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American College of Radiology
ACR Appropriateness Criteria®

Clinical Condition: **Acute Pelvic Pain in the Reproductive Age Group**

Variant 1: **Gynecological etiology suspected, serum β-hCG positive.**

Radiologic Procedure	Rating	Comments	RRL*
US pelvis transvaginal	9	Both transvaginal and transabdominal US should be performed if possible.	O
US pelvis transabdominal	9	Both transvaginal and transabdominal US should be performed if possible.	O
US duplex Doppler adnexa	8		O
MRI pelvis without IV contrast	6	This procedure can be performed if US is inconclusive or nondiagnostic. See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
MRI abdomen and pelvis without IV contrast	6	This procedure can be performed if US is inconclusive or nondiagnostic. See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
MRI pelvis without and with IV contrast	1		O
MRI abdomen and pelvis without and with IV contrast	1		O
CT pelvis without IV contrast	1		☢☢☢
CT pelvis with IV contrast	1		☢☢☢
CT pelvis without and with IV contrast	1		☢☢☢☢
CT abdomen and pelvis without IV contrast	1		☢☢☢
CT abdomen and pelvis with IV contrast	1		☢☢☢
CT abdomen and pelvis without and with IV contrast	1		☢☢☢☢
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			***Relative Radiation Level**

Clinical Condition: **Acute Pelvic Pain in the Reproductive Age Group**

Variant 2: **Gynecological etiology suspected, serum β-hCG negative.**

Radiologic Procedure	Rating	Comments	RRL*
US pelvis transvaginal	9	Both transvaginal and transabdominal US should be performed if possible.	O
US pelvis transabdominal	9	Both transvaginal and transabdominal US should be performed if possible.	O
US duplex Doppler pelvis	9		O
MRI pelvis without and with IV contrast	6	This procedure can be performed if US is inconclusive or nondiagnostic. See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
MRI abdomen and pelvis without and with IV contrast	6	This procedure can be performed if US is inconclusive or nondiagnostic. See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
MRI pelvis without IV contrast	4	This procedure can be performed if US is inconclusive or nondiagnostic. See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
MRI abdomen and pelvis without IV contrast	4	This procedure can be performed if US is inconclusive or nondiagnostic. See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
CT abdomen and pelvis with IV contrast	4	This procedure can be performed if US is inconclusive or nondiagnostic and MRI is not available. See the Summary of Literature Review for the use of contrast media.	☢☢☢
CT pelvis with IV contrast	4	This procedure can be performed if US is inconclusive or nondiagnostic and MRI is not available. In young women undergoing repeat imaging, the cumulative radiation dose should be considered. See the Summary of Literature Review for the use of contrast media.	☢☢☢
CT pelvis without IV contrast	2	This procedure can be performed if US is inconclusive or nondiagnostic and MRI is not available. In young women undergoing repeat imaging, the cumulative radiation dose should be considered.	☢☢☢
CT pelvis without and with IV contrast	2		☢☢☢☢
CT abdomen and pelvis without IV contrast	2		☢☢☢
CT abdomen and pelvis without and with IV contrast	2		☢☢☢☢
Rating Scale: **1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate**			***Relative Radiation Level**

Clinical Condition: **Acute Pelvic Pain in the Reproductive Age Group**

Variant 3: **Nongynecological etiology suspected, serum β-hCG positive.**

Radiologic Procedure	Rating	Comments	RRL*
US pelvis transvaginal	9	This procedure is usually performed in conjunction with transabdominal US.	O
US abdomen and pelvis transabdominal	9	Add transvaginal US as indicated.	O
US duplex Doppler adnexa	8		O
MRI abdomen and pelvis without IV contrast	8	See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
CT abdomen and pelvis with IV contrast	4	This procedure can be performed if US is nondiagnostic and MRI is unavailable or equivocal or for prompt diagnosis of a potentially life-threatening condition. See the Summary of Literature Review for the use of contrast media.	☢☢☢
CT abdomen and pelvis without IV contrast	3	Literature suggests that noncontrast low-dose CT is better than US for diagnosing appendicitis, diverticulitis, enteritis, and renal calculi.	☢☢☢
MRI abdomen and pelvis without and with IV contrast	2	See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
CT abdomen and pelvis without and with IV contrast	1		☢☢☢☢
Rating Scale: **1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate**			***Relative Radiation Level**

