

Overutilization of CT Abdomen/Pelvis in Young Females with Abdominal Pain: Optimizing Imaging Pathways



Zuhair Sadiq, M.D. & Eric Marten, M.D.

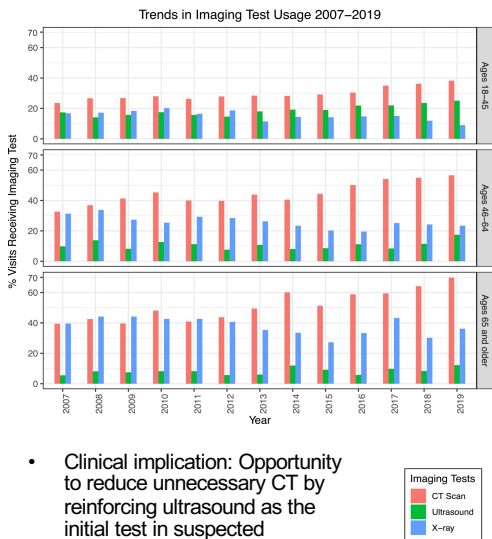
Background

CT-AP is frequently ordered for nonspecific abdominal pain in reproductive-age females, despite the predominance of benign or gynecologic etiologies that are more accurately and safely assessed with ultrasound or, in select cases, MRI. This practice results in unnecessary exposure to ionizing radiation, increased healthcare costs, and a higher rate of incidental findings that rarely alter management.

Methods

This exhibit will emphasize imaging algorithms based on ACR Appropriateness Criteria and outline strategies for radiologists to support evidence-based imaging selection.

- Stable CT use in ages 0–18: Low rates overall, but CT still used despite radiation concerns in young females
- Ultrasound underutilized: Remains consistently lower than CT across all age groups, even though it should be first-line in reproductive-age women
- X-ray use declining: Gradual decrease over time, replaced by cross-sectional imaging
- Key concern: In young females, CT is often chosen over ultrasound, contrary to ACR Appropriateness Criteria



- Clinical implication: Opportunity to reduce unnecessary CT by reinforcing ultrasound as the initial test in suspected gynecologic etiologies

Variant 1: Acute pelvic pain in the reproductive age group. Gynecological etiology suspected, β -hCG positive (either serum or urine). Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
US duplex Doppler adnexa	Usually Appropriate	0
US pelvis transabdominal	Usually Appropriate	0
US pelvis transvaginal	Usually Appropriate	0
MRI abdomen and pelvis without and with IV contrast	Usually Not Appropriate	0
MRI abdomen and pelvis without IV contrast	Usually Not Appropriate	0
MRI pelvis without and with IV contrast	Usually Not Appropriate	0
MRI pelvis without IV contrast	Usually Not Appropriate	0
CT abdomen and pelvis with IV contrast	Usually Not Appropriate	☹☹☹
CT abdomen and pelvis without IV contrast	Usually Not Appropriate	☹☹☹
CT pelvis with IV contrast	Usually Not Appropriate	☹☹☹
CT pelvis without IV contrast	Usually Not Appropriate	☹☹☹
CT abdomen and pelvis without and with IV contrast	Usually Not Appropriate	☹☹☹☹
CT pelvis without and with IV contrast	Usually Not Appropriate	☹☹☹☹

Variant 2: Acute pelvic pain in the reproductive age group. Gynecological etiology suspected, β -hCG negative (either serum or urine). Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
US duplex Doppler pelvis	Usually Appropriate	0
US pelvis transabdominal	Usually Appropriate	0
US pelvis transvaginal	Usually Appropriate	0
MRI pelvis without and with IV contrast	May Be Appropriate	0
MRI pelvis without IV contrast	May Be Appropriate	0
CT abdomen and pelvis with IV contrast	May Be Appropriate	☹☹☹
MRI abdomen and pelvis without and with IV contrast	Usually Not Appropriate	0
MRI abdomen and pelvis without IV contrast	Usually Not Appropriate	0
CT abdomen and pelvis without IV contrast	Usually Not Appropriate	☹☹☹
CT pelvis with IV contrast	Usually Not Appropriate	☹☹☹
CT pelvis without IV contrast	Usually Not Appropriate	☹☹☹
CT abdomen and pelvis without and with IV contrast	Usually Not Appropriate	☹☹☹☹
CT pelvis without and with IV contrast	Usually Not Appropriate	☹☹☹☹

Pearls for young females with acute pelvic pain:

- US duplex Doppler adnexa: usually appropriate as initial imaging
- US pelvis, transabdominal: usually appropriate as initial imaging
- US pelvis, transvaginal: usually appropriate as initial imaging

Results

Data show a steady rise in CT-AP utilization in reproductive-age women, even when guidelines recommend ultrasound as the initial test. Drivers include practice variation, time pressure in emergency settings, and the perceived comprehensiveness of CT.

Comparative evidence underscores that ultrasound accurately detects common gynecologic causes such as ovarian torsion, hemorrhagic cysts, and ectopic pregnancy, while avoiding ionizing radiation. MRI provides an additional radiation-free option in equivocal cases.

Conclusion

Overutilization of CT-AP in young females leads to avoidable radiation exposure, increased costs, and frequent incidental findings. Radiologists can mitigate this trend by promoting guideline-driven pathways, educating referring clinicians, and advocating for ultrasound and MRI as first-line modalities. Improved imaging stewardship enhances patient safety and optimizes resource use.

References

- Brook OR, Dadour JR, Robbins JB, Wasnik AP et al. ACR Appropriateness Criteria Acute Pelvic Pain in the Reproductive Age Group: 2023 Update. J Am Coll Radiol. 2024 Jun;21(6S):S3-S20. doi: 10.1016/j.jacr.2024.02.014. PMID: 38823952.
- ACR-ACOG-AIUM-SRU Practice Parameter for the Performance of Pelvic Ultrasound. 2014; Available at: http://www.acr.org/~media/ACR/Documents/PGTS/guidelines/US_Pelvic.pdf.