

Hernia Repair

VENTRAL



AMERICAN COLLEGE OF SURGEONS

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Patient Education

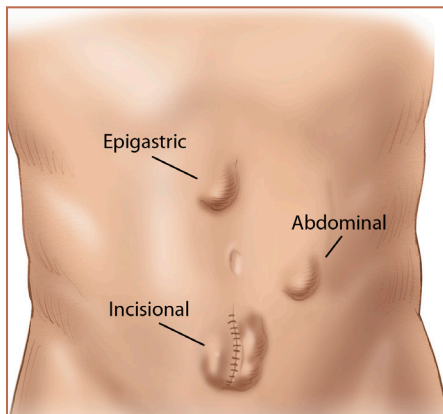
This educational information is to help you be better informed about your operation and empower you with the skills and knowledge needed to actively participate in your care.

Keeping You Informed

Information that will help you further understand your operation and your role in healing.

Education is provided on:

Hernia Repair Overview	1
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Common Sites for Ventral Hernia

The Condition

A ventral hernia is a bulge through an opening in the muscles on the abdomen. The hernia can occur at a past incision site (incisional), above the navel (epigastric), or other weak muscle sites (primary abdominal).

Common Symptoms

- Visible bulge on the abdomen, especially with coughing or straining
- Pain or pressure at the hernia site

Treatment Options

Surgical Procedure

Open hernia repair—An incision is made near the site and the hernia is repaired with mesh or by suturing (sewing) the muscle closed.

Laparoscopic hernia repair—The hernia is repaired by mesh or sutures inserted through instruments placed into small incisions in the abdomen.

Nonsurgical

Watchful waiting is an option for adults with hernias that are reducible and not uncomfortable.¹⁻³

Benefits and Risks of Your Operation

Benefits—An operation is the only way to repair a hernia. You can return to your normal activities and, in most cases, will not have further discomfort.

Risks of not having an operation—The size of your hernia and the pain it causes can increase. If your intestine becomes trapped in the hernia pouch you will have sudden pain and vomiting and require an immediate operation.

If you decide to have the operation, possible risks include: Return of the hernia; infection; injury to the bladder, blood vessels, or intestines; and continued pain at the hernia site.

Expectations

Before your operation—Evaluation may include blood work, urinalysis, and ultrasound. Your surgeon and anesthesia provider will review your health history, home medications, and pain control options.

The day of your operation—You will not eat or drink for 6 hours before the operation. Most often you will take your home medication with a sip of water. You will need someone to drive you home.

Your recovery—You may go home within 24 hours for small hernia procedures but may need to stay in the hospital longer for more complex repairs. The average is 2 days for laparoscopic procedures and 4 days for open procedures.^{1,14}

Call your surgeon if you have severe pain, stomach cramping, chills with a high fever (higher than 101°F), odor or increased drainage from your incision, or no bowel movement for 3 days.

This first page is an overview. For more detailed information, review the entire document.

