Absite Review Series

Hernias II - Abdominal Wall Hernia

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ACGME Core Competencies

Medical Knowledge
Patient Care
Interpersonal Skills
Practice Based Learning
Systems Based Learning
Professionalism
Questions

1. Which of the follow is the most common anterior abdominal wall hernia?
   a. epigastric hernia
   b. umbilical hernia
   c. incisional hernia
   d. sphegalian hernia
   e. obturator hernia

2. Which of the following form the border of Superior lumbar hernia?
   a. latissimus dorsi
   b. serratus posterior inferior
   c. posterior border of internal oblique
   d. Iliac Crest

3. Which of the following prosthetic mesh is ideal for intraperitoneal use?
   a. polypropylene mesh
   b. PTFE mesh
   c. vicryl mesh
   d. parietex mesh

4. Which of the following is an ideal characteristic of bio-prosthetic mesh
   a. causes foreign body reaction so the mesh can be well incorporated into surrounding tissues.
   b. non carcinogenic
   c. chemically inert
   d. easily bio-degradable.
   e. easily sterilized
Abdominal Wall Hernia

- Anatomy of Abdominal Wall
- Types of Abdominal Wall Hernia
- Surgical Repair
Anatomy of Abdominal Wall

- Complex, layered structure with a segmentally derived blood supply and innervation

Boundaries of Abdominal Wall

- Superiorly by the costal margins
- Inferiorly by the symphysis pubis and pelvic bones
- Posteriorly by the vertebral column
Anterior Abdominal Wall
Anterior Abdominal Wall

- **Rectus Abdominus muscle:**
  - Encased within an aponeurotic sheath
  - Layers of which are fused in the midline at the linea alba
  - Lateral border of the rectus muscles assumes a convex shape that gives rise to the surface landmark, the linea semilunaris
Anterior Abdominal Wall

- **RECTUS SHEATH**

- Anterior and posterior aspects of the rectus sheath with respect to arcuate line (semicircular line of Douglas)
Acquired Abnormalities of Abdominal Wall

- Rectus abdominis diastasis (or diastasis recti):
  - Clinically evident separation of the rectus abdominus muscle pillars

- Congenital – lateral insertion of rectus

- Acquired - advanced age, obesity, pregnancy
Acquired Abnormalities of the Abdominal Wall

- Diastasis Recti
Abdominal Wall Hernias

- Anterior abdominal wall, or ventral hernias
  - Defects in the parietal abdominal wall fascia and muscle through which intra-abdominal or preperitoneal contents can protrude.
  - Due to
    - Slow architectural deterioration
    - Poor wound healing
  - Mass or bulge in anterior abdominal wall with Valsalva
Clinical Features

- **Uncomplicated hernia** -
  - Mass or bulge in anterior abdominal wall with valsalva.
  - Reduces spontaneously with recumbency.
  - Does not trans-illuminate.
  - Edges of defect can be easily palpated.
Complications

- A hernia that cannot be reduced is described as incarcerated.

Obstruction:

- Incarceration of intestinal segment
- 3rd most common cause of obstruction

Strangulated hernia – compromise to blood supply to an incarcerated bowel.

Richter’s Hemia

- Part of the bowel wall herniates through the defect
Complications - Richter’s Hernia
Types of Ventral Hernia

- Epigastrica
- Umbilical
- Semilunar
- Incisional
Ventral Hernia

- **Primary Ventral hernia**
  - Epigastric hernias: located in midline between Xiphoid and umbilicus.
    - Small and multiple
    - found to contain omentum or a portion of the falciform ligament
- **Umbilical Hernia**: at the umbilical ring
  - 10% of all newborns
  - Spontaneously close by age 5
Epigastric Hernia

A) Normal linea alba

B) Hernia of the linea alba

- Skin
- Fat
- Rectus abdominis m.
- Anterior rectus sheath
- Posterior rectus sheath
- Transversalis fascia
- Peritoneum
Spigelian hernias:
- Occur along the lateral border of rectus muscle ( linea semilunaris )
  - Most commonly at or slightly above the arcuate line ( linea semicircularis ).
- Usually are not clinically evident and present with pain or incarceration.
Spigelian Hernia

A

External oblique m.
Internal oblique m.
Transversus abdominis m.
Transversalis fascia
Peritoneum

B

Linea semilunaris

Hernia

Inferior epigastric a.

External iliac a.

Linea semicircularis (fold of Douglas)

Hesselbach's triangle

Spermatic cord...

C

Aponeurosis of

external oblique m.

Skin

Fat

Anterior rectus sheath

Rectus abdominis m.

Transversalis fascia

Peritoneum

Internal oblique m.

Transversus abdominis m.
Littre's Hernia

- Hemia that contains a Meckel diverticulum in the hernia sac

- Inguinal, 50%; femoral, 20%; umbilical, 20%; and miscellaneous, 10%

- Repair of hemia and excision of the diverticulum
Ventral Hernia

- **Incisional Hernia:**
  - Healing failure of a prior abdominal wall surgical closure.
  - 80% of ventral hernias
  - Up to 10-15% of laparotomy incisions
    - Risk factors include:
      - postoperative wound infection, malnutrition, obesity, immunosuppression, and chronically increased intra-abdominal pressure.
Obturator Hernia

Obturator Canal
- Obturator nerve and vessels.

