

- Weakness due to structures entering and leaving the abdomen
- Development failure
- Genetic weakness of collagen
- Sharp and blunt injury
- Weakness due to ageing and pregnancy and hormonal changes
- Neurological and muscle weakness
- Increased intra abdominal pressure
- Abdominal straining (heavy lifting, constipation, urinary retention)
- Persistent cough
- Smoking
- Poor nutrition
- Ascites (accumulation of abdominal fluid)
- Undescended testes
- Peritoneal dialysis
- Physical exertion
- Long-term (chronic) constipation and pushing hard (straining) to have a bowel movement
- Chronic sneezing
- Cystic fibrosis
- Enlarged prostate, straining to urinate
- Extra weight
- Overexertion

Types Of Hernia

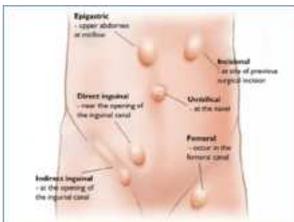


Figure: Different Types Of Hernia Based On Site

Based On Site:

Approximately 75% of all abdominal wall hernias are seen in the groin of which inguinal hernia is most common.

Inguinal Hernia

An inguinal hernia is a groin hernia that results from protrusion of abdominal contents through the inguinal canal.

There are two types of inguinal hernia;

a. Direct inguinal hernia occur medial to the inferior epigastric vessels when abdominal contents protrude through a weakness in the posterior wall of the inguinal canal, which is formed by the transversalis fascia. This type of hernia usually occurs following heavy lifting.

b. Indirect inguinal hernia occur when abdominal contents protrude through the deep inguinal ring, lateral to the inferior epigastric vessels. This is usually caused by failed closure of embryonic processus vaginalis.¹¹

Inguinal hernias usually present as a lump in the groin. They can become more prominent when coughing, straining or standing. The lump usually disappears when lying down. Inguinal hernia are usually asymptomatic, and only rarely painful. Although most are unilateral, up to 20% of patients go on to develop one on the contralateral side.

Femoral Hernia

Femoral hernias are a rare type of groin hernia. In contrast to inguinal hernia almost all femoral hernia occur in females due to the female pelvis being wider. In a femoral hernia the abdominal contents protrude medial to the nerves and vessels that supply the leg, through the femoral canal. Due to the femoral canal being narrow, femoral hernia are at increased

risk of incarceration and strangulation of abdominal contents.¹¹

Umbilical & Paraumbilical Hernia

An umbilical hernia is a type of ventral hernia, which is located in the central aspect of the umbilicus. They are also commonly referred to as "bellybutton" or "navel" hernias. They may be present from birth and in 85% of cases will close spontaneously. If the hernia persists beyond five years of age, they are less likely to improve and may require surgery. It is uncommon for umbilical hernias in children to strangulate. It is therefore reasonable to avoid surgery and adopt a wait-and-see policy.¹¹

In adults, hernias that occur around the umbilicus are termed 'paraumbilical' hernias. The umbilicus is a natural weak point in the abdominal wall. They typically present as a 'bulge' or 'outie' in the bellybutton. Apart from in pregnancy, they don't disappear, and surgery is usually recommended. The diagnosis is usually made clinically. Ultrasound or CT may be helpful but are usually not necessary.¹¹

Ventral Hernia

A ventral hernia results from a defect in the midline of the abdominal wall. They are also referred to as 'epigastric' hernia. Most present with a small lump, that is usually asymptomatic, anywhere in the midline between the xiphoid process (lower end of sternum) and the umbilicus. They rarely cause complications. In some instances, imaging by Ultrasound or CT is required to confirm the diagnosis and help plan treatment.¹¹

Incisional Hernia

Incisional hernia is a type of hernia that develops due to incomplete healing of an abdominal wound. They therefore present as a lump at or near the surgical scar. Factors associated with an increased risk of incisional hernia include, multiple abdominal operations, obesity, poor nutrition or activities in the post-operative period associated with increased abdominal pressure (coughing, lifting, constipation, urinary retention). Surgery repair is commonly advised but not always required. Imaging by Ultrasound or CT may be required to confirm the diagnosis and extent of herniation, to help ascertain whether surgery is required.¹¹

