

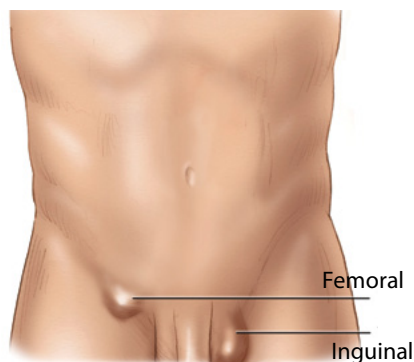
Inguinal and Femoral Groin Hernia Repair



The Condition

A hernia occurs when tissue bulges out through an opening in the muscles. Any part of the abdominal wall can weaken and develop a hernia, but the most common sites are the groin (inguinal), the navel (umbilical) and a previous surgical incision site. An inguinal hernia in the groin is more common in men.¹ A femoral hernia may be at the upper leg, vaginal area or groin, and is more common in women.

Groin Hernia Location



Groin Hernia Symptoms

- Visible bulge in the scrotum or groin area, 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 Procedure

About 1/3 of groin hernia patients have no symptoms. Watchful waiting may be a safe option for adults who are not uncomfortable. Most men with an inguinal hernia need surgery due to increased pain with exercise, chronic constipation or urinary symptoms. 23% crossed over to surgery after 2 years and 50% after 5 years.²

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.

Possible risks include—Return of the hernia; infection; injury to the bladder, blood vessels, intestines or nerves, difficulty passing urine, continued pain, and swelling of the testes or groin area.

Risks of not having an operation—Your hernia may cause pain and increase in size. If your intestine becomes trapped in the hernia pouch you will have sudden pain, vomiting, and need an immediate operation.

Expectations

Before your operation—A physical examination is usually all that is needed to diagnose groin hernias.² Evaluation may include blood work and urinalysis. Your surgeon and anesthesia provider will discuss your health history, home medications, and pain control options.

The day of your operation—You will not eat or drink for 4 hours before the operation. Most often you will take your normal medication with a sip of water. You will need someone to drive you home.

Your recovery—If you do not have complications you usually will go home the same day. You may return to work after 1 to 2 weeks after laparoscopic or open repair, as long as you don't do any heavy lifting.

When to Contact Your Surgeon

Contact your surgeon if you have:

- Pain that will not go away
- Pain that gets worse
- A fever of more than 101°F or 38.3°C
- Continuous 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 by 2 to 3 days after the operation

**SURGICAL PATIENT
EDUCATION PROGRAM**

Prepare for the Best Recovery

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

The Condition, Symptoms, and Diagnostic Tests

Keeping You Informed

Who Gets Hernias?

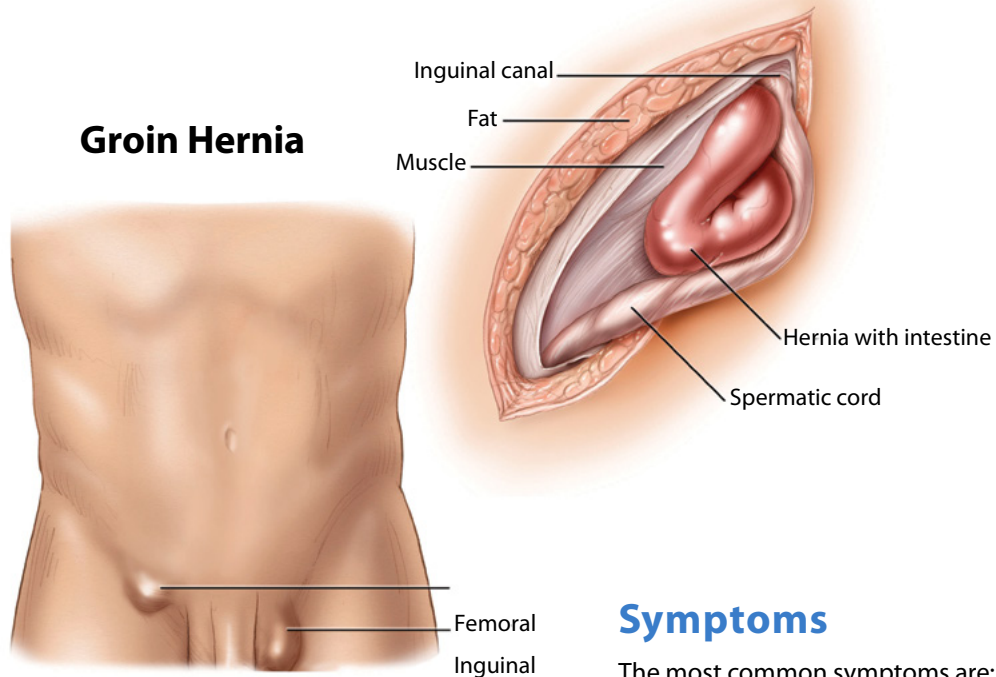
There may be no cause for a hernia. The risk of developing an inguinal hernia is 3% for women and 27% for men.³ Inguinal hernias are 8-10 times more common in men.² Some risk factors are:

