

# AMSER Case of the Month:

32 year old G1P0 with colicky RUQ pain

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# Patient Presentation

- G1P0 at 28w5d with colicky RUQ pain lasting 1 week, now with 10/10 exacerbations, occurring mostly after eating
  - Radiates to R and L upper quadrants
  - Nausea, dry heaving but no vomiting
  - Last BM 4 days ago
- PMH: Chronic Constipation, GERD, Gastric Ulcer (at age 19) related to NSAID use
- Exam:
  - Mild tenderness throughout abdomen, worse in epigastrium and RUQ. Positive Murphy's sign. No rebound or guarding.
  - Cervical exam unremarkable

# Pertinent Labs

- Mild Leukocytosis: WBC 11.4
- Elevated Lipase (169) that proved to be transient or spurious
- LFTs WNL
- Cr: 0.73

What Imaging Should We Order?

# Select the applicable ACR Appropriateness Criteria

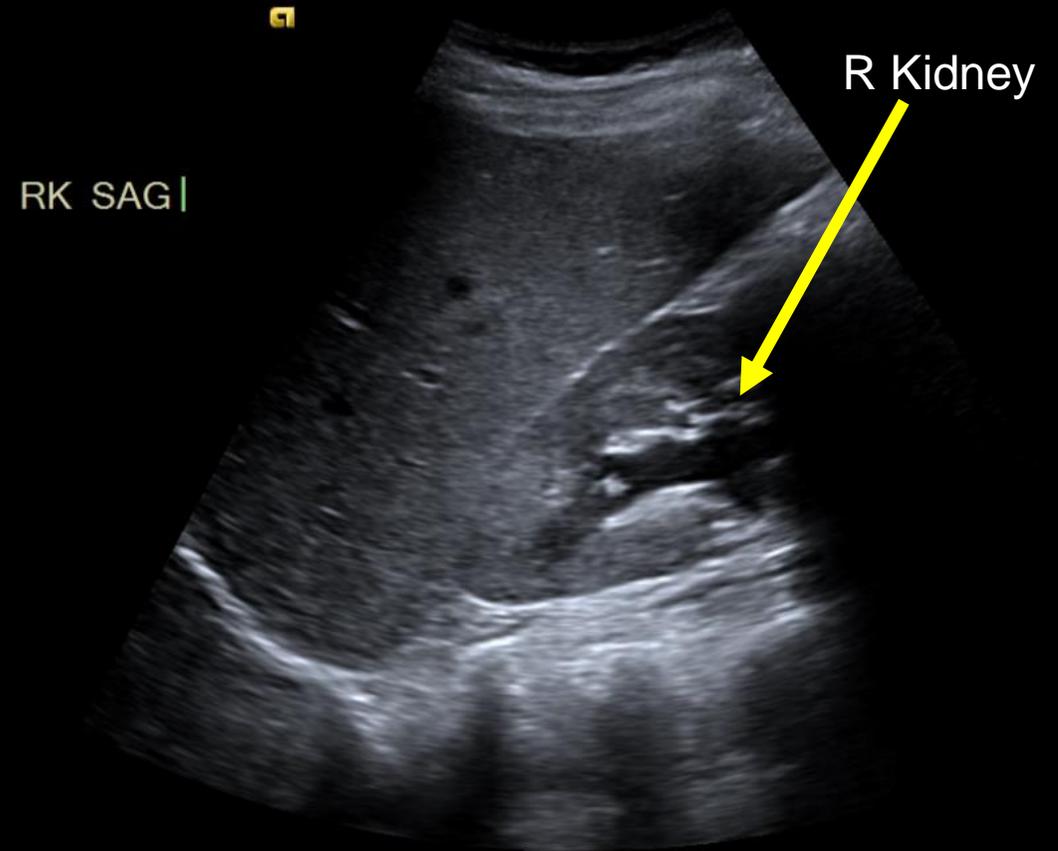
**Variant 1:** Right upper quadrant pain. Suspected biliary disease. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
US abdomen	Usually Appropriate	0
CT abdomen with IV contrast	May Be Appropriate	⊕⊕⊕
MRI abdomen without and with IV contrast with MRCP	May Be Appropriate	0
MRI abdomen without IV contrast with MRCP	May Be Appropriate	0
Nuclear medicine scan gallbladder	May Be Appropriate	⊕⊕
CT abdomen without IV contrast	May Be Appropriate	⊕⊕⊕
CT abdomen without and with IV contrast	Usually Not Appropriate	⊕⊕⊕⊕

This imaging modality was ordered by the Obstetrician

# Ultrasound Findings

- No sonographic evidence of cholelithiasis or acute cholecystitis.
- Mild R hydronephrosis which persisted on postvoid imaging, felt likely due to distal ureteral compression from gravid uterus. No visualized shadowing renal calculi.

