WHAT WOULD YOU DO?

Uterine Fibroid Embolization in a Patient With Lupus and Previous VTE

MODERATOR: KARI J. NELSON, MD

PANEL: MAUREEN P. KOHI, MD, FSIR; ANDREW C. PICEL, MD; AND E. BROOKE SPENCER, MD, FSIR

CASE PRESENTATION

A 40-year-old gravida 0, para 0 woman who is Jehovah's Witness with a complicated past medical history was referred to the interventional radiology clinic for a uterine fibroid and menorrhagia resulting in iron deficiency anemia. The patient's past medical history is remarkable for systemic lupus erythematosus with hypercoagulable state, resulting in multiple cerebrovascular accidents and recurrent venous thromboembolism (VTE) now managed with lifelong anticoagulation (rivaroxaban); pseudotumor cerebri status after ventriculoperitoneal shunt; and congestive heart failure. Her gynecologic history is remarkable for endometriosis; recurrent, large, symptomatic right ovarian cysts, for which she underwent right ovarian cystectomies in 1999 and 2000; and subsequent right salpingo-oophorectomy with lysis of adhesions in 2001. Later in 2001, hysterectomy for menorrhagia was aborted due to extensive, dense adhesions. The patient underwent hysteroscopy with dilatation and curettage in 2010, followed by endometrial ablation in 2012.

The patient has been taking rivaroxaban since 2009 after experiencing a submassive pulmonary embolism (PE). She reports trouble with warfarin and an inability to maintain a therapeutic level. She reports heavy monthly vaginal bleeding with secondary anemia. She cannot receive transfusions because of her Jehovah's Witness beliefs. She reports 7-day menses every month requiring pad changes approximately every 1 hour with episodes of overflow. She is desperate for treatment for her heavy vaginal bleeding.

She reports that uterine fibroid embolization (UFE) was first discussed as a treatment option by her hematologist and is recommended by gynecology. She has concerns regarding the risk of ovarian failure with UFE, as she only has one ovary. Additionally, she has extensive allergies, including allergies to intravenous contrast material for which she has been successfully premedicated in the past; nonsteroidal anti-inflammatory drugs, which results in hives; and a history of seizure and respiratory difficulty with coadministration of ketorolac and morphine.

How would you address this patient's hypercoagulable state in the perioperative period?

Dr. Kohi: Because of this patient's hypercoagulable state and previous history of thromboembolic disease, I want her to remain anticoagulated. I would discuss with her hematologist whether she can be switched to low-molecular-weight heparin prior to her procedure and, if possible, hold the dose on the day of her procedure. In some settings, patients can be preadmitted and

placed on a heparin drip that can be turned off 1 to 2 hours before the procedure to reduce the risk of hemorrhage. In light of the perioperative anticoagulant use, I would proceed with uterine artery embolization (UAE) using a transradial approach for arterial access, which would eliminate the risk of retroperitoneal hemorrhage and would be easier to control should bleeding occur. A transradial approach would also eliminate the need for postprocedural bed rest. This patient would benefit from sequential compression devices in the perioperative setting with encouragement of ambulation to limit the risk of deep vein thrombosis (DVT).

Dr. Picel: Given the patient's history of hypercoagulability and multiple complications from VTE, it is in her best interest to remain on rivaroxaban, although it is also likely contributing to the severe menorrhagia. The procedure carries a moderate risk of bleeding, and she should be appropriately counseled regarding the increased risk of procedure-related bleeding. Theoretically, the anticoagulation could decrease the efficacy of particle embolization, but this is not likely to be clinically significant. Careful attention would be paid to the common femoral artery puncture with ultrasound guidance for access and prolonged compression and immobility or use of a closure device to achieve hemostasis. Radial artery access is a reasonable alternative to decrease the bleeding risk.

Dr. Spencer: I would hold the rivaroxaban the night before or the morning of the procedure (whichever time the patient usually takes it) and then restart it within 2 hours of the procedure.

How would you approach sedation for this case given the patient's comorbidities and allergies?