- Older age—muscles become weaker
- Obesity—increased weight places pressure on abdominal muscle
- Sudden twist, pulls, or strains
- Chronic straining
- Family history
- Connective tissue disorders
- Pregnancy—1 in 2,000 women develop a hernia during pregnancy.⁴

Other medical disorders

that have symptoms similar to hernias include enlarged lymph nodes, cysts, and testicular problems such as scrotal hydrocele.⁵

Groin Hernia



The Condition

The Hernia

A **groin hernia** occurs when the intestine bulges through the opening in the muscle in the groin area. A **reducible hernia** can be pushed back into the opening. When intestine or abdominal tissue fills the hernia sac and cannot be pushed back, it is called **irreducible or incarcerated**. 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 surgical emergency.**⁶

There are two types of **groin hernias**:

An **inguinal hernia (IH)** appears as a bulge in the groin or scrotum. Inguinal hernias account for 75% of all hernias and are most common in men.²

A **femoral hernia (FH)** appears as a bulge in the groin, upper thigh, or labia (skin folds surrounding the vaginal opening). Femoral hernias are four times more common in women.⁷ They are always repaired because of a high risk of strangulation.²

Herniorraphy is the surgical repair of a hernia. **Hernioplasty** is the surgical repair of a hernia with mesh.

Symptoms

The most common symptoms are:

- Bulge in the groin, scrotum, or abdominal area that often increases in size with coughing or straining.
- Mild pain or pressure at the hernia site.¹
- Numbness or irritation due to pressure on the nerves around the hernia.²
- Sharp abdominal pain and vomiting can mean that the intestine has slipped through the hernia sac and is strangulated. **This is a surgical emergency and immediate treatment is needed.**

Common Tests

History and Physical exam¹

The site is checked for a bulge.

Other tests may include (**see glossary**):

- Digital exam
- Blood tests
- Urinalysis
- Electrocardiogram (ECG)—for patients over 45 or if high risk of heart problems
- Ultrasound
- Computerized tomography (CT) scan

Surgical and Nonsurgical Treatment

Surgical Treatment

The type of operation depends on hernia size and 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 incarcerated/strangulated and femoral hernias.

Your hernia can be repaired either as an **open or laparoscopic approach**. The repair can be done by using sutures only or adding a piece of mesh.

Open Hernia Repair

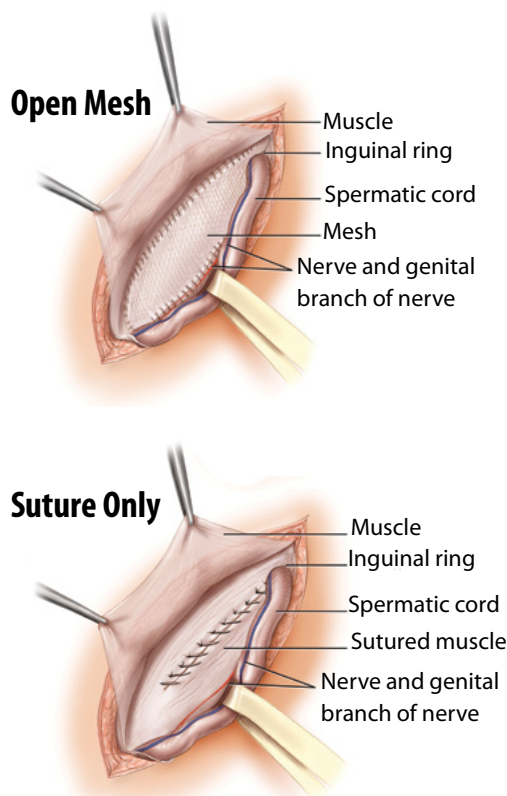
The surgeon makes an incision near the hernia site and the bulging tissue is pushed back into the abdomen. Most inguinal hernia repairs use mesh to close the muscle and to decrease recurrence.² An open repair can be done with local anesthesia.

