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Case Report

A case report: uterine fibroids treated by polyvinyl alcohol particles

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ABSTRACT

Uterine fibroids, the most common type of tumor among women of reproductive age, are associated with heavy menstrual bleeding, sub-fertility, abdominal discomfort, and a reduced quality of life. For women who wish to preserve their uterus and who have not had a response to medical treatment, uterine artery embolization and myomectomy are therapeutic options. A 35-year-old asthmatic female came to our hospital with dysfunctional uterine bleeding (DUB) from the past 6 months complicated by severe anemia requiring multiple blood transfusions. Ultrasound of the pelvis shows a bulky uterus with an intramural fundal fibroid indenting the endometrial cavity with fluid collection within. Considering the age and reduced Hemoglobin and the co-morbidity of asthma, endovascular PVA (Polyvinyl alcohol particle) particle embolization of both uterine arteries was performed. Post procedure, there was there were no acute symptoms. Six months after the intervention, the patient's pelvic USG shows significant reduction in the size of the fundal fibroid with total absence of menstrual bleeding. Therefore, endovascular uterine artery embolization with PVA particles is safe and effective method to treat DUB.

Keywords: Case report, DUB, Endovascular uterine artery embolization, PVA

INTRODUCTION

Uterine fibroids are the most common type of tumor among women of the reproductive age group and its prevalence increases with age.[1-3] Approximately half of women with fibroids have bothersome symptoms, including heavy menstrual bleeding, abdominal pain, and pressure, that negatively affect quality of life.[3-5] Submucosal fibroids and, to a lesser extent, intramural fibroids have been associated with subfertility and adverse pregnancy outcomes although data are inconsistent.[6-8]

Surgery, either myomectomy or hysterectomy, has traditionally been the primary approach for the management of symptomatic fibroids; uterine artery embolization emerged as an alternative during the 1990s. Myomectomy involves the surgical removal of the fibroid and preservation of the uterus. Although myomectomy substantially reduces heavy bleeding, it is associated with myometrial trauma, and whether it results in improved reproductive outcomes is not known.[9]

Uterine-artery embolization, which is usually performed while the patient is under local anesthesia, involves temporary occlusion of the arteries supplying the uterus, with the use of biocompatible particles, to cause ischemic infarction of the fibroids. As compared with myomectomy, uterine-artery embolization is associated with a shorter hospital stay and an earlier return to normal activities.[10,11] Concern regarding a possible effect on ovarian and uterine function has resulted in recommendations against the use of uterine-artery embolization in women who plan to become pregnant; however, the results of a recent meta-analysis suggested no appreciable effect on ovarian reserve.[12]

Here we presented a case report of a patient with DUB from the past 6 months complicated by severe anemia requiring multiple blood transfusions managed with endovascular uterine artery embolization with PVA particles.

CASE REPORT

Patient information and clinical findings

The patient a 35-year-old female with history of one caesarean section presented to our hospital with DUB from the past 6 months complicated by severe anemia requiring multiple blood transfusions. She was pale and dyspneic her haemoglobin level was 4.5 g/dL. Her pelvic ultrasound shows a bulky uterus with an intramural fundal fibroid measuring 5×5×3.8 cm (CC×AP×TRANS) indenting the endometrium with fluid collection within the endometrial cavity (Figure 1). Digital subtraction angiography (DSA) after selective canalization of both uterine arteries confirmed the diagnosis of a fibroid (Figure 2). The patient was a known asthmatic and a pre-operative medical fitness was obtained from the chest physician.