Giant abdominal hernia

A giant abdominal wall hernia can develop from any long-standing hernia or as a result of delayed closure of the abdominal wall. They usually have a history of multiple failed repair attempts. The large defect allows for multiple loops of intestines and on occasion, other abdominal organs, to protrude into the hernia sac. Giant abdominal hernia are difficult to repair and often require a combination of mesh repair and/or component separation to bridge the large defect in the abdominal wall.¹¹

Parastomal Hernia

A parastomal hernia is a type of incisional hernia where there is protrusion of intra-abdominal contents through the abdominal wall defect created during stoma formation. Examples include ileostomy (terminal small bowel brought to the skin), colostomy (colon brought to the skin) gastrostomy (stomach or feeding tube brought to the skin) or urostomy (urinary diversion brought to the skin). Parastomal hernias are often difficult to diagnose and develop gradually over time. They often make it difficult to attach an appliance over the stoma and over time can increase dramatically in size. Treatment often requires more than one specialist and may involve either the re-siting of the stoma or repair of the hernia around the stoma with the use of mesh.¹¹

Spigelian Hernia

A spigelian hernia or lateral ventral hernia is a hernia that

extends through the linea semilunaris, the line between the lateral edge of the rectus muscle and the oblique muscles of the abdominal wall. They almost always develop in the lower abdominal wall, more commonly on the right. They usually present with a lump and due to their small size, are at high risk of strangulation.¹¹

Recurrent Hernia

A recurrent hernia is the recurrence of a hernia following surgical repair. It usually presents as a lump at or near the site of previous repair. It needs to be differentiated from other causes, such as seroma (fluid collection) or hematoma, and imaging is sometimes helpful. A recurrent hernia usually requires further surgical repair.¹¹

Sportsman Hernia

A sportsman hernia is a chronic exercise-related groin pain associated with incipient direct bulge of the inguinal wall whenever the abdominal muscles contract forcefully. The pain develops during exercise, is usually unilateral and is located just above the inguinal ligament at the lateral aspect of rectus abdominus. The majority of the patients are young adult males. There is often no objective physical examination findings. A cough impulse is either weak or absent. Imaging by Ultrasound, CT or MRI may be helpful in showing a direct bulge of the posterior inguinal wall when forcefully contracting the abdominal muscles.¹¹

Hiatal hernia occurs in the diaphragm muscle that separates the chest and abdomen. Part of the upper stomach pushes into the chest.

Based On Complexity

a. Occult hidden protrusion

b. Reducible can be reduced by manipulation, is one which can be pushed back into the abdomen by putting manual pressure to it.

c. Irreducible cannot be reduced by manipulation need surgical intervention, is one which cannot be pushed back into the abdomen by applying manual pressure.

d. Obstructed the hernia is obstructing the flow of the content, is one in which the lumen of the herniated part of intestine is obstructed but the blood supply to the hernial sac is intact. Incarcerated hernia-is one in which adhesions develop between the wall of hernial sac and the wall of intestine

e. Strangulated twisting of the herniated structured causing ischemia, necrosis, one in which the blood supply of the sac is cut off, thus, leading to ischemia. the lumen of the intestine may be patent or not.

f. Infected: when the content of the hernia have become gangrenous.

Based on Content structure of the cavity from which the hernia is formed

a. Omentocele in omentum

b. Enterocoele in intestine

c. Cystocoele in bladder

d. Sliding hernia

e. Littre's hernia in Meckels diverticulum

f. Amyands in appendix

g. Prevesical fat, a diverticulum in ovary

h. Maydl's hernia

i. Richter's hernia portion of circumference of intestine

Epidemiology Of Hernia

According to American Hernia Society, As much as 10% of the population develops some type of hernia during life.