- **For an open mesh repair:** The hernia sac is removed. Mesh is placed over the hernia site. The placement of mesh is the most agreed upon approach in IH repair.² Mesh is often used for large hernia repairs and may reduce the risk that the hernia will come back. The site is closed using sutures, staples, or surgical glue.
- **For a suture-only repair:** The hernia sac is removed. Then the tissue along the muscle edge is sewn together. This procedure is often used for strangulated or infected hernias or small defects (less than 3 cm).

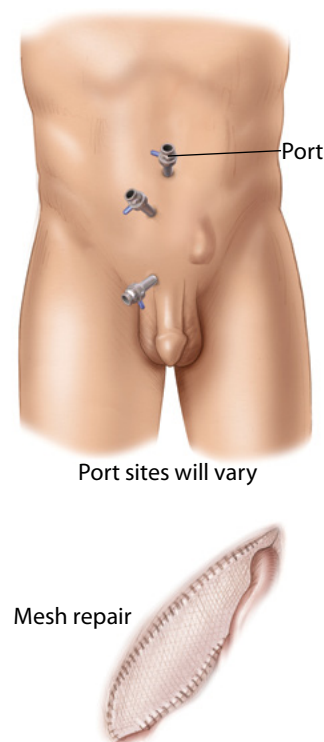
Laparoscopic Hernia Repair

The surgeon will make several small punctures or incisions in the abdomen. Ports (hollow tubes) are inserted into the openings. The abdomen is inflated with carbon dioxide gas to make it easier to see the internal organs. Surgical tools and a laparoscopic light are placed into the ports. The hernia is repaired with mesh and sutured or stapled in place. The repair is done as a TransAbdominal PrePeritoneal (TAPP) procedure, which means the peritoneum (the sac that contains all of the abdominal organs) is entered, or the repair is done as a Totally ExtraPeritoneal (TEP) procedure.⁸

Open Repair



Laparoscopic Repair



Nonsurgical Treatment

Watchful waiting is an option if you have an inguinal hernia with no symptoms.² Hernia incarceration occurred in less than 1% of men who waited longer than 2 years to have a repair.⁹ Femoral hernias should always be repaired due to an increased risk of incarceration or strangulation and the risk is increased if the hernia is right-sided.¹⁰

Trusses or belts attempt to manage symptoms by applying pressure at the site however they are not recommended as they may cause complications like testicular nerve damage and incarceration.⁹

Keeping You Informed

Open vs. Laparoscopic Incisional Repair

A laparoscopic repair of inguinal hernia may result in less pain and numbness, lower infection rate, and faster return to normal activity than open repair. When surgeons have experience with laparoscopic repair, operation times, and complication rates compare to open suture repair. In follow-up after 48 months there was no difference in severe chronic pain and long-term recurrence between the types of repair.¹¹

Repairing both sides of the hernia at the same time (bilateral repair) when done by an experienced laparoscopic surgeon has faster recovery, lower reports of chronic pain and is cost effective.¹²

Risks Based on the ACS Risk Calculator

Open and Laparoscopic Inguinal and Femoral Hernia Surgery from the ACS Risk Calculator—July 19, 2022

