FEMALE PELVIC ULTRASOUND EXAMINATION

POLICY: Pelvic ultrasound will be performed with an order from a physician or other qualified clinical practitioner. The examination will be supervised and interpreted by a radiologist or other licensed practitioner who is qualified by reason of training to understand the normal anatomy, pathophysiology of the pelvis, and integration of ultrasound with other imaging techniques to optimize the probability of detecting disease.

PURPOSE: To assess the anatomy of the pelvis and document normal and abnormal structures therein.

INDICATIONS: Ultrasound of the pelvis is indicated for patients with signs, symptoms, and/or laboratory evidence of disease involving the uterus, endometrium, ovaries and their supporting structures, bladder, or intestine. This examination is an appropriate study for patients with nonspecific pelvic complaints. Patients who, for historical reasons, are at risk for pelvic disease, even without signs, symptoms, or laboratory evidence, are also candidates for ultrasound examination.

PATIENT PREPARATION: In most cases, patients will be investigated from a transabdominal approach through the distended urinary bladder. Patients will be instructed to drink 16-32 ounces of liquid two hours prior to the scheduled examination time and refrain from voiding until instructed by Inland Imaging staff. Patients who do not require a filled bladder need no special preparation. Patients should be instructed to take prescribed oral or injectable medication on their normal schedule. Menstruating women should be scheduled between days 5 and 13 of their menstrual cycle when possible.

PROCEDURE: Women who have a history of sexual activity will be examined both transabdominally and endovaginally, unless individual circumstances prohibit one technique. Each organ should be imaged in its entirety (e.g. long and transverse views) before imaging the next organ. The order of organ imaging will be (minimal number of images in parenthesis):

Transabdominal
- Uterus and endometrium (4 images)
- Right ovary (2 images)
- Left ovary (2 images)

Endovaginal
- Uterus (5 images, 2 cine sweeps)
- Endometrium (1 image)
- Right ovary (2 images, one cine sweep)
- Left ovary (2 images, one cine sweep)
TRANSABDOMINAL

- Transabdominal images are intended to demonstrate the uterine size, contour, and position in the pelvis, and its relationship to other structures (e.g. the bladder, ovaries, vagina, and abnormal structures). Ovaries that are positioned in the superior pelvis and large pelvic masses may be best demonstrated transabdominally and if encountered, additional images will be required to fully document the findings.

- Minimal stored images should include:
  - Two long axis views of the uterus (oriented along the length of the organ) that include unobstructed views of the fundus and cervix labeled *uterus long*. One image should be optimized to display measurements of the long and short diameters of the uterus and one image should be optimized to demonstrate the endometrium;
  - One long axis view of the uterus labeled *uterus long*, to optimize the cervical segment, its relationship to the vagina, and pelvic cul-de-sac (of Douglas);
  - One transverse view of the uterus labeled *uterus transverse*, to include measurement of its maximal transverse diameter;
  - One view of the right ovary oriented parallel to its longest axis, labeled *right ovary long*. (In patients who will not receive an endovaginal examination, a second sagittal image of the ovary should be obtained and measured in its longest and orthogonal diameters.) In patients whom the ovary cannot be identified or is absent, a sagittal image of the pelvis shall be obtained and labeled *right adnexa long*;
  - One view of the right ovary perpendicular to its long axis, labeled *right ovary transverse*, to include its relationship to the uterus or pelvic sidewall. (In patients who will not receive an endovaginal examination, a second transverse image of the ovary should be obtained and measured in its transverse dimension.) In patients whom the ovary cannot be identified or is absent, a transverse image of the pelvis shall be obtained and labeled *right adnexa transverse*;
  - One view of the left ovary oriented parallel to its longest axis, labeled *left ovary long*. (In patients who will not receive an endovaginal examination, a second sagittal image of the ovary should be obtained and measured in its longest and orthogonal diameters.) In patients whom the ovary cannot be identified or is absent, a sagittal image of the pelvis shall be obtained and labeled *left adnexa long*;
  - One view of the left ovary perpendicular to its long axis, labeled *left ovary transverse*, to include its relationship to the uterus or pelvic sidewall. (In patients who will not receive an endovaginal examination, a second transverse image of the ovary should be obtained and measured in its transverse dimension.) In patients whom the ovary
cannot be identified or is absent, a transverse image of the pelvis shall be obtained and labeled left adnexa transverse.

ENDOVAGINAL
• Endovaginal images are intended to demonstrate the details of myometrial architecture, endometrial texture and thickness, and ovarian structure. Most abnormalities of female pelvic organs can be demonstrated to better advantage with endovaginal imaging and adequate documentation is required to allow accurate characterization and follow-up of pathologic findings. All endovaginal examinations performed on female patients by a male sonographer will be chaperoned by a female Inland Imaging staff. The endovaginal examination should be performed with the urinary bladder empty with the patient in the supine position on an elevated foam pad to allow movement of the transducer in all planes. All transducers shall be covered with a clean protective sheath prior to use and all transducers shall be cleaned after each use in an approved antimicrobial solution or automated disinfection device, such as the Trophon EPR unit. The sonographer or patient may insert the transducer.

