WHAT WOULD YOU DO?

Menorrhagia and Pelvic Pain in a Patient With Adenomyosis and Uterine Fibroids

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CASE PRESENTATION

A 32-year-old woman who is gravida 2, para 2, therapeutic abortion 0 and has a history of type 1 diabetes mellitus, uterine fibroids, and adenomyosis presents with menorrhagia and pelvic pain. She has an irregular menstrual cycle every 21 to 28 days, lasting for 5 to 7 days (3–5 days are heavy). She changes an overnight pad every hour when her cycle is heavy. She has both flooding and clot passage but does not bleed between cycles. The patient had a recent normal Pap smear and has never had an endometrial biopsy. Her surgical history is remarkable for two previous cesarean sections and a tubal ligation but no previous fibroid intervention. She would like to avoid a hysterectomy.

Based solely on the history and an MRI (Figure 1), how would you counsel this patient about uterine artery embolization (UAE)?

Dr. Sterling: Based on the history and provided MRI, I believe that the patient warrants some additional workup before counseling her about possible UAE. The first sagittal image with contrast demonstrates incomplete infarction of two fibroids; one is in the anterior intramural portion of the midbody of the uterus and the other appears to be an exophytic subserosal fibroid. The second sagittal image demonstrates what appears to be complete infarction of a posterior intramural fibroid. Additional images would more definitively confirm these findings. The third T2-weighted sagittal image has asymmetric focal thickening of the junctional zone anteriorly. The remainder of the junctional zone is normal, and there are no cystic changes in this focal anterior portion; however, this may represent focal adenomyosis. Finally, on this same image, there is a low-intensity "sausage-like" mass within the endometrial cavity. This may represent either a blood clot or a true endometrial mass/polyp. I am confident that the patient had a transvaginal ultrasound, which could better evaluate this finding. Therefore, I would want to see that first. If this was not well demonstrated, then a hysterosonogram could also be obtained to differentiate between the two. Depending on the result of this additional imaging workup, a recommendation would be made for hysteroscopic polypectomy or endometrial biopsy—or nothing if it were a blood clot. All three possible entities (uterine fibroids, adenomyosis, or endometrial abnormality) could certainly cause menorrhagia/dysfunctional uterine bleeding.

If an endometrial abnormality is excluded and/or treated and the symptoms remain unchanged, then embolization may be considered for treating both the adenomyosis and the viable portions of the uterine fibroids. I would counsel the patient about the expected results in patients who undergo embolization for both adenomyosis and uterine fibroids. This would include the fact that successful embolization could be performed, but she may not experience resolution or