Risks	Percent for Average Patient	Keeping You Informed
Wound Infection: Infection at the area of the incision or near the organ where the surgery was performed	Open 0.4% Laparoscopic 0.3%	Antibiotics and drainage of the wound may be needed. Smoking can increase the risk of infection.
Complications: Including surgical infections, breathing difficulties, blood clots, renal (kidney) complications, cardiac complications, and return to the operating room	Open 1.6% Laparoscopic 1.5%	Complications related to general anesthesia and surgery may be higher in smokers, elderly and/or obese patients, and those with high blood pressure and breathing problems. Wound healing may also be decreased in smokers and those with diabetes and immune system disorders.
Pneumonia: Infection in the lungs	Open 0.1% Laparoscopic 0.1%	Movement, deep breathing, and stopping smoking can help prevent respiratory infections.
Urinary tract infection: Infection of the bladder or kidneys	Open 0.2% Laparoscopic 0.2%	Drinking fluids and catheter care decrease the risk of bladder infection.
Venous thrombosis: A blood clot in the legs that can travel to the lungs	Open 0.1% Laparoscopic 0.1%	Longer surgery and bed rest increase the risk. Getting up, walking 5 to 6 times per day, and wearing support stockings reduce the risk.
Death	Less than 1%	Your surgical team is prepared for all emergency situations.
Risks from Outcomes Reported in the Last 10 years of Literature	Percent for Average Patient	Keeping You Informed
Chronic (long-term) pain	10% to 12% may have pain one year after surgery; possibly less with laparoscopic ¹³	Factors contributing to chronic pain include emergency hernia repair, scrotal hernia, recurrent hernia repair, young age, female gender, perioperative pain, open hernia repair, perioperative complications, and penetrating mesh fixation. ¹ Pain caused by compression or tension may gradually decrease with time as a result of tissue rearrangement. ¹⁴
Recurrence: A hernia can recur after the repair	All patients 1% to 17% ¹⁵ Open 4.9% Laparoscopic 10.1%	Recurrence occurs less often when mesh is used versus non-mesh repair. ¹⁶ Laparoscopic repair is recommended for recurrent hernias because the surgeon avoids previous scar tissue. There is a higher rate of recurrence in older men with laparoscopic repair.
Neuralgia: Nerve pain causing tingling or numbness	Open 10.7% Laparoscopic 7.4%	Pressure, staples, stitches, or a trapped nerve in the surgical area can cause nerve pain. Tell your doctor if you feel severe, sharp, or tingling pain in the groin and leg immediately after your procedure; an operation may be required if the nerve is trapped. ¹⁶
Seroma: A collection of clear/yellow fluid	5-25% ¹⁷	Seromas can form around the former hernia site. Removal of fluid with a sterile needle may be required.
Hematoma: a collection of blood in the wound site or scrotum	3.4% ¹⁸	Hematomas are treated with anti-inflammatory medications, elevation, and rest. Rarely blood replacement or further testing for a blood vessel injury is needed.

The data have been averaged per 100 cases

The ACS Surgical Risk Calculator estimates the risk of an unfavorable outcome. Data is from a large number of patients who had a surgical procedure similar to this one. If you are healthy with no health problems, your risks may be below average. If you smoke, are obese, or have other health conditions, then your risk may be higher. This information is not intended to replace the advice of a doctor or health care provider. To check your risks, go to the ACS Risk Calculator at

<http://riskcalculator.facs.org>.

Expectations: Preparation for Your Operation

Preparing for Your Operation

Home Medication

Bring a list of all of the medications and vitamins that you are taking. Your medication may have to be adjusted before your operation. Some medications can affect your recovery and response to the anesthesia. Most often you will take your morning medication with a sip of water.

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), or loose teeth; if you smoke, drink alcohol, use drugs, or take any herbs or vitamins; or if you have a history of nausea and vomiting with anesthesia.

If you smoke, you should let your surgical team know and you should plan to quit. Quitting before your surgery can decrease your rate of respiratory and wound complications and increase your chances of staying smoke-free for life. Resources to help you quit may be found at <https://www.facs.org/for-patients/preparing-for-your-surgery/quit-smoking/>.

Length of Stay

If you have local anesthesia, you will usually go home the same day. You may stay overnight if you had a repair of a large or incarcerated hernia, laparoscopic repair with a longer anesthesia time, postanesthesia issues such as severe nausea and vomiting, or you are unable to pass urine.

The Day of Your Operation

- Do not eat or drink for at least 4 hours before your operation.
- Shower and clean your abdomen and groin area with a mild antibacterial soap.
- Brush your teeth and rinse your mouth out with mouthwash.
- Do not shave the surgical site; your surgical team will clip the hair nearest the incision site.

