



Uterine artery embolization

Bhavesh Dave, Naveen Bhatt, Yogendra Khalasi, KS Balasubramanya, Mohit Gupta

Department of Radiology, Trauma Center, S.S.G. Hospital and Medical College, Baroda – 390 001.

Key words : uterine artery embolization, fibroids, postpartum hemorrhage.

The use of uterine artery embolization (UAE) as a therapeutic alternative for symptomatic uterine fibroids and acute uterine bleeding in those patients who would prefer uterine preservation needs to be highlighted. We report three cases of uterine artery embolization done for the treatment of uterine fibroid in two cases and for controlling acute uterine bleeding in a case of choriocarcinoma. The advantages of the procedure include restoration of the physiological menstrual cycle, a great psychological benefit and significantly low complication rates as compared to surgery. UAE is also valuable for controlling severe postpartum uterine bleeding.

Case report 1

A 43 year old, para 3 had polymenorrhoea since 8 months and on examination revealed a 8 week size uterus. On ultrasound examination, the uterus measured 11.5 x 10.2 x 9.5 cm and showed a 10 x 9.2 x 8.4 cm size well defined hypoechoic intramural fibroid in the anterior wall. Vaginal bleeding did not reduce inspite of medical therapy and so hysterectomy was advised. The patient had an appendectomy, two cesarean sections and an exploratory laparotomy for adhesive small bowel obstruction in the past, and hence was reluctant to go for one more surgery. Considering the technical difficulties that would have been encountered during hysterectomy due to adhesions, she was explained about the alternative of UAE.

Selective pre-embolization bilateral uterine artery angiogram showed dilated tortuous hypertrophied bilateral main uterine arterial trunks with extensive intramural tortuous arcuate and

radial branches supplying the fibroid with tumor blush during the arteriodocapillary phase (Figure 1A, 1B) and washout with the venous phase. Both uterine arteries were then embolized using a mixture of 500-750 micron polyvinyl alcohol particles and gelfoam particles. Post-embolization angiogram showed complete lack of tumor blush on both sides (Figure 2A, 2B). Elective ovarian arterial study showed no supply to the fibroid from either side.

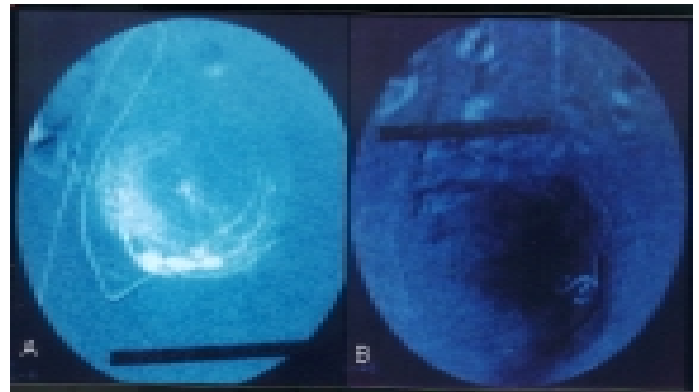


Figure 1A and B. Right and left uterine preembolization angiogram showing tumor blush

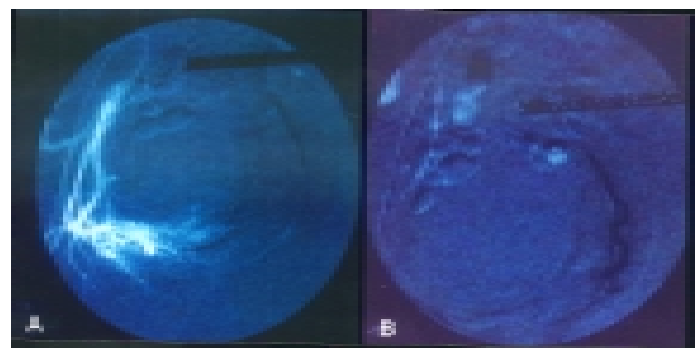


Figure 2A and B. Right and left uterine postembolization angiogram showing no tumor blush

Paper received on 10/05/2003 ; accepted on 01/02/2004

Correspondence :

Dr. Bhavesh Dave

C/o. J P Khalasi,

3/26, Ghanshyam Park Society, Bh Sahyog Society, P. O. Gorwa,
Baroda, Pin 390016.

The patient was kept under observation overnight and discharged on the next day. She had mild lower abdominal pain for the next two days which was very well taken care of by oral analgesics. She developed amenorrhea for 3 months but regained normal menstrual cycles thereafter. At follow up after 6 months, she had normal menstrual cycles, was totally asymptomatic, and on ultrasound examination showed reduction in the size of the uterus and fibroid. Uterus measured 8.5x 7.0 x 6.5 cm and the fibroid measured 6.0 x 5.5 x 5.2 cm.