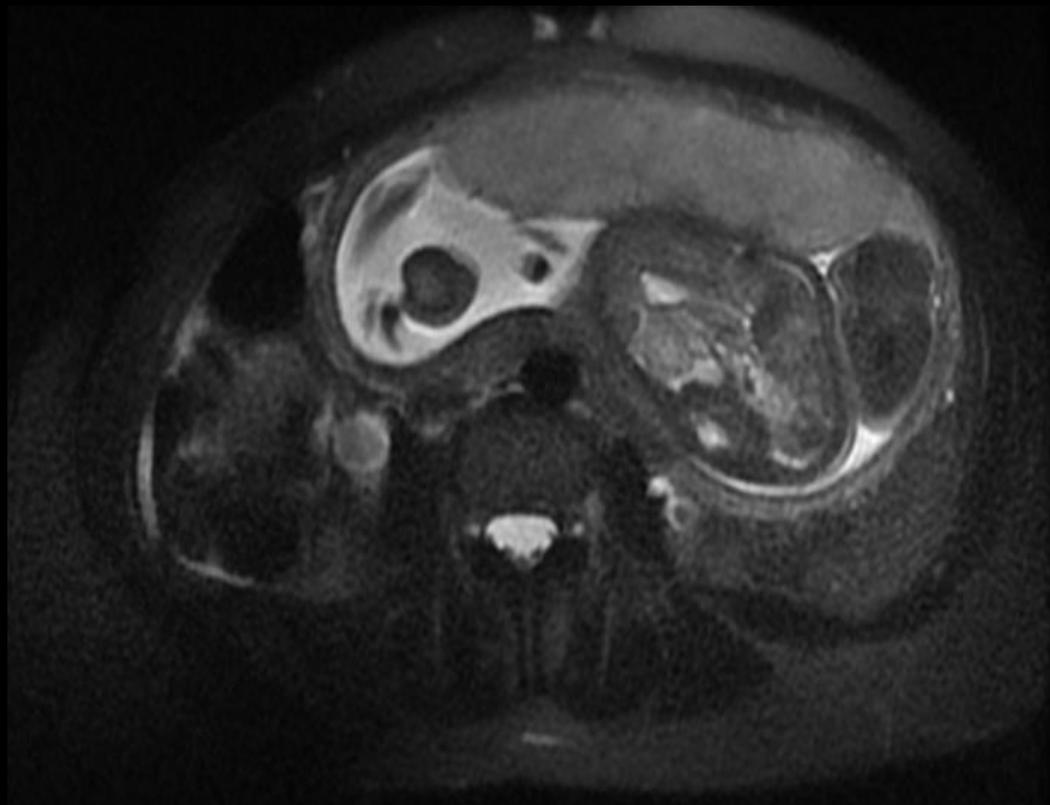


**Note:** MRI and CT were ordered to evaluate for appendicitis as cecum often migrates to RUQ during pregnancy. CT ordered after MRI failed to visualize appendix.

