

Rady 401

RLQ Pain and Vaginal Bleeding post Dilation
and Curettage: AVM vs RPOC

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Outline

- Focused patient history and workup
- US imaging
- MRI imaging
- Treatment & outcome
 - IR UAE
- ACR appropriateness Criteria
- Wrap up

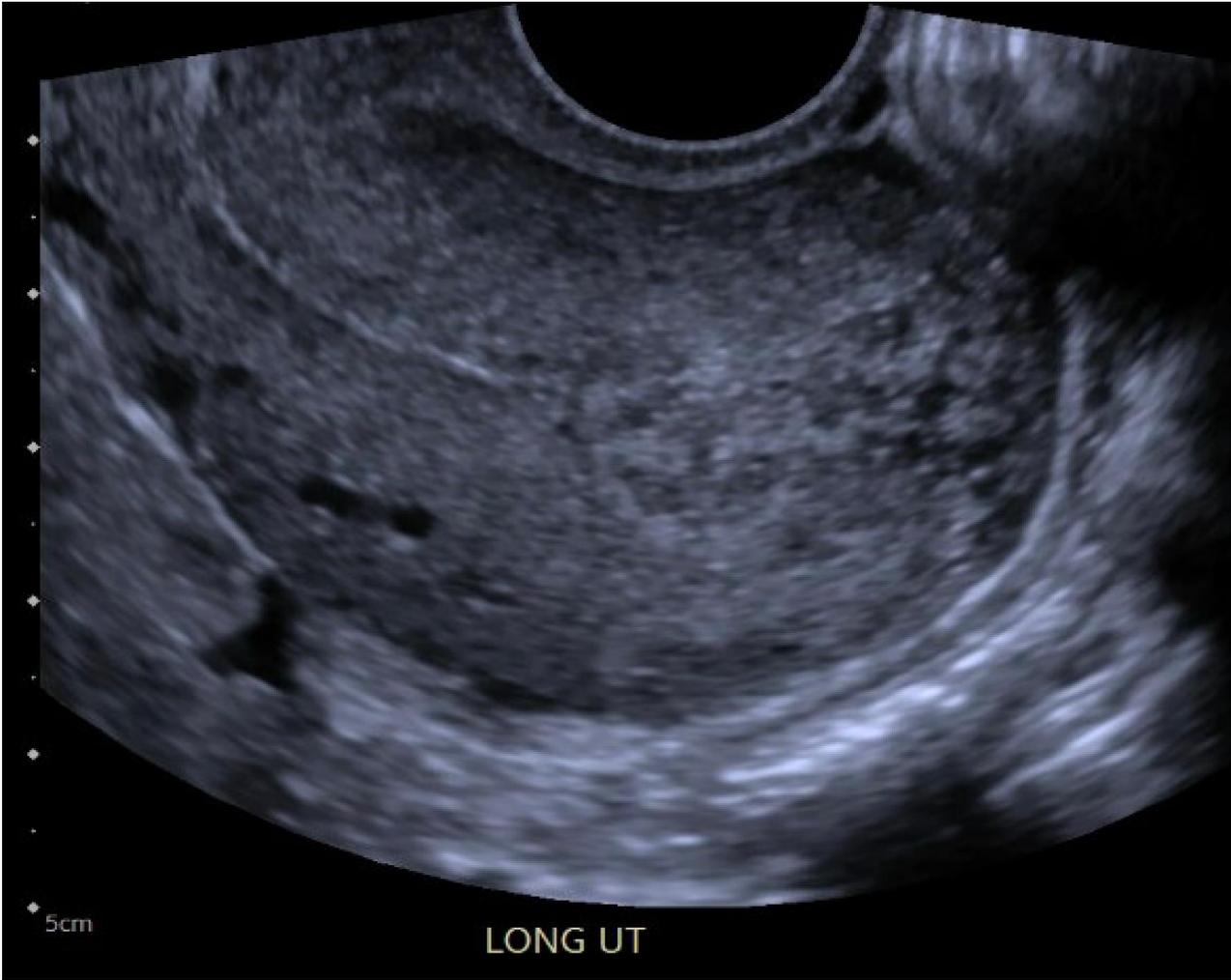
Focused patient history and workup

- Patient is a 21-year-old G1P0 presenting with RLQ pain, increased urinary frequency, and vaginal bleeding.
- Three weeks prior, patient had a D&C for therapeutic abortion at 20 weeks (fetus with skeletal dysplasia)
- T: 98.4°F HR: 82 BP: 137/97
- EXAM:
 - Positive for pain with palpation on RLQ and normal bowel sounds
 - Negative for rebound tenderness, palpable masses, and hepatosplenomegaly
- LABS
 - UA (+ occasional bacteria), Urine culture (Mixed Urogenital Flora), UPT (negative)

