

UT Southwestern Department of Radiology

Ultrasound – Hernia Evaluation

PURPOSE:

To evaluate for hernias of the anterior abdominal wall or inguinal region.

SCOPE:

Applies to all ultrasound studies performed for the evaluation of abdominal or inguinal hernias in:

- UT Southwestern University Hospitals and Clinics, Imaging Services (UTSW)
- Parkland Health and Hospital System, Department of Radiology (PHHS)

INDICATIONS:

- Signs (example: mass) or symptoms (examples: pain, fullness) associated with hernia
- Abnormal findings on other imaging studies
- Follow up known hernia

CONTRAINDICATIONS:

No absolute contraindications

EQUIPMENT:

Linear array transducers with a frequency range of 10-12 MHz and large field of view (5 cm). Linear, sector, or curvilinear transducers with a frequency range of 2-9 MHz may be required for appropriate penetration and resolution depending on patient's body habitus.

PATIENT PREPARATION:

- None

EXAMINATION:

GENERAL GUIDELINES:

A complete examination includes evaluation of the region corresponding to the patient's signs or symptoms.

EXAM INITIATION:

- Introduce yourself to the patient
- Verify patient identity using patient name and DOB
- Explain test
- Obtain patient history including symptoms. Enter and store data page
- Place patient in supine and/or standing position

TECHNICAL CONSIDERATIONS:

- Review any prior imaging, making note of associated abnormalities requiring evaluation.
- Images should be taken with and without Valsalva maneuver, with proper annotation.
- Images should be taken supine and standing, with proper annotation.
- Hernia sac and hernia neck should be documented with size measurements.
- Contents of the hernia sac (bowel, fluid, etc) should be evaluated. For instance, detection of bowel gas and peristalsis indicate a bowel-containing hernia.
- Evaluated for reducibility, tenderness, and change in overlying skin color (erythema).

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- Fat/omental herniation may appear indistinct from the surrounding subcutaneous fat. Higher frequency transducer and movement of fat during Valsalva can help discern the two.
- To distinguish between indirect, direct, and femoral hernias and identify Spigelian hernias, identify the inferior epigastric artery (IEA) within the anterior abdominal wall, tracing it inferiorly to the origin from the external iliac artery (see Appendix).
- Hernias anterior to the external iliac vein (EIV) and superolateral to the IEA are referred to as Indirect Inguinal Hernias (IIH), and descend into the scrotum through the inguinal canal. These hernias are located anterior to the spermatic cord. See Appendix.
- Hernias anterior to the EIV and inferomedially to the IEA are referred to as Direct Inguinal Hernias (DIH). Direct hernias are located posterior to the spermatic cord. See Appendix.
- Hernias located inferior to the inguinal crease, medial to the common femoral vein (CFV), are likely in the femoral canal. These hernias are more common in females and located in the anterior thigh. See Appendix.
- Anterior abdominal wall hernia that occurs along the lateral margin of the rectus abdominis muscle, the oblique muscle superolaterally, and the IEA inferomedially. See Appendix.

DOCUMENTATION:

- Longitudinal images:
 - Representative images with measurements included if abnormal
 - For inguinal hernias:
 - Repeat in standing position
- Transverse images:
 - Representative images of the palpable or sonographic measurements included if abnormal
 - For inguinal hernias:
 - Identify internal iliac artery at origin with the external iliac artery.
 - Identify common femoral vein.
 - Repeat imaging in standing position
- Cine images:
 - Dynamic images during Valsalva

PROCESSING:

- Review examination images and data
- Export all images to PACS
- Document relevant history and any study limitations

REFERENCES:

ACR-AIUM Practice Guideline (Revised 2007)

Stavros AT et al. Dynamic Ultrasound of Hernias of the Groin and Anterior Abdominal Wall. Ultrasound Quarterly 2010;26:135-169.