Imaging: Unlabeled

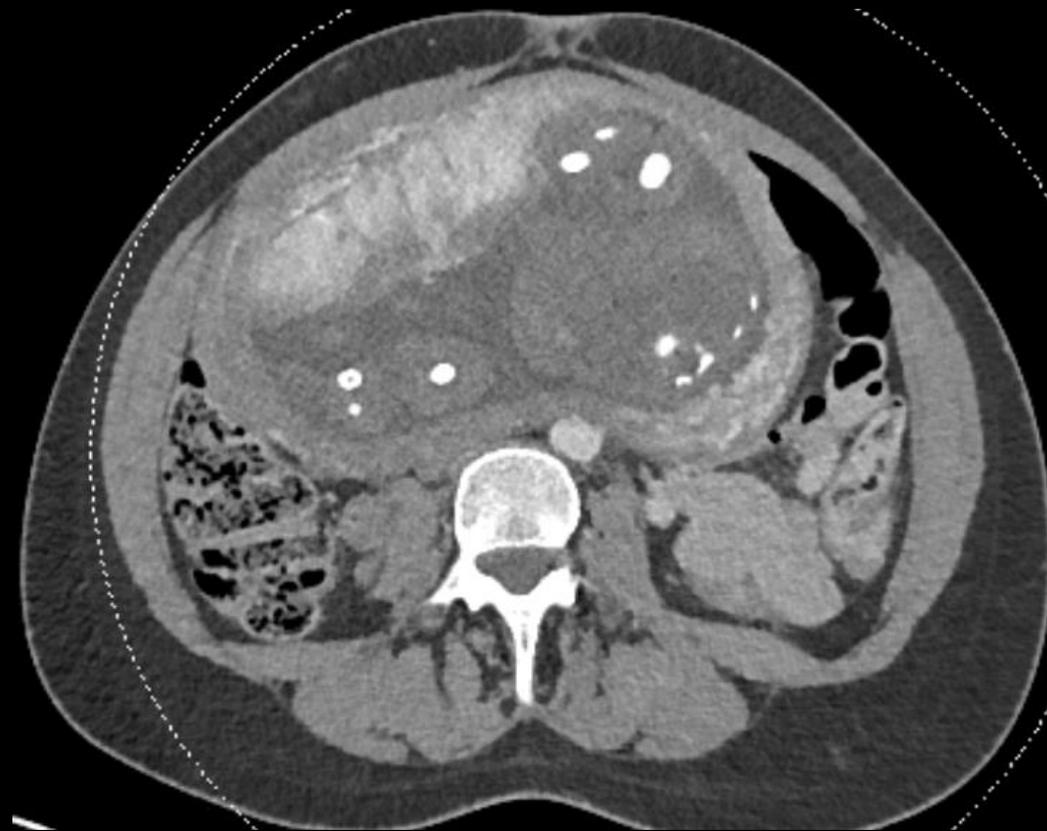
MRI

T2 Ax FATSAT SSFSE – No Contrast



CT

