Abdominal Hernia

Omar alnoubani MD, MRCS
• Definition of hernia
• Anatomical landmarks
• Overview of types of hernia
• Presentation and Management of common types of hernia
What is the definition of a hernia?

- An abnormal protrusion of a viscus or part of it from the body cavity through a weakness in the wall of the cavity taking with it all lining of the cavity
Where can hernias occur?

- Via natural orifices
- Via natural ‘weaknesses’
- Via iatrogenic orifices
- Via iatrogenic ‘weaknesses’
Etiology

A) Congenital or B) Acquired

- A) Congenital Hernia:
  - Congenital hernia consists most of the cases of pediatric hernias.
  - In the descent of the testes from the abdomen to the scrotum in the third trimester, a part of the peritoneum descends with it which is called the process vaginalis.
  - In the weeks 36-40 of gestation this process vaginalis closes.
  - Lack of closure of process vaginalis results in a patent process vaginalis which is a reason for the high prevalence of inguinal hernia in the preterm neonates.
  - A lot of the process vaginalises close in a few months after birth and its patency does not necessarily mean that a hernia will be formed.
B) Acquired Hernia:
Patient factors:
Increased Intraabdominal pressure
repeated INCREASE in abdominal pressure is usually due to

- Chronic cough
- Straining
- Bladder neck or urethral obstruction
- Pregnancy
- Vomiting
- Sever muscular effort
- Ascetic fluid
Types of Abdominal Hernia

- Inguinal
- Femoral
- Umbilical/Paraumbilical
- Epigastric
- Incisional
- Parastomal
- Perineal
- Spigelian
- Lumbar
- Obturator
- ‘Internal’
- Hiatus
What can hernias do?

• Nothing
• Lump
• Pain
• Incarcerate;
  – Something gets stuck
• Obstruct;
  – Something gets stuck and blocks off
• Strangulate;
  – Something gets stuck and loses its blood supply
Inguinal Hernia

• About 75% of all hernias happen in the **inguinal region**.

• **90%** of them are in **men** and **10%** in **women**.

• **70%** of **femoral hernia repairs** occur in **women** (although the prevalence of inguinal hernia in women is 5 times that of femoral hernia).

• The **most common inguinal hernia** in women and in men is the **indirect** inguinal hernia.
• About 1/3 of the patients who present with hernia, also develop a **contralateral hernia**.

• Hernia in the **right side** is more **common**.

• The prevalence of hernia in **men** has two **peak ages**: Under **one** and above **40**.

• The **prevalence** of inguinal hernia **increases with age** (especially in **men**).
• Congenital: 15% bilateral, 80-90% in boys
• Undescended and ectopic testes: 90% associated with Inguinal Hernia
Anatomy

• The inguinal canal:-

The inguinal canal is approximately 4 cm long and is directed obliquely inferomedially through the inferior part of the anterolateral abdominal wall.

The canal lies parallel and 2-4 cm superior to the medial half of the inguinal ligament.
Inguinal canal

Here are the anterior wall (which has the SUPERFICIAL inguinal ring situated medially), and the roof.
• **Superficial Inguinal Ring**
  • Triangular defect in the aponeurosis of the external oblique
  • Immediately above and medial to the pubic tubercle
  • Margins give origin to the external spermatic fascia
• Deep Inguinal Ring
• ½ inch above the ligament
• Midway between Anterior superior iliac spine and the Symphysis
• Lateral to the inferior epigastric vessels
• Margins of ring gives origin to the internal spermatic fascia
Inguinal Triangle (of Hesselbach)

Boundaries

Inferiorly = Inguinal ligament (Poupart's ligament)
Medially = Lateral border of rectus abdominis
Superiorly and Laterally = Inferior epigastric artery
**Anterior wall** - Aponeurosis of External oblique
– Reinforced in its lateral third by origin of the Internal oblique
strongest where it lies opposite the weakest part of the posterior wall (deep ring)
**Posterior wall** - Fascia transversalis
– Reinforced in its medial third by the conjoint tendon
Strongest where it lies opposite the weakest part of the anterior wall (superficial ring)
**Inferior (floor)** - Rolled-under inferior edge of aponeurosis of the External oblique (the inguinal ligament)
Superior (roof) - Arching lowest fibers of the Int. oblique and transversus abdominis muscles
Content :-

