

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

Henry Stiepel, MS4
4 September 2019

Patient history and workup

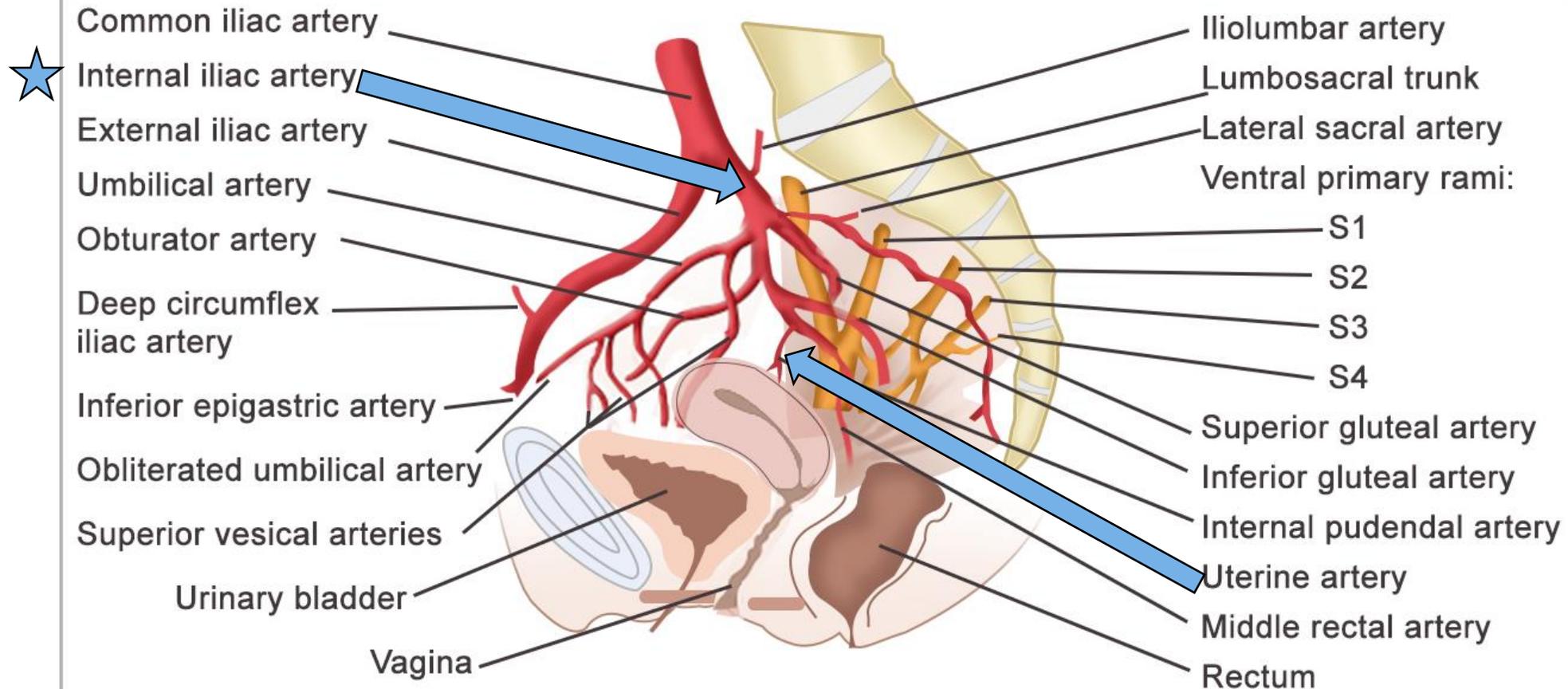
- A 40-year-old G8P5126 female presented to the hospital with severe vaginal bleeding and an estimated 2000mL of blood loss at home.
 - The patient had a history of ectopic pregnancy, placenta previa, and dilatation and curettage.
- Three weeks prior, she had a vaginal delivery of a term infant resulting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