The Condition, Signs and Symptoms, and Diagnostic Tests

Keeping You Informed

Abdominal Wall Hernias

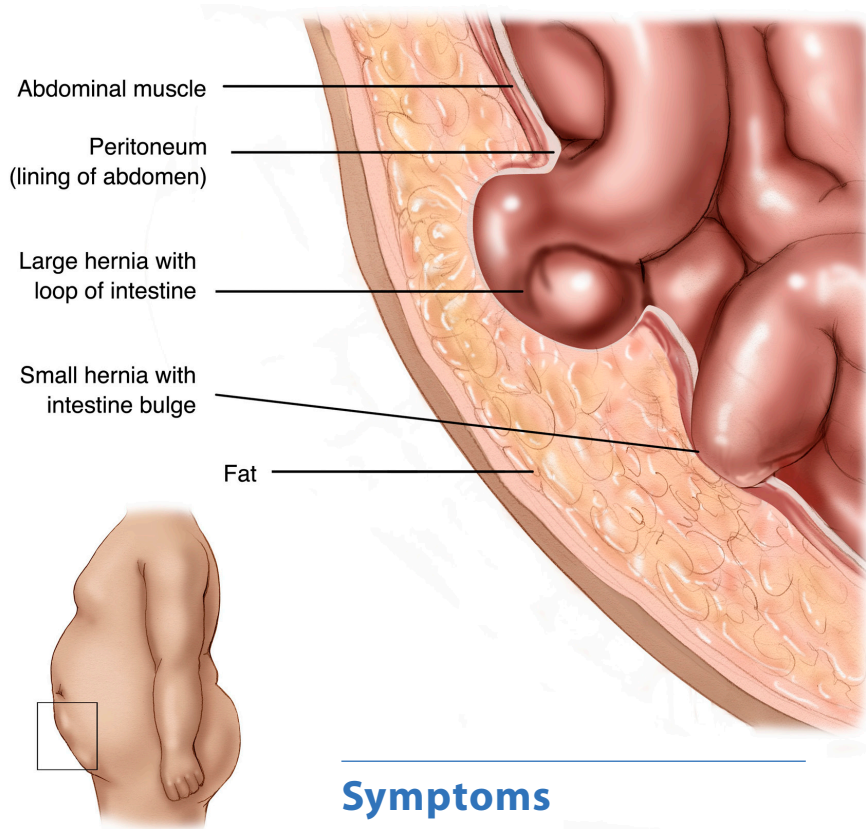
They are also called ventral hernias. They can occur:

- At birth (congenital)
- Over time due to muscle weakness
- At a past incision site

Incisional Hernias²⁻⁴

Incisional hernias can develop at the laparoscopic port site in 5 of 1,000 patients and in up to 150 of 1,000 patients who have had a prior open abdominal incision. Most appear in the first 5 years after an operation. Risk factors that can contribute to incisional hernia formation include:

- Obesity, which creates tension and pressure on abdominal muscles
- Large abdominal incisions
- Postoperative infection (note that smoking is related to higher infection rates)
- Weakness of the connective tissue (the material between the cells of the body that gives it strength, sometimes called the cellular glue)
- Diabetes mellitus
- Pulmonary disease



The Condition

The Hernia

A **ventral hernia** is a bulge through an opening in the muscles on the abdomen. If the hernia reduces in size when a person is lying flat or in response to manual pressure, it is **reducible**. If it cannot be reduced, it is **irreducible or incarcerated**, and a portion of the intestine may be bulging through the hernia sac. A hernia is **strangulated** if the intestine is trapped in the hernia pouch and the blood supply to the intestine is decreased. This is a medical emergency.²

A **primary abdominal hernia** occurs spontaneously in the abdomen.

An **incisional hernia** bulges through a past incision site. This issue can be the result of scar tissue or weak muscles around the site.

An **epigastric hernia** bulges midline above the umbilicus.

Herniorraphy is the surgical repair of a hernia.

Hernioplasty is the surgical repair of a hernia using mesh.

Symptoms

The most common symptoms of a hernia are:

- Visible bulge in the abdominal wall, especially with coughing or straining.
- Hernia site pain or pressure.

Sharp abdominal pain and vomiting may mean that the intestine has slipped through the hernia sac and is strangulated.

This is a medical emergency and immediate treatment is needed.

Common Tests

History and Physical

The site is checked for a bulge.

