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Single-Incision Laparoscopic Surgery

Presenting the New Revolution in Laparoscopic General and Weight-Loss Surgery.

By Sashi Ganta, MD, FACS, FRCS (Eng), FRC SI

During the past two decades, laparoscopic surgery has established its role in the field of surgery. Laparoscopy is the preferred approach today for many common general surgical procedures, which include cholecystectomy, appendectomy as well as weight-loss surgery procedures such as gastric bypass or Lap-Band® Adjustable Gastric Banding System placement. The advances in laparoscopic surgery lead to reduced pain and recovery time encouraging early return to work.

Laparoscopic surgery is undergoing another revolution, trying to eliminate the typical four or more incisions required. Therefore, surgeons hope to reduce pain further and hasten the recovery process. Two different approaches in this minimally invasive surgery revolution are SILS (or Single-Incision Laparoscopic Surgery) and NOTES (or natural orifice transluminal endoscopic surgery) with access via an existing orifice such as the mouth, colon or vagina. SILS has been evolving rapidly and the patients are embracing this technology because of improved cosmetic results with no visible scars as well as the possibility for faster recovery.

Traditional Laparoscopic Approach

Traditional laparoscopy involves making four or more incisions of 0.5 inches to 1.5 inches in length to perform the surgical procedure such as cholecystectomy, Lap-Band, gastric bypass or other laparoscopic surgery. One port is used for the video camera for visualization, one port for automatic retraction and one port for the assistant. Two other ports are used as the surgeon's operating ports. The majority of these procedures are completed on an outpatient basis with minimal pain and loss of work. However, this approach still leaves patients with four or five small but visible scars. Even though most patients are quite content with the small scars, surgeons would like to reduce – or eliminate – all scars, if at all possible.

NOTES

NOTES technology is currently used in animal labs and requires specialized instrumentation, which is unavailable at this time. The pros and cons of eliminating a few small incisions versus violating natural orifices with potential pathogens for infections and complications related to healing the opening in the stomach or vagina has not yet been established in the medical community.

SILS (Single-Incision Laparoscopic Surgery)

On the other hand, the SILS technique is accepted more readily than NOTES because it virtually eliminates all scars and does not violate any natural orifices with potential complications. SILS is an advanced approach in which the surgeon operates exclusively through a single-entry point, usually the umbilicus, instead of the typical five or more incisions. Currently, only a few surgeons across the country are using this technique for procedures such as gallbladder removal because it requires significant dexterity. Even fewer surgeons are using this technique for weight-loss surgery and placing the Lap-Band.

Lap-Band Placement Using the SILS Approach

The Lap-Band System is the first U.S Food and Drug Administration-approved adjustable gastric band for use in weight reduction. To date, this reversible, surgically implanted device has been successfully used in more than 300,000 procedures worldwide. The Lap-Band is considered safer and less invasive than gastric bypass, as it does not require stomach cutting, stapling or intestinal re-routing. It induces weight loss by reducing the stomach capacity and restricting the amount of food that can be consumed at one time. Patients gain the ability to control portion size and realize long-term weight loss.

With the traditional approach, surgeons typically use a five-incision laparoscopic technique. Four incisions are smaller than 0.5 inches and the incision for the port placement to access the band is approximately 1.5 inches. Once the abdominal cavity is entered, a tunnel is created behind the upper portion of the stomach immediately behind the GE junction. The band is passed through the tunnel and locked below the GE junction. The diameter of the band can be modified with a simple office procedure by injecting or removing saline from the access port that is implanted subcutaneously.

The handful of surgeons using the advanced SILS approach utilize a two-inch incision below the patient's left rib and a 0.25-inch incision in the sub xiphoid area for liver retraction. This technique eliminates three other incisions and is very well accepted by patients. However, this technique still leaves a visible scar in the left upper quadrant.

