**, *Director of Laparoscopic Surgery*. Dr. Bessler, along with a team including **Dennis Fowler, MD**, *Director, Minimal Access Surgery Center*, and **Peter Stevens, MD**, has been aggressively conducting animal studies at NewYork-Presbyterian/Columbia toward the ultimate goal of doing operations without any external incisions or scarring.

Surgeons in India have removed the appendix in a handful of patients through a scope inserted through the mouth, into the stomach, and across an incision in the stomach wall. The absence of nerves in these organs allows for a virtually pain-free recovery, but it is very difficult to achieve a perfect closure of incisions in

the stomach, and leaks can cause serious complications. For this reason, although a range of operations could eventually be performed through the colon or mouth, the first natural orifice operations in people will likely be transvaginal removal of the gall bladder. At this time, transvaginal access poses the lowest risk of infection: “Nothing leaks into the belly as it could from the stomach,” Dr. Bessler explains. In time, transvaginal access could potentially be used to remove the appendix, the ovaries, tissue from the liver, or any mass inside the abdomen.

Many gynecologists nationwide are already performing hysterectomy and tubal ligation transvaginally. In these operations, a tiny incision is made high in the vaginal wall, flexible endoscopic instruments are inserted, and the gall bladder or appendix can easily be removed. After surgery, the small vaginal incision heals and patients have no external scars.

Potential challenges to the adoption of NOTES include internal leakage (from imperfect suturing of the internal incision), infection, need for enhanced suturing and visualization techniques, and others. In addition, NOTES will require specialized new training because the technique and visualization differ from those used in laparoscopic surgery today.

In a parallel and complementary project, Dr. Fowler, with funding from the National Institutes of Health and in collaboration with colleagues from the Department of Computer Science at Columbia University, has developed new devices that are likely to help meet some of the technological challenges. Providing three-dimensional images and tools for surgery, these devices can be remotely controlled through joystick or voice commands, or they can be programmed to move autonomously within a patient’s body. “The goal of this is to further reduce the invasiveness of the surgery for the benefit of the patient,” says Dr. Fowler.

Dr. Bessler represents the center in the Natural Orifice Surgery Consortium for Advancement and Research (NOSCAR), a national think tank working to solve the current challenges to transluminal surgery. “This is a new and exciting future,” says Dr. Bessler. In addition to the transvaginal approach, the team is investigating access through the mouth for minimally invasive procedures for gastroesophageal reflux and weight loss. They have applied for approval by the Institutional Review Board (IRB) to perform transvaginal gall bladder removal, and expect to begin offering this option to eligible women in late fall 2006. 

**For more information, please visit the Minimal Access Surgery Center at [www.nyp.org/masc](http://www.nyp.org/masc) or call 212.305.1123.**

## Colorectal Cancer

continued from page 2

that might remain after the operation. Physicians have avoided giving chemotherapy during the month or two immediately after surgery because of fears that its toxic effects would prevent the body from healing during this vulnerable time. Now, a compound called granulocyte-macrophage colony-stimulating factor (GM-CSF), given for three days before and four days after laparoscopic colon surgery, has been shown to ameliorate the impact of the VEGF increase that occurs after surgery. GM-CSF may prevent the VEGF from stimulating cancer growth, according to Dr. Whelan. "Although it was initially thought that GM-CSF would improve immune function after surgery, in fact, this drug was found to have a greater impact on angiogenesis." Importantly, GM-CSF was well tolerated and did not appear to cause any complications.

"The advent and development of minimally invasive surgery has altered forever the manner in which major abdominal surgery is performed. The next step, I believe, is to find safe drugs that can be given immediately before and after cancer resection that will decrease tumor recurrence rates and improve survival." A second anti-cancer drug trial, testing the effects of a drug called cetuximab when given three weeks before and three weeks following surgery, is planned for early 2007. 

**The Laparoscopic Physiology Laboratory at NewYork-Presbyterian/Columbia is one of the world's largest laboratories studying the physiologic and oncologic ramifications of surgery. To learn more, please visit [www.columbiasurgery.org/divisions/colorectal/research.html](http://www.columbiasurgery.org/divisions/colorectal/research.html)**

## Minimal Access Surgery: Terms and Definitions

**Minimal access surgery** refers to surgery performed through one or more small incisions, sometimes called ports, rather than through a large open incision. Although some may use the terms interchangeably, the phrases "endoscopic," "laparoscopic," and "minimally invasive," have unique meanings.

**Minimal access, or minimally invasive surgery**, refers to surgical procedures done through one or more small incision (usually two inches or less) rather than a large incision.

**Resection** is the surgical removal of all or part of an organ, such as a segment of the colon.

**Endoscopic surgery** (literally "looking inside") is the insertion of a small scope, either through a natural orifice or through a tiny incision, to view or collect tissue samples from an organ. Endoscopy is used to evaluate, diagnose, and treat a range of conditions in the respiratory tract, gastrointestinal tract, reproductive system, and more.