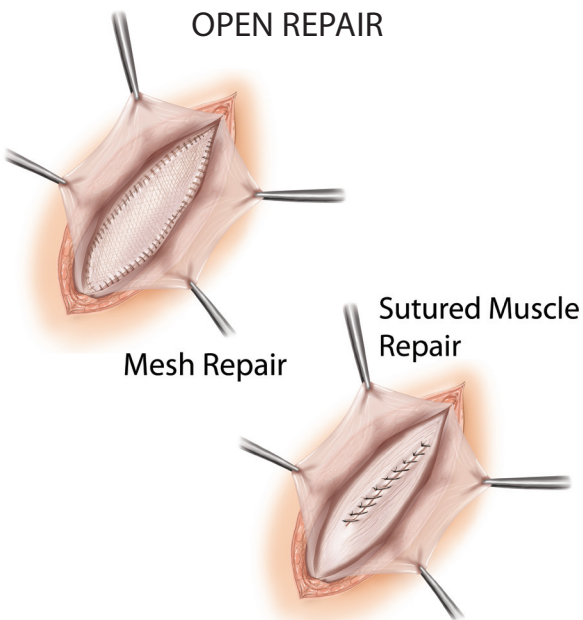
Additional Tests (see Glossary)

Other tests may include:

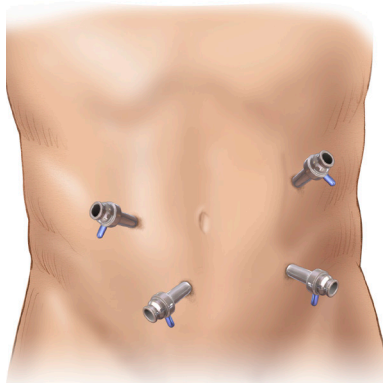
- Ultrasound
- Computerized tomography (CT) scan
- Blood tests
- Urinalysis
- Electrocardiogram (EKG), but only if high risk of heart problems

Surgical and Nonsurgical Treatment

OPEN REPAIR

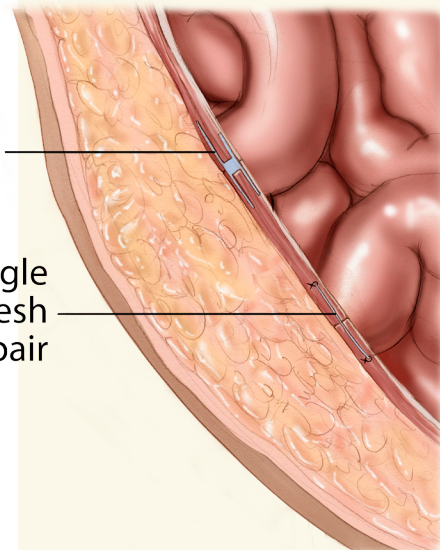


LAPAROSCOPIC REPAIR



Double mesh repair

Single mesh repair



Surgical Treatment

The type of operation depends on the hernia size, location, and if it is a repeat hernia. Your health, age, anesthesia risk, and the surgeon's expertise are also important. An operation is the only treatment for a hernia repair.

Your hernia can be repaired by:

- Suturing the muscle around the hernia site closed.
- Inserting a piece of mesh to reinforce the closed hernia site. Mesh is attached with sutures, tacks, or staples into the stronger tissue surrounding the hernia site. The mesh extends 3 to 4 centimeters larger than the size of the hernia.
- Use of a muscle or tissue flap directed over the hernia site.

Open Hernia Repair

The surgeon makes an incision near the hernia site. The bulging tissue is gently pushed back into the abdomen. Sutures, mesh, or a tissue flap is used to close the muscle. With complex or large hernias, small drains may be placed going from inside to the outside of the abdomen. The site is closed using sutures, staples, or surgical glue.

Laparoscopic Hernia Repair

The surgeon will make several small punctures or incisions in the abdomen. Ports or trocars (hollow tubes) are inserted into the openings. Surgical tools are placed into the ports. The abdomen is inflated with carbon dioxide gas to make it easier for the surgeon to see the hernia. Mesh is sutured, stapled, or clipped to the muscle around the hernia site. The hernia site can also be sewn directly together.

Nonsurgical Treatment

Watchful waiting is an option for a hernia without symptoms. All patients should get treatment if they have sudden, sharp abdominal pain and vomiting. These symptoms can indicate an incarcerated hernia and bowel obstruction.

