

AIUM Practice Parameter for the Performance of an Ultrasound Examination of the Female Pelvis

Introduction

The American Institute of Ultrasound in Medicine (AIUM) is a multidisciplinary association dedicated to advancing the safe and effective use of ultrasound in medicine through professional and public education, research, development of clinical practice parameters, and accreditation of practices performing ultrasound examinations.

The *AIUM Practice Parameter for the Performance of an Ultrasound Examination of the Female Pelvis* was developed (or revised) by the AIUM in collaboration with other organizations whose members use ultrasound for performing this examination(s) (see “Acknowledgments”). Recommendations for personnel requirements, the request for the examination, documentation, quality assurance, and safety may vary among the organizations and may be addressed by each separately.

This Practice Parameter is intended to provide the medical ultrasound community with recommendations for the performance and recording of high-quality ultrasound examinations. The parameter reflects what the AIUM considers the appropriate criteria for this type of ultrasound examination but is not intended to establish a legal standard of care. Examinations performed in this specialty area are expected to follow the parameter with recognition that deviations may occur depending on the clinical situation.

Indications

Indications for pelvic ultrasound include but are not limited to the following:

1. Evaluation of pelvic pain
2. Evaluation of pelvic masses
3. Evaluation of endocrine abnormalities, including polycystic ovaries
4. Evaluation of dysmenorrhea (painful menses)
5. Evaluation of amenorrhea
6. Evaluation of abnormal uterine bleeding
7. Evaluation of postmenopausal bleeding

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8. Evaluation of delayed menses
9. Follow-up of a previously detected abnormality
10. Evaluation, monitoring, and/or treatment of patients with infertility
11. Evaluation when there is a limited clinical examination of the pelvis
12. Evaluation for signs or symptoms of pelvic infection
13. Further characterization of a pelvic abnormality noted on another imaging study
14. Evaluation of congenital uterine, gonadal, and lower genital tract anomalies
15. Evaluation of excessive bleeding, pain, or signs of infection after pelvic surgery, delivery, or abortion
16. Localization of an intrauterine device (IUD)
17. Screening for malignancy in high-risk patients
18. Evaluation of incontinence or pelvic organ prolapse
19. Guidance for interventional or surgical procedures
20. Preoperative and postoperative evaluation of pelvic structures

Qualifications and Responsibilities of Personnel

Physicians interpreting or performing this type of ultrasound examination should meet the specified *AIUM Training Guidelines* in accordance with *AIUM accreditation policies*.

Sonographers performing the ultrasound examination should be appropriately credentialed in the specialty area in accordance with *AIUM accreditation policies*.

Physicians not personally performing the examination must provide supervision, as defined by the Centers for Medicare and Medicaid Services Code of Federal Regulations 42 CFR §410.32.

Request for the Examination

The written or electronic request for an ultrasound examination must originate from a physician or other appropriately licensed health care provider or under the provider's direction. The clinical information provided should allow for the performance and interpretation of the appropriate ultrasound examination and should be consistent with relevant legal and local health care facility requirements.

Specifications of the Examination

The following section details the examination to be performed for each organ and anatomic region in the female pelvis. All relevant structures should be identified by the transabdominal and/or transvaginal approach. A transrectal or transperineal approach may be useful in patients who are not candidates for introduction of a vaginal transducer and in assessing the patient with pelvic organ prolapse. More than 1 approach may be necessary.^{1,2}

General Pelvic Preparation

For a transabdominal pelvic sonogram, the patient's bladder can be distended if necessary to displace the bowel from the field of view and to provide an optimal acoustic window to better visualize the pelvic structures, particularly if a transvaginal examination cannot be performed. Occasionally, overdistention of the bladder may compromise the evaluation. When this occurs, imaging may be repeated after partial bladder emptying. If an abnormality of the urinary bladder is detected, it should be documented and reported.

