Rady 401
RLQ Pain and Vaginal Bleeding post Dilation and Curettage: AVM vs RPOC
Lisa Wanda 6.13.22
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 heterogeneous 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 (?)
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

Reference\(^2\): AVM

Reference\(^{11}\): RPOC
Pelvic MRI

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

- 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 AVM\(^2\)
➢ Mainstay therapy for uterine and pelvic AVMs: Endovascular management with transcatheter embolization
➢ Uterine AVMs refractory to endovascular interventions: Hysterectomy

Treatment for RPOC\(^{10}\)
➢ 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

Right Common Iliac Artery

Right External Iliac Artery

Left Radial Artery

Left Internal Iliac Artery

Left Uterine Artery

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.**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Procedure</th>
<th>Adult RRL</th>
<th>Peds RRL</th>
<th>Appropriateness Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postpartum hemorrhage, &gt;24hrs to &lt;= 6wks hrs after vaginal delivery, initial Imaging</td>
<td>US pelvis transvaginal</td>
<td>0 mSv</td>
<td>0 mSv [ped]</td>
<td>Usually appropriate</td>
</tr>
<tr>
<td></td>
<td>US duplex Doppler pelvis</td>
<td>0 mSv</td>
<td>0 mSv [ped]</td>
<td>Usually appropriate</td>
</tr>
<tr>
<td></td>
<td>US pelvis transabdominal</td>
<td>0 mSv</td>
<td>0 mSv [ped]</td>
<td>Usually appropriate</td>
</tr>
<tr>
<td></td>
<td>CT abdomen and pelvis with IV contrast</td>
<td>1-10 mSv</td>
<td>3-10 mSv [ped]</td>
<td>May be appropriate</td>
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<tr>
<td></td>
<td>CTA abdomen and pelvis with IV contrast</td>
<td>10-30 mSv</td>
<td>Null</td>
<td>May be appropriate</td>
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<tr>
<td></td>
<td>MRI pelvis without IV contrast</td>
<td>0 mSv</td>
<td>0 mSv [ped]</td>
<td>May be appropriate</td>
</tr>
<tr>
<td></td>
<td>MRI pelvis without and with IV contrast</td>
<td>0 mSv</td>
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https://www.acr.org/Clinical-Resources/ACR-Appropriateness-Criteria
Transvaginal ultrasound with Doppler: Was It Needed?

- According to ACR Appropriateness Criteria for PPH, transvaginal ultrasound of the pelvis is usually appropriate.

- Cost: $632

- Gold standard for diagnosis RPOC: Ultrasound with Doppler

- Gold standard for diagnosis Uterine AVM: Digital subtraction angiograph (DSA)

- 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 AVM\(^{2}\)
  - 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:

  - 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.

  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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• 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.
References


9. mdsave.com/procedures/mri-with-and-without-contrast/d781f5cb