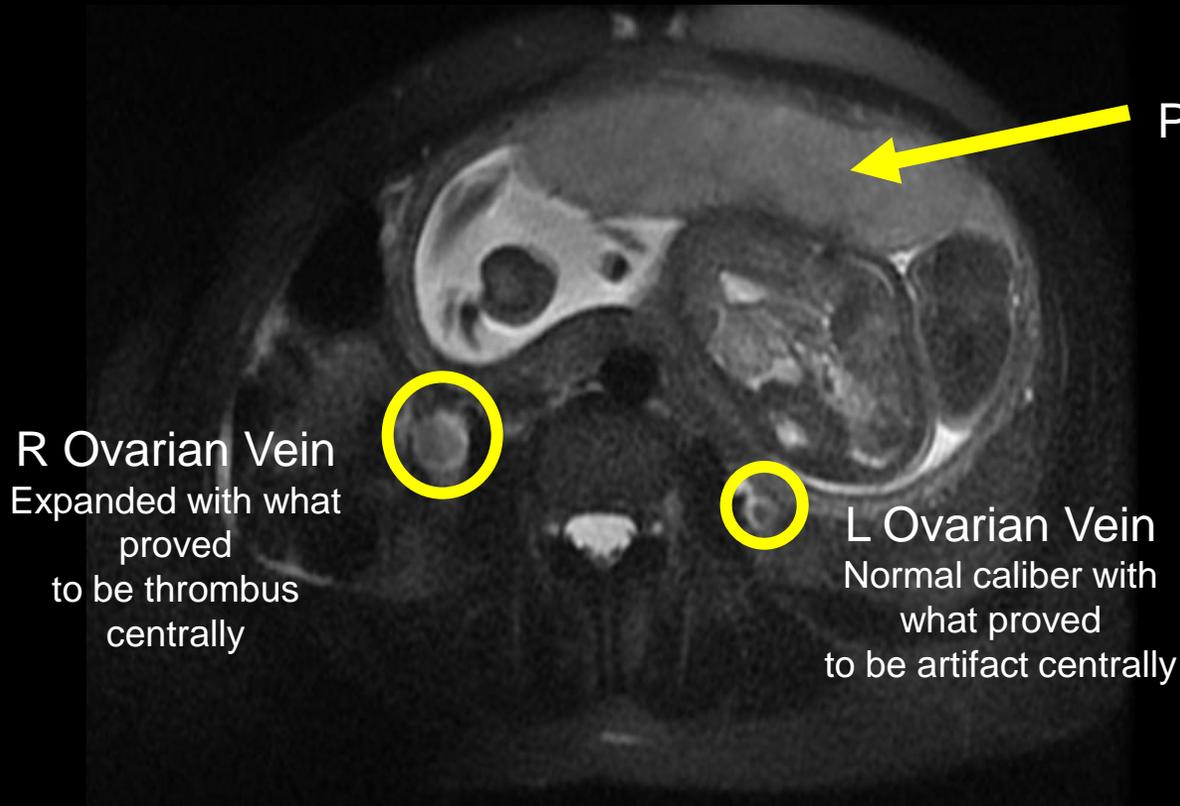
Axial with Contrast



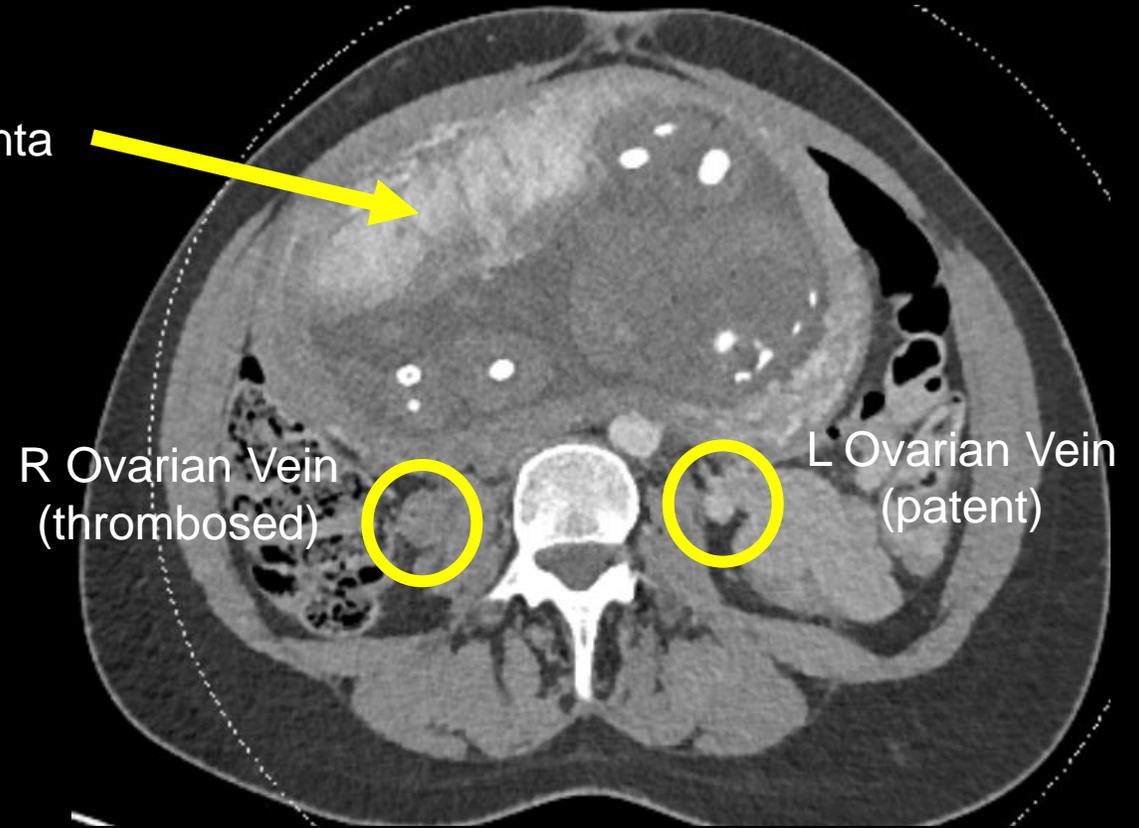
# Imaging: Labeled