TUGB (Trans Umbilical Gastric Banding) with No Visible Scars

This new technique involves complete navigation and placement of the Lap-Band via the belly button, thus eliminating the need for special instruments. It also leaves no visible scars on the abdomen. TUGB for Lap-Band placement positions the scar within the umbilicus. Three trocars are placed in the umbilicus once the incision is made. A 0.25-inch sub xiphoid incision is made for the liver retractor. The single-incision Lap-Band surgery, whether umbilical or left upper quadrant approach, utilizes sutures and threads placed in strategic locations to achieve retraction – thus eliminating the need for assistants ports. (See Figure 1.) Once the band is placed and sutured into position, the access port is tunneled into the left upper quadrant area via the incision at the umbilicus – thus eliminating the need for a separate left upper quadrant incision to implant the port. (See Figure 2.) Therefore, this technique eliminates virtually all scarring. (See Figures 3 and 4.)

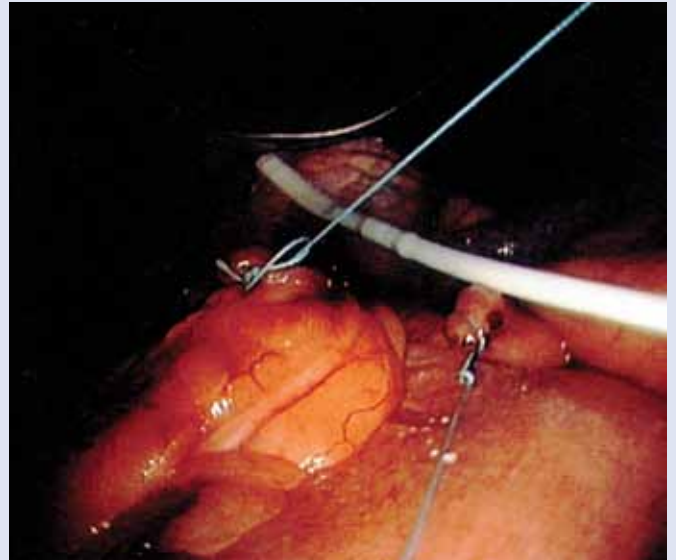


Figure 1. Sutures and pulleys placed in strategic location for retraction.



Figure 2. Access port positioned and sutured in the subcutaneous tunnel.



Figure 3. Patient scars immediately after the Lap-Band procedure via umbilicus (TUGB).



Figure 4. Patient scars 6 weeks after the Lap-Band procedure via umbilicus (TUGB).

Patient selection is an important determinant of the success of this approach. Typical patients chosen for this approach have a body mass index below 45; have had no previous history of upper abdominal surgery; and have a normally positioned umbilicus. Lack of extra-long instruments, appropriate trocars and other equipment limits the availability of this approach for patients meeting the above criteria at this time.

Conclusion

As technology evolves, the healthcare field is trying to develop new instruments for these new procedures. The long-term clinical application and usefulness of these new approaches, though promising, needs to be evaluated through the course of appropriate clinical trials. TUGB may find its application in pediatric obesity management and help the patients from a psychological perspective by avoiding the stigma related to the weight loss surgery scars.

Dr. Sashi Ganta, a Board-Certified bariatric surgeon practicing in Austin, is believed to have performed Texas' first trans-umbilical Lap-Band weight loss surgery with no visible scar on Sept. 9, 2008, at Seton Northwest Hospital. One of the most experienced bariatric surgeons in Austin, Dr. Ganta is one of the first surgeons in the United States to use this almost scar-less approach for Lap-Band placement.



Dr. Ganta received fellowship training in Advanced Laparoscopic Surgery at Yale University School of Medicine in New Haven, Conn., and completed his surgery residency training at Sound Shore Medical Center in New York. He has studied medicine in the United States, India and United Kingdom.

For more information about the single-incision scar-less approaches for general and weight-loss surgeries, contact Dr. Ganta at (866) 994-2425 or visit www.austinbariatric.com.

Pediatric Rheumatologists at Dell Children's Breakthrough a Difficult Diagnosis

By Lisa K. Petiniot, MD

When I first met Hailey, she was six years old and had been suffering from lower extremity pain for almost a year. Her pain began in her right knee and, in addition to bothering her during the day, it would wake her at night. After a one-month trial of Nonsteroidal Antiinflammatory Drugs without significant improvement, Hailey was referred to orthopedics. There, she was diagnosed with flat feet and given shoe inserts.