Clinical Condition: **Acute Pelvic Pain in the Reproductive Age Group**

Variant 4: **Nongynecological etiology suspected, serum β-hCG negative.**

Radiologic Procedure	Rating	Comments	RRL*
CT abdomen and pelvis with IV contrast	9		☢☢☢
US abdomen and pelvis transabdominal	7	This procedure can be appropriate for suspected appendicitis and urinary tract pathology and to minimize radiation exposure.	O
US duplex Doppler pelvis	7	Doppler can be used as an adjunct to assess for appendicitis or to evaluate ureteral jets for obstructive versus nonobstructive pathology.	O
CT abdomen and pelvis without IV contrast	6		☢☢☢
MRI abdomen and pelvis without and with IV contrast	6	This procedure can be used to avoid the radiation exposure of CT in a young patient or if US is inconclusive or nondiagnostic. See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
MRI abdomen and pelvis without IV contrast	4	This procedure can be used to avoid the radiation exposure of CT in a young patient or if US is inconclusive or nondiagnostic. See the Summary of Literature Review and *ACR Manual on Contrast Media* for the use of contrast media.	O
US pelvis transvaginal	4		O
CT abdomen and pelvis without and with IV contrast	2		☢☢☢☢
Rating Scale: **1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate**			***Relative Radiation Level**

ACUTE PELVIC PAIN IN THE REPRODUCTIVE AGE GROUP

Expert Panel on Women's Imaging: Priyadarshani R. Bhosale, MD[1]; Mostafa Atri, MD[2]; Robert D. Harris, MD, MPH[3]; Stella K. Kang, MD, MS[4]; Benjamin J. Meyer, MD[5]; Pari V. Pandharipande, MD, MPH[6]; Caroline Reinhold, MD[7]; Gloria M. Salazar, MD[8]; Thomas D. Shipp, MD, RDMS[9]; Lynn Simpson, MD[10]; Betsy L. Sussman, MD[11]; Jennifer Uyeda, MD[12]; Darci J. Wall, MD[13]; Carolyn M. Zelop, MD[14]; Marcia C. Javitt, MD[15]; Phyllis Glanc, MD.[16]

Summary of Literature Review

Introduction/Background

Premenopausal women with acute pelvic pain often pose a diagnostic dilemma. They often exhibit nonspecific signs and symptoms, the most common being nausea, vomiting, and leukocytosis. The differential considerations encompass gynecologic and obstetrical causes (eg, hemorrhagic ovarian cysts, pelvic inflammatory disease, ovarian torsion, ectopic pregnancy, spontaneous abortion, or labor and placental abruption), as well as nongynecologic etiologies (eg, appendicitis, inflammatory bowel disease, infectious enteritis, diverticulitis, urinary tract calculi, pyelonephritis, and pelvic thrombophlebitis). The choice of imaging modality is determined by the most likely clinically suspected differential diagnosis. Thus, a thorough clinical evaluation of the patient is required to determine the index of suspicion among the various etiologies. Diagnostic considerations should be based upon correlation of history, physical examination, and laboratory testing before a radiologic examination is chosen.

Transvaginal (TVS) and transabdominal (TAS) pelvic sonography is the preferred imaging modality for initial assessment when an obstetrical or gynecologic etiology is suspected [1] due to its wide availability, lack of ionizing radiation, and diagnostic versatility. Computed tomography (CT) is more useful when gastrointestinal or urinary tract pathology is likely. Magnetic resonance imaging (MRI), with its lack of ionizing radiation and excellent soft-tissue contrast, is preferred over CT for assessing the pregnant patient for nongynecologic pathologies; however, it is sometimes hampered by lack of widespread availability, especially in the acute setting.

Serum β-hCG

A serum β-hCG test is usually performed when a menstruating female presents with symptoms of acute pelvic pain. Knowledge of pregnancy is of utmost importance to determine whether pregnancy-related causes of pain should be considered, especially ectopic pregnancy. Concern for fetal exposure to ionizing radiation is an important consideration in triage to imaging. Serum β-hCG test becomes positive about 9 days after conception. Thus, a negative serum β-hCG test essentially excludes the diagnosis of a live intrauterine pregnancy and acute ectopic pregnancy. Some studies suggest that in a pregnant patient endometrial thickness of >21 mm virtually excludes the possibility of ectopic pregnancy [2,3]. Literature from the 1980s correlated the presence of a gestational sac using TVS with β-hCG levels of 1000 to 2000 mIU/mL [4-6]. The sonographic detection of a normal intrauterine pregnancy at β-hCG levels >2000 mIU/mL can be complicated by variation in operator technique or obscuration of the endometrial cavity by fibroids, hemorrhage, intrauterine devices, or vaginal bleeding [7-9].