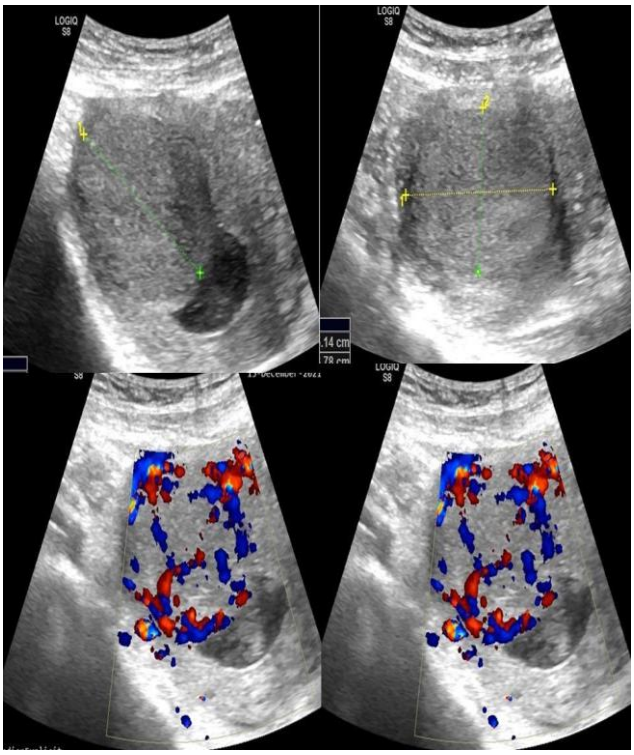


Figure 1: Bulky uterus with an intramural fundal fibroid measuring 5×5×3.8 cm (CC×AP×TRANS) indenting the endometrium with fluid collection within the endometrial cavity.

Considering the age and reduced hemoglobin and the co-morbidity of asthma, endovascular PVA particle embolization of both uterine arteries was performed.

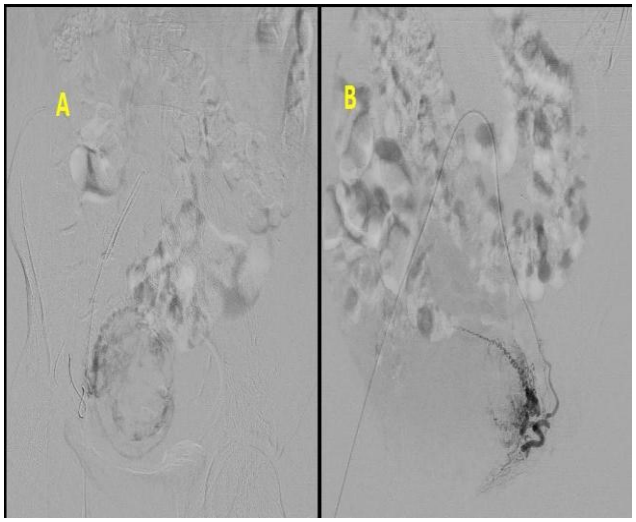


Figure 2 (A and B): Digital subtraction angiography (DSA) after selective canalization of both (A-Right, B-Left) uterine arteries confirmed the diagnosis of a fibroid.

Therapeutic intervention

Surgical procedure

The patient was positioned supine on the operating table in the angiosuite and administered local anesthesia along the right inguinal crease for the right femoral arterialpuncture.

Progreat 2.8 fr microcatheter was navigated under fluoroscope control through a right femoral puncture coaxially into the left uterine artery, with the help of 6fr cobra catheter and 8 fr short sheeth placed in right femoral artery (Figure 2). The right uterine artery was cannulated with the same the microcathater under fluoroscope control coaxially through 5 fr Sim 1 cathater (Figure 2). The 500 IU of heparin was administered in the right femoral sheath in order to diminish the risk of embolism without increasing hemorrhaging unduly. PVA 350-500 µ (microns) was administered through both the uterine arteries.

Post embolization check angiogram of both the uterine arteries showed complete obliteration of both uterine arteries demonstrated by reflux of contrast (Figure 3).

A guiding catheter 7 fr (Penumbra)was navigated under fluoroscope control through a right femoral puncture and, with the help of 8 fr short sheeth placed in right femoral artery, placed on the right ICA and the microcatheter echelon and traxus microwire were positioned alongside the aneurysm neck. In order to diminish the risk of embolism without increasing hemorrhaging unduly and prevent vasospasm, a 0.9% saline solution containing heparin (1000 U/L) was delivered at a continuous flow of 30 mL/h through the microcathater and 15 ml Nimodipiune diluted in one litre 0.9% saline solution were through the guiding catheter respectively.

