RADY 410 Case Presentation:
Uterine Artery Arteriovenous Malformation in Postpartum Hemorrhage

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Patient history and workup

• A 40-year-old G8P5126 female presented to the hospital with severe vaginal bleeding and an estimated 2000mL of blood loss at home.
  • The patient had a history of ectopic pregnancy, placenta previa, and dilatation and curettage.

• Three weeks prior, she had a vaginal delivery of a term infant resulting in post-partum hemorrhage, with 2700mL of blood loss.
  • The hemorrhage was controlled with uterotonics and the placement of a bakri balloon.
  • She stabilized and was discharged home on postpartum day two.
Patient history and workup

• In the emergency department, her hemoglobin dropped from 12 g/dL to 10 g/dL.

• Interventional Radiology was consulted, and they elected to perform bilateral internal iliac arteriograms via a radial approach.
  • Sub-selection of the uterine arteries would also be performed if possible.
Iliac Artery Anatomy

COMMON ILIAC ARTERY AND ITS BRANCHES (FEMALE)

- Common iliac artery
- Internal iliac artery
- External iliac artery
- Umbilical artery
- Obturator artery
- Deep circumflex iliac artery
- Inferior epigastric artery
- Obliterated umbilical artery
- Superior vesical arteries
- Urinary bladder
- Vagina
- Iliolumbar artery
- Lumbosacral trunk
- Lateral sacral artery
- Ventral primary rami:
  - S1
  - S2
  - S3
  - S4
- Superior gluteal artery
- Inferior gluteal artery
- Internal pudendal artery
- Uterine artery
- Middle rectal artery
- Rectum

https://web.duke.edu/anatomy/Lab09/Lab9.html
Imaging Studies: Left Internal Iliac Artery Arteriogram

- Digital subtraction angiography of the left internal iliac artery.
  - The beginning of a nidus is noted in the uterine artery.
  - A nidus is a tangle of abnormal blood vessels.
Imaging Studies: Left uterine artery arteriogram

• Sub-selection of the uterine artery demonstrates a large, tortuous uterine artery with the presence of a nidus.
Imaging Studies: Left uterine artery arteriogram

- Brisk venous filling is noted around the nidus.
Imaging Studies: Left uterine artery arteriogram

- Early opacification of the internal iliac vein is seen. The presence of a nidus with early opacification of the congruent vein confirms a uterine artery arteriovenous malformation (AVM).
Imaging Studies: Right uterine artery arteriogram

- The right uterine artery has tortuous, spiral arteries that are associates with a post-partum, enlarged uterus.
Patient treatment: Left uterine artery embolization

• Thick glue was used to embolize the AVM in the left uterine artery due to its brisk flow and large size.

• Post-embolization left uterine artery arteriogram shows obliteration of the nidus.
Patient treatment: Right Uterine Artery Embolization

• The right uterine artery was empirically embolized using 500 – 700 µm non-absorbable particles (Embosphere, Merit Medical, South Jordan, Utah, US).

• Stasis of blood flow within the right uterine artery confirmed on repeat arteriogram of the uterine artery.
Patient outcome

• At her outpatient follow up two weeks after the procedure, she did not report any repeat bleeding or passage of clots.

• The patient did not require a hysterectomy due to the obliteration of the AVM.
Discussion: Epidemiology of uterine artery AVMs

• Arteriovenous malformations are abnormalities of the vascular system that consist of a tangle of abnormal blood vessels forming a nidus that allows for an abnormal, brisk communication between arteries and veins.

• The prevalence of uterine AVMs is currently unknown, and estimates are based on reviews of the literature.
  • There are little more than one-hundred reported cases [1].
Discussion: Symptoms of uterine artery AVMs

• Uterine AVMs typically present with symptoms such as menorrhagia, postpartum hemorrhage, and spontaneous abortions [2].
  • Symptoms may be similar to fibroids, endometriosis, and adenomyosis.
Discussion: Types of uterine artery AVMs

- Primary/Idiopathic
  - Congenital developmental abnormalities [3].

- Secondary/Acquired
  - Caused by reactive angiogenesis, pregnancy related changes, uterine procedures, or trophoblastic invasion [3].
  - Uterine instrumentation, such as dilatation and curettage or surgery, is considered one of the main causes of acquired uterine AVMs [1,4].
    - This is because they cause inflammation and reactive angiogenesis.
  - Diseases associated with the formation of uterine AVMs include endometrial carcinoma, cervical carcinoma, and trophoblastic disease [3].
Discussion: Diagnosis of uterine artery AVMs

• The gold standard for the diagnosis of uterine artery AVMs is digital subtraction angiography [1].

• Color doppler ultrasonography can also demonstrate the presence of uterine artery AVMs [5].
  • Patients complaining of symptoms in the non-acute setting may benefit from an initial non-invasive evaluation.

• Computed topography angiography and magnetic resonance angiography may also be used for procedural planning [5].
Discussion: Treatment of uterine artery AVMs

• Uterine artery embolization (UAE) is the gold standard for treatment of uterine artery AVMs [3].
  • Trans-arterial embolization is a minimally invasive technique that can quickly control even catastrophic hemorrhage and effectively treat the lesion, while preserving the uterus.

• Prior to UAE, the gold standard was hysterectomy.

• Embolization of the bilateral uterine arteries should be the preferred approach, since uterine AVMs most likely have feeding vessels from both sides [3].
Discussion: Treatment of uterine artery AVMs

• The type of embolic agent chosen by the interventional radiologist performing the procedure varies and depends on the size and flow rate of the shunt.
  • Another important factor is the operator’s comfort and experience level with the different agents.

• Gelfoam is commonly used since it is reabsorbed by the body in 10-14 days and can maintain fertility in reproductive age women [6].
Summary

• Uterine artery AVMs are rare, but can result in serious complications, including severe menorrhagia, spontaneous abortions, and postpartum hemorrhage.
• Uterine AVMs are most commonly acquired and are associated with instrumentation of the uterus (such as dilatation and curettage).
• Diagnosis can be made by digital subtraction angiography or color doppler ultrasonography.
• Treating with uterine artery embolization can prevent the need for a hysterectomy and preserve fertility.
References