Trusses or belts made to apply pressure on a hernia require correct fitting. When used correctly, part or complete control of the hernia was achieved in 31% of patients and 64% found the truss to be uncomfortable.⁵

Keeping You Informed

Open versus Laparoscopic Incisional Repair

There is no one type of repair that is good for all ventral hernias. Laparoscopic repairs are associated with lower infection rates and shorter hospital stays. There is no difference in recurrence rates, long-term pain, or quality of life. For patients with strangulated intestines and infections, the laparoscopic approach may not be an option.^{1,6,14}

Will My Hernia Come Back?

Mesh reduces the risk that the hernia will return again. Mesh can be tacked, stapled, or sutured. All of these techniques have the same recurrence rate.⁷

Morbidly obese patients are prone to ventral hernias and can sometimes have the option of repair during gastric bypass surgery.

Risks of this Procedure

The Risk	What Can Happen	Keeping You Informed
Recurrence	Based on studies from the past 10 years, a hernia can come back for 41 of 1,000 mesh repair patients and 430 of 1,000 open, nonmesh repair patients. ^{1,6}	Recurrence is higher for a complex or infected hernia and previous hernia repair or abdominal surgery.
Seroma	On average, a seroma occurs in 137 of 1,000 patients for laparoscopic repair and 108 of 1,000 patients for open repair. Seromas are rare in infants/children. ^{1,6}	A seroma usually goes away on its own within 4 to 6 weeks. Wearing a binder around the abdomen may help decrease seroma formation. Rarely, the fluid is removed with a needle. ⁹
Intestines/ bowel injury or temporary decrease in motility	On average, bowel injury occurs in 26 of 1,000 patients for laparoscopic and 7 of 1,000 patients for open mesh repairs. Ileus or the temporary stop of movement of fluid or food through the bowel can occur in 22 of 1,000 repairs. ^{1,6,10}	If injury occurs, repair is done at that time. If there is bowel leakage into the abdominal cavity, the hernia repair will be done after the bowel injury heals. If fluid is not moving through the bowel, a nasogastric tube may be placed to keep the stomach empty.
Urinary retention	Trouble urinating occurs in 210 of 1,000 patients following removal of a urinary catheter and 48 of 1,000 patients when no catheter was placed. ^{11,12}	General or regional anesthesia, older age, an enlarged prostate, and diabetes are associated with urinary retention. A temporary urinary catheter may be inserted or medication may be given.
Wound infection	On average, an infection is reported in 2 of 1,000 laparoscopic repairs and 91 of 1,000 open mesh procedures. Pediatric infection is less than 1 of 1,000.	Antibiotics and drainage of the wound may be needed. If the infection continues, the mesh may have to be removed. Smoking can increase the infection rate.
Pain	Pain scores are similar for laparoscopic and open procedures. Continued pain is reported in 10 to 30 of 1,000 patients. ^{1,6,9}	A nonsteroidal anti-inflammatory medication can help with pain while the patient is at home. Medication may be injected into the site for long-term pain.
Hernia at port site	Hernia at the site where the laparoscopic instruments were inserted occurs in fewer than 4 of 1,000 adults and fewer than 1 of 1,000 children.	This risk is reduced with the use of smaller ports and instruments. The most common location is the umbilical port site. ³
Hematoma or bleeding into the abdomen	A hematoma (collection of blood at the wound site) is reported in 13 of 1,000 laparoscopic repairs and 53 of 1,000 open repairs. ^{1,6}	A blood transfusion may be needed. Repair of the bleeding site will be done.
Heart and breathing problems	Breathing problems/pneumonia are reported in 7 of 1,000 patients. Heart problems (chest pain/irregular heart rate) are reported in 4 of 1,000 patients. ¹⁰	Other health problems increase the risk for heart and breathing complications. Deep breathing, walking, and good oral care can decrease your risk of pneumonia.
Pediatric risks	Risks are rare and include hematoma and wound infection.	Complex abdominal wall defects are often not repaired until age 1 to 2 years. They are sometimes repaired in a series of operations.
Elderly risks	The length of hospital stay increases with older age.	Risks may be higher because of other diseases/health problems and may be related to the response to general anesthesia.
Obesity risks	Recurrence rates are higher and operating room time and length of stay are longer for obese patients.	Obesity increases the risk of infection and poor wound healing. Additional medical problems such as diabetes can also increase the risk of complications.
Death	Fewer than 1 in 1,000 patients die following a ventral hernia repair.	Perforated and large hernias and repair in patients with liver disease are at a higher risk of complications. Your surgical team is prepared for all emergency situations.