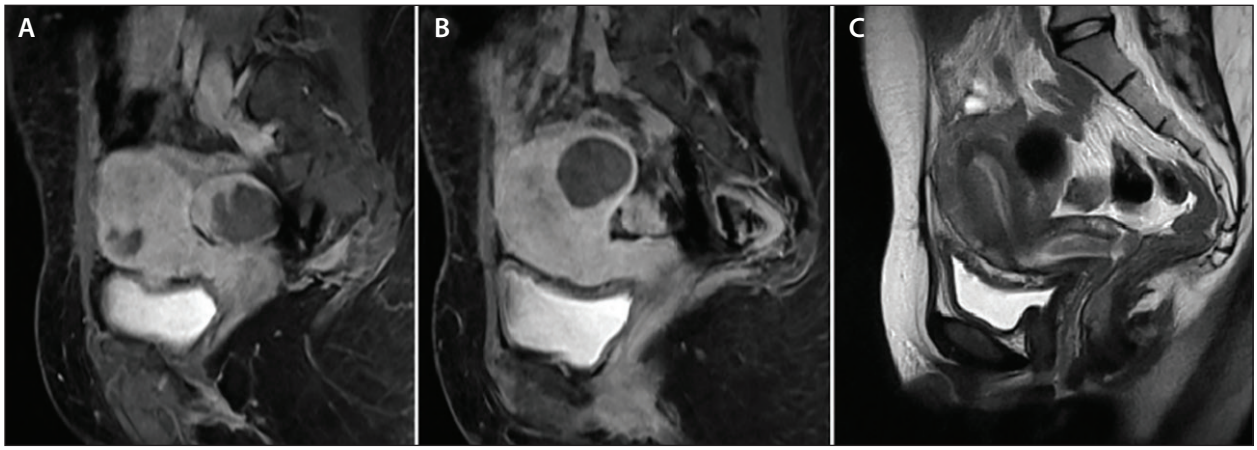

Figure 1. Two sagittal T1-weighted MRIs with contrast (A, B) and a T2-weighted sagittal image (C) demonstrating the two dominant fibroids and the junctional zone.

improvement of her symptoms. Lastly, I would discuss the potential need to embolize the ovarian arteries due to the incomplete infarction of the fibroids. Given the lack of known surgical treatment, the infarction may have occurred spontaneously or possibly at the time of cesarean section if significant bleeding was encountered and necessitated uterine artery ligation.

Dr. Roberts: I would tell her that it is most likely the adenomyosis that is causing her symptoms. At least on these images, I don't see a fibroid involving the endometrial cavity. At least one of the fibroids has lost its blood supply, and we would not treat that one; the other has partially lost blood supply, but embolization might complete the devascularization. I would explain to the patient that there has been increasing evidence that embolization of adenomyosis can be effective for controlling symptoms.

Dr. Costantino: These images show a posterior infarcted fibroid, an anterior small fibroid with small peripheral viability, a posterior mass with peripheral enhancement (which is either a pedunculated fibroid or an ovarian mass), and small to moderate adenomyosis anteriorly involving the midbody and lower uterine segment. The endometrium is not distorted and is only abutted by the posterior infarcted fibroid. The primary cause of menorrhagia appears to be adenomyosis.

Given the degree of her bleeding, I would approach UAE cautiously. Treatment options include an intrauterine device (IUD), UAE, ablation, or hysterectomy. I'd recommend an IUD first. If she was opposed to hormonal treatment and did not want a hysterectomy, I'd perform UAE but counsel her that, given her age, she will likely need additional treatment at some point. If she was not opposed to hysterectomy, given the number of years she has before menopause, the dual pathology (adenomyosis plus fibroids), and a possible hormonal component of menorrhagia (triple pathology), she may be more satisfied with a hysterectomy—and may ultimately need one. If this patient chose UAE, I would prepare her for the possible need for an IUD at some point postprocedure to control a hormonal contribution to menorrhagia. If this patient understands this, is prepared to have recurrent symptoms at some point in her life, and would like to avoid hormonal treatment or surgery, I'd absolutely proceed with UAE. I would expect her to have a satisfactory outcome with UAE only, but I'd want her to be an active participant in the decision-making process.

Approach of the Moderator

Review of the MRI demonstrates two dominant fibroids, one each in the intramural and the subserosal locations and neither with contact nor disruption of the endometrium. The subserosal fibroid enhances in the periphery, but otherwise, these fibroids lack enhancement when compared with the myometrium and may be nonviable. Also seen on these images is a thickened junctional zone anteriorly indicating adenomyosis.

I counseled the patient that her fibroids were likely not the cause of her symptoms and that her menorrhagia and pelvic pain could be attributed to adenomyosis. Given that she is done with childbearing and would like to avoid a hysterectomy, I explained to her that UAE can be effective with treating adenomyosis alone or in combination with fibroids. Recent literature suggests that symptom improvement is seen in approximately 83% of women who undergo UAE for adenomyosis.[1] Although recurrence rates are higher than those seen