Current studies suggest that sometimes the gestational sac may not be visible on TVS until the β-hCG level reaches 3510 mIU/mL [10-12]. Therefore, in a stable patient the diagnosis of failed or ectopic pregnancy should not be made below this level, and repeat sonographic evaluation and β-hCG levels should be obtained. The absence of an intrauterine pregnancy when the β-hCG level is above the discriminatory zone of 3510 mIU/mL should be strongly suggestive of an ectopic pregnancy. The high specificity of adnexal findings suggestive of

[1]Principal Author, University of Texas MD Anderson Cancer Center, Houston, Texas. [2]Toronto General Hospital, Toronto, Ontario, Canada. [3]Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire. [4]New York University Medical Center, New York, New York. [5]Northwestern University Prentice Women's Hospital, Chicago, Illinois. [6]Massachusetts General Hospital, Boston, Massachusetts. [7]McGill University, Montreal, Quebec, Canada. [8]Massachusetts General Hospital, Boston, Massachusetts. [9]Brigham & Women's Hospital, Boston, Massachusetts, American College of Obstetrics and Gynecology. [10]Columbia University Medical Center, New York, New York, American College of Obstetrics and Gynecology. [11]The University of Vermont Medical Center, Burlington, Vermont. [12]Brigham & Women's Hospital, Boston, Massachusetts. [13]Mayo Clinic, Rochester, Minnesota. [14]Valley Hospital, Ridgewood, New Jersey, American College of Obstetrics and Gynecology. [15]Specialty Chair, Rambam Healthcare Campus, Haifa, Israel. [16]Panel Chair, Sunnybrook Health Sciences Centre, Bayview Campus, Toronto, Ontario, Canada.

Reprint requests to: publications@acr.org

ectopic pregnancy, including the classic “tubal ring,” has been widely reported in the literature [13]. Endovaginal ultrasound (US) is currently considered the single best diagnostic modality to assess for ectopic pregnancy [14].

Ultrasound

Pelvic US is the initial study of choice in most reproductive-age women presenting with acute pelvic pain. TVS should be used whenever possible, although TAS is recommended when a larger field of view is desired, such as when uterine and adnexal structures are beyond the field of view of the transvaginal probe. In addition, duplex and color or power Doppler imaging can be used to characterize vascularity of the ovaries and the adnexal structures, information that can be helpful in narrowing the field of differential considerations. However, Doppler imaging should be avoided in the setting of developing intrauterine pregnancy and should be performed in a pregnant patient only when absolutely necessary.

In the evaluation of obstetrical and gynecological causes of pain, TVS may be able to differentiate findings such as a hemorrhagic cyst or pelvic inflammatory disease, which are often more compatible with medical management, from those that require emergency care, such as ovarian torsion (a surgical emergency) or obstetrical causes, including ectopic pregnancy or placental abruption, that may require urgent management. A hemorrhagic cyst can be hyperechoic acutely; but with hemolysis and retraction of the clot, a reticular network (sponge-like appearance) of fibrin stranding can be seen. Fluid-fluid levels between fluid components and a seemingly solid area representing a retracted clot with concave outer margins can be demonstrated. Fibrin strands and a retracting clot are key observations in that they permit a confident diagnosis of hemorrhagic ovarian cysts. About 90% of hemorrhagic ovarian cysts will exhibit at least 1 of these 2 features [15]. The specificity for diagnosis of a hemorrhagic cyst is 98.7% [16]. Peripheral low-impedance flow without internal color Doppler signal is characteristic [15]. Free fluid in the pelvis can be an indicator of cyst rupture. Hemoperitoneum can appear as fluid with low-level internal echoes.

Uncomplicated pelvic inflammatory disease may not be demonstrated sonographically, although early acute signs such as thickening of the fallopian tube or increased vascularity can be seen in a targeted examination [17,18]. Salpingitis can present as a solid adnexal mass or a cystic paraovarian mass with a thick wall and increased vascularity [19]. A tubo-ovarian abscess (TOA) is an inflammatory mass that involves the ovary, fallopian tube, and sometimes adjacent pelvic organs such as the bowel and bladder. Clumping of these structures together is called a tubo-ovarian complex. The sensitivity for the diagnosis of TOA by US ranges from 56% to 93%, with a specificity of 86% to 98% [20,21]. The sonographic findings for TOA are nonspecific. The presence of a mass in the expected location of the ovaries or in the cul-de-sac, associated with elevated white cell count, erythrocyte sedimentation rate, and clinical suspicion, is important in making the correct diagnosis [22]. US guidance can be used to drain a TOA and may help preserve fertility [23].