- Over 1 million abdominal hernia repairs are performed each year, with inguinal hernia repairs constituting nearly

770,000 of these cases.

- Approximately 75% of all hernias are inguinal: 50% indirect (male-to-female ratio, 7:1), with a right-side predominance, young adults 25% are direct, incidence increases with increasing age 3% have sliding hernias (men >> women) Female infants have a high incidence of sliding tube, ovary or broad ligament hernias.
- Umbilical (14%)
- Incisional or ventral (10%) (female-to-male ratio, 2:1)
- Femoral (3-5%)
- Inter-parietal, supra-vesical, lumbar, sciatic, and perineal hernias are rare
- Spigelian hernias (rare): around the age of 50 years; no sex or side predilection is reported
- Obturator hernias (thin, elderly women, right side)
- The incidence of incarcerated or strangulated hernias in pediatric patients is 10-20%; 50% of these occur in infants younger than 6 months
- Anatomical Epigastric Umbilical/ Praumbilical (14%) Groin: Inguinal (75%) and Femoral (3-5%), Incisional/ Recurrent (10%), Rare (Spigelian, lumbar, obturator, gluteal sciatic)

Complication of hernia

Most hernias are reducible which means that the contents can be reduced back into the abdominal cavity.

Some hernias are irreducible, also called "incarcerated" and cannot be reduced back into the abdomen.

This can lead to the following complications:

Strangulation : Pressure at the hernia neck on the contents may compromise the blood supply to the part of intestine or organ that has herniated leading to aschemia and gangrene. A strangulated hernia is life-threatening and requires immediate surgery to reduce and repair the hernia.

Obstruction : When part of the intestine herniates, the bowel contents may no longer be able to pass through the herniated area leading to bowel obstruction. This usually presents with crampy abdominal pain, absence of defecation and vomiting. This is an emergency that requires immediate surgical repair.

Anyone with a hernia who develops any of the following symptoms should seek urgent medical attention- sudden and severe pain, nausea and vomiting, obstipation (absence of defecation and flatus), hernia is tender and will not reduce

Signs And Symptom Of Hernia

- A bulge in the area on either side of your pubic bone
- A burning, gurgling or aching sensation at the bulge
- Pain or discomfort in the groin, especially when bending over, coughing or lifting
- A heavy or dragging sensation in groin
- Weakness or pressure in your groin
- Occasionally, in men, pain and swelling in the scrotum around the testicles when the protruding intestine descends into the scrotum
- Signs and symptoms in children inguinal hernias in newborns and children result from a weakness in the abdominal wall that is present at birth. Sometimes the hernia may be visible only when an infant is crying, coughing or straining during a bowel movement. In an older child, a hernia is likely to be more apparent when the child coughs strains during a bowel movement or stands for a long period.

Laboratory Studies For Hernia

- All baseline investigations Imaging Studies Evaluation for potential reversal of provocative factors (prostatism, chronic cough, severe constipation, rectal cancer, and ascites) is important.

- Radiography Plain X-rays are of little value Chest X-ray: Hiatus hernia.
- Ultrasonography
- Nature of content is dubious
- Narrows the differential on both scrotal masses and masses below the inguinal ligament.
- May be indicated when a spigelian or obturator hernia is suspected
- When the patient's body habitus hinders physical examination
- Post op period to differentiate between early recurrence and hematoma/seroma
- Computer Topography Complex incisional hernia to determine the size & no. of muscle defects, identifying contents, adhesions, ascites. Workup Clinical Diagnosis
- Contrast (barium) radiology help to define most hidden hernias Small recurrent hernias, Occult inguinal hernia
- Magnetic Resonating Image Diagnosis of sportsman's groin
- Laparoscopy Incisional hernia (occult contralateral) Suspected incarcerated or strangulated hernia Upright chest radiograph to exclude free air Flat and upright abdominal films to diagnose a small bowel obstruction (neither sensitive or specific)

Management Of Hernia

Conservative Management

- Hernias that or not strangulated or incarcerated can be mechanically reduced.
- A truss can be placed over the hernia after it has been reduced & left in place to prevent the hernia from recurring. (truss is a firm pad held in place by a belt)
- The client is taught to apply the truss daily before arising & to inspect the skin underneath for any breakdown.