Dr. Picel: Based on her comorbidities and history of medicine allergies, I would perform the procedure with the assistance of anesthesiology. With a history of congestive heart failure and potential for blood loss as well as respiratory distress with analgesics, having an additional practitioner to manage sedation would be the safest way to proceed. Premedication would be given for the history of contrast allergy and hives. Epidural anesthesia could be considered.

Dr. Spencer: My approach would be monitored anesthesia care with propofol or local and hydromorphone with diphenhydramine, depending on patient preference. Intravenous acetaminophen could be used in the postoperative period for pain in addition to hydromorphone to minimize narcotic use.

Dr. Kohi: The patient's history of congestive heart failure and cerebrovascular accidents places her in the American Society of Anesthesiologists class 4. Therefore, I would not provide moderate sedation and would request the assistance of an anesthesiologist who can provide the necessary sedation and be able to resuscitate the patient if cardiopulmonary compromise occurs. Her anticoagulation may limit the use of an epidural, which can be effective for postprocedural pain management. I would use standard premedication with corticosteroids and diphenhydramine for her contrast allergy.

CASE CONTINUED

Review of cross-sectional imaging does not clearly demonstrate a left uterine artery arising from the left hypogastric artery. The right ovary is absent, compatible with the patient's history of right salpingo-oophorectomy.

How would you counsel the patient regarding ovarian failure? Would you proceed with UFE?

Dr. Spencer: The risk of ovarian failure increases with age, and the risk is higher in women older than 40 years than in younger women. However, the risk is significantly lower than with hysterectomy, which the patient was willing to undergo, so I would counsel her on this, but I believe the risk is low.

Dr. Kohi: Data from prospective case series and randomized trials suggest that ovarian dysfunction may occur after UAE. However, this finding is more likely in women who are older than 45 years. There is very little evidence of ovarian dysfunction in women who are younger than 40 years. I would discuss these findings with the patient. I would emphasize that the low likelihood of ovarian injury is outweighed by the benefits of the UAE for her menorrhagia, and if she agrees, I would proceed with UAE.

Dr. Picel: I would proceed with fibroid embolization. Reduced ovarian reserve can occur after embolization or hysterectomy, often in older patients. Ovarian failure with early menopause has been reported, but it is thought to be rare. I would tell her that, while rare, it is certainly a risk of the procedure. Her case is complicated with severe bleeding with anemia and an inability to receive transfusions. She had severe bleeding for several years and underwent attempted hysterectomy in 2001, indicating the severity of her condition. She needs to continue anticoagulation, which likely exacerbates her bleeding. In this case, the ongoing risks of bleeding outweigh the potential for procedure-related complications.

CASE CONTINUED

Initial pelvic angiography confirms the presence of the right uterine artery but the absence of the left uterine artery. Selective angiography of the left ovarian artery demonstrates perfusion of the left ovary as well as perfusion of the intramural uterine artery and submucosal fibroid. A microcatheter cannot be advanced distal to the branches visibly perfusing the left ovary.

Would you proceed with embolization? If so, what embolic agent(s) would you use?

Dr. Picel: Yes, I would proceed with embolization. The risks of continued bleeding in this case are significant. Despite the risk of ovarian failure, successful embolization and control of menorrhagia provides a minimally invasive treatment option to reduce the blood loss and improve her quality of life. I would perform embolization with 500–700-µm Embosphere microspheres (Merit Medical Systems, Inc.).

Dr. Kohi: I would proceed with embolization. I would use trisacryl gelatin microspheres, starting with 500–700 µm and upsizing to 700–900 µm after two vials. I would inject slowly, allowing the blood flow to move the particles to the fibroid and avoid reflux.

Dr. Spencer: To definitively answer this question, I would need to know where the fibroids are. Are they on the right or left side of uterus? Is there a submucosal fibroid that is the likeliest candidate to cause bleeding, and where is the supply to that fibroid? Do the fibroids primarily fill from the right uterine artery or the left ovarian artery? In tricky situations like this, it is important to thoroughly consider all of these issues to make your best educated choice for a treatment approach.