The most consistent finding of torsion is an enlarged, edematous ovary or ovarian complex consisting of an ovary and an associated adnexal mass. One study in menarchal females suggests that an adnexal volume of <20 mL precludes torsion [24]. Another feature suggestive of torsion is peripherally placed follicles in an enlarged ovary; however, this finding can also be seen in a polycystic ovary. Findings on Doppler vary, including absent, decreased, or reversed ovarian artery flow, and may depend on the degree of obstruction and the chronicity [25]. Lack of Doppler flow enables fairly confident diagnosis, but the presence of arterial and venous Doppler signal has been documented in one-third of cases with surgically proven torsion [26,27]. More recently, a study has appeared in the literature demonstrating an abnormal flow pattern within the ovarian vein as the only Doppler finding in patients with early torsion, lending support for Doppler findings associated with the diagnosis [28,29]. One study reported sensitivities and specificities for diagnosis of ovarian torsion based on the following findings: tissue edema, 21% and 100%; absence of intraovarian vascularity, 52% and 91%; absence of arterial flow, 76% and 99%; and absence or abnormal venous flow, 100% and 97%, respectively [28]. However, the reliability of this finding needs further investigation. Other signs suggestive of ovarian torsion are the whirlpool sign and the twisted-pedicle sign [30,31].

Sonography should be considered when gastrointestinal or urinary tract pathology is suspected in pregnant patients. Despite some diagnostic limitations, sonography has the advantage over CT because the latter uses ionizing radiation. In the diagnosis of appendicitis, TAS has demonstrated variable sensitivity (67%–100%) and specificity (83%–96%) [32-34]. Unfortunately, the technique of graded compression required for this diagnosis may not be feasible in the presence of an enlarged, gravid uterus. More importantly, a normal appendix is visualized in as few as 13%–50% of patients, even in the absence of pregnancy [33]. As a result, a negative US examination cannot exclude the diagnosis of appendicitis [32,35,36]. For the diagnosis of obstructing ureteral calculi, a wide range of sensitivities (34%–95%) has been reported with US [37,38]. In a pregnant patient, US may not be able to differentiate physiologic hydronephrosis from obstructive hydronephrosis and may result in unnecessary surgical intervention [39]. Early ureteral obstruction by a small calculus may not be associated with pelvocaliectasis, resulting in a false-negative examination [40].

Computed Tomography

CT provides the best diagnostic performance in identifying the gastrointestinal and urinary tract causes of acute pelvic pain. It shows high sensitivity (95%–100%) and specificity (87%–98%) in diagnosing appendicitis. CT is superior to US because it decreases the likelihood of false-negative laparotomy [32,41-46]. Because CT almost always permits a normal appendix to be visualized, it is useful for reliably excluding the diagnosis of appendicitis [47]. CT is also the preferred modality for detecting other bowel pathologies, such as inflammatory bowel disease, diverticulitis, and infectious enteritis or colitis [48]. CT without intravenous contrast is more sensitive than sonography for detecting ureteral calculi, with a reported sensitivity of 96% and specificity of 93%–98% [37,49,50]. Low-dose noncontrast CT is routinely used in the detection of pain on the basis of suspected renal colic[51]. If CT is to be performed, low-dose noncontrast CT for acute pelvic pain in pregnancy has been suggested to reduce radiation exposure, particularly in the second and third trimester [52]. In children and young adults, the scanning technique can be modified to minimize the radiation dose without significantly compromising accuracy [53]. Newer technology such as dual-energy CT has the capability to mathematically create virtually unenhanced images from contrast-enhanced images and is able to characterize the chemical composition of renal calculi. This technique can especially be used in nonpregnant patients to help in treatment planning [54,55].

For accurate diagnosis of pyelonephritis [56,57], pelvic venous thrombosis, ovarian vein thrombus [58,59], and most bowel pathologies, intravenous contrast-enhanced CT is required for optimum accuracy. For the diagnosis of acute appendicitis on CT, clinical practice is trending against the administration of enteric contrast, in particular rectal contrast, when intravenous contrast will be administered. Two studies suggest that for diagnosis of appendicitis or other acute abdominal processes, administration of intravenous contrast alone yields similar results to administration of oral, rectal, and intravenous contrast [60,61]. Another suggests that neutral versus positive oral contrast does not change the diagnostic accuracy [62]. Although the addition of oral contrast has been shown to provide additional diagnostic confidence in a minority of patients [63], the routine use of oral contrast is associated with increased examination time and concerns with patient tolerance.