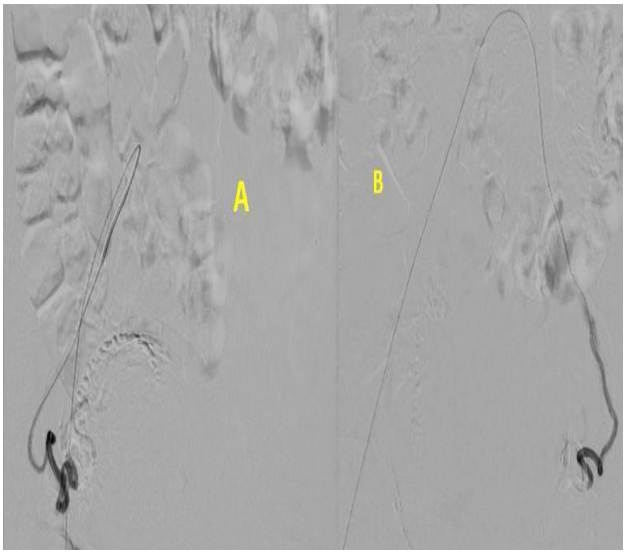


Figure 3 (A and B): Post embolization check angiogram of both (A-Right, B-Left) the uterine arteries showed complete obliteration of both uterine arteries demonstrated by reflux of contrast.

Follow-up and outcomes

Immediately after the procedure patient presented with abdominal pain which was relieved on administration of non-steroidal anti-inflammatory drugs (NSAIDs) analgesic. She was discharged from the intensive care unit on the first postoperative day and was discharged from the hospital on the second day (Figure 4).

Six months after the intervention, the patient's pelvic USG shows significant reduction in the size (3×3×3 cm; CC×AP×TRANS) of the fundal fibroid with reduced vascularity and absence of fluid in the endometrium (Figure 5) and she was totally asymptomatic with hemoglobin of 11 g/dL.

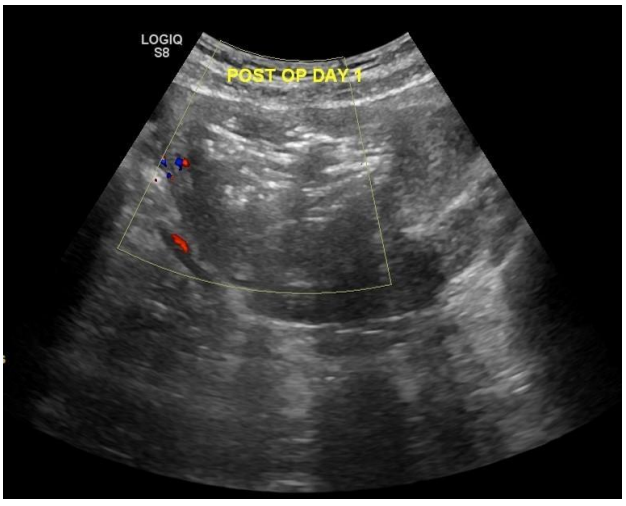


Figure 4: Post op day 1 scan shows hyperechoic foci within the fibroid-S/o arterial occlusion resulting in fibroid infarction.

