

Embolization of uterine and ovarian artery anastomosis in the treatment of menorrhagia secondary to adenomyosis and leiomyoma

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Abstract

Background: Adenomyosis is a benign uterine condition that causes menorrhagia and dysmenorrhea. Although hysterectomy is considered a definitive treatment, it is not an ideal option for women who wish to preserve their fertility. Minimally invasive procedures such as uterine artery embolization (UAE) have the potential to eliminate surgery for women who have failed conservative and medical treatment for adenomyosis and leiomyoma.

Case Presentation: This case report discusses a 54-year-old female who presented with menometrorrhagia refractory to medical treatment. Pelvic T2 MRI revealed findings consistent with adenomyosis and leiomyoma. Elective UAE was performed and follow up was scheduled at 3, 6 and 12 months.

Conclusion: This case provides a review of UAE, the efficacy of UAE for the treatment of leiomyoma and adenomyosis, the primary causes of treatment failure, and what has been done to address these shortcomings. UAE has significant promise for the treatment of these disorders. However, establishing UAE as a first line treatment requires further research. (El Med J 2:4; 2014)

Keywords: Adenomyosis, Leiomyoma, Radiology, Interventional, Uterine Artery Embolization, Uterine-ovarian Artery Anastomosis

Introduction

Adenomyosis is a benign focal or diffuse deposition of endometrial glandular and stromal tissue within the myometrium [1, 2]. The prevalence of the disorder ranges from 10% to 18%. Thirty-five percent of patients may be asymptomatic, while those who are symptomatic, menorrhagia occurs in 50%, dysmenorrhea in 30%, and bulk related symptoms such as back and pelvic pain and frequent urination in 20% [1, 2].

The diagnosis of adenomyosis is made by transvaginal ultrasound showing focal or diffuse areas of myometrial hypoechoogenicity [2]. Alternatively, T2 pelvic MRI revealing an increased junctional zone thickness of at least 10mm and focal or diffuse hyperintense signals within the low signal myometrium is diagnostic [2].

Treatment of adenomyosis consists of conservative, medical, surgical, and interventional means. Conservative treatment involves NSAIDs and acetaminophen. These are effective for pain in most cases, but have no effect on bleeding [3]. Medical treatment involves hormone cycling using oral contraceptives, intrauterine devices, continuous GnRH agonists, and androgenic steroids [3]. Definitive treatment is achieved with hysterectomy; however, this is not a suitable option for women wishing to preserve fertility [1, 2]. Myomectomy is another surgical procedure that also cannot guarantee preservation of fertility [1, 2]. Women who have failed conservative and medical treatment and are wishing to preserve fertility, have a quick recovery, and avoid invasive inpatient procedures can opt for UAE [1, 2]. Patients choosing UAE should be made aware of its risks which include post embolization syndrome, aberrant embolization, particle migration, endometritis, septicemia, and, rarely, infertility.

UAE involves the use of polyvinyl alcohol (PVA) particles ranging in size from 100 to 900 micrometers suspended in saline and contrast solution to occlude the helicine branches of the uterine artery (UA). This markedly limits blood supply to fibroid and adenomyotic tissue.

Percutaneous access of the right femoral artery is obtained to advance a guide wire proximally under fluoroscopic guidance to the bifurcation of the aorta. Once positioned there, the guide wire is turned and advanced distally to the contralateral UA. Finally, catheter placement over the wire can then be easily achieved, and under fluoroscopy, proper placement of the catheter prior to particle injection can be determined. Satisfactory embolization of the targeted vessels is achieved once contrast stasis and/or retrograde flow in the UA is seen. Again under fluoroscopy, occlusion of the vessels is confirmed with disappearance of antegrade flow into the helicine branches. Reversal of the catheter system allows for ipsilateral embolization.

Case Report

Clinical History

The patient was a 54-year-old Caucasian female who presented with irregular, heavy, painful menstrual cycles. The initial work up consisted of CBC, pelvic exam and ultrasound. Based on the results of initial studies, an MRI pelvis was ordered as part of additional workup. Based on the patient's presentation, a differential diagnosis of endometrial hyperplasia, endometrial or cervical polyps, endometrial carcinoma, adenomyosis, and sub-mucosal leiomyoma was made. The patient was initially treated conservatively and medically with no avail, thus, deeming the patient eligible for UAE.

