

inside surgery

CUTTING-EDGE BARIATRIC SURGERY AND SURGICAL MANAGEMENT OF FOREGUT DISEASE

UCSF Medical Center has long been a pioneer in minimally invasive surgery, leading the development of important laparoscopic techniques and devices, particularly for bariatric surgery and surgical management of esophageal disorders. Today, UCSF gastrointestinal surgeons and their colleagues provide exceptional and innovative care for patients with rare or difficult-to-treat conditions, frequently partnering with multidisciplinary colleagues – particularly in gastroenterology – to employ even less invasive approaches.

“Our group has a degree of technical expertise that is not common in the community,” said Stanley J. Rogers, MD, director of the UCSF Bariatric Surgery Center and chief of minimally invasive surgery. “Everyone on staff here at UCSF is experienced in dealing with very complex problems, including patients who have had surgery elsewhere who subsequently develop complications or need to have the surgery redone. We encourage physicians to consider initial referral to UCSF to optimize patient care.”

Bariatric Surgery

“The UCSF Bariatric Surgery Center is a high-volume practice with some of the best outcomes in the country,” said Rogers. “We are nationally recognized, accredited as a Center of Excellence by the American College of Surgeons, and offer a distinguished, multidisciplinary treatment approach.” In addition to Rogers, the center’s team includes

bariatric surgeons Jonathan Carter, MD, Matthew Lin, MD, and Andrew Posselt, MD, PhD; gastroenterologist John Cello, MD; dietitian Mary Ellen DiPaola, RD, CDE, IBCLC; and psychiatrist John Chamberlain, MD.

The center performs about 150 bariatric surgeries annually, essentially all done laparoscopically, with no mortality in the past decade and very few complications. Weight loss results are excellent. “Our track record is a testament to the outstanding training and skills of our surgeons, our multidisciplinary approach and the fact that these procedures have become very refined and safe,” said Rogers.

In addition to preparing a comprehensive preoperative workup plan for each patient, the center offers a monthly bariatric support group led by surgeons and ongoing support from the dietitian and psychiatrist. In the rare case of postoperative complications, bariatric

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LETTER FROM THE INTERIM CHAIR

UCSF Medical Center has long been at the forefront of innovation in every facet of surgery. Our outgoing chair of the Department of Surgery, Nancy L. Ascher, MD, PhD, led our team to new heights. She supported outstanding work across the full spectrum of surgical research and practice – from the Surgical Innovations initiative, which helps surgeons, engineers and trainees develop new surgical devices, to the Center for Maternal-Fetal Precision Medicine, which seeks to better diagnose and treat birth defects, to the Center for Surgery in Older Adults, which helps older patients better prepare for and recover from surgery. These are just a few of the creative, visionary developments Dr. Ascher championed during her 17 years as chair.

She remains active as a UCSF abdominal transplant surgeon, while bringing her leadership gifts to a new level as president of the Transplantation Society, an international nonprofit organization that provides global leadership in transplantation. It is my privilege to serve as interim chair of the UCSF Department of Surgery.

In this issue of *Inside Surgery*, I am pleased to share a few of the latest highlights in our state-of-the-art care for patients. Our general surgeons have pioneered many of the latest techniques for minimally invasive bariatric surgery, which can now be used to help patients with metabolic disease. Drawing on the world-class expertise across UCSF, we often partner with gastroenterologists to provide even less invasive approaches, which sometimes can be performed endoscopically – eliminating the need for any skin incisions. Our team is highly skilled in treating rare and complex disease, and helps ensure that all patients achieve the best possible outcomes.

We are also excited to employ the latest developments in robotic surgery, which can facilitate procedures conducted in challenging anatomical spaces, and in some cases can offer an even less invasive approach, resulting in fewer complications, shorter hospital stays and less postoperative pain.

My colleagues and I appreciate the privilege of working with you to provide exceptional patient care.