Figure: Picture of TRUSS

Watchful Waiting: Watchful waiting is an option for people who do not have complications or symptoms with their hernias.

Surgical Management Of Hernia

Surgery is the only treatment that can permanently fix a hernia. Surgery may be more risky for people with serious medical problems.

Surgery repairs the weakened abdominal wall tissue (fascia) and closes any holes. Most hernias are closed with stitches and sometimes with mesh patches to plug the hole.

Operative Approaches To The Hernia

The surgical management aims to:

- Not all hernias require surgical repair
- Small hernias can be more dangerous than large
- Pain, tenderness and skin color changes imply high risk of strangulation
- Femoral hernia should always be repaired

The Principles Of The Surgical Repair

- Reduction of the hernia content into the abdominal cavity with removal of any non-viable tissue and bowel repair if

necessary

- Excision and closure of a peritoneal sac if present or replacing it deep to the muscle
- Reapproximation of the walls of the neck of the hernia if possible
- Permanent reinforcement of the abdominal wall defect with suture or mesh.

Surgical Approaches

- **Laparoscopic** - The surgeon makes several small incisions in the abdomen that allow surgical tools into the openings to repair the hernia. Laparoscopic surgery can be performed with or without surgical mesh.
- **Open Repair** - The surgeon makes an incision near the hernia and the weak muscle area is repaired. Open repair can be done with or without surgical mesh. Open repair that uses sutures without mesh is referred to as primary closure. Primary closure is used to repair inguinal hernias in infants, small hernias, strangulated or infected hernias.
- Hernias have a high rate of recurrence, and surgeons often use surgical mesh to strengthen the hernia repair and reduce the rate of recurrence. Since the 1980s, there has been an increase in mesh-based hernia repairs, by 2000 non-mesh repairs represented less than 10% of groin hernia repair techniques.
- The use of surgical mesh may also improve patient outcomes through decreased operative time and minimized recovery time. However, recovery time depends on the type of hernia, the surgical approach, and the patient's condition both before and after surgery.
- Information found in medical literature has consistently demonstrated a reduced hernia recurrence rate when surgical mesh is used to repair the hernia compared to hernia repair without surgical mesh. For example, inguinal hernia recurrence is higher with open repair using sutures (primary closure) than with mesh repair.
- Despite reduced rates of recurrence, there are situations where the use of surgical mesh for hernia repair may not be recommended. Patients should talk to their surgeons about their specific circumstances and their best options and alternatives for hernia repair.

Surgical Mesh

- Surgical mesh is a medical device that is used to provide additional support to weakened or damaged tissue. The majority of surgical mesh devices currently available for use are constructed from synthetic materials or animal tissue.
- Surgical mesh made of synthetic materials can be found in knitted mesh or non-knitted sheet forms. The synthetic materials used can be absorbable, non-absorbable or a combination of absorbable and non-absorbable materials.
- Animal-derived mesh are made of animal tissue, such as intestine or skin, that has been processed and disinfected to be suitable for use as an implanted device. These animal-derived mesh are absorbable. The majority of tissue used to produce these mesh implants are from a pig (porcine) or cow (bovine) source.
- Non-absorbable mesh will remain in the body indefinitely and is considered a permanent implant. It is used to provide permanent reinforcement to the repaired hernia. Absorbable mesh will degrade and lose strength over time. It is not intended to provide long-term reinforcement to the repair site. As the material degrades, new tissue growth is intended to provide strength to the repair.