Imaging

Sagittal T2 pelvic MRI (Figure 1) revealed an anteverted uterus with a thickened endometrium and uterine wall, a junctional zone thickness of approximately 12mm, and foci of hyper-intense signals within the myometrium consistent with deposition of endometrial glandular and stromal tissue. Focal hypo-intense signal was appreciated adjacent to the endometrium, consistent with a submucosal fibroid. Pre-embolization fluoroscopy revealed the helicine branches and confirmed catheter placement before particle injection (Figure 2). Satisfactory embolization was confirmed by displaying stasis

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and/or retrograde flow of contrast in the UA and disappearance of the helicine branches (Figure 3). Angiography of the right UA revealed a very small vessel and an absence of helicine branches post catheterization (Figure 4). This was an indication that an anastomosis between the uterine and ovarian arteries possibly existed on the right. Aortography, using pigtail catheter at the level of the renal arteries, allowed identification of the ovarian arteries (OA) (Figure 5). Selective right OA angiography, using a microcatheter, revealed right helicine branches consistent with anastomosis between the right OA and UA (Figure 6). Embolization of the distal OA was then performed (Figure 7). Follow up was scheduled at 3, 6 and 12 months.

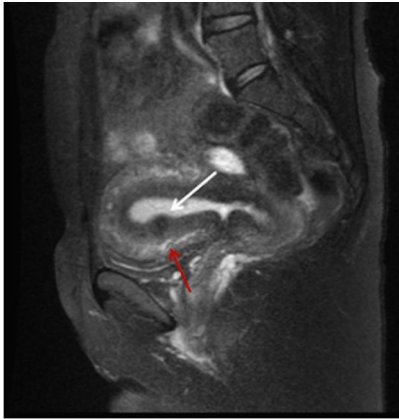


Figure 1: T2 pelvic MRI showing submucosal fibroid (white arrow) and areas of adenomyotic tissue at the thickened junctional zone (red arrow).

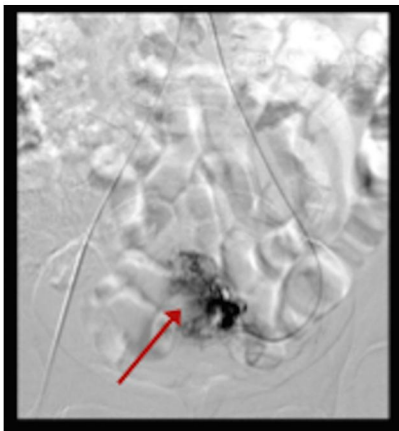


Figure 2: Pre-embolization fluoroscopy sequence of the left UA following selective catheterization showing numerous helicine branches.

Discussion

Adenomyosis is a benign focal or diffuse deposition of endometrial glandular and stromal tissue within the myometrium [1, 2]. Thirty-five percent of patients may be asymptomatic while 50% present with menorrhagia, 30% with dysmenorrhea, and 20% with bulk related symptoms such as back and pelvic pain and frequent urination [1, 2]. Dysmenorrhea and menorrhagia may be a result of uterine instability and poor contractibility of a fibrotic uterus secondary to endometrial tissue deposition [1, 2]. Approximately 80% of women diagnosed with adenomyosis have other uterine pathologies [2]. Leiomyoma occur in 53% while endometriosis and endometrial polyps each account for 2-20% [2]. There is also an increased risk of

endometrial hyperplasia and adenocarcinoma in women with this condition [2].