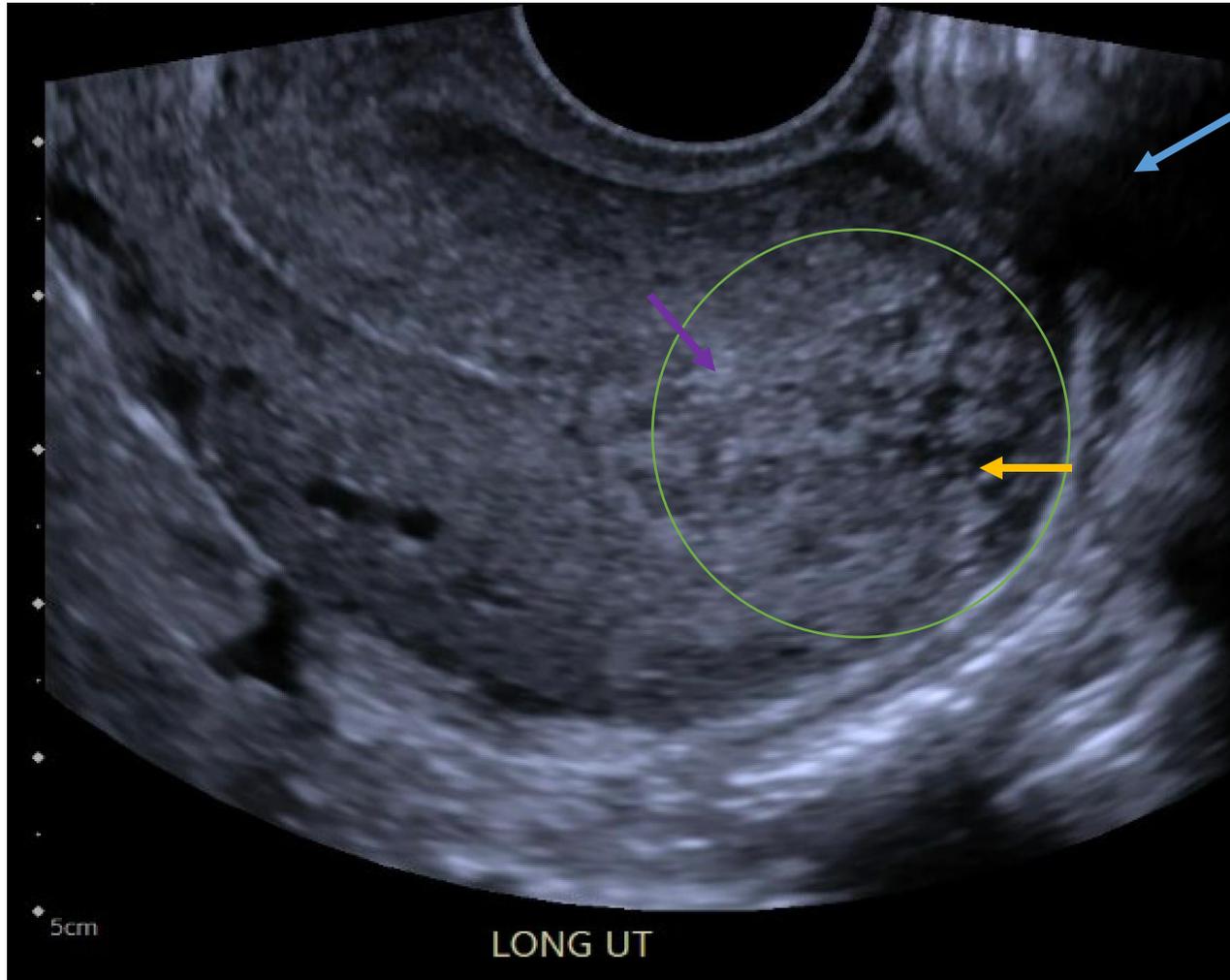
List of imaging studies

- US Endovaginal (NON-OB)
 - US with color and spectral doppler (ABD/PEL/SCROTUM/RETRO)
- MRI Pelvis with and without IV Contrast

Transvaginal ultrasound in sag plane

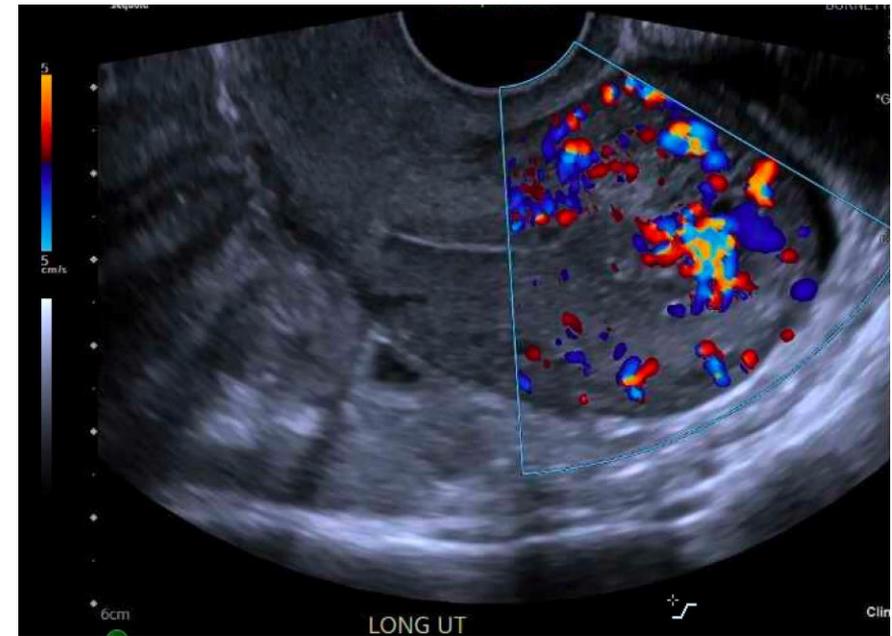
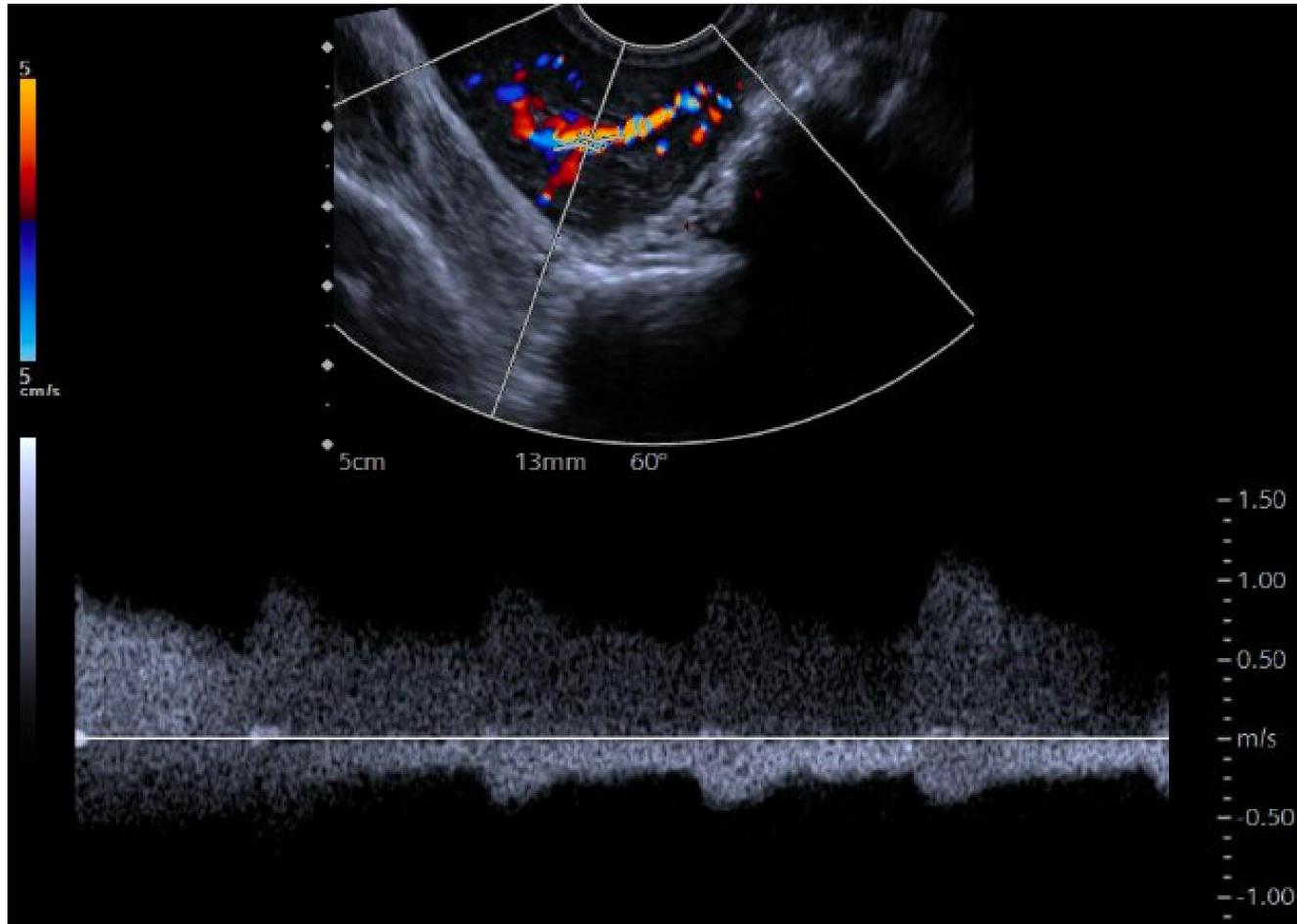