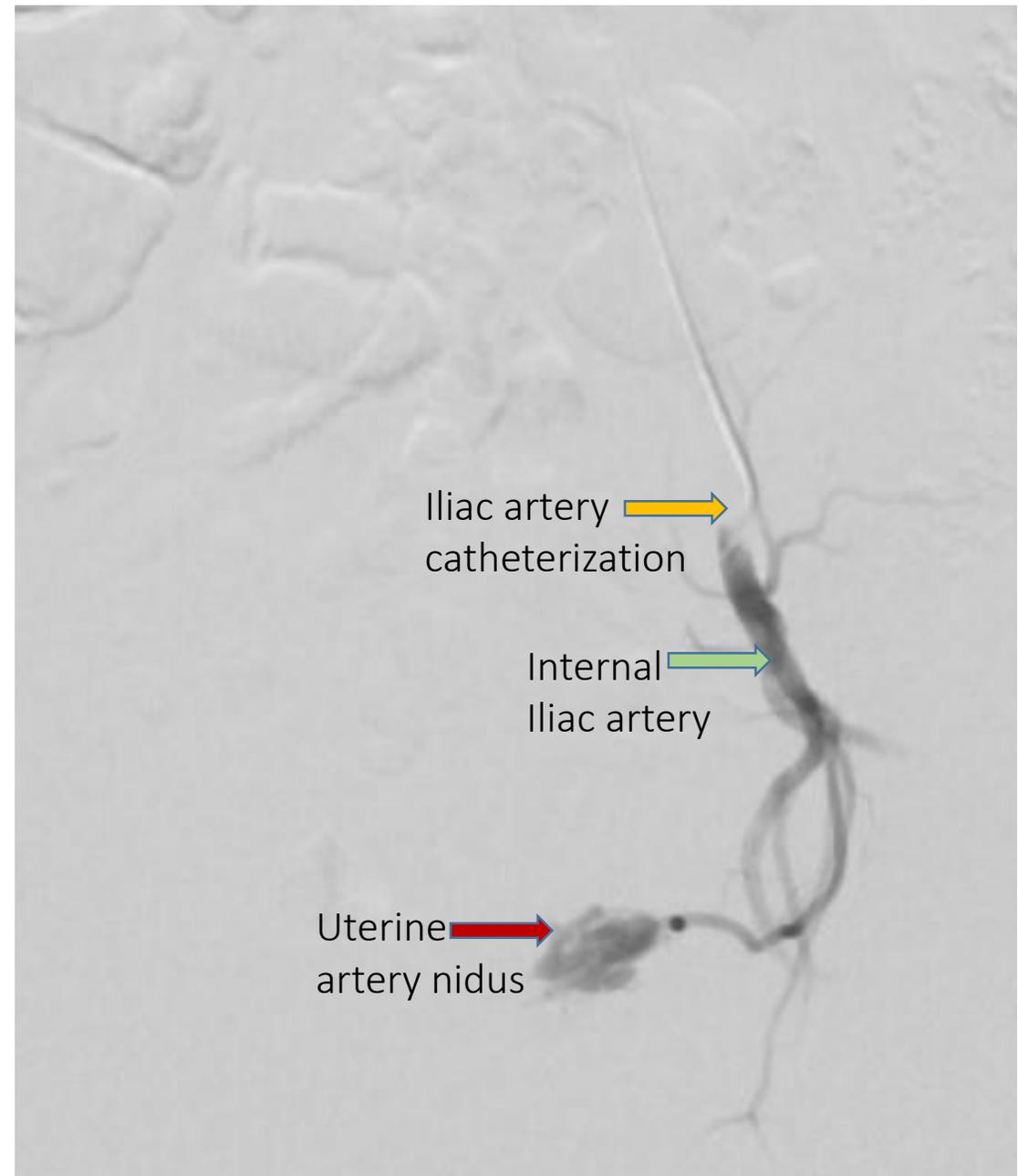
Iliac Artery Anatomy

COMMON ILIAC ARTERY AND ITS BRANCHES (FEMALE)