Hailey's pain continued, though, and, shortly thereafter, she developed an abnormal gait that her mother described as a "lurching." She saw a chiropractor who treated her for three months for a misaligned hip. When her gait didn't improve, he sent her back to orthopedics. X-rays of her lower extremities showed osteopenia and raised the diagnostic possibility of juvenile rheumatoid arthritis. It was then recommended she see a pediatric rheumatologist.

By the time I saw Hailey, her pain had spread to her hips and lower back despite regular NSAID use. While she would have "good" days, the pain never disappeared completely. It often woke her in the middle of the night, when her parents would find her screaming in pain. She continued to have an abnormal gait that was worsening and she was having difficulty running.

On physical exam, Hailey had pain in her low back and knee during movement of her right hip. Her gait was particularly abnormal. She would hesitate to move her right foot forward, but when she did, she would lean her upper body backward and swing her right leg forward with difficulty. She was unable to run. Her right quadriceps and calf muscles were mildly atrophied. Both her knees and her ankles were held in a valgus position – it was unclear whether this was a result or cause of her pain. Her laboratory evaluation was unremarkable and included a normal ESR and negative ANA.

Hailey's diagnosis was not immediately clear. She did not have swelling, warmth or decreased range of motion of any of her joints, which made the diagnosis of arthritis unlikely. However, she did have significant pain that seemed to originate from her right hip. An MRI was obtained, which revealed multiple abnormalities including a small effusion of the right SI joint and increased T2 signal in the right ilium, the right sacrum and the left femur. (See Figure 1.)

With an abnormal bone marrow signal in multiple locations, the primary diagnosis to rule out was malignancy. She was referred to hematology/oncology for further work up. Her bone marrow biopsy was negative. Her bone scan was consistent with the MRI findings; no new areas of abnormal uptake were found. Her CT scan proved the most enlightening and showed periosteal reaction involving the right ilium and sclerotic changes of the sacrum adjacent to the LS junction. With multiple bony lesions in various stages of healing on the CT scan, the most likely diagnosis now became chronic recurrent multifocal osteomyelitis. A bone biopsy was being planned to confirm



Figure 1. MRI of bilateral hips and pelvis. This cut demonstrates increased T2 weighted signal in the right ilium and left femur.

the diagnosis when Hailey developed a non-pruritic, scaly, erythematous and pustular rash on her right hand known as palmar-plantar pustulosis – a rash seen in many patients with CRMO. (See Figure 2.)

Hailey was started on oral prednisone with a good response; both her pain and rash improved. As her steroids were slowly weaned, though, her symptoms returned. Subcutaneous methotrexate was successfully initiated as a steroid-sparing agent. As a result, she was able to wean off prednisone completely and has remained in remission on methotrexate for more than six months.

CRMO is a rare disorder that primarily affects children and adolescents. As the name suggests, it is characterized by recurrent inflammatory bone lesions that often present as intermittent episodes of localized pain and swelling. Multiple sites are typically affected, either initially or over the course of the disease. The bones most commonly involved are the long tubular bones and the clavicles. The episodes of bone pain may or may not be accompanied by systemic symptoms such as fever, fatigue or malaise; likewise, inflammatory markers such as the sedimentation rate or CRP are not necessarily elevated.

Besides inflammatory bone lesions, children with CRMO may also have arthritis, often in joints adjacent to the bone lesions. Dermatological manifestations are also relatively common. Palmar-plantar pustulosis is the most common skin rash, but psoriasis, acne, Sweet's syndrome and pyoderma gangrenosum have also been reported. Interestingly, the pattern of arthritis and the types of skin disorders observed often fall within the continuum of spondyloarthropathic disease, suggesting these diseases may be related. Indeed, multiple-case series have reported diagnoses of enthesitis-related arthritis, inflammatory bowel disease or psoriasis in patients also diagnosed with CRMO.

The first diagnostic step for a patient with possible CRMO is obtaining plain films of the affected area. Early in the clinical course, CRMO lesions typically appear as osteolytic metaphyseal lesions. With time, these lesions progress to have a sclerotic rim and eventually become purely sclerotic. During this course, variable levels of periosteal reaction can also be seen. If plain films are consistent with a diagnosis of CRMO, a bone scan is recommended to identify any additional (possibly asymptomatic) lesions. Upon identification of new lesions, radiographs of those areas should be obtained. MRI may be needed to further assess these areas if radiographs are negative.

