

Inguinal Hernia

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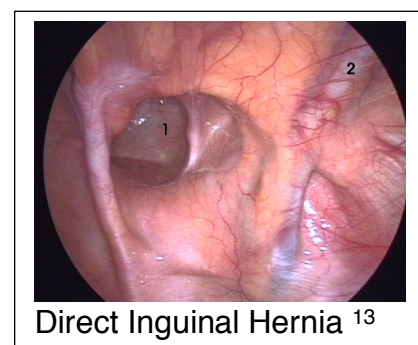
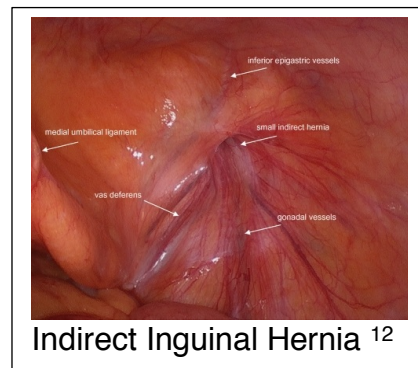
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Definitions and Descriptors

Definitions ^{1,2}

MN

- **Indirect Inguinal Hernia:** Hernia Through the **Processus Vaginalis**
 - The Most Common Inguinal Hernia
 - **Lateral** to Inferior Epigastric Vessels
 - Sac Protrudes Through the Inguinal Ring Anterior and Medial to the Cord Structures
- **Direct Inguinal Hernia:** Hernia Through **Hasselbach's Triangle**
 - Due to a Weakness in the Transversalis Fascia
 - **Medial** to Inferior Epigastric Vessels
 - Sac Protrudes Through the Posterior Wall of the Inguinal Canal
 - Lower Risk of Incarceration but Higher Risk of Recurrence
- **Pantaloon Hernia:** Hernia with Both Direct and Indirect Components



Sex Differences

- Lifetime Prevalence: ³
 - Males: 27-43%
 - Females: 3-6%
- Anatomic Differences in Females: ⁴

Rico JD. Inguinal Hernia.

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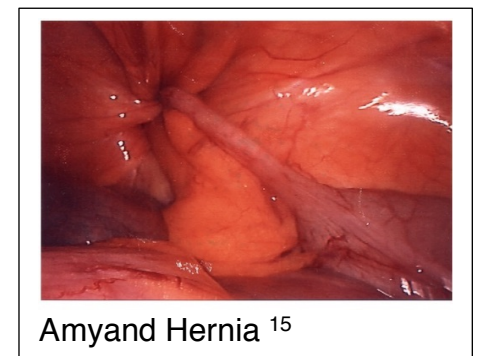
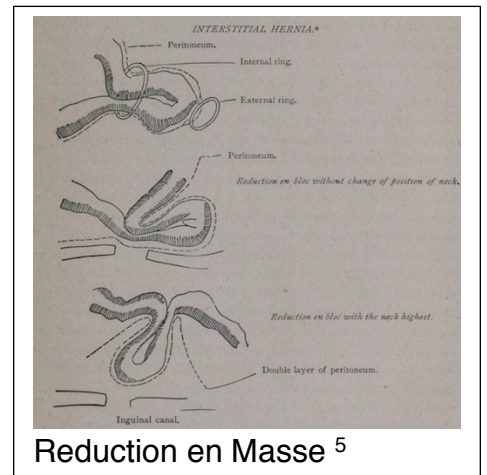
- Greater Distance Between Pubic Tubercle and Internal Ring
- Wider Rectus Muscle
- Narrower Internal Ring

Basic Hernia Descriptors

- *Reducible*: Able to Reduce/Push the Hernia Contents Back into the Abdominal Cavity
- *Incarcerated*: Unable to Reduce/Push the Hernia Contents Back into the Abdominal Cavity
 - Causes a Risk of Strangulation
- *Strangulated*: Hernia Blood Supply is Obstructed
 - Causes a Risk of Ischemia and Necrosis (Surgical Emergency)