For a transvaginal sonogram, the urinary bladder is preferably empty. The patient, the sonographer, or the physician may introduce the vaginal transducer, preferably under real-time monitoring. Consideration of having a chaperone present should be in accordance with local policy.^{3,4}

Uterus

The vagina and uterus provide anatomic landmarks that can be used as reference points for the other pelvic structures, whether normal or abnormal. In examining the uterus, the following should be evaluated: (a) the uterine size, shape, and orientation; (b) the endometrium; (c) the myometrium; and (d) the cervix. The vagina may be imaged while introducing the transducer and can be a landmark for the cervix.^{5,6} If evaluations of the vaginal mucosa and rectovaginal septum are desired, instillation of 20 mL of sterile gel into the vagina with distension of the vaginal fornices may be helpful.⁷

The overall uterine length is evaluated in the sagittal view from the fundus to the cervix (to the external os, if it can be identified). The length can be measured as a straight line from the fundus to the external os by using the outer-to-outer technique or

by measuring from the fundal region along the endometrial lining and endocervical canal using the outer-to-outer technique.⁸ The depth of the uterus (anteroposterior dimension) is measured in the same sagittal view from its anterior to posterior walls, perpendicular to the length. The maximum width is measured in the transverse or coronal view. If volume measurements of the uterine corpus are performed, the cervical component should be excluded from the uterine length measurement.

Abnormalities of the uterus should be documented.⁹⁻¹¹ The myometrium and cervix should be evaluated for contour changes, echogenicity, masses, and cysts as well as symmetry between the anterior and posterior segments of the myometrium. Fixed retroflexion of the uterus, particularly in the presence of posterior adenomyosis, should be recognized as a possible indicator of deeply infiltrating endometriosis in the posterior cul-de-sac.¹² The size and location of clinically relevant lesions should be documented. Masses that may require follow-up or intervention should be measured in at least 2 dimensions, acknowledging that it is not usually necessary to measure all uterine fibroids.

The endometrium should be analyzed for its thickness, focal abnormalities, echogenicity, and the presence and characteristics of fluid or masses in the cavity. The thickest part of the endometrium should be measured perpendicular to its longitudinal plane in the

anteroposterior diameter from echogenic to echogenic borders, using the outer-to-outer technique (see Figure 1).⁸ The adjacent hypoechoic myometrium and fluid in the cavity should be excluded (see Figure 2). In reproductive-aged postmenarchal patients, assessment of the endometrium should allow for variations expected with phases of the menstrual cycle and with hormonal supplementation.^{11,13,14} It should be reported if the endometrium is not adequately seen in its entirety or is poorly defined; in this circumstance, the measurement should not be included in the report. Sonohysterography may be a useful adjunct to evaluate the patient with abnormal uterine bleeding or to further clarify an abnormally thickened endometrium and to further evaluate an incompletely visualized endometrium. (See the *AIUM Practice Parameter for the Performance of Sonohysterography*.) If the patient has an IUD, its location should be documented.

The addition of 3-dimensional to 2-dimensional ultrasound (transabdominal, transvaginal, transperineal, and/or transrectal) can be helpful in many circumstances, including but not limited to evaluating the relationship of masses with the endometrial cavity, identifying uterine congenital anomalies and a thickened and/or heterogenous endometrium, and evaluating the location and orientation of an IUD and the integrity of the pelvic floor.^{12,15-22}

Figure 1. Measurement of endometrial thickness. The endometrial thickness is measured in its thickest portion from echogenic to echogenic borders (calipers) perpendicular to the midline longitudinal plane of the uterus.



Figure 2. Measurement of endometrium with fluid in cavity. In the presence of endometrial fluid, the measurements of the 2 separate layers of the endometrium (calipers), excluding the fluid, are added to determine the endometrial thickness.



Adnexa Including Ovaries and Fallopian Tubes

When evaluating the adnexa, an attempt should be made to identify the ovaries first because they can serve as a major point of reference for assessing the presence of adnexal pathology. Ovarian size may be determined by measuring the ovary in 3 dimensions (longitudinal, transverse, and anteroposterior diameters) on views obtained in 2 orthogonal planes^{23,24} with calculation of the ovarian volume as necessary. Any ovarian abnormalities should be documented.^{25–30}

The ovaries may not be identifiable in some patients. This occurs most frequently before puberty and after menopause when the ovaries are smaller and/or follicles are not consistently present to serve as a landmark. The adnexal region should be surveyed for abnormalities, particularly masses and dilated tubular structures.