Transvaginal ultrasound in sag plane



- Focal thickening with ill-defined heterogenous material
- Hyperechoic area within endometrium/myometrium (purple arrow): increased vascularity (?)
- Hypoechoic regions within endometrium/ myometrium (orange arrow): Edema (?)
- Pockets of hypoechoic regions around the uterus (blue arrow): free fluid (?)

Transvaginal ultrasound w doppler

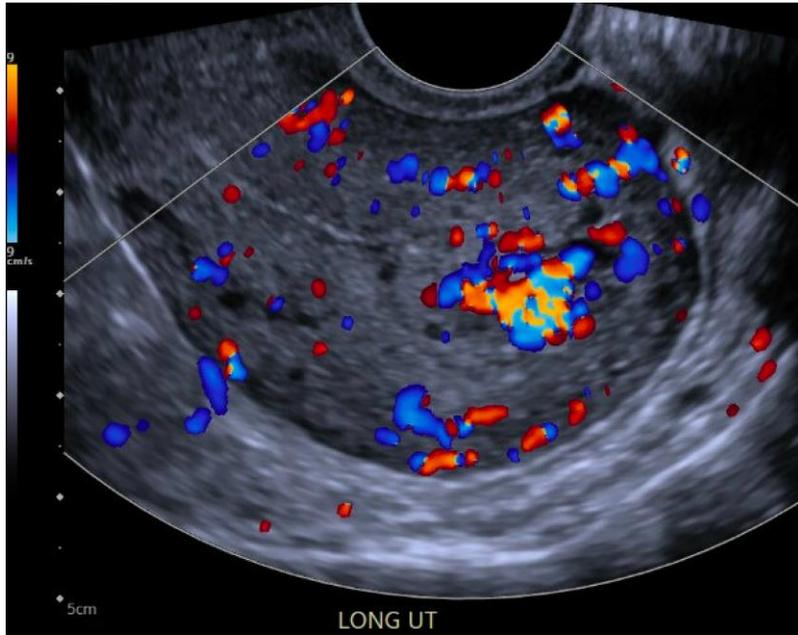


- Increased vascularity within the upper endometrial canal and myometrium of the fundus.
- Spectral doppler: high-velocity and low resistance waveform (arterial ?)

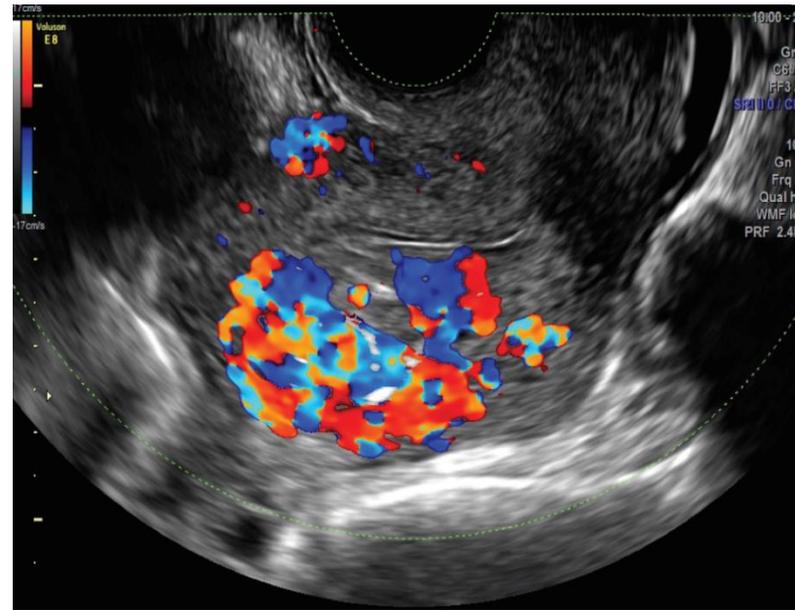
Differential diagnosis

- Retained products of conception (RPOC)
 - US with color doppler showing an area of focal increased vascularity with or without a mass has a sensitivity (79%) and specificity (89%) for RPOC.³
 - Vascular component of RPOC is located in the endometrium⁸
- Arteriovenous malformations (AVM)
 - Color Doppler ultrasound sensitivity was 100% in detecting a uterine hyper vascular lesion.⁶
 - Vascular component in AVM is located in the myometrium.⁸
- Further workup: MRI with and without IV contrast