Sincerely,

John Paul Roberts, MD
Professor and Interim Chair, Department of Surgery
Endowed Chair in Abdominal Transplantation

ROBOTIC SURGERY

Robotic surgery is one of the next frontiers of minimally invasive surgery. Similar to traditional laparoscopy, surgeons make small incisions through which they insert trocars, which provide access for miniature, robot-controlled instruments and a camera. While assistants remain at the patient's bedside, the surgeon moves to a nearby console to manipulate the instruments and camera remotely. UCSF Medical Center at Mission Bay and Parnassus now offer robotic surgery, which can provide superior access and facilitate faster recovery in many cases.

Colorectal Surgery

"Our entire group is well versed in performing operations laparoscopically," said colorectal surgeon Ankit Sarin, MD, MHA. "While the patient experience is similar whether they undergo a laparoscopic or robotic approach, robotic surgery can offer a distinct advantage in cases involving the pelvis." This anatomy presents specific challenges to which the robot is especially well suited, including limited visualization, narrow working space and challenging angles from operating in the body's midline.

Since 2012, UCSF Medical Center has used the robot to treat several colorectal conditions, including:

- **Rectal cancer:** To resect rectal tumors, surgeons may perform low anterior resection, removing the rectum and connecting the colon directly to the anus, or abdominoperineal resection, removing the entire rectum and creating a colostomy.
- **Inflammatory bowel disease involving the pelvis:** Removing the rectum for ulcerative colitis or Crohn's disease can also be done robotically.
- **Rectal prolapse:** Surgeons perform rectopexy, mobilizing the entire rectum and securing it to the sacral bone to prevent rectal prolapse.



Ankit Sarin, MD, MHA



Johannes Kratz, MD



David Jablons, MD

- **Sigmoid procedures:** The robot can be useful for procedures occurring close to the rectum, such as surgical treatment of diverticulitis or cancer of the sigmoid.

"With the robot, we get a three-dimensional picture, instruments that allow articulation and rotational ability within the abdominal cavity – rather than just the up-and-down motion of laparoscopic instruments – and the robot never tires of retracting tissue or holding the camera steady," said Sarin.

Thoracic Surgery

Thoracic surgeons use video-assisted thoracoscopic surgery (VATS) to perform some procedures through minimally invasive approaches, but many surgeries benefit from an open approach due to technical complexity and the risk of operating near the heart. UCSF Medical Center recently acquired the Intuitive Surgical da Vinci Xi robot, which now allows some thoracic procedures to be performed minimally invasively.

"Robotic surgery offers several advantages over VATS, and allows us to do more complex operations with greater ease and accessibility in the chest," said cardiothoracic surgery fellow Johannes Kratz, MD, who is completing his training as an American Association for Thoracic Surgery Graham Foundation Intuitive Surgical Robotics Fellow. "Compared with open surgery, minimally invasive approaches result in less postoperative pain, fewer days in the intensive care unit and hospital, and fewer days with chest tubes."

Kratz and David Jablons, MD, chief of the section of General Thoracic Surgery, are experienced in robotic applications for thoracic surgery, including:

- **Lobectomy:** Surgeons create several small ports in the chest, separate the lobe from the rest of the lung, and slightly extend one port incision at the end of the operation to allow removal of the lobe and tumor. This eliminates the need for a rib-spreading thoracotomy, which can contribute to postoperative pain.
- **Esophagectomy:** This is typically done jointly with general surgeon Stanley Rogers, MD, who uses a laparoscopic approach through the abdomen to mobilize the esophagus from the stomach. Thoracic surgeons now use a robot-assisted minimally invasive approach in the chest to complete the operation.
- **Thymectomy:** The robot is well suited to the tight confines of the thymus, which is located between the heart and the sternum, and enables easier removal of the thymus without requiring a sternal split to access it.

"We're just in the beginning era of computer-assisted minimally invasive surgery," said Kratz. "Significant advances are in the pipeline, including instruments with haptic feedback and multiple instruments that use a single port and branch out within the chest or belly. UCSF Medical Center is poised to become the leading robotic thoracic center in Northern California, and the best is yet to come."

CONSULTATIONS AND REFERRALS

To refer a colorectal patient, call 415-885-3798 or visit colorectal.surgery.ucsf.edu. To refer a thoracic patient, call 415-885-3882 or visit thoracic.surgery.ucsf.edu.