If an adnexal abnormality is noted, its relationship with the ovaries and uterus should be assessed. The size and sonographic characteristics of adnexal masses should be documented. The addition of 3-dimensional to 2-dimensional ultrasound can be helpful to differentiate ovarian multiseptated cysts from hydrosalpinges. Additionally, the use of the “slide-by” technique can demonstrate the presence or absence of mobility of the adnexal structures.³¹ An abnormal ovarian location, such as in the posterior cul-de-sac with adhesion, particularly to the uterus, pelvic side wall, or contralateral ovary, should be documented, as this may indicate endometriosis, other sources of adhesions, or displacement of the ovary in the setting of ovarian torsion. Documentation should include whether the mass is cystic or solid and, if cystic, simple or complex. A detailed description of complex cysts should be provided, including the presence or absence of septations (thick or thin), solid components, mural nodules, excrescences or papillations, and vascular characteristics if appropriate. If the sonographic characteristics are suggestive of a specific diagnosis, such as a hemorrhagic cyst, an endometrioma, a mature teratoma, hydrosalpinx, or a pedunculated fibroid, this information should also be provided. Spectral, color, and/or power Doppler ultrasound may be useful to evaluate the vascular characteristics of pelvic lesions.^{32–35}

Cul-de-Sac

The cul-de-sac and bowel posterior to the uterus may be evaluated for the presence of free fluid, loculated

fluid, or a mass. If a mass is detected, its size, position, shape, sonographic characteristics, and relationship with the ovaries and uterus should be documented. Differentiation of normal loops of bowel from a mass may be difficult if only a transabdominal examination is performed. The rectosigmoid colon wall may be imaged from the posterior vaginal fornix.³⁶ Special attention to the posterior cul-de-sac should be made in women with pelvic pain, fixed retroflexion of the uterus, or sonographic evidence of posterior adenomyosis and in those with known or clinically suspected endometriosis.^{12,37} Hypoechoic masses with tapering ends in the rectosigmoid wall may be seen in deeply infiltrating endometriosis.^{36,37} The presence of adhesions in the cul-de-sac may be inferred in the absence of a normal uterine sliding sign^{36,38} during dynamic imaging.

Documentation

Accurate and complete documentation is essential for high-quality patient care. Written reports and ultrasound images/video clips that contain diagnostic information should be obtained and archived, with recommendations for follow-up studies if clinically applicable, in accordance with the *AIUM Practice Parameter for Documentation of an Ultrasound Examination*.

Equipment Specifications

The ultrasound examination of the female pelvis should be conducted with a real-time scanner, preferably using sector, curved linear, and/or endocavitary transducers. The transducer should be adjusted to operate at the highest frequency appropriate for the clinical circumstance, realizing that there is a trade-off between resolution and beam penetration.

Quality and Safety

Policies and procedures related to quality assurance and improvement, safety, infection control, and equipment performance monitoring should be developed and implemented in accordance with the AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices.

ALARA (As Low as Reasonably Achievable) Principle

The potential benefits and risks of each examination should be considered. The *ALARA principle* should be observed for factors that affect the acoustical output and by considering the transducer dwell time and total scanning time. Further details on ALARA may be found in the current AIUM publication *Medical Ultrasound Safety*.

Infection Control

Transducer preparation, cleaning, and disinfection should follow manufacturer recommendations and be consistent with the *AIUM Guidelines for Cleaning and Preparing External- and Internal-Use Ultrasound Transducers Between Patients, Safe Handling, and Use of Ultrasound Coupling Gel*.

Equipment Performance Monitoring

Monitoring protocols for equipment performance should be developed and implemented in accordance with the *AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices*.

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