APPENDIX:

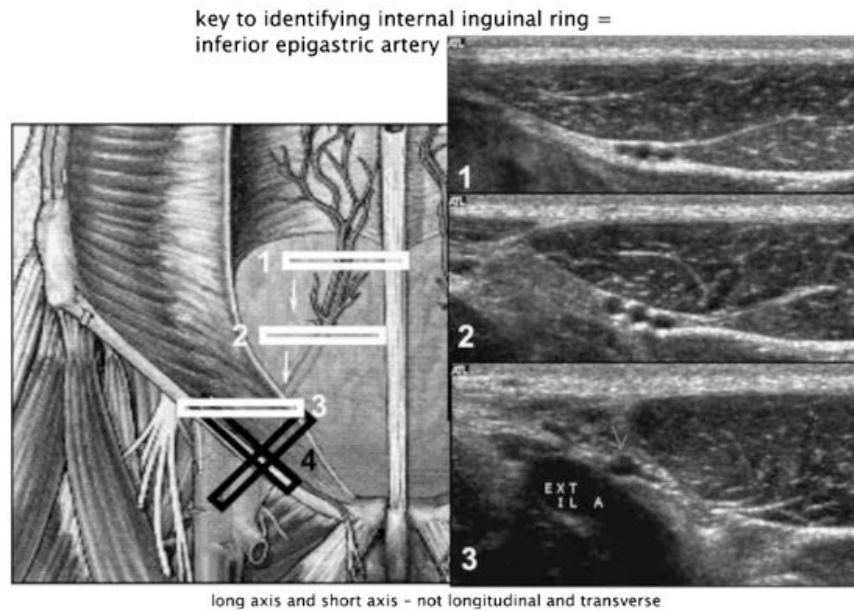


FIGURE 9. Diagram and images of the main landmark for evaluating the inguinal area, the inferior epigastric vessels (EIVs). Image 1 is obtained in a transverse plane about half-way between the umbilicus and the pubic symphysis. The inferior epigastric artery and its paired veins lie along the midlateral posterior surface of the rectus abdominis muscle. Image 2 is obtained several centimeters inferiorly, and the EIVs lie more laterally. Image 3 is obtained at a level where the IEVs (arrow) lie at the edge of the rectus muscle. (This is the level at which most spigelian hernias occur.) Image 4 shows that once the origin of the inferior epigastric artery, the transducer should be rotated into planes that are parallel and perpendicular to the inguinal canal—long-axis and short-axis views.

INDIRECT INGUINAL HERNIA (most common): hernias anterior to the external iliac vein (EIV) and superolateral to the IEA are referred to as Indirect Inguinal Hernias (IIH), and descend into the scrotum through the inguinal canal. These hernias are located anterior to the spermatic cord.

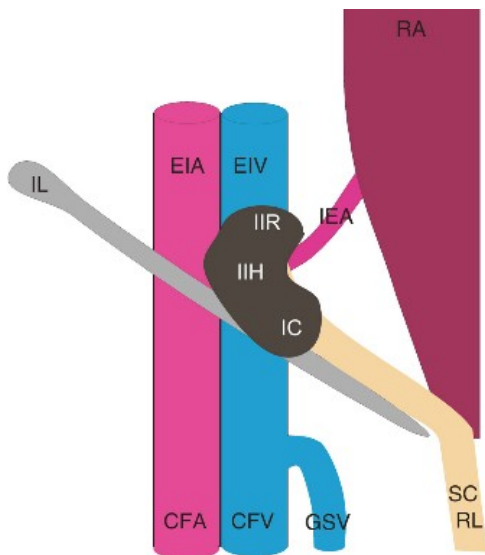


FIGURE 11. This diagram shows the relationship of indirect inguinal hernias (IIH) to the inferior epigastric artery (IEA) origin from the external iliac artery (EIA). The neck of the hernia arises in the internal inguinal ring (IIR), extends anteriorly, then extends inferomedially superficial to the proximal to the IEA and lies anterior to the spermatic cord (SC) in males or round ligament (RL) in females. Other landmarks: CFA indicates common femoral artery; CFV, common femoral vein; EIA, external iliac artery; EIV, external iliac vein; GSV, greater saphenous vein; IC, inguinal canal; IL, inguinal ligament; RA, rectus abdominis.