What to Bring

- Insurance card and identification
- Advance directives (see glossary)
- List of medicines
- Loose-fitting, comfortable clothes
- Slip-on shoes that don't require that you bend over
- Leave jewelry and valuables at home

What You Can Expect

An identification (ID) bracelet and allergy bracelet with your name and hospital/clinic number will be placed on your wrist. These should be checked by all health team members before they perform any procedures or give you medication. Your surgeon will mark and initial the operation site.

Fluids and Anesthesia

An intravenous line (IV) will be started to give your fluids and medication. For general anesthesia, you will be asleep and pain-free. A tube will be placed down your throat to help you breathe during the operation. For spinal anesthesia, a small needle with medication will be placed in your back near your spinal column. You will be awake and pain-free.

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. Be sure that all visitors wash their hands.

Preventing Pneumonia and Blood Clots

Movement and deep breathing after your operation can help prevent postoperative complications such as blood clots, fluid in your lungs, and pneumonia. Every hour take 5 to 10 deep breaths and hold each breath for 3 to 5 seconds.

When you have an operation, you are at risk of getting blood clots because of not moving during anesthesia. The longer and more complicated your surgery, the greater the risk. This risk is decreased by getting up and walking 5 to 6 times per day, wearing special support stockings or compression boots on your legs, and, for high risk patients, taking a medication that thins your blood.

Questions to Ask

About my operation

- What are the risks and side effects of general anesthesia?
- What technique will be used to repair the hernia—laparoscopic or open; mesh or with sutures?
- Ask your surgeon how frequently they perform laparoscopic hernia repairs?
- What are the risks of this procedure?
- Will you be performing the entire procedure 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?

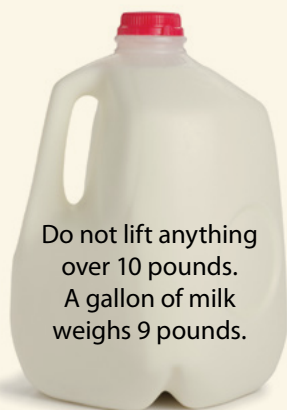
Your Recovery and Discharge

SAMPLE

Keeping You Informed

High-Fiber Foods

Foods 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, or if you are taking narcotic pain medication, it may cause you to feel different for 2 or 3 days, have difficulty with memory, and feel more fatigued. You should 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 water per day.
- Eat a high-fiber diet so you don't strain while having a bowel movement.

Activity

- Slowly increase your activity. Be sure to get up and walk every hour or so to prevent blood clot formation.
- Patients usually take 2 to 3 weeks to return comfortably to normal activity.²
- You may go home the same day after a simple repair. If you have other health conditions or complications such as nausea, vomiting, bleeding, or difficulty passing urine, you may stay longer.
- Persons sexually active before the operation reported being able to return to sexual activity in 14 days (average).

Work and Return to School

- You may return to work after 1 to 2 weeks after laparoscopic or open repair, as long as you don't do any heavy lifting. Discuss the timing with your surgeon.
- Do not lift items heavier than 10 pounds or participate in strenuous activity for at least 4 to 6 weeks.
- Lifting limitation may last for 6 months after complex or recurrent hernia repairs.



Handwashing



Steri-Strips®

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.
- See the ACS Surgical Wound program for more instruction: <https://www.facs.org/for-patients/home-skills-for-patients/wound-management/>
- 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, just 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, especially 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.

Bowel Movements

Avoid straining with bowel movements by increasing the fiber in your diet with high-fiber foods or over-the-counter medicines (like Metamucil® and FiberCon®). Be sure you are drinking 8 to 10 glasses of water each day.

Pain

The amount of pain is different for each person. The new medicine you will need after your operation is for pain control, and your doctor will advise how much you should take. You can use throat lozenges if you have sore throat pain from the tube placed in your throat during your anesthesia.