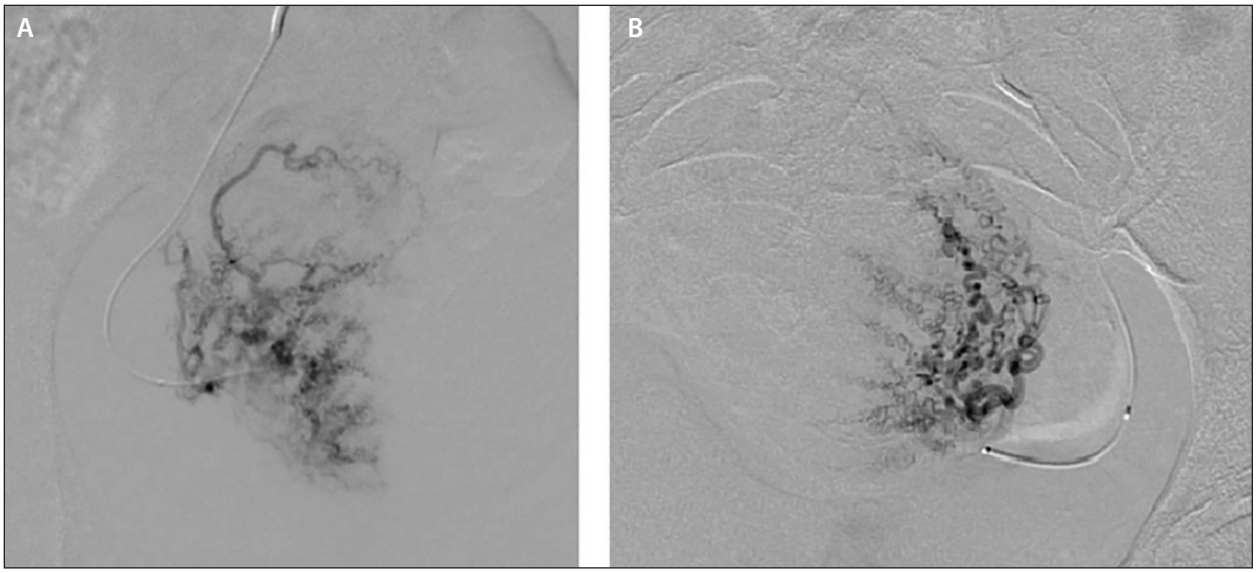

Figure 2. Digital subtraction angiograms from the bilateral uterine arteries with the right uterine artery injection demonstrating supply to a fibroid superiorly (A) and the left uterine artery injection demonstrating mild hypertrophy but otherwise normal-appearing myometrial branches (B).

with UAE for fibroids alone, UAE for adenomyosis offers long-term symptom relief in two-thirds of patients and is uterine sparing.[1,2]

After reviewing the angiograms in Figure 2, please comment on the degree of fibroid supply and which uterine arteries should be embolized. If you would embolize, what particle size would you use?

Dr. Costantino: These angiograms are the expected appearance of an adenomyosis-dominant process, with slightly hypertrophic intrauterine arteries and a lack of visible fibroid opacification on the left. Adenomyosis would continue to be my primary working diagnosis. I would embolize with 100–200-µm particles, one vial (or 2 mL) per side, and then upsize to 300–500-µm particles. Given the adenomyosis-dominant appearance, I would expect to use two to three vials of particles at most. I would embolize both sides and expect more particles in the right compared with the left. If I had a choice, I'd embolize the right side first. This would allow me to identify any collateral flow from the left to the fibroid that is not seen on this initial angiogram, although I think this option only applies to those who employ bilateral groin access.

Dr. Sterling: Not surprisingly, there is not a significant amount of vascularity from the uterine arteries to the remaining viable fibroid tissue. The right uterine artery provides the dominant supply to the residual posterior subserosal fibroid. The vascularity to the anterior fibroid is not clearly identified, but there is relative hypervascularity to the uterus. In this case, embolization would be performed not only to treat the residual uninfarcted fibroids but also the adenomyosis. Therefore, I would perform bilateral UAE. When treating patients with hypervascular uterine fibroids with or without adenomyosis, I typically perform embolization first with 500–700-µm spherical embolic, followed by 700–900-µm spherical embolic. However, in this case—with the diffuse adenomyosis, the relatively small amount of viable fibroid tissue, and the caliber size of these arteries—I would start my UAE with 300–500-µm spherical embolic to achieve greater penetration of the embolic, followed by 500–700-µm spherical embolic only if needed.