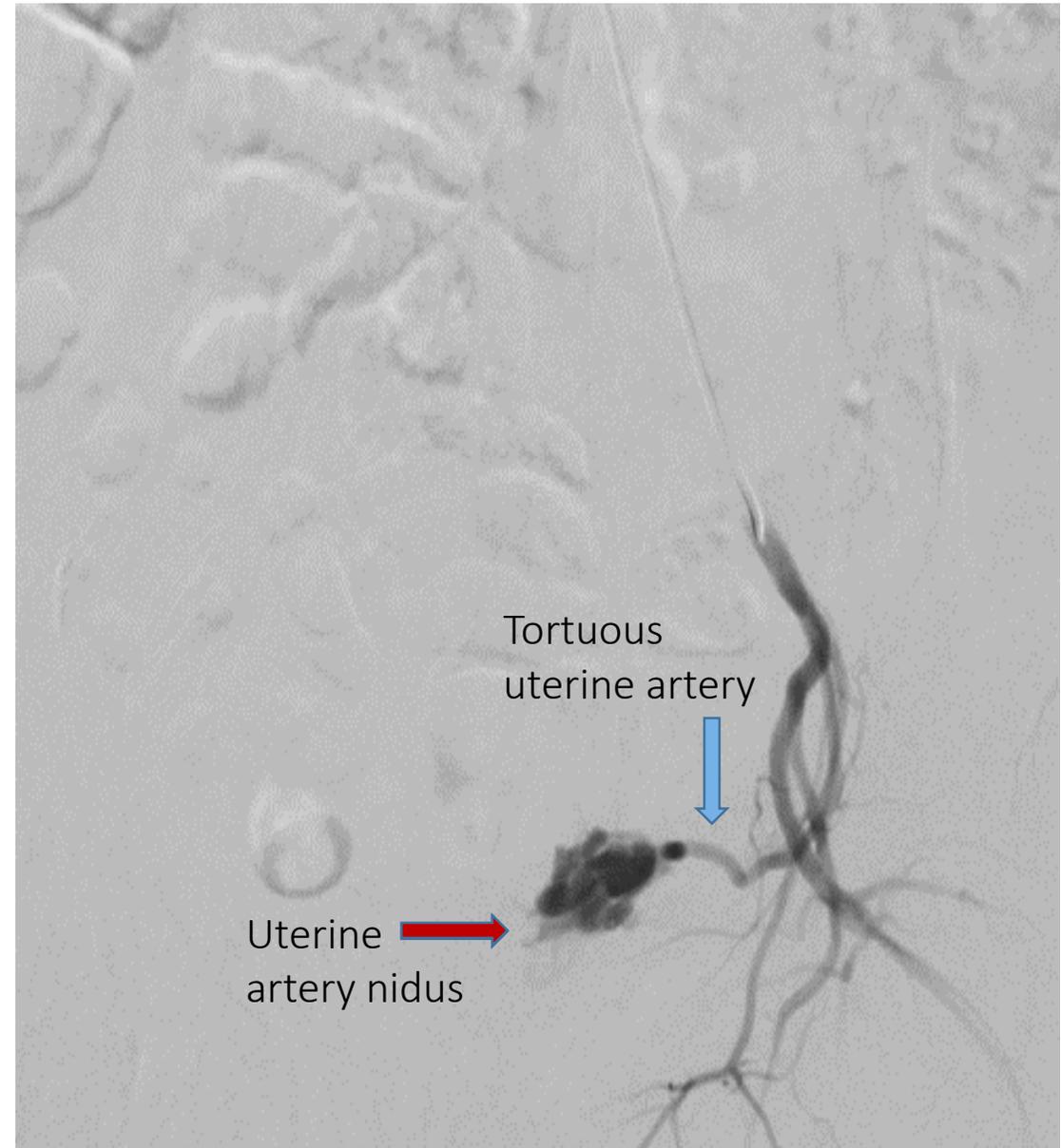
Imaging Studies: Left Internal Iliac Artery Arteriogram

- 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.