1. Spermatic cord (round ligament of the uterus in female): Hernial sac is anteromedial to spermatic cord.
   The Cord Itself.—The contents of the spermatic cord are
   (a) the ductus (vas) deferens and its artery.
   (b) the testicular artery and venous (pampiniform) plexus.
   (c) the genital branch of the genitofemoral nerve.
   (d) lymphatic vessels and sympathetic nerve fibers.
   (e) fat and connective tissue surrounding the cord and its coverings in various amounts

2. Ilioinguinal nerve.

3. Ilioinguinal lymph node.
Spermatic Cord: Coverings

1. **Internal spermatic fascia:**
   - Derived from **transversalis fascia**

2. **Cremasteric fascia:**
   - Derived from the investing fascia of **internal oblique muscle**.
   - **Cremasteric muscle** is **striated** and innervated by the genital branch of the genitofemoral nerve to elevate the testis (GSE) (draws testis closer to body for protection e.g. in response to cold temperatures)

3. **External spermatic fascia:**
   - Derived from the investing fascia of **external oblique muscle**
# Indirect Versus Direct Inguinal Hernias

<table>
<thead>
<tr>
<th>Indirect Inguinal Hernia</th>
<th>Direct Inguinal Hernia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass through inguinal canal.</td>
<td>Bulge from the posterior wall of the inguinal canal</td>
</tr>
<tr>
<td>Can descend into the scrotum.</td>
<td>Cannot descent into the scrotum.</td>
</tr>
<tr>
<td>Lateral to inferior epigastric vessels.</td>
<td>Medial to inferior epigastric vessels.</td>
</tr>
<tr>
<td>Reduced: upward, then laterally and backward.</td>
<td>Reduced: upward, then straight backward.</td>
</tr>
<tr>
<td>Controlled: after reduction by pressure over the internal (deep) inguinal ring.</td>
<td>Not controlled: after reduction by pressure over the internal (deep) inguinal ring.</td>
</tr>
<tr>
<td>The defect is not palpable (it is behind the fibers of the external oblique muscle).</td>
<td>The defect may be felt in the abdominal wall above the pubic tubercle.</td>
</tr>
<tr>
<td>After reduction: the bulge appears in the middle of inguinal region and then flows medially before turning down to the scrotum.</td>
<td>After reduction: the bulge reappears exactly where it was before.</td>
</tr>
</tbody>
</table>
Femoral Canal

The major feature of the femoral canal is the femoral sheath. This sheath is a condensation of the deep fascia (fascia lata) of the thigh and contains, from lateral to medial, the femoral artery, femoral vein, and femoral canal. The femoral canal is a space medial to the vein that allows for venous expansion and contains a lymph node (node of Cloquet).

Other features of the femoral triangle include the femoral nerve, which lies lateral to the sheath,

- **Wall of The Femoral canal**
  - anterior is the inguinal ligament
  - posterior is the iliopsoas, pectineal, and long adductor muscles (floor).
  - Medial is lacunar ligament
  - Lateral is femoral vessels
Femoral nerve
Femoral canal
Great saphenous vein
Femoral sheath
Femoral Hernia

History

• Age: uncommon in children, most common in old age female.
• Sex: women > men (but still commonest hernia in women the inguinal hernia)
• The patient came with local symptoms
  • 1- discomfort and pain
  • 2- swelling in the groin
• General: femoral hernia is more likely to be strangulated than the inguinal hernia, 40% risk
## Femoral Hernia versus Inguinal Hernia