Stanley J. Rogers, MD



Jonathan Carter, MD



Carter Lebares, MD

CONTINUED FROM FRONT COVER

surgeons usually correct these themselves rather than referring patients to a gastroenterologist.

“The new horizon for bariatric surgery is performing gastric bypass and sleeve gastrectomy for metabolic disease,” said Carter. “The American Diabetes Association and 45 other professional societies recently included bariatric surgery as a first-line treatment alternative for type 2 diabetics. We now have high-quality data that a gastric bypass will induce complete reversal of adult-onset diabetes in about 80 percent of patients. After five years, about 60 percent have lasting remission. That means no medications or insulin, and normal fasting blood glucose and HbA1c.”

Two of the most commonly performed bariatric procedures are the following:

■ **Sleeve gastrectomy:** This investigational procedure is now the most popular bariatric surgery for weight loss in the United States, surpassing gastric bypass. UCSF Medical Center usually performs this procedure laparoscopically, even in patients with prior abdominal surgeries. The surgeon makes several small abdominal incisions, removes about 70 percent of the stomach and uses a surgical stapler to create a banana-shaped pouch. The new stomach produces a feeling of fullness after a small meal.

“Because sleeve gastrectomy does not touch the small intestines, it may be a better option than gastric bypass if the patient has a hernia, inflammatory bowel disease or adhesions from prior surgeries,” said Carter. Patients achieve significant

weight loss, although slightly less than with gastric bypass.

“Because sleeve gastrectomy is so new, we know that it’s a safe procedure in the short term and that most patients sustain weight loss in the two- to five-year time frame,” said Carter. “We don’t yet have 10- or 20-year data, but performing a sleeve gastrectomy is clearly better than doing nothing, and can be a good alternative for many patients.”

■ **Gastric bypass:** This laparoscopic procedure creates a very small stomach pouch from the top portion of the stomach, bypassing most of the stomach and the duodenum by attaching the pouch directly to the small intestine. Gastric bypass creates both a restrictive component – the small stomach pouch – and a malabsorptive component, since fat absorption is substantially reduced through bypassing the duodenum.

“Gastric bypass can be the better choice for patients with higher BMI [body mass index] or diabetes,” said Carter. “Because food no longer goes through the duodenum, the procedure has a potent antidiabetes effect that is independent of weight loss and likely associated with an endocrine hormone effect which is not yet fully defined.” Because the procedure separates the stomach pouch from the acid-producing portion of the stomach, gastric bypass can also improve gastroesophageal reflux disease (GERD).

Because of its multidisciplinary approach, UCSF Medical Center is able to offer bariatric surgery to

pre- and post-transplant patients, even to those with diabetes or end-stage liver or kidney dysfunction. The surgery can be lifesaving for pretransplant patients, helping those with a high BMI or diabetes achieve sufficient weight loss and improvement of metabolic disease to qualify for organ transplant. The expert team can also safely offer bariatric surgery to post-transplant patients, even though they have abdominal adhesions from transplant surgery and are on immunosuppressants – increasing the need to avoid staple line leaks and other complications that could lead to infection.

“It’s not the surgeon alone,” said Lin. “We have the equipment, facilities and colleagues from other specialties who help us care for these complex patients after surgery.”

“Most patients who are 100 pounds overweight have no control over their body weight, and are well beyond anything that diet and exercise can do for them,” said Carter. “Their physiology is fundamentally different such that they cannot lose weight. It’s tremendously satisfying to perform a two- to three-hour intervention and see someone’s life transformed. They lose 100 pounds, their diabetes and sleep apnea go away, their blood pressure gets better, and their joints feel better. They’re virtually a new person.”