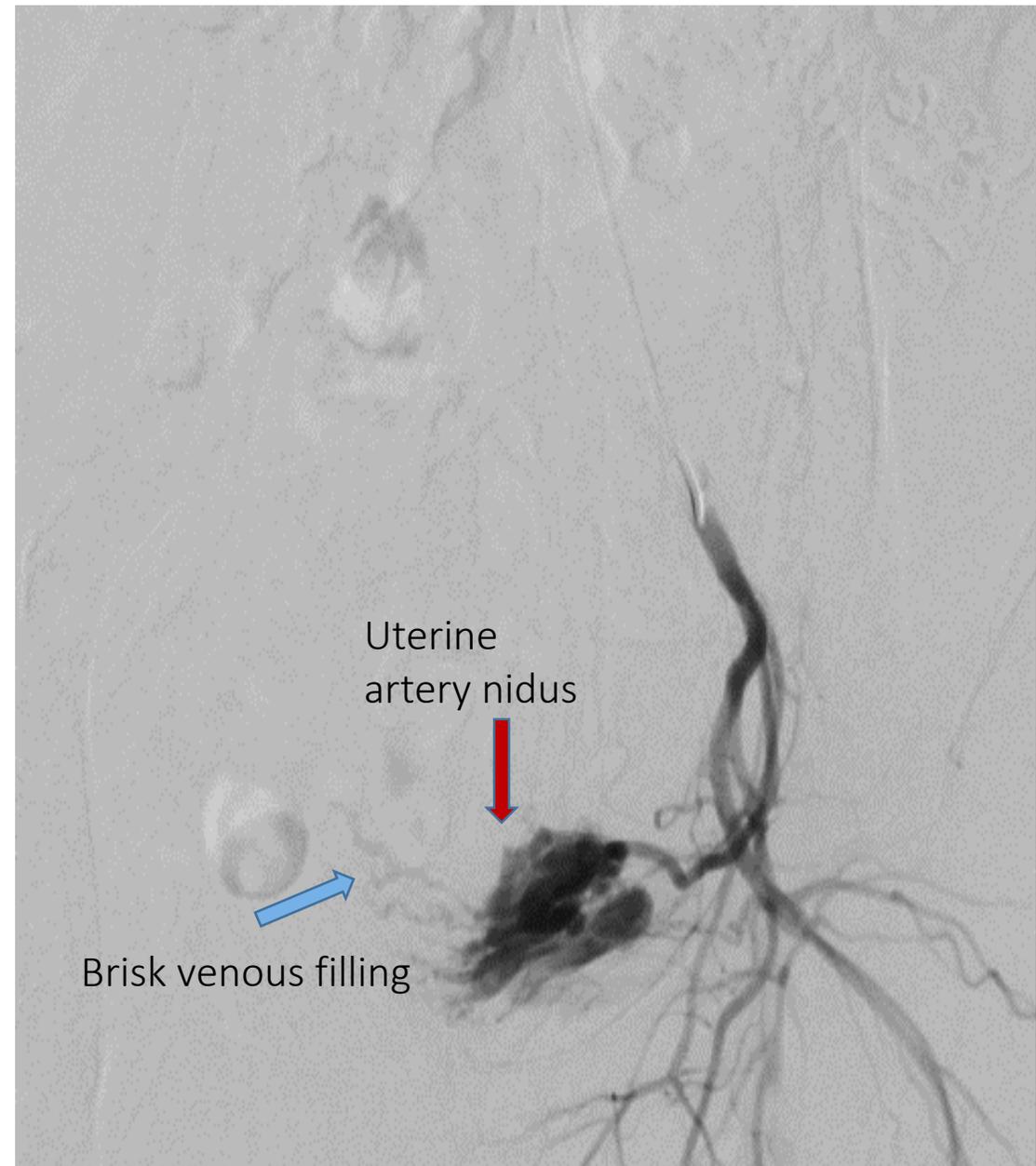
Imaging Studies: Left uterine artery arteriogram

- Sub-selection of the uterine artery demonstrates a large, tortuous uterine artery with the presence of a nidus.