Additional Descriptors MN

- *Reduction en Masse*: Hernia Sac is Reduced but the Bowel is Still Incarcerated within the Reduced Sac ⁵
 - Causes a Risk of Progression to Ischemia and Necrosis Despite Reduction
 - “Classically” Describing an Inguinal Hernia ⁵
- *Richter Hernia*: Only the Antimesenteric Border of the Bowel Wall is Herniated ⁶
 - Also Described as a “Partial Enterocoele” ⁶
 - May Not Cause Obstruction as Bowel Contents Can Pass Through the Intraperitoneal Portion of the Bowel
 - High Risk of Incarceration and Strangulation of the Herniated Portion
- *Littre Hernia*: Hernia Contains a Meckel Diverticulum ⁷
- *Amyand Hernia*: Hernia Contains the Appendix ⁸
 - “Classically” Describing an Inguinal Hernia
- *Sliding Hernia*: A Retroperitoneal Organ is Included as Part of the Hernia Sac ⁹
 - Most Common Organs:
 - Males: Sigmoid Colon and Cecum
 - Females: Ovary and Fallopian Tube (Ligate the Round Ligament and Return the Ovary at Surgery)



Other Groin Hernias

- *Femoral Hernia*
 - *See Femoral Hernia
- *Obturator Hernia*
 - *See Obturator Hernia
- *Athletic Pubalgia (Sports Hernia)*
 - *See Athletic Pubalgia (Sports Hernia)
 - Not a True Hernia
- *96% of Groin Hernias are Inguinal, 4% are Femoral ^{10,11}

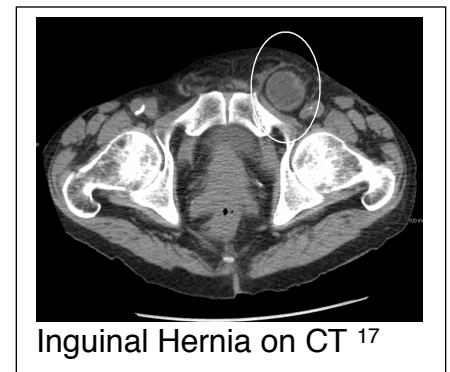
Presentation and Diagnosis

Presentation

- Groin Bulge
- Groin Pain and Discomfort
 - May be Worsened by Coughing or Straining
- Symptoms of Bowel Obstruction
 - Nausea and Vomiting
 - Constipation
- Risk for Bowel Incarceration, Strangulation, and Necrosis
- Overlying Skin Can Develop Erythema, Ischemia, or Ulceration Due to Excessive Pressure

Diagnosis

- Generally a Clinical Diagnosis
 - 75% Sensitivity, 96% Specificity by Physical Exam ¹⁶
 - Small Hernias May Be Difficult to Palpate
 - More Difficult to Diagnose in Females and Obese
- Imaging May Be Required if Uncertain
 - US – More Cost Effective and Allows Dynamic Assessment with Valsalva (Operator Dependent)
 - CT – Allows Better Evaluation of Large and Complex Defects



Treatment

Treatment

- *Asymptomatic or Minimal Symptoms*: Watchful Waiting vs Surgical Repair
 - Choice Based on Patient Preference
 - No Evidence that Physical Activity Can Cause Incarceration or Clinical Worsening of Existing Hernias – Exercise and Beneficial Physical Activity Should Not Be Avoided ¹⁸
- *Symptomatic*: Surgical Repair
- *Necrotic Bowel*: Open Repair with Small Bowel Resection
 - Avoid Permanent Mesh with Bowel Necrosis – Historically Did a Tissue Repair but Now Able to Use Absorbable or Biologic Mesh

Asymptomatic Prognosis

- Low-Risk of Incarceration (0.3-3% Per Year) ¹⁹⁻²²
- 30-70% Eventually Become Symptomatic and Require Repair ²³⁻²⁶