Expectations: Preparation for Your Operation

Preparing for Your Operation

Home Medication

Bring a list of all the medications and vitamins you are taking. Most often you will take your morning medication with a sip of water. If you are diabetic or taking blood thinners (Plavix, Coumadin, aspirin, nonsteroidal anti-inflammatory medication), your medication may have to be adjusted before your operation.

Home Preparation

The average length of stay is 1 to 2 days for laparoscopic repair and 3 to 4 days for an open procedure. Patients with a small hernia repair may go home the same day.

Anesthesia

Let your anesthesia provider know if you have allergies, neurologic disease (epilepsy, stroke), heart disease, stomach problems, lung disease (asthma, emphysema), endocrine disease (diabetes, thyroid conditions), loose teeth, or if you smoke, use alcohol or drugs, or take any herbs or vitamins.

If you have a history of nausea and vomiting with anesthesia, an anti-vomiting drug may be given.

About My Anesthesia

For laparoscopic and open repair, the most common option is general anesthesia.

The Day of Your Operation

Don't Eat or Drink

Not eating or drinking for at least 6 hours before the operation reduces your risk of complications from anesthesia.

What to Bring

- Insurance card and identification
- Advance directive
- List of medicines
- Loose-fitting, comfortable clothes
- Slip-on shoes that don't require you to bend over
- For children, their favorite toy or security blanket

Please leave jewelry and valuables at home.

What You Can Expect

An identification (ID) bracelet with your name and hospital/clinic number will be placed on your wrist. Your ID should be checked by all health team members before they provide any procedures or give you medication. If needed, you will also have an allergy alert bracelet.

An intravenous line (IV) will be started to give you fluids and medication.

For general anesthesia, a tube will be placed down your throat to help you breathe during the operation.

After your operation, you will be moved to a recovery room where your heart rate, breathing rate, oxygen saturation, blood pressure, and urine output will be closely watched.

Preventing Pneumonia

After your operation, moving around and taking deep breaths can help prevent complications such as blood clots, breathing problems, and pneumonia. Deep breathing can be done using an incentive spirometer or by taking 5 to 10 deep breaths and holding each breath for 3 to 5 seconds. Young children can do deep breathing by blowing bubbles.

Preventing Blood Clots

When you have an operation, you are at risk of getting blood clots because of not moving while under anesthesia. The longer and more complicated your operation, the greater the risk. This risk is decreased by taking a medication that thins your blood and by having support stockings or compression boots placed on your legs and walking 3 to 5 times per day.

Preventing Infection

Your surgical team will clip the hair near your surgical incision site. Do not shave the skin on your abdomen. Antibiotics are not routinely used for simple abdominal hernia repair. Be sure all visitors wash their hands.

Questions to Ask

About my home medications:

- What medications should I stop taking before my operation?
- Should I take any medicines on the day of my operation?

About my operation:

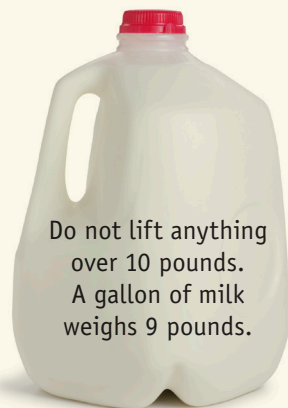
- What are the risks and side effects of anesthesia?
- What technique will be used to repair the hernia (laparoscopic or open; mesh or with sutures)?
- What are the risks of this procedure for me?
- Will you be performing the entire operation yourself?
- What level of pain should I expect and how will it be managed?
- How long will it be before I can return to my normal activities (work, driving, lifting)?