Surgical Endoscopy

One of the latest advances in minimally invasive surgery is surgical endoscopy, also known as interventional endoscopy. “This approach combines foregut surgery with the endoscopic approach,” said gastrointestinal surgeon Carter Lebares, MD. She recently completed advanced fellowship training in surgical endoscopy at IRCAD (Institut de recherche contre les cancers de l’appareil digestif, or Research Institute Against Digestive Cancer) in Strasbourg, France, a world leader in traditional minimally invasive surgery and surgical



endoscopy. “Rather than entering through the abdominal wall with cameras and small instruments, we pass the endoscope through the mouth to approach the esophagus and stomach from the inside,” said Lebares. “There are a lot of possibilities with this technology: Some are still experimental, others are under clinical investigation, and some are becoming standard practice.”

“As our general surgeons have become minimally invasive, we’ve become attracted to endoscopic approaches, and have teamed up with Dr. John Cello, our gastroenterology colleague,” said Rogers. “Surgical endoscopy is more than just putting in an endoscope and taking off a polyp. We now do maximally invasive endoscopic procedures as part of our minimally invasive practice, such as performing extensive resections of intraluminal growth, and endoscopic approaches to bariatric surgery.”

Some of the most recent applications of surgical endoscopy include:

- **Bariatric surgery and repair:** Lin and his colleagues lead a clinical trial of endoscopic gastric bypass revision for patients who have already undergone gastric bypass but regained weight or did not lose as much weight as intended. Lin uses the Apollo Endosurgery OverStitch endoscopic suturing system to decrease the size of the stoma and tighten up the

gastric pouch endoscopically, without needing to make abdominal incisions. “Early results are promising, but this is still an ongoing trial,” said Lin.

He and his team are currently recruiting patients for another trial to perform endoscopic gastropasty, which allows him to use the same endosuturing technology on a native stomach to perform the equivalent of a sleeve gastrectomy. “It’s incisionless, so theoretically there should be decreased levels of pain compared to laparoscopic approaches,” said Lin. “We’re always trying to find new, less invasive ways to help people lose weight.”

- **Endoscopic stents:** One of the main complications of bariatric surgery is a staple line leak, which occurs when gastric juices seep through an incompletely healed area of the foregut that was originally closed using a stapler. “There is a small number of such leaks from procedures such as sleeve gastrectomy, but when they occur, the outcomes can be quite serious,” said Lebares. “Patients can end up with perigastric abscesses or fistulas protruding through their skin, and frequently present with sepsis.”

Sometimes patients receive percutaneous drains, which allow their abscesses to slowly heal over a period of days or weeks. However, if the tube is dislodged or pus does not

drain completely, patients may require an additional surgery to repair the complication.

UCSF Medical Center offers an advanced approach: the endoscopic deployment of stents that function as a radial bandage, allowing pus to drain endoluminally into the digestive tract. “Eventually, the stent is pushed by the healing tissue into the esophagus or stomach, and the patient passes out the stent, or we retrieve it endoscopically,” said Lebares. “Endoscopic stents can save patients from having to undergo yet another surgery, and if we catch them before they become too sick, they can recover at home.”

- **Esophageal motor studies:**

Gastroenterologist John Cello, MD, frequently partners with UCSF gastrointestinal surgeons to enable advanced surgical endoscopic techniques. As director of the UCSF Gastrointestinal Motility and Secretion Center, he also interprets sophisticated advanced esophageal motor studies, which use high-resolution solid-state manometry to measure the function of the upper and lower esophageal sphincters as well as esophageal motility. These studies are performed by advancing a catheter with 30 sensors one centimeter apart through the nostrils into the stomach. With the catheter in place, the patient swallows 10 sips of water while we measure esophageal contraction.

“Thus, a patient might have been referred for dysphagia, but the motility study clearly shows good contraction of the body of the esophagus with a very low-pressure sphincter at the end of the esophagus,” said Cello. “That tells me that the patient would be a good candidate for minimally invasive anti-reflux surgery, and the dysphagia reported by the patient is actually a reflex hypertensive response of the upper sphincter to distal esophageal reflux.”

