HERNIA ULTRASOUND PROTOCOL (UHERNIA)

THIS IS A LIMITED ABDOMINAL EXAM OF THE GROIN OR ABDOMEN TO EVALUATE THE AREA OF CONCERN FOR ABDOMINAL WALL DEFECTS.

PATIENT PREP: No prep

TYPES OF ABDOMINAL HERNIAS:

VENTRAL HERNIAS: Ventral hernias include all hernias in the anterior and lateral abdominal wall.

UMBILICAL – within umbilical stalk
PARAUMBILICAL – adjacent to umbilicus
EPIGASTRIC – midline superior to umbilicus
HYPOGASTRIC – midline inferior to umbilicus
SPIGELIAN – lateral to rectus muscle

DIASTASIS RECTI- Separation of rectus muscles and stretching of linea alba.

GROIN HERNIAS:

DIRECT – superficial inguinal ring
INDIRECT – deep inguinal ring
FEMORAL – femoral canal
DOCUMENTATION OF VENTRAL HERNIAS

VENTRAL HERNIAS

- Ventral hernias include all hernias in the anterior and lateral abdominal wall. Midline defects include umbilical, paraumbilical, epigastric, and hypogastric hernias. Spigelian and incisional hernias are also considered ventral hernias.
- Ventral hernia ultrasounds are focused exams and should be limited to document the symptomatic area of the abdominal wall.
- Images should be labeled with a description of the anatomic area of concern being scanned.
- Standing images are not needed for ventral hernias.

TRANSVERSE IMAGES TO OBTAIN:
1. At least 2 still images of area of concern. One with Valsalva and one without Valsalva.
2. At least one cine clip with Valsalva.
3. At least one cine clip of the area of concern in transverse from superior to inferior.
4. Measure the neck of any hernia seen.

SAGITTAL IMAGES TO OBTAIN:
1. At least 2 still images. One with Valsalva and one without Valsalva.
2. At least one cine clip with Valsalva.
3. At least one cine clip of the area of concern in sagittal from right to left.
4. Measure the neck of any hernia seen.

DIASTASIS RECTI

- Diastasis recti is the midline stretching and thinning of the linea alba fascia caused by increased intrabdominal pressure such as in pregnancy. It can occur above and/or below the umbilicus.
- Diastasis recti can exist with or without ventral hernia. Diastasis recti is the separation of the muscles, but it is not considered a hernia unless there is a defect in the fascia.
- Evaluate the entire length of linea alba fascia for small defects.
- Both epigastric (above umbilicus) and hypogastric (below umbilicus) areas should be evaluated.

TRANSVERSE IMAGES TO OBTAIN: At Epigastric and Hypogastric areas
1. At least one cine clip of the midline from superior to inferior showing the linea alba and both recti.
2. Measure the distance between the recti muscles at multiple areas along midline. If necessary, use panoramic imaging.
3. Measure any defect in the linea alba fascia.
4. At least 2 still images. One with Valsalva and one without Valsalva at any area of concern.
5. At least one cine clip with Valsalva at any area of concern.

SAGITTAL IMAGES TO OBTAIN: At Epigastric and Hypogastric areas
1. At least 2 still images. One with Valsalva and one without Valsalva.
2. At least one cine clip with Valsalva at any area of concern.
3. Measure any defect in fascia seen.
LOCATING THE INGUINAL RING:

1. Identify the inferior epigastric vessels along the posterior aspect of the rectus muscle.

2. Follow the epigastric vessels to where they connect with the iliac vessels. This is the inguinal ring.

3. In this plane you will be in a transverse axis to the inguinal ring. A sagittal plane will run along the crease of the groin, not a true sagittal to the patient’s body.

4. In males, you can also find the inguinal ring by following the spermatic cord/ductus deferens. It can be followed in transverse from just superior to the testicle to where it enters the abdomen and the deep inguinal ring. It appears as a round collection of vessels with a slightly hyperechoic surrounding.

Images of spermatic cord
DETERMINING INDIRECT VS DIRECT HERNIAS

Hernia locations in a left groin in relation to epigastric vessels (red outline)

DIRECT INGUINAL HERNIA A hernia protruding through the abdominal wall via the superficial inguinal ring (Hesselbach’s triangle)

- Located medial and posterior to the epigastric vessels and spermatic cord.
- Direct hernias are inferior to the deep inguinal ring and occur through the conjoined tendon.
- Located lateral to the rectus muscle

INDIRECT INGUINAL HERNIA A hernia protruding through the abdominal wall via the deep inguinal ring and passes down the inguinal canal lateral to the inferior epigastric artery. In male patients, the spermatic cord also runs within the inguinal. In female patients, this is the round ligament.