There are multiple additional questions that need to be answered for me before I would even consider embolization in this patient. First, does the patient have May-Thurner syndrome? Is there chronic DVT in the iliac veins? Are the gonadal veins normal and are there pelvic venous varices? If there is significant pelvic venous disease, I would treat this first. Many women with pelvic venous obstruction have significant uterine bleeding, even in the absence of fibroids. If the patient's PE occurred in the absence of lower extremity DVT, one can usually find a pelvic source, which places her at risk for recurrent DVT/PE if left untreated as well. Therefore, she has several reasons to treat pelvic venous disease first and proceed with UFE only if she continues to bleed.

Without the answers to my aforementioned questions, with modern catheter options (eg, SwiftNinja, Merit Medical Systems, Inc.), I find it extremely hard to believe that catheterization beyond the ovarian supply is impossible. Second, if access to the ovarian artery is possible past the branches to the fibroids, I would coil the ovarian artery beyond the fibroid branch and then embolize from above into the tumor. I would have had this conversation with the patient before the procedure to learn her preferences, specifically whether the bleeding or the risk of ovarian failure is more important. I have embolized uterine arteries with branches to the both ovaries without ovarian failure in the past and have not experienced premature ovarian failure. I would embolize with particles first, and then as the flow slows and the risk of embolization of the ovary increases, I would switch to Gelfoam (Pfizer, Inc.).

Alternative options include coiling the ovarian artery as distal as possible to allow for embolization of the right ovarian artery through redistribution. Intra-arterial nitroglycerin in the right ovarian artery could be considered to facilitate this.

Finally, rivaroxaban has the highest bleeding rate of all the novel oral anticoagulants and the shortest half-life to largest peaks and valleys in dosing. I would switch her to apixaban or dabigatran and would not manage her on rivaroxaban.

APPROACH OF THE MODERATOR

The patient was transitioned from rivaroxaban to enoxaparin in the days prior to the procedure, and enoxaparin was held on the morning of the procedure. Sequential compression devices were utilized throughout the procedure and recovery. Given the patient's comorbidities and extensive allergies, the procedure was performed with general anesthesia utilizing propofol with fentanyl and midazolam, with administration of diphenhydramine 50 mg intravenously and dexamethasone 4 mg.

Right common femoral access was obtained under ultrasound guidance. Angiography confirmed the absence of a left uterine artery from the left internal iliac artery, with solitary left uterine perfusion from the left ovarian artery. After selective catheterization of the left ovarian artery, a coaxial 2-F microcatheter was advanced distally but could not be advanced distal to the branches visibly perfusing the left ovary. As the possibility of ovarian failure and premature menopause had been discussed at the preprocedure consultation and the patient wished to proceed with UFE despite that risk, Gelfoam slurry embolization was performed through the microcatheter to temporarily occlude

the proximal ovarian branches. After ovarian branch occlusion, bilateral UFE was performed with spherical embolic agent. The femoral arteriotomy was successfully closed with a closure device, and enoxaparin was administered 2 hours after hemostasis. There were no bleeding, allergy, or DVT events. Her postprocedure pain was well controlled with hydromorphone patient-controlled analgesia, which was transitioned to oral hydrocodone/acetaminophen the following morning, after which the patient was discharged home.

The patient was transitioned back to rivaroxaban on postprocedure day 2. At follow-up, the patient's menorrhagia had ceased, anemia had resolved, and lighter menses had returned approximately 12 weeks postprocedure. ■

Kari J. Nelson, MD
Associate Clinical Professor
Department of Radiological Services
Chief, Interventional Radiology
University of California, Irvine
Orange, California
k2nelson@uci.edu
Disclosures: None.

Maureen P. Kohi, MD, FSIR
Associate Professor of Clinical Radiology
Chief, Interventional Radiology
Department of Radiology and Biomedical Imaging
University of California, San Francisco
San Francisco, California
maureen.kohi@ucsf.edu
Disclosures: None.

Andrew C. Picel, MD
Assistant Clinical Professor
Vascular and Interventional Radiology
University of California, San Diego
San Diego, California
apicel@ucsd.edu
Disclosures: None.

E. Brooke Spencer, MD, FSIR
Medical Director and CEO
Minimally Invasive Procedure Specialists
Parker, Colorado
bspencer@mipscenter.com
Disclosures: Consultant to Boston Scientific Corporation and Philips.