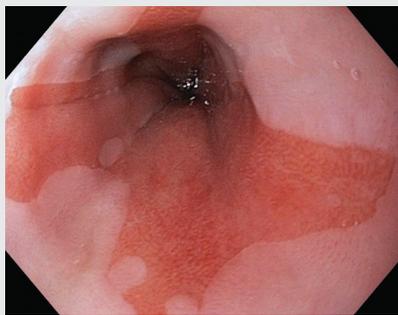


This precise diagnosis allows the team to tailor a treatment plan for each patient, ensuring that procedures are matched to the anatomical defects observed on the manometry studies.

Cello also works closely with the Lung Transplant Program to determine whether pre- and post-transplant patients have silent reflux that damages the lungs through aspiration of gastric contents. "If you transplant donor lungs into patients and they continue to have esophageal reflux, they could destroy their new lungs within a short period of time," said Cello. Such patients should be treated with a minimally invasive anti-reflux surgery such as fundoplication to prevent such complications. The precise diagnosis would require manometry and pH studies of the esophagus prior to surgical decision making.

- **Barrett's esophagus:** Some patients with GERD develop Barrett's esophagus, a premalignant condition in which esophageal squamous cells in the lining of the esophagus are replaced by metaplastic cells that are similar to the lining of the stomach. "Cancer that arises from Barrett's now comprises over 50 percent of esophageal cancers," said Cello.

He and his colleagues identify patients with Barrett's esophagus by performing endoscopic biopsy, then performing manometry and acid and pH studies. "If a patient has reflux and low pressure in the lower esophageal sphincter, we prevent additional injury by performing a minimally invasive anti-reflux surgery, and then we cauterize the Barrett's," said Cello. He uses radiofrequency ablation or argon beam plasma coagulation to remove abnormal cells, allowing normal mucosal cells to replace the Barrett's cells during the healing process. Cello and gastrointestinal



Barrett's esophagus, endoscopic view

surgeons work together to complete both the anti-reflux surgery and cauterization during the same procedure. Cello, Lebares and Lin are all STAR (Skills Training Assessment Reinforcement) certified by the American Society for Gastrointestinal Endoscopy to perform radiofrequency ablation of Barrett's.

- **Endoscopic treatment of early gastroesophageal tumors:**

Traditionally, patients who develop early esophageal cancer undergo an esophagectomy. However, UCSF Medical Center is helping to study precision medicine approaches that may enable select patients to undergo less invasive interventions while maintaining favorable outcomes. "A lot of what has paved the way for this are the incredible optics we can get with an endoscope, which allow us to see what's going on in the esophagus, so we can better stage our treatment," said Lebares.

For example, patients with T1a esophageal cancer may be candidates for endoscopic submucosal dissection, which allows a gastrointestinal surgeon to enucleate an entire tumor while preserving the organ itself. Because the procedure is performed endoscopically, it is incisionless. "Patients may be able to keep their esophagus, with ongoing surveillance that involves same-day visits to their endoscopic surgeon," said Lebares. Although this alternative is still under study, early outcomes have been promising.

On the horizon, UCSF Medical Center hopes to develop other approaches for patients with more advanced esophageal cancer. For example, Lebares wants to study the use of intraoperative fluorescent dye markers to trace the path from tumor to surrounding lymph nodes to their draining nodes. By visualizing this lymphatic drainage map during surgery and removing every node that may have been affected, pathologists could study whether the cancer has spread widely, requiring an esophagectomy. However, if the most distal lymph nodes are cancer-free, the esophagus may be spared. Lebares hopes to enroll patients who are already scheduled to undergo an esophagectomy in an investigative study to measure how well the fluorescent markers can predict the actual spread of the disease.

Minimally Invasive Surgery for Esophageal Disorders

"In addition to our expertise in surgical endoscopy and laparoscopic approaches to bariatric surgery, our group is expert in the surgical treatment of foregut disease," said Rogers. Some of these highly specialized topics and procedures include:

- **Achalasia and reflux disease:**

Achalasia is a rare condition in which the lower esophageal sphincter (LES) is unable to relax normally, making it difficult for the esophagus to move food into the stomach. Esophageal motility is also abnormal. "Because this condition is rare, it is frequently misdiagnosed as acid reflux disease," said Carter. "It takes the average patient five years to receive the correct diagnosis."

