Inguinal Hernias

This comprises a protrusion of abdominal contents through the fascia of the abdominal wall, through the internal inguinal ring. Hernias always contain a portion of peritoneal sac and may contain viscera, usually small bowel and omentum.

Epidemiology

Hernias comprise approximately 7% of all surgical outpatient visits.[1]

- Male:female ratio of groin hernias is 8:1.[2]
- Hernias and hydroceles occur in 1-3% of full-term infants.[3]
- In men, the incidence rises from 11 per 10,000 person-years, aged 16-24 years, to 200 per 10,000 person-years, aged 75 years or above.[4]

Risk factors

- In infants: prematurity, male sex.
- In adults: male sex, obesity, constipation, chronic cough, heavy lifting.

Presentation

- Swelling in the groin that may appear with lifting and be accompanied by sudden pain.
- Indirect hernias are more prone to cause pain in the scrotum and cause a 'dragging sensation'.
- An impulse (increase in swelling) may be palpable on coughing.
It may not be possible to see the hernia if it is reduced.
If a lump is present, it may be reducible.

Congenital inguinal hernias are usually detected at birth and all need urgent outpatient referral for surgical repair.

Inguinal hernias in older children and adults usually develop gradually but can occur suddenly with an episode of heavy lifting causing 'rupture':

- At first appearance, a hernia is usually easily reducible when the patient reclines. However, it may require manual replacement if large.
- With time, the hernia enlarges and becomes harder to replace, due to fibrous adhesions forming.
- When it can no longer be reduced, it is irreducible or incarcerated. This can occur at any time, as can strangulation. This occurs when visceral contents of the hernia become twisted or entrapped by the narrow opening. This compromises the blood supply, causing swelling and eventually infarction. Strangulation usually leads to bowel obstruction.

There are two types of inguinal hernia:

- **Indirect**: a protrusion through the internal inguinal ring passes along the inguinal canal through the abdominal wall, running laterally to the inferior epigastric vessels. This is the more common form accounting for 80% of inguinal hernias, especially in children. It is associated with failure of the inguinal canal to close properly after passage of the testis in utero or during the neonatal period.\[5\]
- **Direct**: the hernia protrudes directly through a weakness in the posterior wall of the inguinal canal, running medially to the inferior epigastric vessels. It is more common in the elderly and rare in children.

The clinical findings will help suggest whether the inguinal hernia is direct or indirect; in adults this is usually confirmed at operation. There may be a limit to the clinical utility of such a distinction, especially in adults.

The less common form is the sliding hernia where a portion of viscera slides behind the peritoneal sac into the inguinal canal with the wall of the organ forming part of the hernial sac.

**Assessment**
- Examine the patient both standing and lying and ask them to cough or strain.
- Insert a finger through the top of the scrotum into the external inguinal ring and palpate for a lump when coughing - cough impulse.
- Sliding hernias are probable with large scrotal hernias.

**Differential diagnosis**
See also separate *Lumps in the Groin and Scrotum* article.

- **Femoral hernia**: this is seen in various forms, at simplest as a small swelling in the top of the inside of the thigh. Alternatively, it may be deflected to appear higher as an inguinal hernia. It is either irreducible or reduces only slowly with pressure.
- **Hydrocele** (when differentiating from an inguinoscrotal hernia, note that it is possible to get above a hydrocele on examination).
- Spermatic cord hydrocele.
- Lymph node swelling.
- Abscess.
- Saphena varix.
- Varicocele.
- Bleeding.
- Undescended testis.

**Investigations**
Ultrasound is the less invasive method, if there is doubt. MRI or CT scanning may also be used.\[5, 6\] Herniography with injection of X-ray contrast agent into the peritoneum is rarely necessary.\[7\]

**Management**

**Adults**\[8\]
If the hernia is small, the patient may only need reassurance. However, there is always the chance of its becoming a surgical emergency through obstruction and incarceration. Episodes of pain and tenderness suggest the need for urgent treatment but when these become prolonged and severe then emergency surgery is indicated for possible strangulation. The fundamentals of indirect inguinal hernia repair are the same regardless of the patient's age. Reduction or excision of the sac and closure of the defect with minimal tension are the essential steps in any hernia repair.