Characteristics Of Mesh

- Woven, knitted or sheet
- Synthetic or biological-synthetic
- Light, medium or heavy weight
- Large pore, small pore-large pore causes less fibrosis and

- pain
- Intrapertoneal use of not, non adhesive mesh on one side
- Non absorbable or absorbable. Non absorbable

Hernioplasty Basics

Two fundamental Concepts:

- Aponeurotic closure of the myopectinal orifice
- Replacement of the defective transversalis fascia with a prosthesis

Tension is the principal cause of failure

Two types:

- Anterior or classical repair
- Posterior or pro-peritoneal

Anterior Classical Groin Hernioplasty

Only three approaches are still used:

- Marcy simple repair
- Bassini Repair (modified to Shouldice)
- McVay-Lotheissen Cooper ligament repair

Three parts

- Dissection of the Inguinal canal
- Repair of the myopectinal orifice
- Closure of the inguinal canal

A. Dissection of the canal

- Opening of the Inguinal Canal
- Preservation of the ilio-inguinal nerve
- Division of the cremaster muscle (often omitted by surgeons)
- Exposure of the deep ring
- Mobilisation of the spermatic cord
- Division plus excision of the weak area in post wall of the inguinal canal (often omitted by surgeons)
- Elimination of the peritoneal sac
- Removal of the cord lipoma
- Dissection is as important as repair

B. Repair of the myopectinal orifice contrary to the belief of some surgeons, the anatomy of the deep ring is such that strangulation of the spermatic cord by reconstruction of the posterior wall of the inguinal canal is virtually impossible. Indeed, insufficient repair of the deep ring is the principal cause of indirect recurrence.

Marcy Repair is called simple ring closure, it consists of tightening an enlarged deep ring only, is indicated in men and women who have indirect hernia with only minimal damage to the deep ring is the hernioplasty of choice for women with indirect inguinal hernia, After dividing the round ligament and eliminating the sac, the deep ring is abolished with a few permanent sutures

Bassini-Shouldice Hernioplasty is indicated in all indirect hernia repair, it consist of high ligation of the sac and approximation of the conjoined tendon and the internal oblique muscle to the shelving of the inguinal ligament with interrupted sutures or by precise imbrication with continuous sutures (shouldice). Does not repair the femoral canal. Repair is none anatomical because the transversalis aponeurosis is sutured to the inguinal ligament. Bassini's operation is Hemiotomy is done to the posterior wall is reinforced by suturing the conjoint tendon to inguinal ligament.

Shouldice operation the incision is made at anterior superior iliac spine to pubic tubercle, the cremaster muscle excised and Hemiotomy done. Redundant fascia transeversalis is excised from deep ring to pubic tubercle, and lower flap of the fascia transversalis is sutured behind the upper flap, upper flap sutured to the inguinal ligament using stainless steel wire or polypropylene. The posterior wall is further reinforced by

suturing the conjoint tendon to inguinal ligament as in Bassini's repair.

Lytle's repair When the deep ring is patulous the fascia transversalis is plicated by suture narrowing the deep ring

McVay Repair is called Cooper ligament hernioplasty, repair the deep ring Hesselbush's triangle and the femoral canal and indicated for the three common types of hernia. Require the excision of the medial portion of the iliopubic tract

McVay Excess tension is always present a relaxing incision is mandatory. C- Closure of the inguinal canal, the aponeurosis of the external oblique is reapproximated and the distal stump of a divided cremaster muscle should be attached to the superficial ring to hitch up the testicle

Hernioplasty is Reinforcement of the posterior wall by synthetic prosthetic material lichtenstein's tension less repair After Hemiotomy, a polypropylene mesh of size 8cm x 6cm. Inferior edge: the lower edge of pubic tubercle, lacunar ligament and inguinal ligament. Medial edge is sutured to rectus sheath. Superior edge to the conjoint tendon and lateral edge is split around the cord at the deep ring, crossed over each other and sutured.

Lichtenstein posterior prosthetic hernioplasty, Properitoneal or Stoppa procedure functionally replace the transversalis fascia. The prosthesis adhere to the peritoneum and render it inextensible so it cannot protrude (Mersilene is preferable). Repair of the wall defect is unnecessary can be performed unilaterally or bilaterally, use transverse or ant groin incision for unilateral approach use Pfannenstiel incision for bilateral approach.