Achalasia can be treated endoscopically with balloon dilation or Botox injection to widen the LES. However, this can create scarring around the esophagus, making subsequent interventions more difficult.



John Cello, MD



John Chamberlain, MD



Andrew Posselt, MD, PhD



Mary Ellen DiPaola, RD,
CDE, IBCLC



Matthew Lin, MD

In the 1990s, UCSF Medical Center pioneered some of the first laparoscopic approaches to treat this condition. Surgeons perform a myotomy to slit the lower esophageal sphincter, and then perform a fundoplication, wrapping the upper stomach around the LES. This reduces the risk of reflux, while allowing food to pass from the esophagus into the stomach.

“A common problem among patients treated elsewhere is an incomplete myotomy, where part of the patient’s lower esophageal sphincter has been left intact, resulting in residual achalasia,” said Rogers. He and his colleagues are highly skilled in correcting such problems.

At IRCAD, Lebares also was trained to perform peroral endoscopic myotomy (POEM), a purely endoscopic approach to achalasia, which can also be used for select patients presenting with esophageal pathology not amenable to the standard laparoscopic approach. POEM was introduced in Japan in 2008, and more than 1,000 safe and successful cases have been performed worldwide since. Recent studies suggest that the rate of clinical reflux following POEM is comparable to that following laparoscopic Heller myotomy with Dor fundoplication. To appropriate patients, we offer POEM as an alternative to the laparoscopic approach.

“Most surgeons might see one case of achalasia in their whole careers,” said Carter. “At UCSF, we typically do about 10 per year, and we have one of the largest series of achalasia patients in the world. People fly in from Europe and Asia to have their surgeries done here.”

■ **Paraesophageal hernia repair:** This condition occurs when the stomach and sometimes the colon, spleen or pancreas pass through the esophageal hiatus in the diaphragm and lodge in the upper chest. “Paraesophageal hernias usually occur due to age, weight gain or having a defect in the hiatus that gets larger over time,” said Rogers. Some patients may be asymptomatic for years. Advanced hernias can involve the entire stomach, which can twist on itself in a condition called volvulus. This is a life-threatening development and requires emergent treatment.



Gastric volvulus, endoscopic view

“For many years, the only way to approach paraesophageal hernia was through a major open surgery,” said Carter. “At UCSF, we usually perform the repair with a minimally invasive approach through the abdomen. Our fellowship-trained surgeons have the expertise to do this very delicate and tricky operation. Our patients typically return home in two days, morbidity is quite low, and mortality is essentially zero.”

Surgeons dissect the stomach from the mediastinal structures, careful to not injure the esophagus or vagus

nerves, then pull the stomach down from the chest and suture the hole in the diaphragm. Then they perform a fundoplication – wrapping the upper stomach around the esophagus and attaching that to the underside of the diaphragm to hold the abdominal organs in place and prevent hernia recurrence.

UCSF recently published a paper investigating the optimal timing for such intervention, and found that elective outcomes were far superior to emergent outcomes. “Because the expertise to fix these hernias isn’t generally available in the community, patients can develop a big problem by the time they arrive at UCSF,” said Carter. “Our recent research suggests that intervening earlier in the disease process could be beneficial for many patients.”

“We are all very experienced in dealing with both straightforward and complex problems,” said Rogers. “Each surgeon in our group is technically excellent and research-focused. It is part of our academic mission to develop and make available the most effective and state-of-the-art treatment options and techniques to provide the very best care for our patients.”

CONSULTATIONS AND REFERRALS

To refer a bariatric patient, call 415-353-2804 or visit bariatric.surgery.ucsf.edu. To refer a gastrointestinal patient, call 415-353-2161 or visit gi.surgery.ucsf.edu.



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The Transfer Center is staffed 24/7 to coordinate the transfer of patients to UCSF Medical Center. The center provides quick access to our doctors and other members of our team. We evaluate the needs of each patient to ensure that appropriate care is provided. The center can also facilitate your patient's return transfer.

Mark R. Laret, President and Chief Executive Officer, UCSF Health

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