Your Recovery and Discharge

Keeping You Informed

High-Fiber Foods

Food high in fiber include beans, bran cereals and whole grain breads, peas, dried fruit (figs, apricots, and dates), raspberries, blackberries, strawberries, sweet corn, broccoli, baked potatoes with skin, plums, pears, apples, greens, and nuts.



Do not lift anything over 10 pounds. A gallon of milk weighs 9 pounds.

Your Recovery and Discharge

Thinking Clearly

If general anesthesia is given, it may cause you to feel different for 2 or 3 days. Do not drive, drink alcohol, or make any big decisions for at least 2 days.

Nutrition

- When you wake up from the anesthesia, you will be able to drink small amounts of liquid. If you do not feel sick, you can begin eating regular foods.
- Continue to drink about 8 to 10 glasses of liquid per day.
- Eat a high-fiber diet to decrease your risk of constipation.

Activity

- Slowly increase your activity. Be sure to get up and walk every hour or so to prevent blood clot formation.
- The average length of hospital stay is 2 days for laparoscopic repair and 4 days for open repair. The length of time to resume full activities of daily living is reported as 4 to 5 days.
- Do not lift items heavier than 10 pounds or participate in strenuous activity until advised by your surgeon. Lifting limitations may last for 6 months following a complex repair.^{1,6}

Work and Return to School

- You can go back to work when you feel well enough. The average time to return to work is 13 days for laparoscopic repair and 25 days for open repair.⁶

Wound Care

- Always wash your hands before and after touching near your incision site.
- Do not soak in a bathtub until your stitches, steri-strips, or staples are removed. You may take a shower after the second postoperative day unless you are told not to.

- Follow your surgeon's instructions on when to change your bandages.
- A small amount of drainage from the incision is normal. If the dressing is soaked with blood, call your surgeon.
- If you have steri-strips in place, they will fall off in 7 to 10 days.
- If you have a glue-like covering over the incision, allow the glue to flake off on its own.
- Avoid wearing tight or rough clothing. It may rub your incisions and make it harder for them to heal.
- Protect the new skin from the sun. The sun can burn and cause darker scarring.
- Your scar will heal in about 4 to 6 weeks and will become softer and continue to fade over the next year.

Pediatric Considerations—For infants, the hernia repair site may be covered with a waterproof dressing to protect the site from urine and stool.

Bowel Movements

Avoid straining with bowel movements by increasing the fiber in your diet with high-fiber foods or over-the-counter fiber medications such as Metamucil and Fibercon.

Pain

The amount of pain is different for each person. For adults, on average, narcotics were used for 3 days, and some patients needed no additional pain medication.⁸ You can use throat lozenges if you have sore throat pain from the tube placed in your throat during your anesthesia.

Home Medications

The new medicine you will need after your operation is for pain control.

When to Contact Your Surgeon

Contact your surgeon if you have:

- Pain that will not go away
- Pain that gets worse
- A fever higher than 101°F
- Vomiting
- Swelling, redness, bleeding, or bad-smelling drainage from your wound site
- Strong or continuous abdominal pain or swelling of your abdomen
- No bowel movement 2 to 3 days after the operation.

Pain Control

Everyone reacts to pain in a different way. A scale from 0 to 10 is used to measure pain. At a “0,” you do not feel any pain. A “10” is the worst pain you have ever felt. Following a laparoscopic procedure, pain is sometimes felt in the shoulder. This is due to the gas inserted into your abdomen during the procedure. Moving and walking helps to decrease the gas and the shoulder pain.

Extreme pain puts extra stress on your body at a time when your body needs to focus on healing. Do not wait until your pain has reached a “10” or is unbearable before telling your provider. It is much easier to control pain before it becomes severe.