Stoppas repair Laparoscopic Repair includes Trans-abdominal pre-peritoneal (TAPP) repair (uses intra-peritoneal trocars and the creation of a peritoneal flap over the posterior inguinal area). Totally extra-peritoneal approach (TEPA). (access to the pre-peritoneal space without entering the peritoneal cavity). Repair is similar in both these techniques. Medial to the inferior epigastric vessels, the mesh is secured to the Cooper ligament, the lacunar ligament, the posterior rectus musculature, and the transversus abdominis aponeurotic arch. Laterally, the mesh is attached to the lateral extension of the transversus aponeurotic arch.

Staples should not be placed below the lateral ilio- pubic tract because of potential injury to the genito- femoral nerve and the lateral femoral cutaneous nerve in this region. Stapling is also avoided in the triangular area inferior to the internal inguinal ring, called the triangle of doom. The triangle is bordered by the ductus deferens medially and the spermatic vessels laterally in the male where the external iliac artery and vein and the femoral nerve are located. The obturator artery is located medial to the triangle of doom but should also be avoided when securing the mesh to the coopers⁴

Complications of hernia surgery

General

- Pulmonary : Atelectasis, Pulmonary embolism, Bronchitis, Broncho- Pneumonia
- Cardiac: Congestive Cardiac Failure
- Urinary retention

Local complications

- Hemorrhage
- Urinary bladder/bowel injury during dissection
- Injury to testicular vessels □ testicular swelling / testicular atrophy
- Tight closure of the external ring □ testicular swelling / testicular atrophy
- Injury to vas deferens,

- Injury to nerves : Ilio-inguinal, ilio- hypogastric, genital branch of genito-femoral
- Wound infection
- Recurrence of hernia

Post operation care of hernia⁵

Does after surgery

- Do follow all instructions provided by health personnel
- Do stay well hydrated
- Do try to stay active and take short walks without over-exerting
- Do take medications as prescribed
- Do avoid constipation by taking stool softeners
- Do get enough rest to assist in recovery, as its more likely to become tired more easily after surgery
- Do wear loose, comfortable clothes that do not rub your incision
- Do be sure to care for the incision as described by your doctor

Do not after surgery⁵

- Do NOT lift heavy items
- Do NOT submerge incision in water such as a bath, swimming pool, or hot tub
- Do NOT engage in strenuous exercise.
- Do NOT drive

Life Style Modification

Diet: There are no specific restrictions, but maintaining a healthy weight is essential. Diets low in fat and high in fiber are recommended to help prevent constipation and the recurrence of your hernia.

Physical Activity: Taking short walks can help you maintain a healthy weight. Avoid vigorous exercise, such as weightlifting or biking.

Avoid smoking: Smoking can negatively affect body's ability to heal and increase your risk of infection. stop smoking for at least 4 weeks prior to your surgery and at least 4 weeks after.

Manual handling: Proper manual handling techniques when lifting or moving a heavy object can help prevent future hernias. Avoid twisting or stooping, and keep your head up when lifting something.⁴

Care of incision site at home⁷

- Wash the surgical area daily with warm water and soap.
- Pat the area dry; never rub or handle vigorously as may reopen the wound.
- If surgical tape is on the incision, leave it on for one week or until it falls off.
- If dissolvable stitches are in the incision site, it will be absorbed over time.
- If staples are used to close the incision, the staples are removed later time.
- The incision site should be covered with a gauze bandage, which should be changed daily.

CONCLUSION

A hernia is a physical opening in the belly or groin, often caused by increased pressure from activities such as coughing, lifting heavy items, or straining to pass stools. Treatment varies depending on the type and severity of the hernia, but often requires surgery to repair it. A hernia repair is generally an outpatient surgery, meaning that most patients can go home on the same day of their operation, though some patients may have to stay in the hospital for a few days. Returning to an active lifestyle is often possible for most patients, with proper care and follow up management.

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