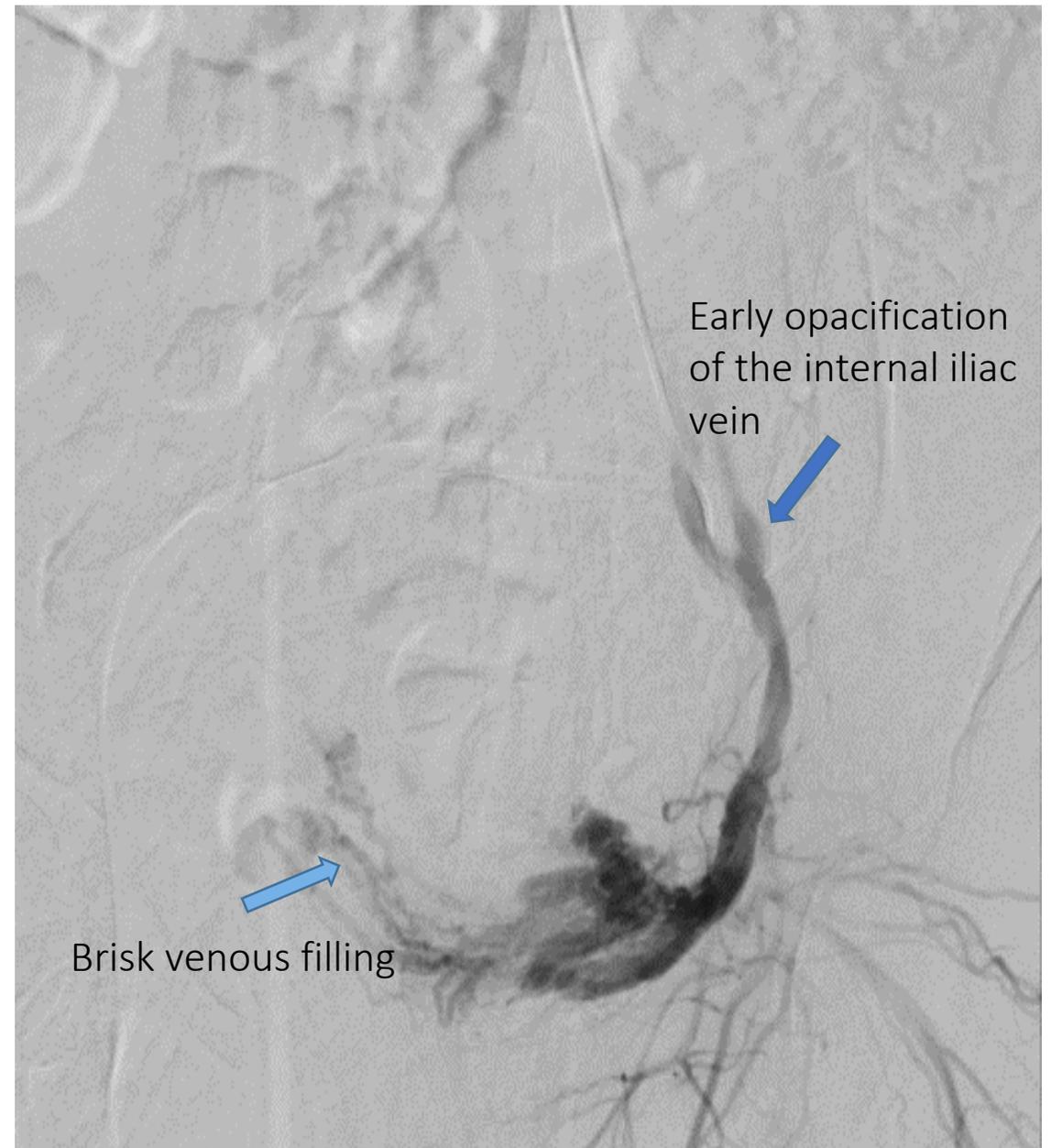
Imaging Studies: Left uterine artery arteriogram

- Brisk venous filling is noted around the nidus.