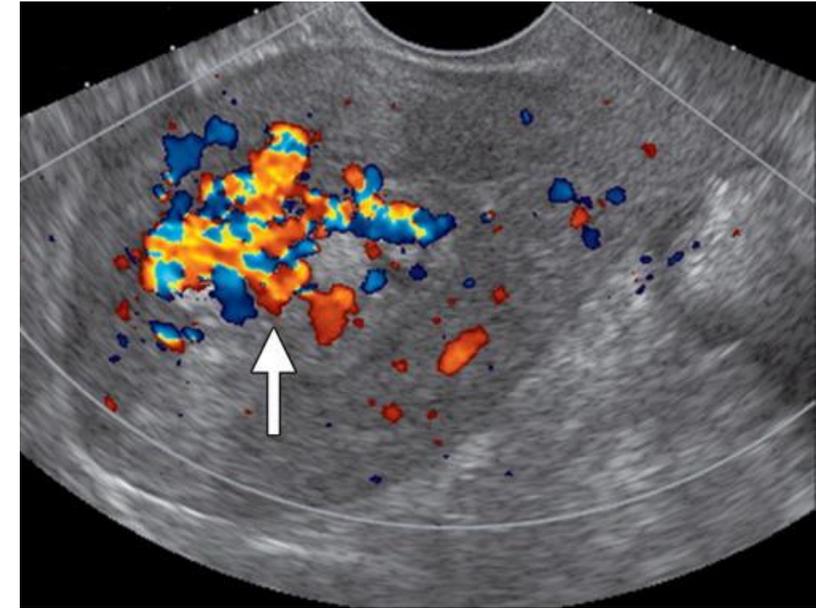
Transvaginal ultrasound Our pt vs references pt