CT is often the first-line imaging modality in the diagnosis of abdominal pain originating from the bowel, the urinary tract, or gynecologic pathology. CT findings of ovarian torsion are well documented in the literature and include a twisted vascular pedicle, thickening of the fallopian tube, smooth-walled thickening of a cystic adnexal mass, ascites, uterine deviation to the twisted side, and infiltration of adjacent pelvic fat [64-66]. CT may allow better appreciation of mild inflammatory changes compared to US, with 1 study reporting the diagnostic accuracy of CT for acute salpingitis to be 84% [58,59]. Acute pelvic pain can occur following rupture of a corpus luteal cyst or an endometrioma. The partially collapsed corpus luteal cyst has a crenulated or redundant wall on CT, whereas endometrial cysts are multilocular and usually larger compared to corpus luteal cysts. [67].

Magnetic Resonance Imaging

MRI is a useful problem-solving tool in the evaluation of pelvic pain in pregnant women [68]. When available, MRI is preferred to CT because it lacks ionizing radiation. In the diagnosis of appendicitis in pregnancy, MRI has high sensitivity and specificity (80%–100% and 94%–100%, respectively) using single-shot fast spin-echo and half-Fourier single-shot turbo spin-echo sequences [69]. MRI can permit visualization of a normal appendix in approximately 83%–90% of patients [70], and preclude negative appendectomies and may replace CT in the future [71-75]. In a direct comparison of US to MRI in women suspected of appendicitis, a normal appendix was identified in 2% versus 87%, respectively [76].

MR urography without contrast reliably detects hydroureteronephrosis with a sensitivity and specificity of 95% and 100%, respectively [77], and is considered to be useful when US is nondiagnostic in pregnant patients [78,79]. Obstruction secondary to urinary tract calculus can be distinguished from physiologic dilatation of pregnancy because renal enlargement and perinephric fluid from pyelosinus backflow are found only when there is pathology [80]. However, MR lacks sensitivity for detecting small ureteral stones. False-positive findings from flow artifacts can simulate stones.

Gadolinium-based contrast agents cross the placenta; however, they have not been shown to cause any adverse effects in human fetuses when clinically recommended doses have been used. In 1 study, pregnant patients who received gadolinium contrast agents in the first trimester of pregnancy demonstrated no evidence of teratogenic effects in their children [81]. Although the limited available literature suggests it is unlikely that gadolinium would have an adverse effect on fetal development, it is prudent to exercise caution and use contrast-enhanced MR imaging only when it can critically change the diagnosis. Currently there are several techniques which can evaluate the venous system in a pregnant female without intravenous contrast [82]. MR venography can be used effectively to diagnose pelvic deep-vein thrombosis and is considered better than US [82-84]. For gynecologic pathologies, there is some evidence that MRI may be more accurate than TVS in diagnosing pelvic inflammatory disease if Doppler US is not performed [85]. The addition of diffusion-weighted MRI to conventional MRI may improve the diagnostic accuracy for pelvic inflammatory disease [86]. The imaging findings of ovarian torsion on CT and MRI are almost similar [64,87]. CT and MRI both can show abnormal or absent ovarian enhancement along with a subacute hematoma [66].