Common Medicines to Control Pain

Narcotics or opioids are used for severe pain. Possible side effects of narcotics are sleepiness; lowered blood pressure, heart rate, and breathing rate; skin rash and itching; constipation; nausea; and difficulty urinating. Some examples of narcotics include morphine, oxycodone (Percocet/Percodan), and hydromorphone (Dilaudid). Medications can be given to control many of the side effects of narcotics.

Nonnarcotic Pain Medication

Most nonopioid analgesics are classified as nonsteroidal anti-inflammatory drugs (NSAIDs). They are used to treat mild pain and inflammation or combined with narcotics to treat severe pain. Possible side effects of NSAIDs are stomach upset, bleeding in the digestive tract, and fluid retention. These side effects usually are not seen with short-term use. An example of a NSAID is Ibuprofen.

Pain Control without Medicine

Distraction helps you focus on other activities instead of your pain. Music, games, or other engaging activities are especially helpful with children.

Splinting your stomach by placing a pillow over your abdomen with firm pressure before coughing or movement can help reduce the pain.

Guided imagery helps you direct and control your emotions. Close your eyes and gently inhale and exhale. Picture yourself in the center of somewhere beautiful. Feel the beauty surrounding you. Feel your emotions come back to your control. You should feel calmer.

Other Instructions:		
Follow-up Appointments		
Who	Date	Phone

Keeping You Informed

Pain after Ventral Hernia Repair

There was no difference in long-term pain or quality of life scores when comparing laparoscopic with open procedures. Pain that continued for more than 6 months is reported as 2.5% for laparoscopic procedures and 1.5% for open procedures. The cause of long-term pain will be assessed by your surgeon and is sometimes treated with local analgesia injections.⁷



Guided imagery



Splinting your stomach

More Information

For more information on tests and procedures, please go to the American College of Surgeons Patient Education website at www.facs.org/patienteducation/. For a complete review of hernia repair, consult *Selected Readings in General Surgery* "Hernia," Vol 37, No 8, at www.facs.org/SRGS/.

Glossary of Terms

Advance directives: Documents signed by a competent person giving direction to health care providers about treatment choices.

Blood tests: Tests usually include a Chem6 profile (sodium, potassium, chloride, carbon dioxide, blood urea nitrogen, and creatinine) and complete blood count (red blood cell and white blood cell count).

Computerized tomography (CT) scan: A diagnostic test using X ray and a computer to create a detailed, three-dimensional picture of your abdomen.

Electrocardiogram (ECG): Measures the rate and regularity of heartbeats, the size of the heart chambers, and any damage to the heart.

Hematoma: A localized collection of blood in the tissue or organ.

Nasogastric tube: A soft plastic tube inserted in the nose and down to the stomach; used to empty the stomach of contents and gases to rest the bowel.

Seroma: A collection of serous (clear/yellow) fluid.

Ultrasound: Sound waves are used to determine the location of deep structures in the body. A hand roller is placed on top of clear gel and rolled across the abdomen.

Urinalysis: A visual and chemical examination of the urine most often used to screen for urinary tract infections and kidney disease.

References

The information provided in this report is chosen from recent articles based on relevant clinical research or trends. The research below does not represent all that is available for your operation. Ask your doctor if he or she recommends that you read any additional research.

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Disclaimer

This information is published to educate you about your specific surgical procedures. It is not intended to take the place of a discussion with a qualified surgeon who is familiar with your situation. It is important to remember that each individual is different, and the reasons and outcomes of any operation depend upon the patient's individual condition.

The American College of Surgeons is a scientific and educational organization that is dedicated to the ethical and competent practice of surgery; it was founded to raise the standards of surgical practice and to improve the quality of care for the surgical patient. The ACS has endeavored to present information for prospective surgical patients based on current scientific information; there is no warranty on the timeliness, accuracy, or usefulness of this content.

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