## MRI

## CT w/ Contrast



Ax SSFPE FATSAT



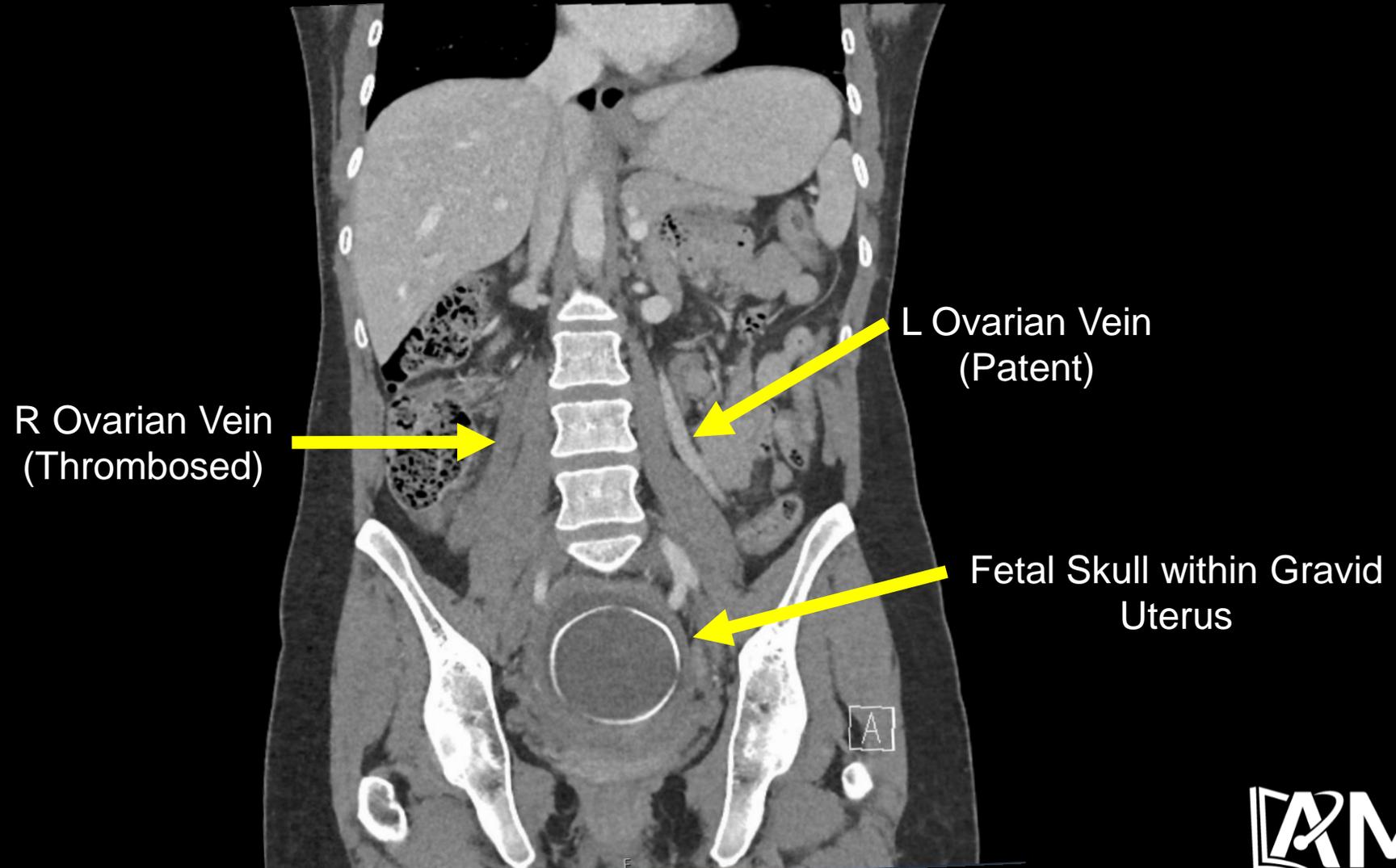
# CT w/ Contrast (Unlabeled)