Patient's

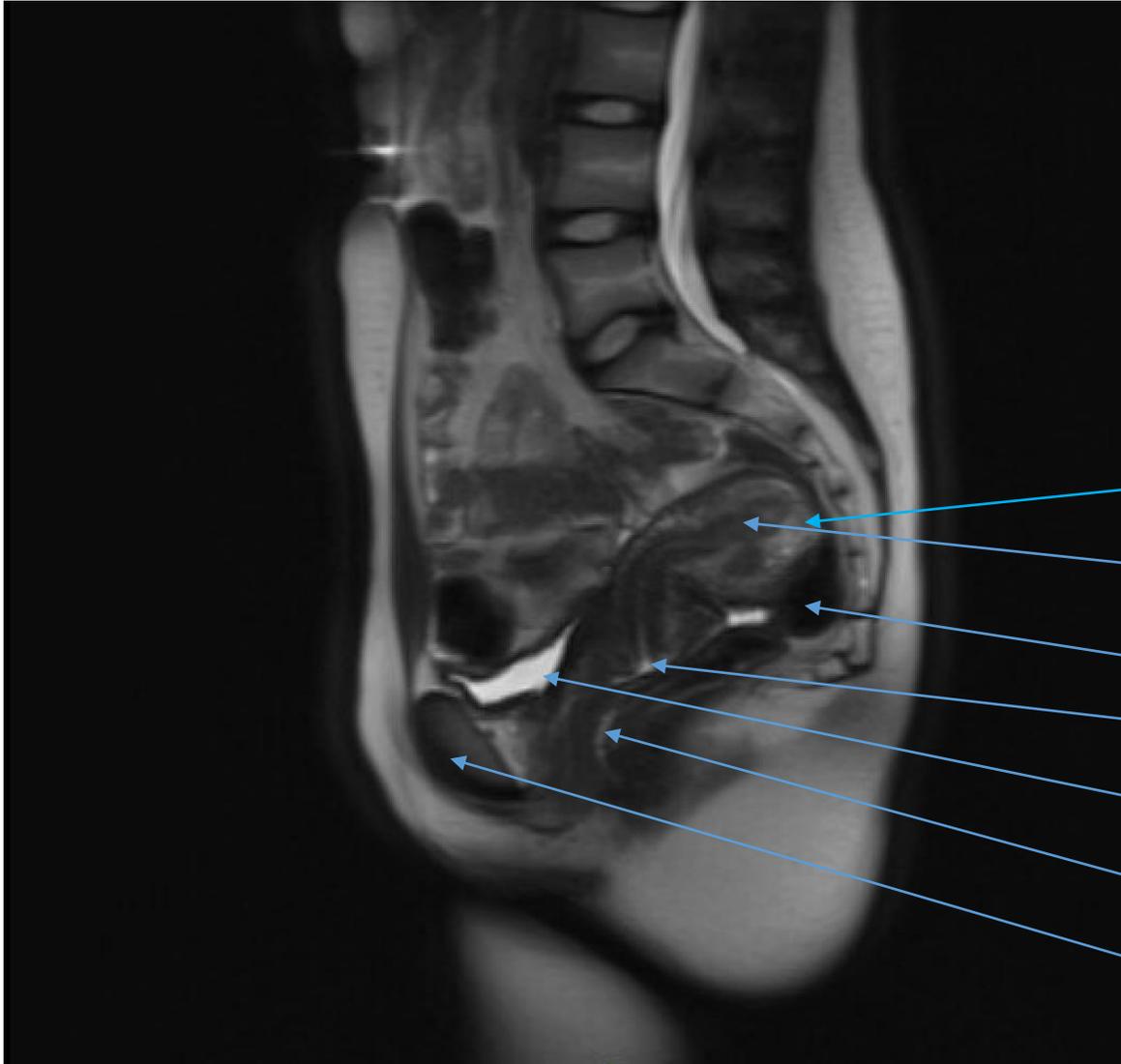


Reference² : AVM

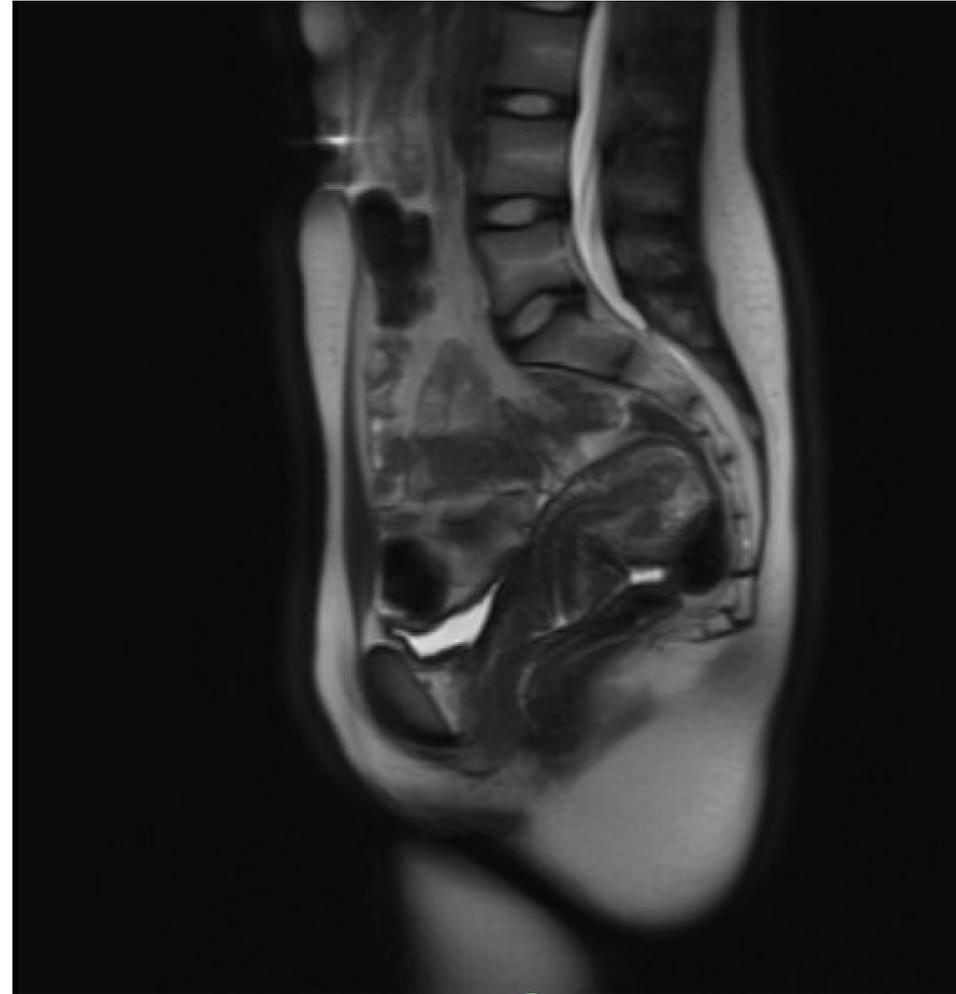


Reference¹¹: RPOC

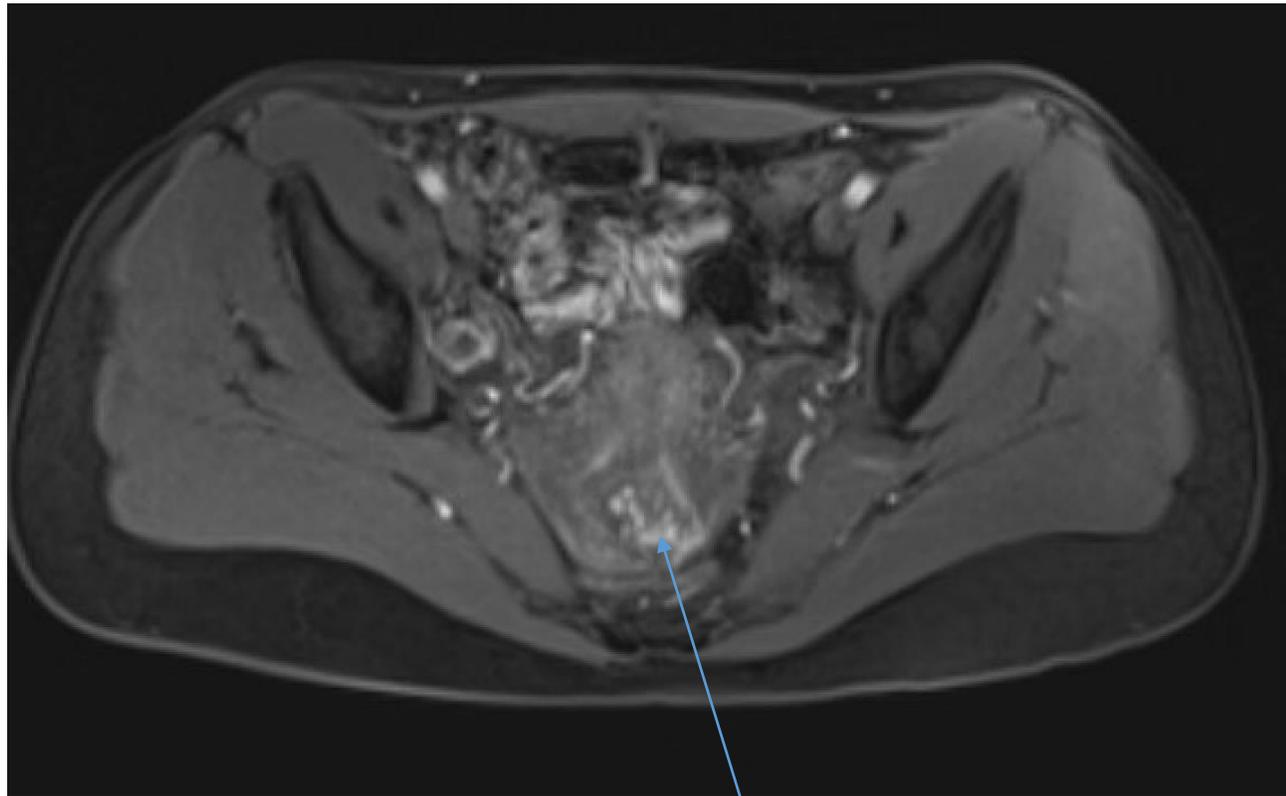
Pelvic MRI



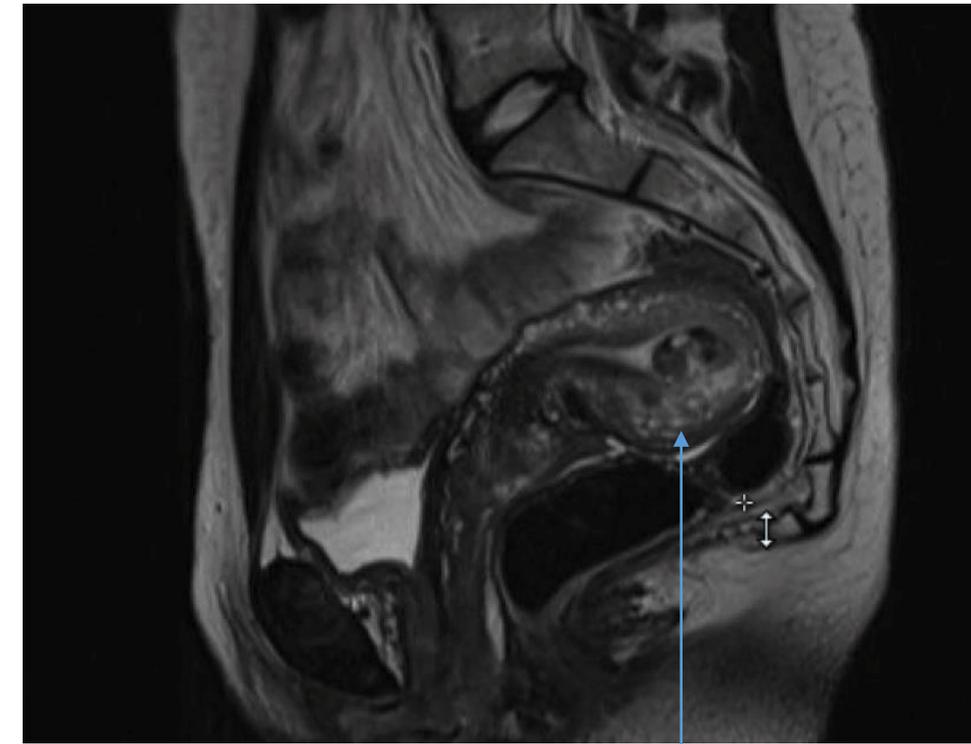
- Myometrium
- Endometrium
- Rectum
- Cervix
- Bladder
- Vagina
- Pubic body



