Ultrasound of Hernias

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Objectives:
• Groin pain
• Inguinal region hernias
• Sports hernia

Groin Pain:
• Hip joint: labral tear
• Pubic symphysis
• Fracture
• Tendon tear
• Inguinal hernia
• Algorithm: radiographs, US, MRI

US protocol:
• Hip joint: effusion, labrum
• Tendons:
  – Rectus abdominis, adductors
  – Rectus femoris, sartorius
• Inguinal region hernias
  – Include Valsalva

Inguinal Region Hernia:
• Indirect inguinal
• Direct inguinal
• Femoral
• Spigelian
Imaging Inguinal Hernias:

- In diagnosis of occult inguinal hernias:
  - Ultrasound:
    - 86% sensitivity and 77% specificity
  - CT:
    - 80% sensitivity and 65% specificity
  - Herniography:
    - 91% sensitivity and 83% specificity

Robinson A. Surg Endosc 2013; 27:11

Inguinal Region Hernia: Posterior View

- Rectus Abdominis
- Inferior Epigastric Artery
- Inguinal Ligament

Inguinal Region Hernia: Posterior View

- Hesselbach’s Triangle
- Deep Inguinal Ring
- Femoral Ring

Jamadar et al. AJR 2006; 187:185

How do you Valsalva?

- Tighten belly
- Hold breath
- Blow on back of hand
- Stand up
- Clue: femoral vein should distend

Indirect Inguinal Hernia:

- Extends through deep inguinal ring
- Lateral to external iliac artery
- Courses medial within inguinal canal
- Parallel to skin surface
- May contain fat or less commonly bowel
- Confirm in two planes
Indirect Hernia

Indirect Inguinal Hernia

Indirect Inguinal Hernia: containing bowel

Indirect Hernias: Pitfalls

- Relying on transducer position in plane or long axis to inguinal canal
  - Must scan short axis to inguinal canal
- Lipoma of inguinal canal
  - True hernias enter through internal ring
- Round ligament varicosities: pregnancy
  - Do not call hemangiomas
Indirect: Pitfall
- You must also scan area in the sagittal plane short axis to inguinal canal
- Inguinal canal may move out of plane relative to transducer

Indirect Hernia: Pitfall
- Lipoma of spermatic cord
- May simulate indirect hernia
- True hernia will enter through internal inguinal ring
Indirect: Pitfall
- Round ligament varicosities
- Early 3rd trimester of pregnancy
- Resolves after childbirth
- Do not misinterpret as vascular malformation

Kahriman G. J Clin Ultrasound 2010; 38:512

Indirect: Pitfall
- Canal of Nuck cyst
- Patent processus vaginalis

Indirect: Pitfall
- Undescended testicle
- In males

Direct Inguinal Hernia:
- Extends through Hesselbach’s triangle
- Medial to external iliac artery
- Protrudes anterior toward skin surface
- May contain fat or less commonly bowel
- Confirm in two planes

Direct Inguinal Hernia
**Direct Inguinal Hernia**

Medial  
Lateral

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**Direct Inguinal Hernia**

+ Valsalva

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**Direct Inguinal Hernia**

+ Valsalva

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**Direct Hernia: Pitfall**

- If only scanning long axis to inguinal canal in Hesselbach’s triangle
- Intra-abdominal contents may move inferior
- Simulate direct hernia
- True hernia shows focal movement in two planes

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**Pseudo Direct Hernia**

Transducer: Axial Plane

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**Pseudo Direct Hernia**

Transducer: Sagittal Plane

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Direct Inguinal Hernia

Axial Sagittal

Medial Lateral Superior Inferior

Artery

"Sports Hernia": medial direct inguinal hernia

Medial Lateral

Inguinal Hernias: reporting

- Indirect inguinal:
  - Contents
  - Cross-section and length
  - Incarcerated or reducible
- Direct inguinal
  - Contents
  - Cross-section and height

Femoral Hernia:

- Extends through femoral ring
- Usually medial to femoral vein
- Protrudes inferior to inguinal ligament
- May contain fat or less commonly bowel
- Confirm in two planes
- Femoral vein should distend with adequate Valsalva!

Femoral Hernia

Medial Lateral

V A
**Spigelian Hernia:**
- Extends lateral to rectus abdominis
- Protrudes anterior toward skin surface
- May contain fat or less commonly bowel
Hernia Repair:
- Polypropylene mesh
- Placed laparoscopically
- Between transversalis fascia and anterior abdominal muscles
- Ultrasound: echogenic and shadowing


Recurrent Inguinal Hernia
- Medial
- Lateral

Umbilical Hernia
- Transverse
- Sagittal

Rectus Sheath Hematoma
- Canal of Nuck cyst
- Patent processus vaginalis

**Other Masses**

- Ewing Sarcoma
- Ovarian Carcinoma

**Take Home Points**

- Anatomic landmarks:
  - Inferior epigastric artery, Hesselbach’s triangle
  - Indirect: lateral to vessels, moves medial
  - Direct: medial to vessels, moves anterior
  - Femoral: inferior to inguinal ligament
- Confirm in two planes

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