UAE in the treatment of patients with fibroids has been generally accepted by interventional radiologists and gynecologists considering that 80 to 93% of patients report short-term symptomatic relief at 3 and 6 month follow up, and 68% remain asymptomatic long-term [1, 2, 5]. Occluding blood supply to fibroids and myometrial glandular tissue reduces the size and amount of tissue without causing complete uterine necrosis as a result of collateral circulation that

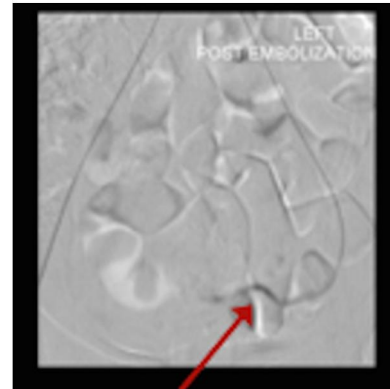


Figure 3: Post embolization sequence showing contrast flow stasis indicating satisfactory embolization.



Figure 4: Catheterization of the right internal iliac showing the right uterine artery (arrow).



Figure 5: Aortography at the level of the renal artery take off displaying the ovarian arteries.

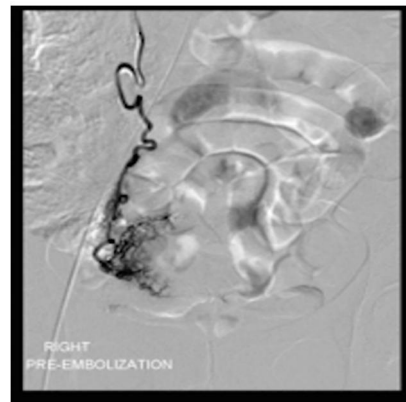


Figure 6: Selective microcatheterization of the right ovarian artery showing prominent blood supply to the uterus indicated by the appearance of the helicine branches.

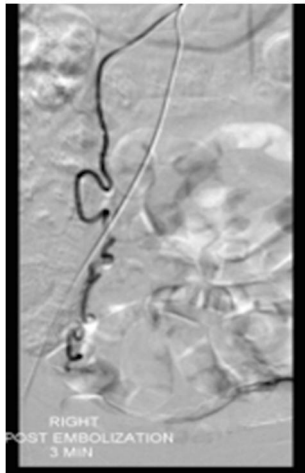


Figure 7: Post embolization sequence of the right ovarian artery showing contrast flow stasis indicating satisfactory embolization.

quickly develops. Historically, adenomyosis has been difficult to treat definitively without turning to hysterectomy [2]. While UAE provided symptomatic relief in 63% of patients with pure adenomyosis at 3 year follow up in one study, many interventional radiologists are reluctant to offer UAE due to the variability of long term efficacy reported in the literature [2]. It seems that long-term efficacy is higher and more consistent in patients with adenomyosis concomitant with fibroids when common causes of failure are addressed during the procedure [2].

It is reported that 4-19% of UAE fail, partly attributed to uterine and ovarian artery anastomosis (UOAA) [4]. The prevalence of UOAA is reported to be 21%. Therefore, many interventional radiologists opt for aortography following bilateral embolization in an attempt to identify an anastomosis [5]. Bilateral UAE plus UOAA embolization has an approximately 9% failure rate compared to 19% with bilateral UAE alone [4]. UOAA embolization is not without risks. There is a 6% risk of ovarian failure and/or premature menopause induction in all women, and 16% risk in women older than 45 [4].

Failure of UAE is also attributed to adenomyosis co-existing with fibroids. UAE seems to infarct the fibroids but leaves much of the adenomyotic myometrium intact. Its success seems to be related to particle size [1, 2]. There is a significantly higher success rate in groups that received 250-355 and 500-710 micron PVA particles than in those who received only 355-500 or 250-355 micron particles [2]. At 2 year follow up, 56% of the patients remain asymptomatic with decreased thickness of junctional zone on MRI while 82% of patients reported significant symptomatic improvement [1, 2, 5]. The limitation of the latter figure is that it is subjective without standardized assessment [5].

Conclusion

The results in the literature show significant promise for the use of UAE in treatment of adenomyosis, but the data gathered so far has been insufficient to advocate UAE as a first line treatment [5]. In future, randomized controlled studies need to be conducted to establish the efficacy and safety of UAE as a first line treatment [5]. Additionally, optimizing the technique of UAE in the treatment of adenomyosis and an evaluation of how long-term outcomes can be improved should be done [2].

Competing interests: The authors declare that no competing interests exist.

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