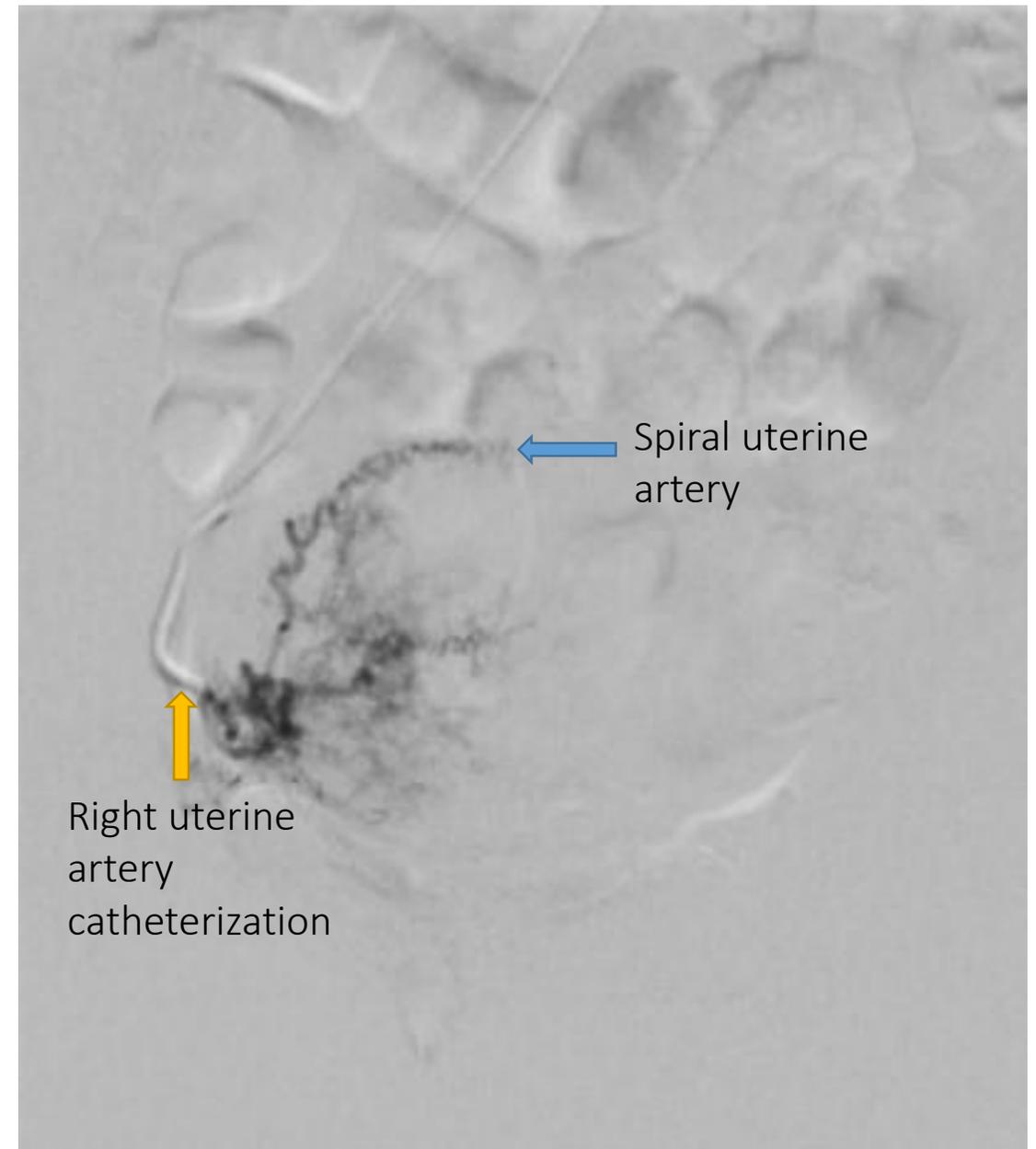
Imaging Studies: Left uterine artery arteriogram

- 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).