• Minimal stored images should include:
  • three long axis views of the uterus, labeled uterus long. One image should optimize display of the fundus and mid body, one image should optimize the cervix, and one image document the endometrium in its maximal thickness. When the endometrial/myometrial interface is conspicuous, the double layer endometrial thickness should be measured at its maximal dimension perpendicular to the plane of the endometrial cavity;
  • one cine sweep of the uterus in sagittal plane from right to left and labeled uterus long to left;
  • three transverse images of the uterus labeled uterus transverse, to include the cervix, mid body, and fundus;
  • one cine sweep of the uterus in transverse plane from the cervix to fundus and labeled uterus transverse fundus to cervix;
  • one image of the right ovary oriented parallel to its long axis labeled right ovary long to include measurements of its longest and orthogonal diameters. In patients whom the ovary cannot be identified or is absent, an image of the right adnexal region shall be obtained and labeled right adnexa long;
  • one image of the right ovary perpendicular to it long axis labeled right ovary transverse to include measurement of the maximal transverse diameter. In patients whom the ovary cannot be identified or is absent, an image of the right adnexal region shall be obtained and labeled right adnexa transverse;
  • one cine sweep of the right ovary in the plane that optimizes its visualization labeled right ovary;
• one image of the left ovary oriented parallel to its long axis labeled *left ovary long* to include measurements of its longest and orthogonal diameters. In patients whom the ovary cannot be identified or is absent, an image of the left adnexal region shall be obtained and labeled *left adnexa*;

• one image of the left ovary perpendicular to its long axis labeled *left ovary transverse* to include measurement of the maximal transverse diameter. In patients whom the ovary cannot be identified or is absent, an image of the left adnexal region shall be obtained and labeled *left adnexa transverse*;

• one cine sweep of the left ovary in the plane that optimizes its visualization labeled *left ovary*.

**PATHOLOGIC CONDITIONS:** When pathologic processes are detected during the course of the examination, extra images are necessary to characterize the abnormality. One or more cine clips should be obtained of any detected pathology. The following is a description of commonly encountered abnormalities, or conditions that should be considered during the examination and the minimum additional stored images expected for each circumstance. The list is not intended to be comprehensive, and sonographers are expected to apply their knowledge of pathophysiology to provide clear images of the abnormalities they encounter. Many pathologic conditions will be imaged with both transabdominal and endovaginal techniques, but the sonographer shall focus his/her efforts on the technique that optimizes pathologic details and information.

**Uterine Mass:** It is the purpose of the examination to document the number, position, and size of uterine masses. Transabdominal ultrasound is best suited to image large uterine masses that extend beyond the field of view of endovaginal transducers. If the uterus can be imaged in its entirety with the endovaginal probe, uterine masses are usually best characterized with an endovaginal examination. Uterine masses, whether imaged best with transabdominal or endovaginal probes, with conspicuous margins should be individually imaged in two orthogonal planes and labeled with their respective position (*i.e.* *uterus right, uterus left, uterus anterior, uterus posterior, uterus midline, uterus fundus, uterus cervix*). If more than one mass is present, labels “A”, “B”, “C”, etc, shall be included on the center of the mass in the stored image in two planes, for up to a maximum of 5 masses. Three orthogonal dimensions of the largest mass with conspicuous, reproducible margins shall be stored, with its appropriate label (*e.g.* *uterus posterior “A”*).

**Endometrial Mass/Thickening:** Whenever possible, the endometrium should be examined between the conclusion of menses and the subsequent ovulation (days 5-13 in a normally menstruating patient) to avoid over estimation of endometrial thickness late in the cycle, and to optimize the opportunity to visualize endometrial masses (*e.g.* polyps, cancer). If a mass with conspicuous and reproducible margins is identified, it should be imaged in two orthogonal planes,
measured in its greatest diameter, and labeled *endometrium long or coronal or transverse*. In cases where the margins are inconspicuous (e.g. retained products of conception, endometrial polyps in the secretory phase of the cycle), only the maximal double layer endometrial thickness should be measured. Color (or power) Doppler ultrasound should be applied to endometrial masses/thickening to identify the relative quantity and source (e.g. anterior or posterior uterine wall) of blood flow. Spectral Doppler measurement of flow within a mass should be attempted to characterize its maximal systolic velocity and Resistive Index. Representative images of color and spectral Doppler should be stored and labeled *endometrium long or coronal or transverse*.

Ovarian Mass: Ovarian masses should be examined for the purpose of confirming their ovarian origin, documenting their size, and identifying features that permit characterization of benignity or malignancy. In addition to documentation of the ovaries in (see minimum stored images above), ovarian masses (and simple ovarian cysts greater than 3cm) must be separately imaged in two orthogonal planes, labeled *right ovary long or transverse* and *left ovary long or transverse*. One image in each plane should be free of measurements and one image should include measurements. Cysts should be measured to include the cyst wall. Images of ovarian masses should be obtained to accurately demonstrate their contour (e.g. smooth, irregular, inconspicuous), wall thickness, presence or absence of internal septa, solid elements, or suspended echoes. Color (or power) Doppler ultrasound should be applied to ovarian masses (with the exception of thin, smooth walled cysts with no septa or solid elements) to identify flow within their margins/septa/solid elements. Spectral Doppler flow of the mass should be attempted to characterize the maximal systolic velocity and Resistive Index of internal septa or solid elements. Representative images of color and spectral Doppler should be stored and labeled *right ovary or left ovary*.