Case report 2

A 42 year old, P4A1, presented with polymenorrhagia for 6 months. Examination revealed a 6 week size uterus and bleeding from the cervical os. Ultrasound examination showed a bulky uterus measuring 9.5 x 7.5x 6.2 cm with a large, well defined, intramural hypoechoic fibroid measuring 7.5 x 6.0 x 5.0 cm, in the posterior wall of the uterus. The symptoms did not improve in spite of medical therapy. Hysterectomy was advised but since the patient did not want surgery, UAE was performed as in the previous case. Immediate postprocedural period showed a mild postembolization syndrome comprising pain, nausea and fever which was well controlled by symptomatic treatment. Postprocedure noncontrast CT scan of the pelvis showed retention of contrast by the tumor suggesting totally successful embolization (Figure 3).

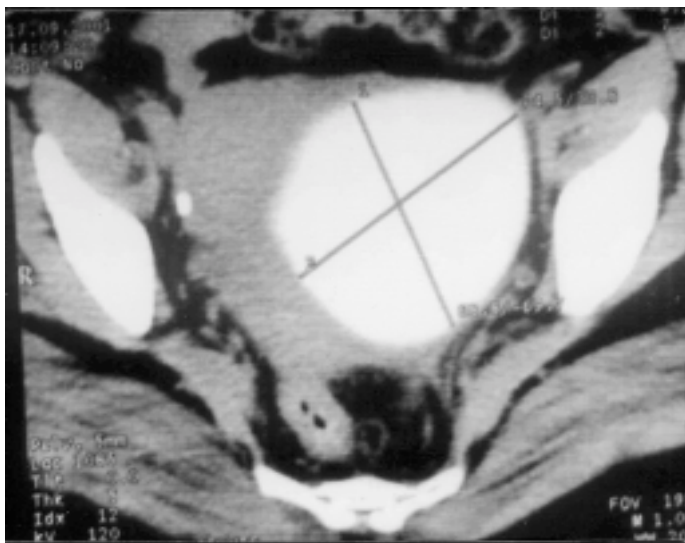


Figure 3. Postembolization pelvic axial noncontrast CT scan showing contrast retention in the fibroid suggesting a successful embolization.

Eight weeks later, the patient was readmitted with amenorrhea, hot flushes, sweating and insomnia. She was treated symptomatically. Follow up showed that the symptoms

reduced and menstrual bleeding resumed three months later. It was considered that the symptoms were due to transient ovarian failure which is known to occur in association with uterine artery embolization. On follow up after 7 months, the patient is asymptomatic and has regular periods.

Case report 3

A 20 year old, primigravida presented with 10 weeks of amenorrhea, hyperemesis, rapidly enlarging lower abdominal swelling, severe weakness, breathlessness, and spotting since 2 days. On examination she was pale and had a 24 week size lower abdominal swelling from the cervical os. At speculum examination about one liter of frank blood gushed out with expulsion of few grape like vesicles. Ultrasound examination showed a bulky uterus completely filled with a large heterogenous mass with multiple anechoic cystic spaces (Figure 4A). There was no evidence of any intra- or extra-uterine gestational sac or fetal parts. Chest radiograph revealed multiple well defined, round, nodular opacities suggestive of metastases in both the lung fields distributed predominantly in the lower zone. Laboratory investigations revealed a positive urine pregnancy test, 3.5 g/dL hemoglobin and 10^9 IU serum β hCG. She was diagnosed as a case of choriocarcinoma. Uterine artery ligation was mandatory for controlling severe uterine bleeding but considering the anesthetic risks, an emergency bilateral UAE was performed which successfully controlled the uterine bleeding. She was later put on combination chemotherapy including etoposide, methotrexate, D-actinomycin, cyclophosphamide and vincristine (EMACO regime) for 6 cycles, and followed up clinically and with serum β hCG levels. The follow up chest radiograph after 2 weeks showed reduction in the size of the metastases which completely resolved after 4 weeks.

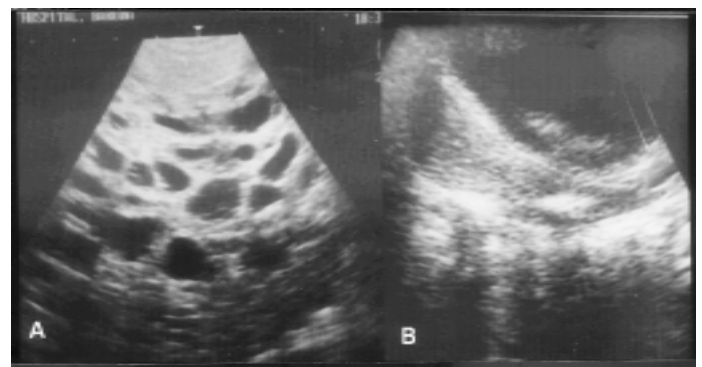


Figure 4A and B : (A) Pelvic sonography showing a bulky uterus completely filled with multiple anechoic cystic spaces and (B) showing normal uterus at follow up sonography.