Many procedures have specific names, such as **bronchoscopy** (to view the lower airways) or **colonoscopy** (to view the colon). In these terms, "scope" refers to the small, flexible scope inserted into the body for imaging during the procedure. The prefix denotes the location, such that **laparoscopic** surgery refers to procedures in the abdomen or pelvic cavity, **arthroscopic** refers to a procedures in the joint, **thoracoscopic** refers to procedures in the chest (thorax), and so on. In some procedures, the scope is inserted through one port, while a surgical instrument is inserted through a second tiny port.

During procedures in the abdomen, surgeons first fill the pelvic cavity with carbon dioxide gas to create a space for the surgical instruments. After the procedure, the gas is removed from the body cavity to minimize discomfort and pain. 



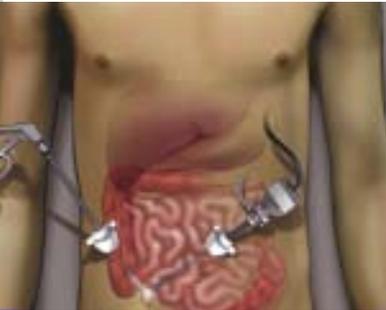
Compared to an open incision like the one in the photo at bottom, laparoscopic incisions for gall bladder removal, appendectomy, and other abdominal procedures (photo at top) are far smaller, promoting much faster recovery.

## Insulinomas continued from page 3

have had to return for more surgeries until all the tumors were found. Today, the ability to monitor hormones during surgery immediately confirms whether the surgeons have successfully completed the operation, or if more tumors may be present — so they can complete the operation in one sitting. "Despite the clear advantages of intra-operative hormone monitoring during pancreatic surgery, NewYork-Presbyterian Hospital/Columbia University Medical Center is one of only a handful of U.S. Centers to routinely use the technique. In addition to measuring insulin during surgery for insulinoma, Dr. Inabnet uses the equipment to measure parathyroid hormone during thyroid and parathyroid surgeries. 

For more information about endocrine surgery, call 212.305.0444 or visit [www.columbiasurgery.org/pat/endo/index.html](http://www.columbiasurgery.org/pat/endo/index.html)

## Minimal Access Surgery for Children



Visual Goodness Inc.

Used for both diagnostic and therapeutic procedures, minimal access techniques dramatically reduce the need for postoperative pain medications and shorten the hospital stay for young patients. The Minimal Access Surgery Center routinely performs minimally invasive operations in children,

**Appendectomy is routinely performed laparoscopically at the Minimal Access Surgery Center.**

including even the tiniest of babies. These include:

- ❖ appendectomy (removal of the appendix)
- ❖ pyloromyotomy
- ❖ treatment of gall bladder disease
- ❖ splenectomy (removal of the spleen)
- ❖ exploration during inguinal hernia repair (to determine whether the opposite side requires surgery or not)
- ❖ colectomy/intestinal resection
- ❖ reduction of intussusception
- ❖ antireflux surgery for GERD
- ❖ orchidopexy/varicocele
- ❖ tumor biopsy and excision
- ❖ video assisted pectus excavatum repair
- ❖ thoroscopic treatment of empyema (inflammatory reaction between the lung and chest wall)

**To learn more about minimally invasive surgery in children, please visit [www.nyp.org/masc](http://www.nyp.org/masc)**

## Advances in Adult Bariatric Surgery

continued from page 6

to making procedures less invasive and easier for patients. In his laboratory, some of his newest research focuses on the development of *endolumenal surgery* — going through the mouth endoscopically to operate within the space of the stomach, without creating any incisions for access. A major step beyond laparoscopic surgery, endolumenal surgery entails working within the space of the stomach without cutting it open. “This could allow us to perform gastric bypass internally, either by inserting devices or suturing the stomach from the inside to cause weight loss,” he says. In the stage of animal study now, such procedures are several years away from human testing, although Dr. Bessler predicts that creating sutures as a revisional procedure could become available relatively soon. Plans for a study to reduce pouch size are underway and could begin by the end of 2006. “These new approaches may help to greatly advance the goal of developing weight loss procedures that are less invasive,” says Dr. Bessler. 

**To learn more about bariatric surgery, please visit [www.obesityMD.org](http://www.obesityMD.org) or call 212.305.4000.**

healthpoints is published by Columbia University Department of Surgery as a service to our patients. You may contact the Office of External Affairs for additional information, to be added to our mailing list, and to request additional copies. Please call 1-201-346-7001.

For physician referrals, please call **1-800-227-2762**

Deborah Schwarz-McGregor, PA  
Director, Office of External Affairs

M. El-Tamer, MD  
Medical Editor

Sherry Knecht  
Managing Editor

Tanya Krawciw  
Creative Director



COLUMBIA UNIVERSITY  
MEDICAL CENTER

Department of Surgery  
Office of External Affairs  
630 West 168th Street, Box 94  
New York, NY 10032-3784

Non-Profit  
US Postage  
PAID  
Columbia University