- Conventional surgery was based on Bassini's operation; this consisted of apposition of the transversus abdominis and transversalis fascia and the lateral rectus sheath to the inguinal ligament. The Shouldice technique uses two layers of running suture in a similar fashion.
However, the Lichtenstein technique is widely used, where a piece of open-weave polypropylene mesh is used to repair and reinforce the abdominal wall. This operation is easier to learn, gives earlier mobility and has a very low recurrence rate. The standard repair now uses prostheses, usually polypropylene mesh. It is, however, associated with a slightly increased risk of infection but this can be combated by administering a single dose of intravenous antibiotic 30 minutes before the procedure. Oral antibiotics can also be used. First-line cephalosporins give the best results.

Some of the traditional meshes are heavy and associated with postoperative stiffness and pain. This has led to the development of lighter meshes. A systematic review has failed to find any differences in long-term and short-term complications between the two.\[9\]

Bilateral hernias are best repaired laparoscopically. There is less postoperative pain, full recovery is better and return to work is faster.\[10, 11\] However, the price is increased compared with the conventional approach and there appears to be a higher number of serious complications of visceral (especially bladder) and vascular injuries.\[12\]

There are two approaches: either the transabdominal preperitoneal (TAPP) or the totally extraperitoneal (TEP) procedure. In TAPP, the surgeon goes into the peritoneal cavity and places a mesh through a peritoneal incision over possible hernia sites. TEP is different, as the peritoneal cavity is not entered and mesh is used to seal the hernia from outside the peritoneum. The mesh, where used, becomes incorporated by fibrous tissue.

Meta-analyses found that laparoscopic and open mesh repairs for recurrent inguinal hernias were equivalent in most of the analysed outcomes.

Preferences in surgical techniques vary across the world. In the USA and some parts of Europe, laparoscopic repair is becoming the first-line option for all types of hernias. In the UK, open surgery is still preferred for uncomplicated unilateral hernias. Much depends on cost-effectiveness and the availability of expertise.

Surgery can be performed on a day-case basis; for seven days afterwards the patient should avoid driving and lifting. The patient should be able to resume normal activities over the subsequent 2-3 weeks but, with a heavy job, it can take up to six weeks to return to work.

A truss may be required where surgery is inadvisable or refused; however, it can be difficult for patients to manage and cannot be recommended as a definitive form of treatment.

**Children**

The incidence of incarcerated or strangulated hernias in paediatric patients is 12-16\%.\[13\] 50% of these occur in infants aged younger than 6 months.\[14\]

- Paediatric surgeons will repair soon after diagnosis, regardless of age or weight, in healthy full-term infant boys with asymptomatic reducible inguinal hernias. There is no significant difference in operative time for unilateral hernias but laparoscopy is faster than open surgery for bilateral hernias. There is no difference in recurrence rate but wound infection is higher with open surgery than with laparoscopy.\[15\]

- Inguinal hernias in premature infants are usually repaired prior to discharge from the neonatal intensive care unit (NICU). Since infants are now being discharged home at much lower weights there has been a trend towards postponing surgery for 1-2 months to allow further growth. However one study advocated early surgery in order to avoid perioperative morbidity and to reduce the risk of incarceration, subsequent testicular ischemia and hernia recurrence.\[16\]

- Herniotomy is all that is required with ligation and excision of the patent processus vaginalis.
Complications
These include:

- Recurrence: 1.0% - most happening within five years of operation. Recurrence rate increases:
  - In children aged younger than 1 year.
  - In elderly patients.
  - After incarcerations.
  - In those with ongoing increased intra-abdominal pressure.
  - Where there is growth failure.
  - With prematurity.
  - Where there are chronic respiratory problems.
  - In girls with sliding hernias.

- Infarcted testis or ovary with atrophy.
- Wound infection.
- Bladder injury.
- Intestinal injury.

A hydrocele from fluid accumulation in the distal sac usually resolves spontaneously but sometimes requires aspiration.

Prognosis
This is generally very good, depending on comorbidity.

Further reading & references

5. Burkhard J et al; Diagnosis of Inguinal Region Hernias with Axial CT: The Lateral Crescent Sign and Other Key Findings, 2010.

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