Pain Control

Your pain can be controlled using acetaminophen (Tylenol®) and ibuprofen (Motrin®, Advil®). Nonmedication therapies, such as ice may also be effective. For severe pain that is keeping you from moving and sleeping, an opioid may be needed. By day 4, most people report no severe pain after an operation. Pain from the surgical incision is usually gone in 7 to 10 days. See the **Safe and Effective Pain Control Guide** below or on the ACS website for more information. <https://www.facs.org/education/patient-education/safe-pain-control>

Pain	How Intense is my pain	What Can I Take to Feel Better	Most Common Therapies
Mild	- I hardly notice my pain, and it does not interfere with my activities. - I notice my pain and it distracts me, but I can still do activities (sitting up, walking, standing).	Non-medication therapies + Non-opioid, oral medications - Take as needed when you feel pain. - These help to decrease pain and swelling (inflammation)	<u>Non-medication Therapies</u> - Ice, elevation, rest, meditation, massage, distraction (music, TV, play) walking and mild exercise - Splinting the abdomen with pillows <u>Non-Opioid Medication</u> - Acetaminophen (Tylenol®) - Non-steroidal anti-inflammatory drugs (NSAIDS) Aspirin, Ibuprofen (Motrin®, Advil®) Naproxen (Aleve®)
Moderate	- My pain is hard to ignore and is more noticeable even when I rest. - My pain interferes with my usual activities.	Non-Medication Therapy + Non-opioid, oral medication Take these on a regular schedule	<u>Take Non-opioid medication</u> on a regular schedule instead of as needed. (Ex: Tylenol® every 6 hours at 9am, 3pm, 9pm, 3am and Motrin® every 6 hours and 12am, 6am, 12pm, 6pm)
Severe	- I am focused on my pain, and I am not doing my daily activities. - I am groaning in pain, and I cannot sleep. I am unable to do anything. - My pain is as bad as it could be, and nothing else matters.	Non-Medication Therapy + Non-opioid, oral medication - Take these on a regular schedule Short-acting Opioids - Take for a few days and decrease/ stop as soon as possible	Opioids block pain and give a feeling of euphoria (feel high). Addiction, a serious side effect of opioids, is rare with short term use. Examples of short-acting opioids include: Tramadol (Ultram®), Hydrocodone (Norco®, Vicodin®), Hydromorphone (Dilaudid®)

More Information

For more information, please go to the American College of Surgeons Patient Education website at [facs.org/patienteducation](https://www.facs.org/patienteducation).
For a complete review of hernia repair, consult *Selected Readings in General Surgery, Volume 45, No. 5, 2019, Hernia* <https://www.facs.org/for-medical-professionals/news-publications/journals/srgs/>

GLOSSARY

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

Computerized tomography (CT) scan: A diagnostic test X ray and a computer to create a detailed, three-dimensional picture of your abdomen. A CT scan is commonly used to detect abnormalities or disease inside the abdomen. It is sometimes used to find a hernia not obvious during the physical exam.

Digital exam: The examiner will place their gloved index finger gently into the scrotal sac and feel up to the inguinal ring in the groin. Then the patient is asked to strain.

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

General anesthesia: A treatment with certain medicines that puts you into a deep sleep so you do not feel pain during surgery.

Hematoma: A collection of blood that has leaked into the tissues of the skin or in an organ, resulting from cutting in surgery or the blood's inability to form a clot.

Incarceration: The protrusion or constriction of an organ through the wall of the cavity that normally contains it.

Local anesthesia: The loss of sensation only in the area of the body where an anesthetic drug is applied or injected.

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

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

Strangulation: Part of the intestine or fat is squeezed in the hernia sac and blood supply to the tissue is cut off.

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. An ultrasound may be used to find a hernia that is not obvious during the physical exam.

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 surgery. Ask your doctor if he or she recommends that you read any additional research.