In a patient with intermittent and recurrent episodes of bony pain, the radiographic finding of multiple bony lesions in variable stages of healing is consistent with the diagnosis of CRMO. However, these findings are relatively nonspecific and a differential diagnosis including infectious osteomyelitis, bone tumors, leukemia/lymphoma and langerhan cell granulomatosis should be considered. For this reason, a bone biopsy/culture is usually required to confirm diagnosis. Bone biopsy findings in patients with CRMO are also non-specific (acute/subacute/chronic inflammatory infiltrate); it is the lack of more specific findings expected with other disorders that is helpful in confirming diagnosis.

Most patients with CRMO respond to NSAIDs; this therapy is often used successfully for the initial episode and for relapses. For patients not responsive to NSAIDs, a course of prednisone is usually effective. In the rare patient where steroids are unable to be weaned, methotrexate, sulfasalazine, bisphosphonates or TNF inhibitors may be considered as steroid-sparing agents. However, due to the fact that CRMO is a rare disease with few patients not responding to NSAID therapy, the support for any of these agents is merely anecdotal.

Overall, CRMO is a rare disease that can be difficult to diagnose due to non-specific clinical, radiological and histopathological findings. For this reason, diagnosis is often delayed. Keeping a high index of suspicion



Figure 2. Hailey's rash began as a small spot that grew to this size over the course of two months. It eventually grew to cover her whole palm and her left hand became affected as well. She did not develop rash on her feet. Although difficult to see here, besides erythema and scaling, she had two to three pustules in the center of the lesion.

Seton Medical Center Hays

Building a First-Rate Medical Team

Located in the scenic hill country just 10 miles south of Austin in Kyle, Seton Medical Center Hays will be the largest medical facility in Hays County, offering a full range of medical, diagnostic and maternity services. Scheduled to open Nov. 1, 2009, the facility is strategically positioned in an area of aggressive commercial and residential growth (currently, Kyle is the fifth fastest-growing city in Texas according to the U.S. Census Bureau).

Physician Opportunities in Central Texas

The new medical campus will offer numerous opportunities for both primary care physicians and a variety of specialists:

- Primary Care
 - Family Practice
 - Internal Medicine
 - OB/Gyn
 - Pediatrics
- Medical Specialists
 - Cardiology



- Endocrinology
- Gastroenterology
- Hematology/Oncology
- Infectious Disease
- Nephrology
- Neurology
- Pulmonary Medicine
- Surgical Specialists
 - CT Surgery
 - ENT
 - General Surgery
 - Neurosurgery
 - Ophthalmology
 - Orthopedics
 - Urology
- Hospital Specialists
 - Anesthesiology
 - Pathology
 - Emergency Medicine
 - Neonatology
 - Radiology

For information about physician opportunities with Seton Medical Center Hays, please contact Patrick Garcia, MD, vice president of Medical Affairs, (512) 324-5057, pgarcia@seton.org or Delia Presley, physician relations coordinator, (512) 324-5066, dpresley@seton.org.

for patients who have chronic, localized pain as well as for patients initially diagnosed with bacterial osteomyelitis that do not respond to antibiotics (or who don't have the fever, high sediment rate or high CRP characteristic of bacterial osteomyelitis) will help shorten the time to diagnosis. Once patients are diagnosed and therapy is begun, children with CRMO generally have a good prognosis and most will "outgrow" the disease with time. However, in some cases, long-term sequelae may be observed. Most of these sequelae relate to bony deformities caused by inflammation in a non-mature skeleton. Such sequelae include leg-length discrepancy, valgus deformity of the knee or ankle and long-term clavicle swelling.

Dr. Lisa K. Petiniot

recently joined Dr. Ruy Carrasco as the second full-time pediatric rheumatologist at 'Specially for Children and Dell Children's Medical Center of Central Texas in Austin. To ask a pediatric rheumatology question or make a referral, please call (512) 628-1880 or visit the 'Specially for Children Web site at www.sfcaustin.com.