Dr. Roberts: There appears to be supply to the fibroid from the right uterine artery. I would embolize both uterine arteries. Because I am more concerned about the adenomyosis than the fibroid, I would embolize with 200-µm polyvinyl alcohol (PVA) particles to start. For adenomyosis, I use 200-µm particles, or 0.5 mg (half a bottle), on each side and then use 300-µm PVA particles until I get to stasis. The Korean experience would suggest using 100-µm particles, then 200-µm particles, and then 300-µm particles,[3] but I have been reluctant to use the 100-µm particles for fear of possible uterine ischemia. So, I have settled on using 200- and 300-µm PVA particles.

If one were to use other spheres, then it would be appropriate to increase the particle size.

Approach of the Moderator

The right uterine artery injection demonstrates enhancement of the fibroid superiorly (Figure 2A). The left uterine artery injection appears to show nearly normal myometrium with mildly hypertrophied branches (Figure 2B); however, this appearance can be present with supply to adenomyotic tissue. Ultimately, both sides need treatment due to the possible supply of the uterine arteries to the region of adenomyosis that is thought to be causing her symptoms.

When treating adenomyosis, I modify the step-up protocol published by Kim et al and begin with half a vial of 300–500-µm Embosphere microspheres (Merit Medical Systems, Inc.), in place of the PVA utilized in the published step-up protocol, before increasing in particle size.[3] In this case, I was concerned about the normal myometrium (seen from the left uterine artery injection) and producing uterine ischemia. Therefore, a small amount of 300–500-µm particles was used to treat to sluggish flow in the uterine artery, and no further embolic was used.

CASE CONTINUED

An aortogram is obtained that shows an enlarged left ovarian artery. This was subsequently selected and digital subtraction angiography was performed (Figure 3).

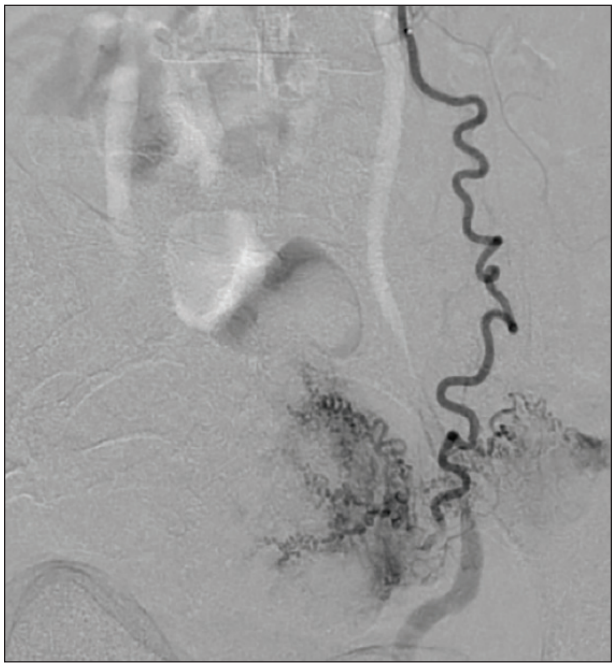

Figure 3. Digital subtraction angiogram of the left ovarian artery showing a hypertrophic artery with uterine, fibroid, and left ovarian supply.

Using the selective left ovarian artery injection (Figure 3), discuss considerations for embolizing from this location.

Dr. Roberts: This could be an issue depending on patient circumstances. In general, it depends a little bit on my discussion with the patient regarding her thoughts on fertility. I would have seen her in the office before the procedure, and we would have discussed her family, what she had planned about future fertility, and how strongly she feels about this.