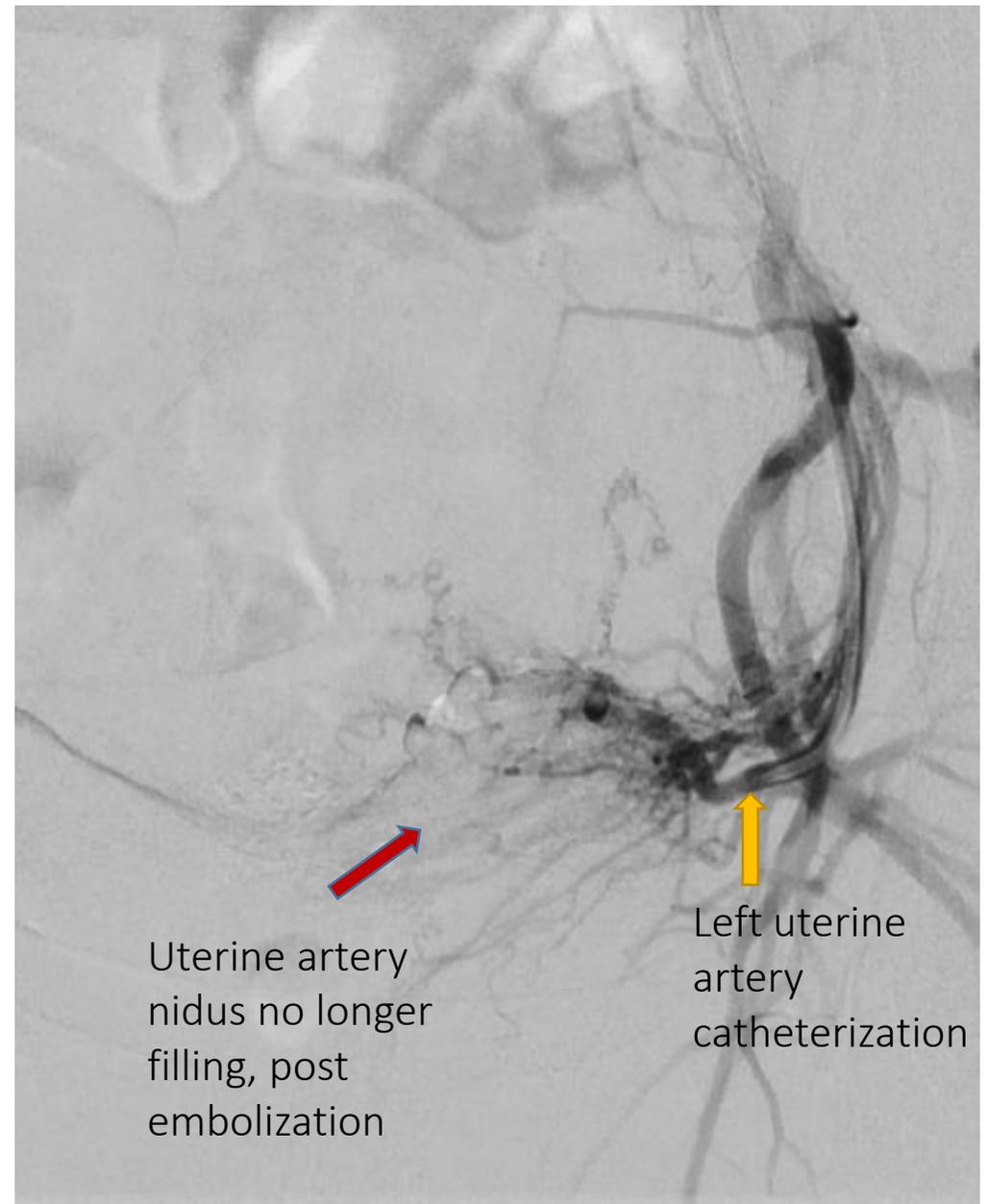
Imaging Studies: Right uterine artery arteriogram

- The right uterine artery has tortuous, spiral arteries that are associated with a post-partum, enlarged uterus.