<table>
<thead>
<tr>
<th>Inguinal hernia</th>
<th>Femoral hernia</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- more common in male</td>
<td>1- more common in females</td>
</tr>
<tr>
<td>2- pass through the inguinal canal</td>
<td>2- pass through the femoral canal</td>
</tr>
<tr>
<td>3- neck of the sac is above and medial the pubic tubercle</td>
<td>3- neck of the sac is below and lateral the pubic tubercle</td>
</tr>
<tr>
<td>4- less common to be strangulated</td>
<td>4- more common to be strangulated</td>
</tr>
<tr>
<td>5- can be treated without surgery</td>
<td>5- must be treated surgically</td>
</tr>
<tr>
<td>6- the two diagnostic signs of hernia +</td>
<td>6- the two diagnostic signs of hernia -</td>
</tr>
<tr>
<td>7- the sac mainly contain ; bowel</td>
<td>7- the sac mainly contains ; omentum</td>
</tr>
</tbody>
</table>
variants

• Sliding Hernia: retroperitoneal structure slides down and herniates into inguinal canal dragging overlaying peritoneum with it.

• Littre’s Hernia: Meckels

• Maydl’s: (W)

• Amyand’s: Appendix

• Richter: Part of the circumference
Management and repair
Inguinal Hernia Repair

Pre op Evaluation & preparation

Reduction

Surgical

Surgical TTT

Choice of Anesthetic

TTT of hernial sac

Inguinal floor reconstruction
Pre op evaluation & preparation

- Watchful Waiting
- Surgical TTT

May be appropriate for pt with asymptomatic hernia or elderly pt with minimal symptoms or easily reduced inguinal hernia.

Routine F/U with health care professional

A Randomized trial concluded that this is an acceptable option for men with minimally symptomatic inguinal hernia and that delaying repair until symptoms increase is safe due to low rate of incarceration. 23% of pt initially treated with watchful waiting crossed over to surgical ttt due to increase in symptoms (most often hernia-related pain), only 1 pt (0.3%) experienced acute hernia incarceration without strangulation within 2 years, a second had acute incarceration with bowel obstruction at 4 years, corresponding to frequency of acute intervention of 1.8/1000 pt-years (JAMA 2006,295:285)
Pre op preparation

- Most pt are treated surgically
- Increase IAP abnormalities (Chronic cough, Constipation, Bladder outlet obstruction) should be evaluated and remedied to extent possible before elective herniorrhaphy.
- In case of intestinal obstruction and possible strangulation, Broad spectrum AB, NG suction may be indicated, correction of volume status & electrolytes.
Reduction

• Uncomplicated:
  • Manual → Gentle pressure over hernia → Gentle traction over the mass → sedation and trendelenburg position.

• Complicated (strangulated):
  • no attempt should be made to reduce the hernia because of potential reduction of gangrenous segment of bowel with the hernial sac.
Surgerical TTT

• Herniotomy till age of 10
• Herniorraphy in adult
• Open vs Lap.
• Mesh: synthetic vs biological
• Ideal: Non allogenic, non carcinogenic, easy to incorporate, give strength and degree of flexibility
INDIRECT: sac is dissected free from the cord structures and cremasteric fibers. Sac should be open away from any herniated contents. Contents are then reduced, and the sac is ligated deep to inguinal ring with an absorbable suture.

DIRECT:
- Too broadly based for ligation and should not be opened, simple freed from transversalis fibers and inverted.
Femoral hernia repair

• Femoral hernias should be repaired very soon after the diagnosis has been made because of the high risk of strangulation.
• There is no place for a truss for a femoral hernia.
  • Different approaches:
    Open VS Laparoscopic
Open surgery

Three approaches have been described for open surgery:

1. Infra-inguinal approach (Lookwood)
2. Supra-inguinal approach (McEvedy)
3. Trans-inguinal approach (Lotheissen)
Umbilical Hernia

• Common in infant when umbilical vessels fail to fuse with urachal remnant and umbilical ring
• F>M
• Majority close spontaneously by age of 4
Periumbilical Hernia

• Defect through midline just above the Umbilicus
• F>M, More in obese
• High incidence of strangulation but usually omentum
• Repair: Mayo vs Mesh
Epigastric

• Midline between xiphisternum and umbilicus
• 30% Multiple
• Painful due to herniation of periperitoneal fat through a small defect
Incisional

• M=F
Rare

- Spigelian Hernia