At 6 months follow up she was having regular periods. Her β hCG level was normal and ultrasound examination showed an absolutely normal uterus (Figure 4b).

Discussion

For decades, hysterectomy has been the standard surgical therapy for uterine leiomyomata for women who have completed their fertility, and myomectomy for those who wish to conceive. In recent years, alternative surgical and medical treatments have been developed, including laparoscopic / hysteroscopic resection and GnRHa. For those patients who are candidates for hysterectomy but prefer uterine preservation and are unwilling to go for surgery and, for young women who desire pregnancy, UAE represents a promising alternative method of treating refractory symptoms related to uterine leiomyomas¹. Use of UAE for treatment of fibroids was first reported from France by Ravina et al² in 1995.

This procedure involves occluding the vessels using polyvinyl alcohol particles, gelfoam, or coils. The normal myometrium rapidly develops a new blood supply from collateral circulation, whereas the fibroids do not. The procedure leads to fibroid shrinkage of approximately 30-50% and appears to lead to relief of fibroid-associated symptoms¹.

Embolization appears to be a good alternative to surgery even for very large fibroids³. It takes weeks to months for noticeable symptomatic improvement, which occurs through a combination of size reduction and alteration in the internal architecture of the fibroids as they undergo hyaline degeneration, rendering them softer and more pliable. They begin to exert less mass effect on the uterus and surrounding structures. The presenting symptoms such as increased urinary frequency, pelvic pain and/or pressure, and constipation improve dramatically during the first several months after UAE, even with only a modest reduction in fibroid size. Most fibroids shrink between 40 and 60% of their volume on an average. Based on the geometry of a sphere, a volume reduction of 50% only amounts to a 20% diameter reduction of the diameter.⁴

Complications of UAE have been extremely uncommon but fall into three general categories – complications of angiography, pelvic infection, and ischemic phenomena^{5,6}. The major adverse effect following fibroid embolization is pain⁷. Most patients experience considerable uterine cramping

after the procedure and require overnight hospitalization for pain control. The other serious postembolization problem is the development of amenorrhea associated with transient ovarian failure. Non-targeted embolization of ovarian arteries has always been considered a possible complication of UAE⁸.

UAE is both safe and effective when performed as an outpatient procedure⁹. Smaller baseline leiomyoma size and submucosal location are more likely to result in a positive imaging outcome¹⁰.

Transcatheter UAE is of significant value in treating certain hemorrhagic conditions in obstetrics and gynecology including postpartum hemorrhage. In our case of choriocarcinoma, UAE was performed to control severe uterine bleeding as an emergency procedure, as emergency hysterectomy was not feasible due to anesthetic risks. However chemotherapy was given later as a definitive treatment.

References

1. Lumsden MA. Embolization versus myomectomy versus hysterectomy. Which is best, when? *Hum Reprod* 2002;17:253-9.
2. Ravina JH, Bouret JM, Fried D et al. Value of preoperative embolization of uterine fibroma: report of a multicenter series of 31 cases. *Contracept Fertil Sex* 1995; 23:45-9.
3. Bradley EA, Reidy JF, Forman RG et al. Transcatheter uterine artery embolization to treat large uterine fibroids. *Br J Obstet Gynaecol* 1998;105:235-40.
4. Lipman JC, Smith SJ, Spies JB et al. IV. Uterine fibroid embolization: follow up: *Tech Vasc Interv Radiol* 2002;5:44-55.
5. Greenwood LH, Glickman MG, Schwartz PE et al. Obstetric and nonmalignant gynecologic bleeding: treatment with angiographic embolization. *Radiology* 1987;164:155-9.
6. Abbas FM, Currie JL, Mitchell S et al. Selective vascular embolization in benign gynecologic conditions. *J Reprod Med* 1994;39: 492-6.
7. Bakri YN, Linjawi T. Angiographic embolization for control of pelvic genital tract hemorrhage. *Acta Obstet Gynecol Scand* 1992;71:17-21.
8. Stringer NH, Grant T, Park J et al. Ovarian failure after uterine artery embolization for treatment of myomas. *J Am Assoc Gynecol Laparoscopist*: 2000;7:395-400.
9. Siskin GP, Stainken BF, Dowling K et al. Outpatient uterine artery embolization for symptomatic uterine fibroids. Experience in 49 Patients. *J Vasc Interv Radiol* 2000;11:305-11.
10. Spies JB, Roth AR, Jha RC et al. Leiomyomata treated with uterine artery embolization, factors associated with successful symptom and imaging outcome. *Radiology* 2002;222:45-52.