Talking about what might be required to treat her is an important part of the clinic visit. We would have discussed premature ovarian failure and the need to potentially perform ovarian artery embolization (OAE) if there is a large amount of flow to the uterus from the ovarian artery. If I had any question about her wishes on this, when I saw the ovarian artery supply, I might consider not performing embolization. However, I don't think that she will have a good result if this artery is not embolized. If there has been some discussion about this and fertility is not important (as in this case because she has had a tubal ligation), then I would embolize the artery to stasis. This might cause embolization of the ovary, but I think that her adenomyosis would be treated with this approach. If I was going to embolize, I would do it to treat the adenomyosis and not worry about the effect on the ovary; and in this case, I would embolize with 200-µm PVA particles until there was stasis in the ovarian artery.

Dr. Costantino: Based on this angiogram and the initial sagittal T2-weighted MRI, the hypervascular mass on the left could still be a pedunculated fibroid instead of an ovarian mass. If two normal ovaries are seen on the MRI, then this mass would be a pedunculated fibroid. In that case, I would advance a microcatheter approximately 5 cm into the ovarian artery and gently embolize with any leftover 300–500-µm particles. If I needed to open a new vial, I'd choose 500–700 µm. This ovarian artery is hypertrophied and demonstrates enough collateral flow to the uterus that I would proceed with a gentle embolization.

Dr. Sterling: This selective left ovarian artery injection demonstrates supply to both the uterus and the left ovary. Because this artery provides significant supply to the uterus, embolization should be performed—otherwise, there is a real concern for clinical

failure. There are two options for performing OAE in this patient. A small-caliber microcatheter could be negotiated through the ovarian artery distal to the ovarian supply, so that forward flow would still be maintained and similar small-caliber spherical embolic (300–500 µm) could be injected to devascularize the remaining uterine supply and mitigate the possibility of nontarget embolization to the ovary.

Alternatively, embolization can be performed from the proximal to the mid main ovarian artery catheter location because there is a high possibility of catheter/wire-induced vasospasm or loss of antegrade flow when moving through the multiple loops in the artery to position a microcatheter distal to the ovarian supply. This could result in both incomplete embolization of uterine tissue and reflux of embolic into the ovarian tissue, and the goal was to avoid that consequence in this case. If I performed embolization from the more proximal location, I would likely use 500–700-µm spherical embolic to minimize embolic from flowing into the ovarian tissue, and I would cease embolization once I stopped seeing the residual uterine tissue on control angiography. In my experience, in a 32-year-old woman with this exact angiogram (ie, with demonstration of ovarian supply) who undergoes unilateral OAE from this more proximal ovarian artery catheter location—as in this case with preservation of contrast washout—the incidence of premature ovarian failure would be rare. However, the possibility is still real, and it absolutely would have been discussed with the patient during her initial consultation and after the procedure.

Approach of the Moderator

The left ovarian artery injection demonstrates filling of the subserosal fibroid and should be treated not only for the fibroid supply but also for possible contribution to the adenomyotic tissue. This is assuming the patient has been counseled either specifically toward OAE or the possibility of ovarian failure. The left ovarian artery was treated with 500–700-µm Embosphere particles. I do not use smaller particles in the ovarian arteries due to concern for ovarian failure, recognizing that the uterine-ovarian anastomoses are thought to be < 500 µm in diameter.[4] Treatment is taken only to the point of no fibroid branches, with the attempt to preserve flow to the ovaries.

CASE CONCLUSION

The patient will be scheduled for postembolization pelvic MRI with contrast and a clinic visit at 3 months following her UAE. Although good symptomatic control is expected, it is also recognized that she may develop new symptoms over time given her age (32 years), whether due to new fibroid growth or recurrence of adenomyosis prior to menopause. If that occurs, there remain treatment options outside of hysterectomy, one of which is repeat UAE. ■

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