DIRECT INGUINAL HERNIAS: Hernias anterior to the EIV and inferomedially to the IEA are referred to as Direct Inguinal Hernias (DIH). Direct hernias are located posterior to the spermatic cord.

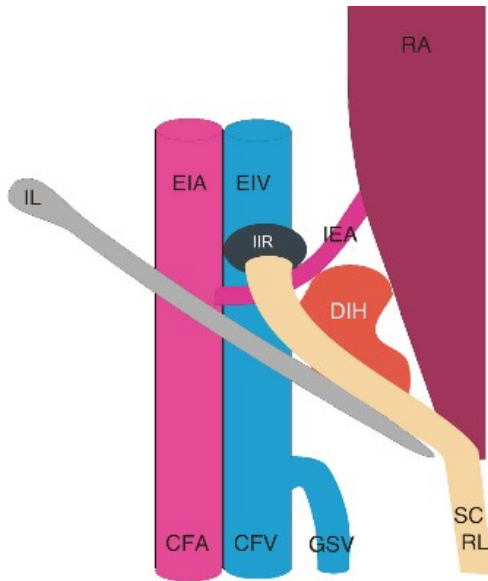


FIGURE 21. Diagram showing the relationship of a direct inguinal hernia (DIH) to the surrounding anatomy. The neck of the hernia arises in the area of the conjoined tendon and lies inferior and medial to the proximal inferior epigastric artery (IEA). The hernia sac does not pass superficial to the IEA and lies posterior and medial to the spermatic cord (SC) or round ligament (RL). CFA indicates common femoral artery; CFV, common femoral vein; EIA, external iliac artery; EIV, external iliac vein; GSV, greater saphenous vein; IIR, internal inguinal ring; IL, inguinal ligament; RA, rectus abdominis muscle; SC/RL, spermatic cord/round ligament.

FEMORAL HERNIAS: Hernias located inferior to the inguinal crease, medial to the common femoral vein (CFV), are likely in the femoral canal. These hernias are more common in females and located in the anterior thigh.

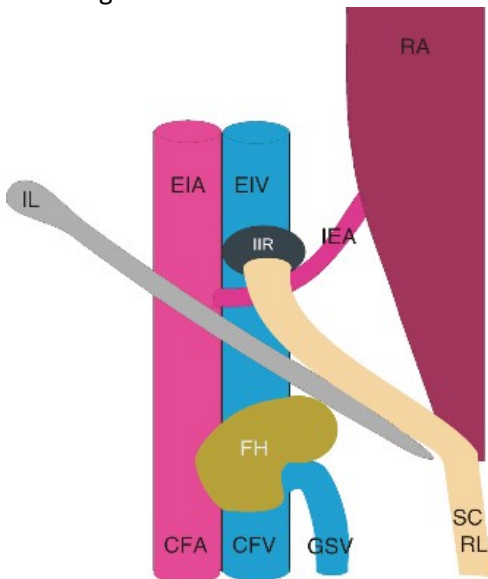


FIGURE 26. Illustration showing the relationship of a femoral hernia (FH) to the surrounding anatomy. Femoral hernias arise within the femoral canal, which lies medial to the common femoral vein just superior to the saphenofemoral junction and inferior to the inguinal ligament. Small femoral hernias remain medial to the CFV, but larger hernias usually wrap around anterior to the CFV. CFA indicates common femoral artery; CFV, common femoral vein; EIA, external iliac artery; EIV, external iliac vein; GSV, greater saphenous vein; IEA, inferior epigastric artery; IIR, internal inguinal ring; IL, inguinal ligament; RA, rectus abdominis muscle; SC/RL, spermatic cord or round ligament.

SPIGELIAN HERNIAS: Anterior abdominal wall hernia that occurs along the lateral margin of the rectus abdominis muscle, the oblique muscle superolaterally, and the IEA inferomedially.