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Obturator Hernia

- Occurs through the obturator canal accompanied by the obturator vessels and nerves.
- Mostly in women and is associated with a laxity of pelvic floor.
- Causes intermittent pain with palpable mass in upper medial thigh.
- Repair via transperitoneal approach with mesh.

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The posterolateral abdominal wall is bounded as follows:

- Above, by the lower ribs
- Below, by the iliac crest
- Posteriorly, by the vertebral column (five lumbar vertebrae)
- Laterally, by a vertical line starting from the anterior superior iliac spine and traveling upward
The posterolateral abdominal wall is formed by 3 layers of muscles:

- **Superficial**
  - External oblique, lattissimus dorsi

- **Mid-level**
  - Sacrospinous, internal oblique, serratus posterior

- **Deep**
  - Psoas major, transversus abdominus, quadratus lumborum
Boundaries of the Lumbar Triangles

Superior Lumbar Triangle (Lesshaft Space)
- Space between the latissimus dorsi, the serratus posterior inferior, and the posterior border of the internal oblique muscle.
Boundaries of the Lumbar Triangles

**Inferior Lumbar Triangle (of Petit)**

- space bounded by the latissimus dorsi posteriorly, the iliac crest inferiorly, and the posterior border of the external oblique anteriorly
Secondary Lumbar Hernia:

- As a result of trauma, mostly surgical (e.g., renal surgery), or infection (spinal tuberculosis with paraspinal abscesses)
Sciatic Hernia

- Protrusion of a peritoneal sac through the major or minor sciatic foramen.
- Very rare
- Present with a swelling on the buttock
- Can entrap sciatic nerve or ureter
- Requires a prosthetic mesh repair via transperitoneal or trans-gluteal approach
Sciatic Hernia

Types of Sciatic Hernia.

- Suprapiriform
- Infrapiriform
- Subspinous
Supravesical Hernia

- Anterior to the urinary bladder
  - Secondary to loss of integrity of the transversus abdominis muscle and the transversalis fascia fail.
- Internal supravesical hernia
  - Can be lateral or posterior to urinary bladder
- Require intraperitoneal approach to repair.
Supravesical Hernia

Peritoneum
Middle umbilical ligament
Transversalis fascia
Rectus abdominis muscle
Pubic symphysis
Anterior internal supravesical hernia into retropubic space of Retzius
Vagina (cervix and uterus removed)

Supravesicular fossa
Lateral umbilical ligament
Bladder
Posterior internal supravesical hernia in retrovesicular space
Vesicorectal space
Rectum
Principles of Repair

- Reduce the contents of hemia
- Identify / delineate the defect
- Tension-free closure of the hemia defect to attain the lowest possible recurrence rate.
  - Either primary or with bio-/prosthetic materials
Ideal Bio-prosthetic Material

- should not be physically modified by tissue fluids;
- should be chemically inert;
- should not excite an inflammatory or foreign body reaction;
- should be noncarcinogenic;
- should not produce a state of allergy or hypersensitivity;
- should be capable of resisting mechanical strains;
- should be capable of being fabricated in the form required; and
- should be capable of being sterilized.
Types of Prosthetic Materials

- Polypropylene mesh
  - Decreased compliance and restricted mobility
  - Strong scar plate formation with stiffness and discomfort
  - Should not be used against viscera as it can cause bowel ingrowth and fistula formation
- Sepra Mesh - PPM coated with protective layer so it can be used against viscera.
Types of Prosthetic Materials

- Polyester mesh
  - Very soft and supple and conforms readily
  - Higher infection rate
  - Parietex Composite mesh (collagen membrane on one side)
    - Can be placed intraperitoneally

- e-PTFE patch (Polytetrafluoroethylene)
  - Most inert, higher rate of infection
  - Can be safely placed in peritoneal cavity.
  - Composite mesh
    - 2 layers – PTFE and polypropylene
      - PPM allows ingrowth of abdominal wall.
Human or animal tissue
- Remove cellular component to avoid allergic reaction
- Stabilize the protein structure so it can act as a scaffold

Surgisis (porcine gut submucosa)
- Good short term results
- Should not be used as a bridge
- Underlay or overlay of native tissue to allow for vascular ingrowth.
- Disappears completely
- Rely on the native host collagen for long term strength
Biologic Mesh

- *Alloderm (cadaver dermis)*
  - can stretch and lose its shape

- No long term results are available
- Recurrences occur after 1-2 years
Components Separation (Ramirez 1990)
- enlarge the abdominal wall by movement of the muscular layers

Steps:
- Dissect the skin and fat off of the muscles to a distance of about 5 cm lateral to the lateral border of the rectus.
- Incision is then made in the rectus sheath and the muscle is mobilized off of the posterior sheath.
Incisional Hernia Repair

- Incise the aponeurosis of the external oblique muscle 1 to 2 cm lateral to the lateral border of the rectus muscle (along the entire length)
- Rectus fascia is then closed in the midline
- Allows advancement of the rectus 3 to 5 cm in the upper abdomen, 7 to 10 cm in the midabdomen, and 1 to 3 cm in the lower abdomen
Conclusions

- Abdominal wall hernias can be a challenging surgical problem.
- Understanding of the anatomy and various surgical options are integral to achieve good results.
References