Surgical Technique

- *Open Inguinal Hernia Repair*
 - *See Open Inguinal Hernia Repair
- *Minimally Invasive (Laparoscopic/Robotic) Inguinal Hernia Repair*
 - *See Minimally Invasive Inguinal Hernia Repair
- Open vs Minimally Invasive Comparisons: ²⁷⁻³⁰
 - Similar Recurrence Rates
 - Laparoscopic Benefits:
 - Faster Return to Work/Activity
 - Less Postoperative Pain
 - Lower Rates of Chronic Pain
 - Better Choice for Bilateral Hernias – Repair Both Through the Same Incisions
 - Open Benefits:
 - Shorter Learning Curve
 - Shorter Operative Time
 - Decreased Cost
 - Can Possibly Perform Under Local Anesthetic and Avoid General Anesthesia if Severe Comorbidities Preclude

Hernia in Pediatrics

- *See Abdominal Wall Hernia in Pediatrics

Recurrent Inguinal Hernia

Definitions

- *Primary Hernia* – The Initial Hernia, Not Previously Repaired
- *Recurrent Hernia* – Hernia that Develops After it was Initially Repaired
- *Re-recurrent Hernia* – Hernia that Develops After At Least Two Prior Repairs
- *Neglected Hernia* – Hernia That was Missed During Repair of Another Hernia

Rates of Recurrence ^{11,31,32}

- *Tissue Repair*: 10-30%
 - *Shouldice Repair Specifically Has Been Reported to Have Significantly Lower Risk of Recurrence than Other Tissue Repairs (2.2%)
- *Mesh Repair*: 3-4%
 - No Difference Based on Type of Mesh Used
 - No Difference Between Open or Minimally Invasive ²⁷⁻³⁰

Timing vs Etiology ³³

- *Early Recurrence* (< 3-6 Months) – Generally the Result of Technical Error
 - Immediate Recurrence May Be Due to Neglected/Missed Hernia
- *Late Recurrence* (> 6-12 Months) – Generally from Patient Factors

Risk Factors ^{11,33-35}

- Technical Factors:
 - Violent Extubation
 - Coughing Attack in the First Few Weeks of Repair
 - Incomplete Dissection of the Myopectineal Orifice
 - Incomplete Reduction of Hernia Sac
 - Mesh of Insufficient Size
 - Mesh Migration
 - Mesh Shrinking
 - Mesh Folding/“Clam-Shelling”
 - Unresected Cord Lipoma Can Cause a “Pseudo-Recurrence”
- Patient Factors:
 - Diabetes
 - Obesity
 - Smoking
 - Immunosuppression
 - Steroid Therapy
 - Chemotherapy
 - Direct Hernia – Inherent Tissue Weakness

Most Common Site

- Open Repair – Direct Hernia ^{34,36}
- Laparoscopic Repair – Indirect Hernia ^{37,38}

Approach Definitions

- *Anterior Approach*: Traditional Open Repairs (Mesh or Tissue)
- *Posterior Approach*: Preperitoneal Repair
 - Minimally Invasive (Laparoscopic/Robotic) or a Trans-Inguinal Preperitoneal (TIPP) Repair

Treatment

- *Asymptomatic or Minimal Symptoms*: Watchful Waiting vs Surgical Repair
 - Choice Based on Patient Preference
- *Symptomatic*: Surgical Repair
 - Previous Tissue Repair: Any Approach
 - Previous Mesh Repair: Approach Through **Unviolated Tissue Planes**
 - Failed Anterior Repair: Posterior Approach

- Failed Posterior Repair: Anterior Approach
- Leave a New Mesh, Even if Mesh Was Already Used Previously
 - Do Not Remove Old Mesh

Mnemonics

Inguinal Hernia Relationship to Epigastric Vessels

- “M.D.s don’t Lle”
- MD: Medial to Epigastrics – Direct
- LI: Lateral to Epigastrics – Indirect

Pantaloon Hernia

- Pantaloon – A Type of Old Time Baggy Pants
- Think of Pant Legs Going Down Both Sides

Hernia Descriptors

- Litre-Little: “Little” Ones Have Meckel’s (Most Common Before Age 2)
- A-A: Amyand-Appendix

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