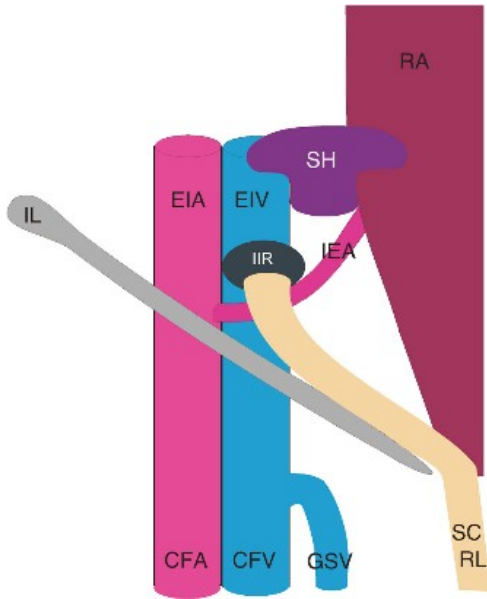


FIGURE 31. Illustration showing the relationship of a spigelian hernia (SH) to the surrounding anatomy. Almost all spigelian hernias arise from the inferior end of the spigelian fascia just lateral to where it is penetrated by the inferior epigastric vessels just lateral to the lateral edge of the rectus abdominis muscle. Although these are usually considered anterior abdominal wall rather than groin hernias, the neck of spigelian hernias often lies within 2 cm of the internal inguinal ring (IIR), where indirect inguinal hernias arise. CFA indicates common femoral artery; CFV, common femoral vein; EIA, external iliac artery; EIV, external iliac vein; GSV, greater saphenous vein; IEA, inferior epigastric artery; IL, inguinal ligament; RA, rectus abdominis muscle; SC/RL, spermatic cord or round ligament.

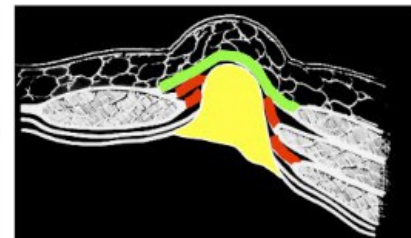
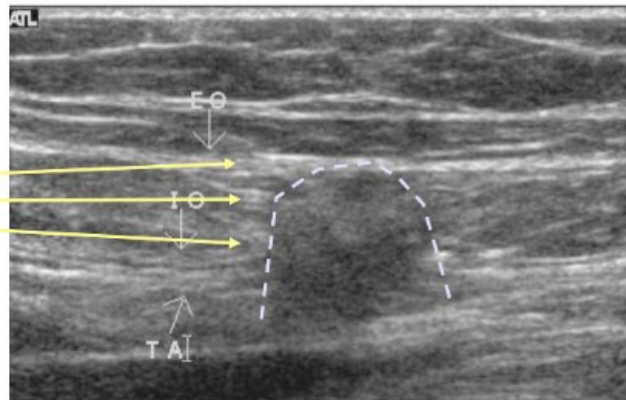
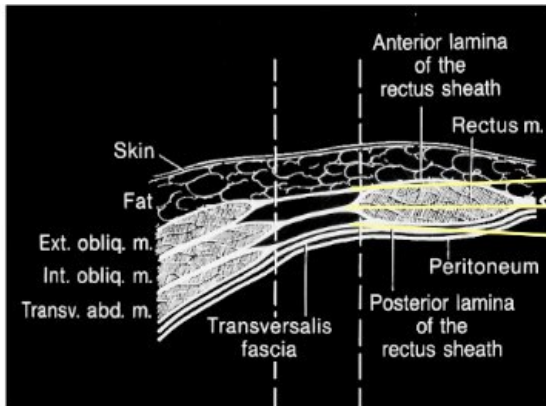


FIGURE 32. Collage of images and illustrations showing a small spigelian hernia in which the aponeuroses of both the transverse abdominis (TA) and the internal oblique (IO) muscles are torn, but in which the external oblique (EO) aponeurosis, as usual, is intact. This is the most common pattern of aponeurosis defects in spigelian hernias. Drawing adapted from Skandalakis.

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REVISION HISTORY:

SUBMITTED BY:	David T. Fetzer, MD	Title	Medical Director
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REVIEW DATE(S):	09-24-2018		
REVISION DATE(S):	11-14-2015	Brief Summary	
REVISION DATE(S):	09-24-2018; Pruitt	Brief Summary	Spelling corrections