- Located lateral and anterior to the epigastric vessels, hernia courses up and over the vessels
- In males, indirect hernias are anterior to the spermatic cord and may communicate with the scrotum.
DOCUMENTATION OF GROIN HERNIAS

- Provide imaging to rule out indirect, direct, and femoral hernias on the indicated side of the lower abdomen. Only the indicated side needs to be evaluated.
- Images should be labeled with the specific groin area being evaluated - Indirect, Direct or Femoral.
- All inguinal hernia evaluations should include a repeat of images in standing position even if the hernia has already been identified. Evaluate whether the defect changes in size or reducibility while standing.

INDIRECT HERNIA DOCUMENTATION:

An INDIRECT HERNIA is located LATERAL AND ANTERIOR to the inferior epigastric artery and travels through the inguinal canal. In males, this is where the spermatic cord enters the abdomen; in females, it is the round ligament.

TRANSVERSE IMAGES TO OBTAIN:

1. At least 2 still images. One with Valsalva and one without Valsalva.
2. At least one cine clip with Valsalva.
3. Measure the neck of any hernia seen.

SAGITTAL IMAGES TO OBTAIN: show the length of the canal and spermatic cord in males.

1. At least 2 still images. One with Valsalva and one without Valsalva.
2. At least one cine clip with Valsalva.
3. Measure the neck of any hernia seen.

The indirect inguinal hernia (yellow outline) is located anterior and lateral to the inferior epigastric vessels in transverse.

Sagittal view of an indirect inguinal hernia during Valsalva. Hernia is seen exiting the abdominal cavity through the deep inguinal ring. It is anterior to the inferior epigastric vessels (blue circle).
DOCUMENTATION OF GROIN HERNIAS continued

DIRECT HERNIA DOCUMENTATION:

A DIRECT HERNIA is located MEDIAL AND POSTERIOR to the inferior epigastric artery and occurs through the Hasselbach Triangle.

HASSELBACH TRIANGLE (purple outline) is defined by the following structures:

- Medial border: Lateral edge of the rectus muscle.
- Superolateral border: Inferior epigastric vessels.
- Inferior border: Inguinal ligament.

TRANSVERSE IMAGES TO OBTAIN:

1. At least 2 still images. One with Valsalva and one without Valsalva.
2. At least one cine clip with Valsalva.
3. Measure the neck of any hernia seen.

SAGITTAL IMAGES TO OBTAIN:

1. At least 2 still images. One with Valsalva and one without Valsalva.
2. At least one cine clip with Valsalva.
3. Measure the neck of any hernia seen.

The direct inguinal hernia (red outline) is located medial and posterior to the inferior epigastric vessels in transverse.

Sagittal view of neck of direct inguinal hernia during Valsalva. It is posterior to the inferior epigastric vessels (blue circle).

In this image, both an indirect and direct hernias can be seen together in a sagittal view. Indirect (yellow outline) is anterior to the epigastric vessels, direct hernia (red outline) is posterior to the epigastric vessels.
FEMORAL HERNIA DOCUMENTATION:

- A hernia through the femoral canal. Extends at least half way over the superior pubic ramus compressing the femoral vein in the cross sectional view.
- The femoral vein will become compressed on Valsalva if hernia present, it will engorge if no hernia present.

TRANSVERSE IMAGES TO OBTAIN:
1. At least 2 still images. One with Valsalva and one without Valsalva.
2. At least one cine clip with Valsalva.
3. Measure the neck of any hernia seen.

SAGITTAL IMAGES TO OBTAIN: Scan parallel to the medial margin of the femoral vein
1. At least 2 still images. One with Valsalva and one without Valsalva.
2. At least one cine clip with Valsalva.
3. Measure the neck of any hernia seen.

**REPEAT ALL GROIN IMAGES IN STANDING POSITION**

All inguinal hernia evaluations should include a repeat of images in standing position even if the hernia has already been identified. Evaluate whether the defect changes in size or reducibility while standing.
## HERNIA PROTOCOL HISTORY

<table>
<thead>
<tr>
<th>Date</th>
<th>Changes made</th>
<th>By whom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updated</td>
<td>09/2017 Only indicated side needed on groin hernia evaluation Standing images needed on all groin imaging</td>
<td>Becky Marion</td>
</tr>
<tr>
<td>Updated</td>
<td>2/2022 Added measure NECK of hernia, not overall size</td>
<td>Renee Betit Fitzgerald</td>
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<tr>
<td>Updated</td>
<td>8/1/2022 Format changed Images added for better visual No standing needed for ventral hernias</td>
<td>Renee Betit Fitzgerald</td>
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