1. Burcharth J, Pedersen M, Bisgaard T, et al. (2013) Nationwide prevalence of groin hernia repair. *PLoS One* 8(1):e54367. <https://doi.org/10.1371/journal.pone.0054367>
2. HerniaSurge Group. International guidelines for groin hernia management. *Hernia*. 2018 Feb;22(1):1-165. doi: 10.1007/s10029-017-1668-x. Epub 2018 Jan 12. PMID: 29330835; PMCID: PMC5809582.
3. Fitzgibbons RJ, Forse RA. Clinical practice. Groin hernias in adults. *N Engl J Med*. 2015;372:756-763.
4. Buch KE, Tabrizian P, Divino CM. Management of hernias in pregnancy. *J Am Coll Surg*. 2008;207(4):539.
5. Crawford P, et al. Evaluation of scrotal masses. *American Family Physician*. 2014;89:723. <http://www.aafp.org/afp/2014/0501/p723.html>. Accessed Feb. 26, 2017.
6. Pastorino A, Alshuqayfi AA. Strangulated Hernia. [Updated 2021 Dec 28]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK555972/>
7. Prospective evaluation of 6895 groin hernia repairs in women. Koch A, Edwards A, Haapaniemi S, et al. *Br J Surg*. 2005;92(12):1553.
8. Yang XF, Liu JL. Laparoscopic repair of inguinal hernia in adults. *Ann Transl Med*. 2016 Oct;4(20):402. doi: 10.21037/atm.2016.10.37. PMID: 27867954; PMCID: PMC5107402. 9.
9. Berger D. Evidence-Based Hernia Treatment in Adults. *Dtsch Arztebl Int*. 2016 Mar 4;113(9):150-7; quiz 158. doi: 10.3238/arztebl.2016.0150. PMID: 26987468; PMCID: PMC4802357.
10. Suppiah A, Gatt M, Barandiaran J, et al. (2007) Outcomes of emergency and elective femoral hernia surgery in four district general hospitals: a 4-year study. *Hernia* 11(6):509-512.
11. Eklund AS, Montgomery AK, Rasmussen IC, et al. (2009) Low recurrence rate after laparoscopic (TEP) and open (Lichtenstein) inguinal hernia repair: a randomized, multicenter trial with 5-year follow-up. *Ann Surg* 249:33-38. <https://doi.org/10.1097/SLA.0b013e3181925d0>
12. Simons MP, Aufenacker T, Bay-Nielsen M et al (2009) European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. *Hernia* 13:343-403. <https://doi.org/10.1007/s10029-009-0529-7>
13. Niebuhr H, Wegner F, Hukauf M, et al. What are the influencing factors for chronic pain following TAPP inguinal hernia repair: an analysis of 20,004 patients from the Herniated Registry. *Surg Endosc*. 2018 Apr;32(4):1971-1983. doi: 10.1007/s00464-017-5893-2. Epub 2017 Oct 26. PMID: 29075969; PMCID: PMC5845068.
14. Aasvang EK, Gmaehle E, Hansen J, et al. Predictive risk factors for persistent postherniotomy pain. *Anesthesiology*. 2010;112:957-969. doi: 10.1097/ALN.0b013e3181d31ff8.
15. Itani K, Fitzgibbons R, Awad S et al. Management of recurrent inguinal hernias. *Journal of the American College of Surgeons*. 2009 Nov; 209(5):653-658. doi: 10.1016/j.jamcollsurg.2009.07.015. Epub 2009 Aug 20.
16. Lockhart K, Dunn D, Teo S, et al. Mesh versus non-mesh for inguinal and femoral hernia repair. *Cochrane Database Syst Rev*. 2018 Sep 13;9(9):CD011517. doi: 10.1002/14651858.CD011517.pub2. PMID: 30209805; PMCID: PMC6513260.
17. Dedemadi G, Sgourakis G, Radtke A, et al. Laparoscopic versus open mesh repair for recurrent inguinal hernia: a meta-analysis of outcomes. *Am J Surg* 2010;200:291-7.
18. Wu J.J., Way J.A., Eslick G.D., Cox M.R. Transabdominal pre-peritoneal versus open repair for primary unilateral inguinal hernia: a meta-analysis. *World J Surg*. 2018;42:1304-13011.

DISCLAIMER

Important Note on the Use of This Document

The American College of Surgeons (ACS) is a scientific and educational association of surgeons that was founded in 1913 to improve the quality of care for the surgical patient by setting high standards for surgical education and practice. The ACS endeavors to provide procedure education for prospective patients and those who educate them. It is not intended to take the place of a discussion with a qualified surgeon who is familiar with your situation. The ACS makes every effort to provide information that is accurate and timely, but makes no guarantee in this regard.

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