Summary of Recommendations

- Acute pelvic pain in the reproductive age group presents a diagnostic challenge. US, CT, or MRI often plays an integral role in arriving at the correct diagnosis. The choice of the correct imaging test depends on the results of a careful clinical evaluation in order to narrow the differential diagnosis. Measuring the serum β-HCG level is the first step. TVS is the imaging procedure of choice to locate a pregnancy (assess the possibility of an ectopic versus intrauterine pregnancy) and the status of the fetus. TVS can sometimes distinguish malignant from benign ovarian masses and has a specificity of 98.7% in diagnosing a hemorrhagic cyst [16]. TVS is the modality of choice in suspected pain from gynecologic origin. TVS with Doppler is useful in the diagnosis of ovarian torsion. CT performs well in the diagnosis of nongynecologic etiologies of acute pelvic pain. CT has a high sensitivity and specificity in the diagnosis of obstructive uropathy and appendicitis. CT is the preferred modality to assess diverticulitis, enteritis, and colitis [46,47]. MRI can be used as a problem-solving tool in pregnant patients, and it has a high sensitivity and specificity in diagnosing appendicitis in this cohort [70].
- In a pregnant patient without acute signs of infection (please refer to ACR practice guidelines in pregnant patients) and with a suspected gynecologic etiology for pain, a pelvic US with adnexal Doppler would be the initial modality to assess the etiology. If the US is inconclusive, then MRI without contrast can be done for further evaluation. In a pregnant patient with suspected nongynecologic etiology for pain, US may be helpful but potentially challenging, particularly in the latter half of pregnancy. MRI is the most sensitive modality if appendicitis is suspected. The best modality to assess for renal calculi is a low-dose noncontrast CT. The addition of oral contrast to CT may help in diagnosing appendicitis, enteritis, colitis, or diverticulitis.
- In a nonpregnant patient presenting with abdominal pain and a suspected gynecologic etiology with no clinical signs of infection, US is the best initial modality. If inconclusive, the next best modality is contrast-enhanced MRI, followed by contrast-enhanced CT. If an infectious etiology is suspected, the best modality in a female of childbearing age is contrast-enhanced MRI.
- In a nonpregnant patient with pain suspected from a nongynecologic origin, a contrast-enhanced CT is the imaging modality of choice. In certain situations, dual-energy CT can be used and virtually unenhanced CT images reconstructed to assess for renal calculi. To avoid radiation exposure in a patient of childbearing age, MRI can be considered but is less sensitive for identification of small calculi with mild or early ureteral obstruction.
- The suspected etiology of the acute pelvic pain, whether it is obstetrical, gynecological, gastrointestinal, or urinary, will determine which pelvic imaging modality is the most appropriate for accurate and expeditious diagnosis and triage.

Summary of Evidence

Of the 91 references cited in the *ACR Appropriateness Criteria® Acute Pelvic Pain in the Reproductive Age Group* document, 87 are categorized as diagnostic references including 6 well designed studies, 10 good quality studies, and 32 quality studies that may have design limitations. Additionally, 1 reference is categorized as a good quality therapeutic study. There are 39 references that may not be useful as primary evidence. There are 3 references that are meta-analysis studies.

The 91 references cited in the *ACR Appropriateness Criteria® Acute Pelvic Pain in the Reproductive Age Group* document were published from 1988-2015.

While there are references that report on studies with design limitations, 17 well designed or good quality studies provide good evidence.

Safety Considerations in Pregnant Patients

Imaging of the pregnant patient can be challenging, particularly with respect to minimizing radiation exposure and risk. For further information and guidance, see the following ACR documents:

- ACR-SPR Practice Parameter for Imaging Pregnant or Potentially Pregnant Adolescents and Women with Ionizing Radiation [88]
- ACR-ACOG-AIUM-SRU Practice Parameter for the Performance of Obstetrical Ultrasound [89]
- ACR Guidance Document on MR Safe Practices [90]
- ACR *Manual on Contrast Media* [91]

Relative Radiation Level Information

Potential adverse health effects associated with radiation exposure are an important factor to consider when selecting the appropriate imaging procedure. Because there is a wide range of radiation exposures associated with different diagnostic procedures, a relative radiation level (RRL) indication has been included for each imaging examination. The RRLs are based on effective dose, which is a radiation dose quantity that is used to estimate population total radiation risk associated with an imaging procedure. Patients in the pediatric age group are at inherently higher risk from exposure, both because of organ sensitivity and longer life expectancy (relevant to the long latency that appears to accompany radiation exposure). For these reasons, the RRL dose estimate ranges for pediatric examinations are lower as compared to those specified for adults (see Table below). Additional information regarding radiation dose assessment for imaging examinations can be found in the ACR Appropriateness Criteria® Radiation Dose Assessment Introduction document.

Relative Radiation Level Designations		
Relative Radiation Level*	**Adult Effective Dose Estimate Range**	**Pediatric Effective Dose Estimate Range**
O	0 mSv	0 mSv
☢	<0.1 mSv	<0.03 mSv
☢☢	0.1-1 mSv	0.03-0.3 mSv
☢☢☢	1-10 mSv	0.3-3 mSv
☢☢☢☢	10-30 mSv	3-10 mSv
☢☢☢☢☢	30-100 mSv	10-30 mSv

*RRL assignments for some of the examinations cannot be made, because the actual patient doses in these procedures vary as a function of a number of factors (eg, region of the body exposed to ionizing radiation, the imaging guidance that is used). The RRLs for these examinations are designated as “Varies”.

Supporting Documents

For additional information on the Appropriateness Criteria methodology and other supporting documents go to www.acr.org/ac.

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