Pelvic MRI



Hyperintensity



- Serpiginous vessels on T2-weighted image.
- Vessels prominently seen on the arterial phase: marked enhancement.

Patient Treatment and Outcome

Diagnosis

- AVM vs RPOC

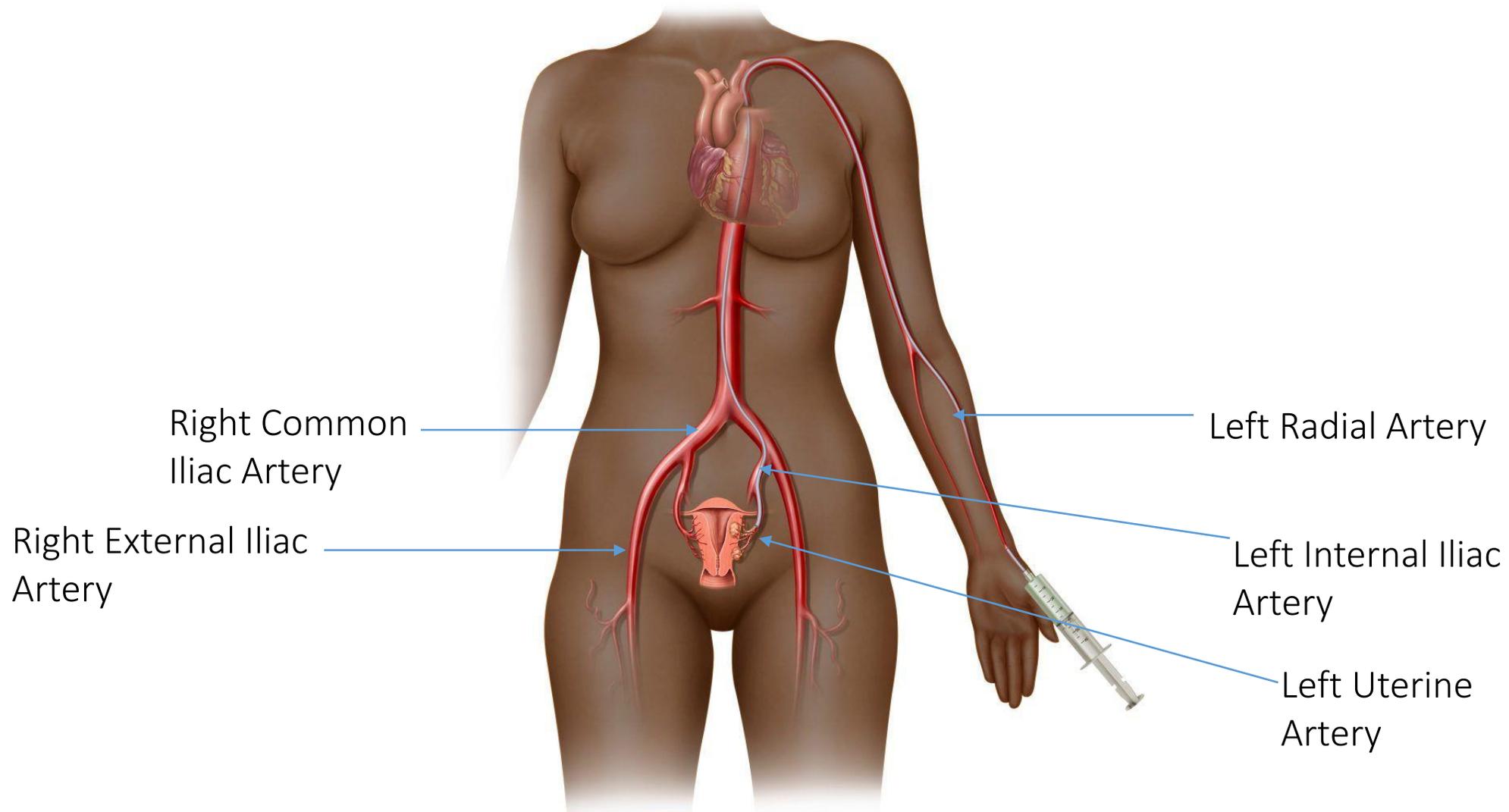
Treatment for AVM²

- Mainstay therapy for uterine and pelvic AVMs: Endovascular management with transcatheter embolization
- Uterine AVMs refractory to endovascular interventions: Hysterectomy