Adnexal (extraovarian) Mass: The purpose of the examination is to document a mass that is separate from the ovary by identifying and documenting normal ovaries, localizing its position in the pelvis, measuring its size, and characterizing its sonographic features. Extraovarian masses, encountered both transabdominally and endovaginally, should be imaged in two orthogonal planes and labeled *right, midline, or left long and right, midline, or left transverse*. One image in each plane should be free of measurements and one image should include measurements. Images of extraovarian masses should be selected to accurately demonstrate their contour (e.g. smooth, irregular, inconspicuous), wall thickness, presence or absence of internal septa, solid elements, or suspended echoes. Color (or power) Doppler ultrasound should be applied to extraovarian masses to identify flow within their margins/septa/solid elements. Spectral Doppler flow of the mass should be attempted to characterize the maximal systolic velocity and Resistive Index. Representative images of color and spectral Doppler should be stored and labeled *right or left*. The extraovarian position of a mass that lies adjacent to the ovary may be best demonstrated with
a cine clip that simultaneously demonstrates the mass and ovary while gentle transducer pressure is applied to record discordant movement of the two structures.

Post Hysterectomy/Oophorectomy: An examination may be requested for pelvic symptoms (e.g. pain) in patients with a history of prior hysterectomy and/or oophorectomy. If the patient has had a hysterectomy and bilateral oophorectomy, a transabdominal examination through the distended urinary bladder with three representatives sagittal (labeled right, midline, and left long) and three axial images (labeled transverse) should be performed. Normal structures that should be documented are the vagina and vaginal cuff in a sagittal view labeled midline long and both pelvic sidewalls including a long axis view of the common/external iliac artery on each side. In patients with a hysterectomy without oophorectomy, unilateral oophorectomy, partial hysterectomy, or pelvic pathology, an endovaginal examination should be performed if the structures of interest will be better characterized.

Right Lower Quadrant Pain: Patients with right lower quadrant symptoms (e.g. pain) may be imaged under the Pelvic or Abdominal Ultrasound protocols. If evaluation of the right lower quadrant is requested as part of a Pelvic Ultrasound, the routine pelvic protocol should be performed in addition to a focused examination directed at the cecum/appendix. The cecum is identified by first locating the ascending colon, and following it inferiorly to its blind end. Tissue between the skin and cecum can be displaced by slowly applying pressure with the examining hand and transducer to the patient’s tolerance. If the appendix cannot be located, representative images of the right lower quadrant obtained in sagittal and axial planes should be obtained and labeled RLQ long and transverse. If the appendix is identified, it should be imaged in two planes labeled RLQ long and transverse, measured in its maximal outer-to-outer diameter in long axis images, and representative power or color Doppler images obtained.

Ovarian Torsion: Patients who are referred to consider (“rule out”) ovarian and/or adnexal torsion and patients with symptoms of torsion (i.e. sudden onset, severe, unilateral lower abdominal pain that worsens intermittently over many hours) shall be imaged with both color (or power) and spectral Doppler, in addition to standard gray scale images. Doppler imaging of both the affected and contralateral ovary is necessary to demonstrate variations in vascularity, and labeled right ovary and left ovary as appropriate. Spectral images shall include at least one intraovarian (not capsular) arterial signal to include measurement of the Resistive Index. Images of intraovarian (not capsular) spectral venous flow should be sought (with machine settings of low PRF and low wall filter) and recorded. If arterial and/or venous spectral signals cannot be detected, representative color and spectral images without flow shall be recorded and labeled right ovary or left ovary. The presence of arterial or venous flow does not rule out ovarian torsion. The ovaries should be evaluated for additional findings.
which may be seen in the presence of ovarian torsion. These may include an ovarian mass, ascites, abnormal ovarian location, an enlarged ovary with or without peripheral follicles and the sonographic whirlpool sign. The sonographic whirlpool sign is a twisting of the vascular pedicle demonstrated in both gray scale and color Doppler imaging. It is sometimes best demonstrated transabdominally.

Uterine Anomaly and IUD: Patients with suspected developmental uterine anomalies (e.g. bicornuate uterus) and patients with an IUD should be imaged with a volume acquisition (manual or automated) and a coronal rendering of the endometrium recorded. For uterine anomalies, the coronal rendering shall include the serosal surface of the uterine fundus. For patients with an IUD, the rendered image(s) should include the entire IUD (e.g. both arms and body of a “T” shaped IUD) and its relationship to the endometrium. Note whether the IUD is normally placed within the fundal end of the endometrial cavity, is imbedded within the myometrium, has perforated the serosal lining, or is located completely outside the uterus.