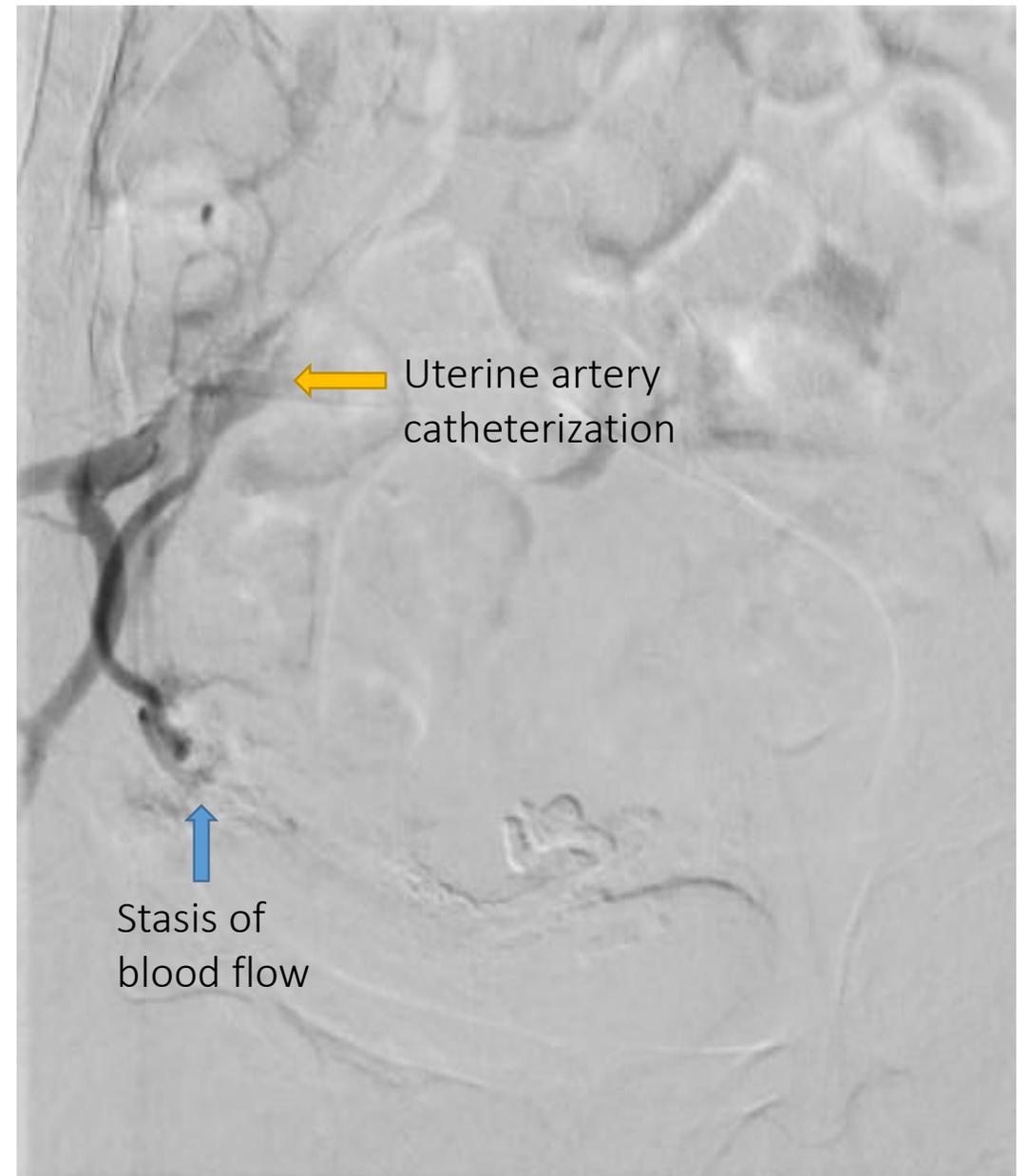
Patient treatment: Left uterine artery embolization

- 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

1. Grivell, Rosalie M. et al. "Uterine Arteriovenous Malformations: A Review of the Current Literature" *Obstetrical and Gynecological Survey* 2005;60(11):761-767
2. Fleming, H et al. "Arteriovenous malformations of the Uterus" *Obstetrics and Gynecology*. 1989;72(2);209-213
3. Kim, Taehwan et al. "Management of Bleeding Uterine Arteriovenous Malformation with Bilateral Uterine Artery Embolization" *Yonsei Medical Journal*. 2014;55(2):367-373
4. Rosen, Todd. "Placenta Accreta and Cesarean Scar Pregnancy: Overlooked Costs of Rising Cesarean Section Rate" *Clin Perinatol* 2008;35:519-529
5. Shim, Da Joung, et al. "Uterine arteriovenous malformation with repeated vaginal bleeding after dilation and curettage" *Obstetrics and Gynecology Science*. 2019;62(2):142-145
6. Vilos, Angelos G. et al. "Uterine artery embolization for uterine arteriovenous malformation in five women desiring fertility: pregnancy outcomes" *Human Reproduction*. 2015;30(7):1599-1605