Treatment for RPOC¹⁰

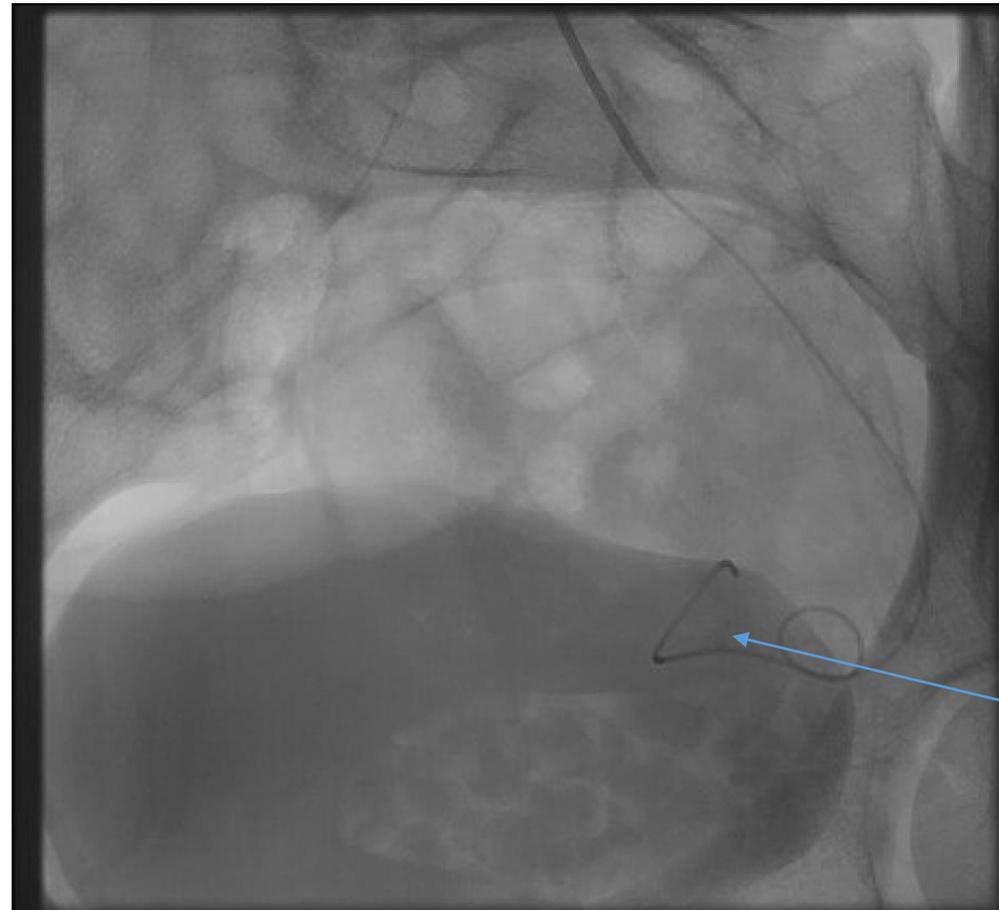
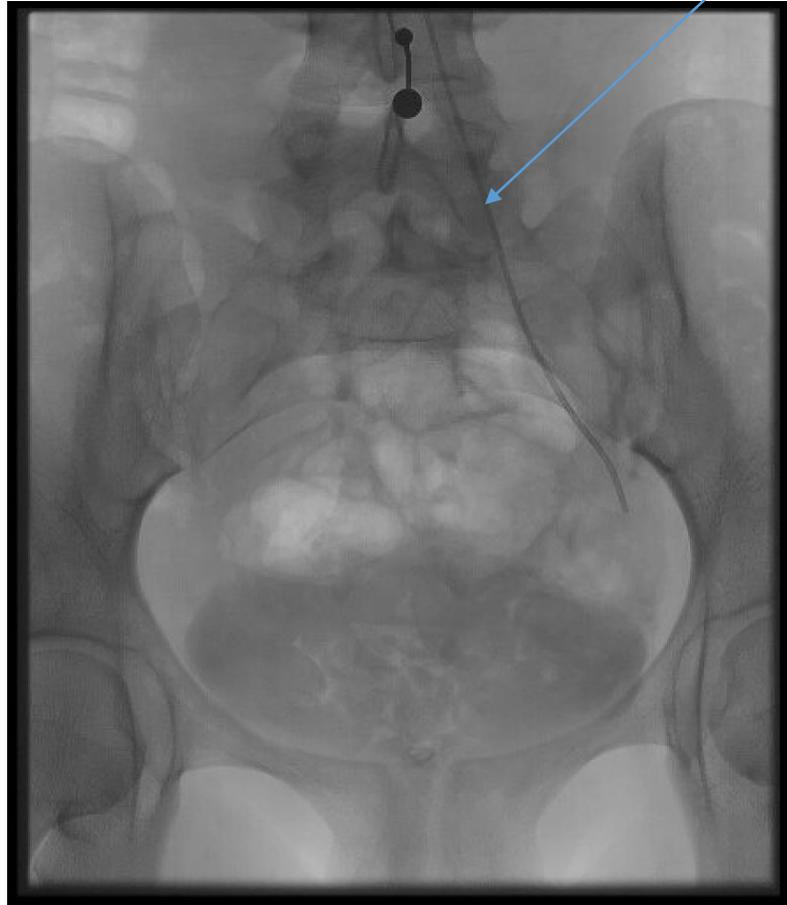
- Expectant management; Use of uterotonic medications (prostaglandin E1 analogs)
- Surgical interventions such as D&C and hysteroscopic removal