Coronal



# CT w/ Contrast (Labeled)

Coronal



Final Dx:

Antepartum Ovarian Vein Thrombosis

# Ovarian Vein Thrombosis (OVT)

- Occurs in 1 out of every 600-2000 live births.
  - Antepartum: Incredibly rare – only 3 cases found in scientific literature search
- Most common vein for puerperal pelvic thrombophlebitis, R>L
- Likely occurs secondary to hypercoagulable peripartum state
- Presenting Symptoms:
  - Almost always presents as post-partum fever; abdominal, flank or back pain
  - GI sx are rare or mild, which can help differentiate from GI/GU pathology
- Imaging Findings:
  - CT or MRI are the imaging modalities of choice
  - Ultrasound is not reliable for ovarian vein visualization

# OB Patient Follow-Up

- Pain resolved on HD#2 (unclear whether OVT was a definitive etiology for her pain)
- On HD#3 discharged home on therapeutic Lovenox to be continued through pregnancy and 6 weeks postpartum
  - Lovenox was not held during labor
- Induction of labor at 37w2d for Intrauterine Growth Restriction
  - Uncomplicated SVD delivery, APGARS 8 and 9
  - No bleeding issues
  - IGR unlikely to have been related to CT-associated radiation exposure (next slide provides rationale)

# Radiation in Pregnancy

- Radiation dose for an abdominal/pelvic CT (and thus for this patient) - approximately 10 mSv (equivalent to approximately 10mGy)
- Radiation effects are based on gestational age
- Threshold dosage that can result in possible effects for the fetus vary throughout pregnancy
- It is important to discuss the risks of radiation compared to the benefit with pregnant patients

**Table 2.** Effects of Gestational Age and Radiation Dose on Radiation-Induced Teratogenesis ↩

Gestational Period	Effects	Estimated Threshold Dose*
Before implantation (0–2 weeks after fertilization)	Death of embryo or no consequence (all or none)	50–100 mGy
Organogenesis (2–8 weeks after fertilization)	Congenital anomalies (skeleton, eyes, genitals)	200 mGy
	Growth restriction	200–250 mGy
Fetal period	Effects	Estimated Threshold Dose*
8–15 weeks	Severe intellectual disability (high risk) <sup>†</sup>	60–310 mGy
	Intellectual deficit	25 IQ-point loss per 1,000 mGy
	Microcephaly	200 mGy
16–25 weeks	Severe intellectual disability (low risk)	250–280 mGy*

\*Data based on results of animal studies, epidemiologic studies of survivors of the atomic bombings in Japan, and studies of groups exposed to radiation for medical reasons (eg, radiation therapy for carcinoma of the uterus).

<sup>†</sup>Because this is a period of rapid neuronal development and migration.

Modified from Patel SJ, Reede DL, Katz DS, Subramaniam R, Amorosa JK. Imaging the pregnant patient for nonobstetric conditions: algorithms and radiation dose considerations. *Radiographics* 2007;27:1705–22.

ACOG Committee Opinion no. 723: Guidelines For Diagnostic Imaging During Pregnancy and Lactation

# References:

1. ACR Appropriateness Criteria <https://acsearch.acr.org/list>
2. Chen, Katherine T. “**Septic Pelvic Thrombophlebitis.**” *UpToDate*, Wolters Kluwer, 30 Sept. 2019, [www.uptodate.com/contents/septic-pelvic-thrombophlebitis](http://www.uptodate.com/contents/septic-pelvic-thrombophlebitis)
3. ACOG Committee Opinion no. 723: Guidelines For Diagnostic Imaging During Pregnancy and Lactation
4. Simons GR, Piwnica-Worms DR, Goldhaber SZ, ***Ovarian Vein Thrombosis***
5. Bertsch NM, Mastrobattista, Kawashima A, Kramer LA, ***Antepartum Bilateral Ovarian Vein Thrombosis: Magnetic Resonance Imaging Diagnosis***
6. Jenayah, Amel Achour et al. “**Ovarian vein thrombosis.**” *The Pan African medical journal* vol. 21 251. 6 Aug. 2015