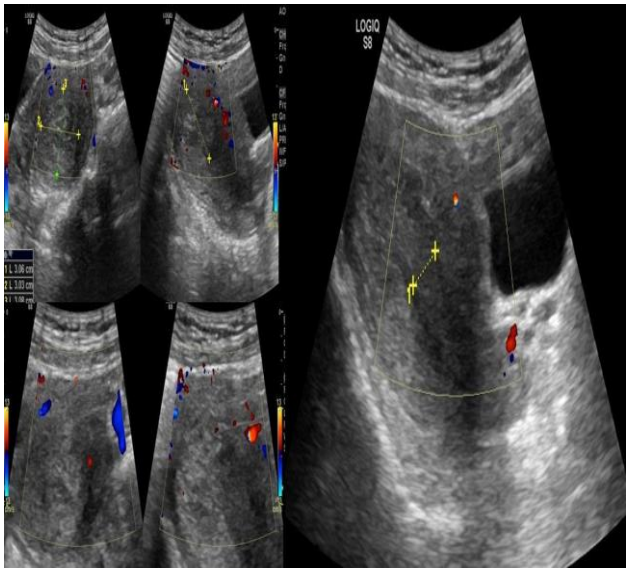


Figure 5: Six months after the intervention, the patient's pelvic USG shows significant reduction in the size (3×3×3 cm; CC×AP×TRANS) of the fundal fibroid with reduced vascularity and absence of fluid in the endometrium.

In the second week after surgery, the patient complained of headache, but improved after medication with oral analgesics. On the fourth week after surgery, she was totally asymptomatic.

DISCUSSION

The successful management of DUB with endovascular uterine artery embolization with PVA particles is requires considerable expertise on the part of the interventional radiologist together with the use of state-of-the-art techniques and equipment. The selective cannulization of both uterine arteries with microcathaters demands patient-specific instrumentation and techniques. At the present time, pregnancies described after uterine fibroid embolization with polyvinyl alcohol show that fertility is potentially preserved.

An embolic agent is then injected into the vessels, resulting in arterial occlusion and fibroid infarction. Polyvinyl alcohol has been the most commonly used embolic agent during uterine fibroid embolization and has been associated with the clinical and imaging success touted by proponents of the procedure.[13-17]

Depending on the disease process and the involved organ, the desired level of occlusion (i.e., proximal or distal) will determine the particle size selected for a given embolization procedure. Generally, the use of small particles will result in a more distal occlusion, increasing the risk for end-organ infarction. However, the tendency of PVAs to clump together often makes the effective size of this agent larger than that of the individual particles, which may account for a proximal occlusion during embolization [18]. Reducing the tendency for particulate

aggregation, with dilution and slow infusion, may lead to a more distal embolization.[18] The optimum particle size for uterine fibroid embolization has not been established, but most centers are using particles measuring 350-500 or 500-710 µ (microns) in diameters.[13-17]

Siskin et al, Aziz et al and McLucas et al specifically studied the histological effects observed after uterine artery embolization with PVAs.[19-21] Both Aziz et al and McLucas et al noted that the particles did not occupy the entire lumen of the embolized vessel. Instead, a foreign body reaction initiates platelet aggregation and thrombus formation in the intra-luminal lattice of PVAs. It is the thrombus formation that results in arterial occlusion and ultimately leads to interstitial edema within the fibroid followed by ischemic necrosis and hyalinization.[19,21] The myometrium adjacent to a fibroid embolized with PVP alcohol particles has been noted to be viable but edematous and chronically inflamed.[21]

Aziz et al also noted that after uterine artery embolization particles can be found in the arteries of the parametrium and outer myometrium, which would likely permit continued endometrial function after the recanalization of larger vessels.[20] However, inadvertent end-organ damage, in this case involving the uterus, can possibly result in uterine ischemia or endometrial infection, both of which may potentially require a hysterectomy for treatment.[14,15] Permanent amenorrhea, a rare event occurring in fewer than 2% of patients, has been reported after uterine artery embolization with PVAs and has been attributed to diminished ovarian perfusion or infarction.[17] Luminal recanalization may represent one of the possible causes of treatment failure. Other rare complications of uterine fibroid embolization with PVAs include transcervical expulsion of an embolized fibroid a small-bowel infection caused by necrosis of an adjacent pedunculated fibroid after embolization.[17,22]

CONCLUSION

An endovascular approach has been increasingly adopted as an alternative to surgical approach in DUB. Since appropriate patient selection is paramount to optimize outcomes, an endovascular approach should be considered as the preferred strategy with multidisciplinary perspective in order to maximize the effectiveness of the treatment and the safety of the patient.

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