IR UAE: Radial Artery Access to Uterine Artery



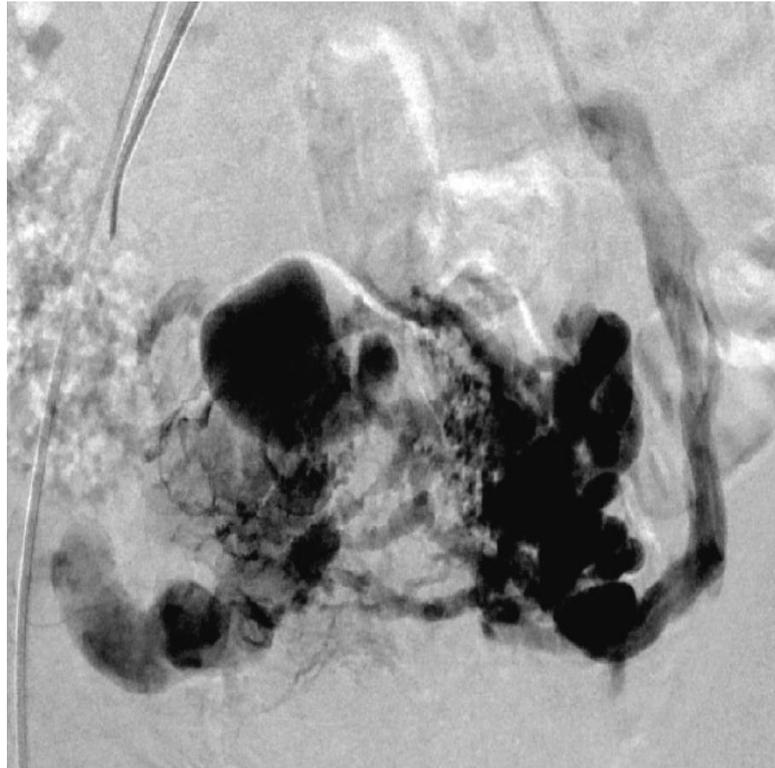
IR UAE

Left Common Iliac Artery

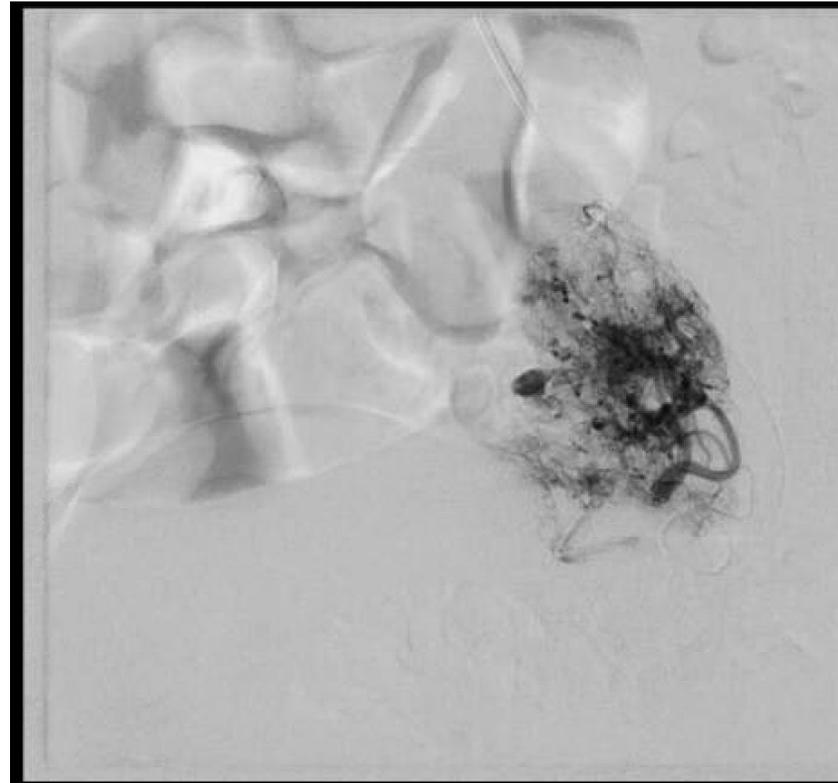


Left Uterine Artery

IR UAE



Reference¹: AVM



Patient's: Pseudoaneurysms

- Left uterine arteriogram: several small pseudoaneurysms & tangle of abnormal vessels
- AVM wasn't ruled out although classical draining vein wasn't visualized
- RPOC was considered less likely
- Embolization of left uterine artery -> occluded flow to tangle vessels with aneurysms.

ACR Appropriateness Criteria for Post Partum Hemorrhage

Variant 4. Postpartum hemorrhage. Late (greater than 24 hrs to 6 weeks) after vaginal delivery. Initial imaging.

Scenario	Procedure	Adult RRL	Peds RRL	Appropriateness Category	
Postpartum hemorrhage, >24hrs to <= 6wks hrs after vaginal delivery, initial Imaging	US pelvis transvaginal	0 mSv ○	0 mSv [ped] ○	Usually appropriate	●
	US duplex Doppler pelvis	0 mSv ○	0 mSv [ped] ○	Usually appropriate	●
	US pelvis transabdominal	0 mSv ○	0 mSv [ped] ○	Usually appropriate	●
	CT abdomen and pelvis with IV contrast	1-10 mSv ⊗⊗⊗	3-10 mSv [ped] ⊗⊗⊗⊗	May be appropriate	●
	CTA abdomen and pelvis with IV contrast	10-30 mSv ⊗⊗⊗⊗	Null	May be appropriate	●
	MRI pelvis without IV contrast	0 mSv ○	0 mSv [ped] ○	May be appropriate	●
	MRI pelvis without and with IV contrast	0 mSv ○	0 mSv [ped] ○	May be appropriate	●
	CT abdomen and pelvis without and with IV contrast	10-30 mSv ⊗⊗⊗⊗	10-30 mSv [ped] ⊗⊗⊗⊗⊗	May be appropriate	●
	CT abdomen and pelvis without IV contrast	1-10 mSv ⊗⊗⊗	3-10 mSv [ped] ⊗⊗⊗⊗	May be appropriate	●

Transvaginal ultrasound with Doppler : Was It Needed?

- According to ACR Appropriateness Criteria for PPH, transvaginal ultrasound of the pelvis is usually appropriate.
- Cost: \$632⁹
- Gold standard for diagnosis RPOC : Ultrasound with Doppler⁸
- Gold standard for diagnosis Uterine AVM: Digital subtraction angiograph (DSA)^{1,2}
- Failed to differentiate between RPOC and AVM, necessitating further imaging.

MRI Pelvis with and without IV Contrast: Was It Needed?

- According to ACR Appropriateness Criteria for PPH, MRI may be appropriate.
- In this patient, US findings were inconclusive and treatment depended on imaging; therefore, MRI was an appropriate next step.⁸
- MRI is best (as compared to CT) in differentiating RPOC, AVMs, and gestational trophoblastic diseases (GTDs) because of soft tissue detail.⁸
- MRI allows for non-invasive confirmation of uterine AVM diagnosis and the extent of the malformation.
- Cost: \$1408⁹

IR UAE: Was It Needed?

- Inconclusive diagnosis: AVM vs RPOC
- Patient desire future fertility
- UAE using gelfoam slurry may be an effective and safe treatment for RPOC with hemorrhage that can preserve fertility.¹²
 - Kimura et al. 2020 -> technical success was achieved in 13 patients (93%) and clinical success was achieved in all 14 patients.
- UAE mainstay therapy for AVM²
 - Kole et al. 2020 -> 7 of 18 patients who had UAE for uterine AVM attained subsequent pregnancies.
 - Of the subsequent pregnancies, 4 patients had full-term deliveries and two of these four also had at least one miscarriage.¹⁵

UNC Top Three

- Differential diagnosis of hypervascularity with turbulent flow on color Doppler ultrasonography in a patient presenting with bleeding post pregnancy includes these three:

seems best (as compared to CT) in differentiating RPOC, AVMs and GTDs but is never the first test in a diagnostic work up.

is the mainstay of therapy for uterine AVMs and has been used successful for the treatment of RPOC in patient desiring future fertility.

UNC Top Three

- Differential diagnosis of hypervascularity with turbulent flow on color Doppler ultrasonography in a patient presenting with bleeding post pregnancy includes these three:
 - **Arteriovenous malformations**
 - **Retained products of conception**
 - **Gestational trophoblastic diseases**
- **MRI** seems best (as compared to CT) in differentiating RPOC, AVMs and GTDs but is never the first test in a diagnostic work up.
- **Endovascular management with transcatheter embolization** is the mainstay of therapy for uterine AVMs and has been used successful for the treatment of RPOC in patient desiring future fertility.

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