

Embolic therapy for myomata

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Summary. Two patients of an initial pilot study are reported. Both suffered from menorrhagia associated with uterine myomata. In each case bilateral uterine artery embolization under digital subtraction angiography was performed using polyvinyl alcohol particles. Patients' anaemia improved; follow-up ultrasound showed a reduction of both uterine volumes and size of myomata. No side-effects from the procedure were noted.

Keywords: embolization, menorrhagia, myoma

Introduction

Embolization of uterine arteries has long been noted to be effective for the control of pelvic haemorrhage both in the obstetric [1] and non-pregnant patient [2]. Success rates higher than uterine or hypogastric artery ligation for control of post-partum haemorrhage have been reported [3]. Other investigators have observed embolization to effectively treat symptoms of pain and pressure associated with myomata by shrinking these benign growths [4]. We report two cases of successful embolization in patients suffering from myomata. This initial report will be expanded when a longer follow-up of a larger group is available.

Case 1

A 47-year-old gravida1, para 1 who wished no further childbearing complained of a 6 month history of menorrhagia, pelvic pain and pressure. The pelvic examination revealed an enlarged irregular 14 weeks-sized uterus. Ultrasound revealed multiple myomata with the largest two having dimensions of 4 × 5 × 6 cm and 3 × 5 × 5 cm. Office hysteroscopy and biopsy revealed a submucous myoma, and normal endometrial biopsy. The patient was offered traditional therapy of hysterectomy, and myomectomy, and chose embolization.

Under unconscious sedation and local anaesthesia the right femoral artery was entered and a vascular sheath placed. A no. 5 French selective catheter was then used to select both uterine arteries. Both arteries

were embolized with 500–700 µm polyvinyl alcohol particles (PVA). Approximately halfway through the embolization, 100 mg of lidocaine was injected into the arterial bed via the catheter on each side for post-operative analgesia. Polyvinyl alcohol particles were administered until there was cessation of flow in both uterine arteries. Sixty mg of Ketorolac was given intramuscularly at the end of the procedure. The patient had no pain on the day of procedure and experienced mild cramping on the third post-operative day which was controlled by acetaminophen. By the end of the first week the patient reported relief from pressure symptoms. A follow-up ultrasound examination performed at 6 weeks post procedure revealed that the myomata had shrunk to 60% of initial size. The patient continues symptom free.

Case 2

This 54-year-old patient taking oestrogen replacement had undergone menopause 2 years prior to her presentation. At that time she complained of post-menopausal bleeding and pressure. Her examination revealed an enlarged irregular uterus. Ultrasound showed multiple myomata including two which were more than 7 cm in diameter. Hysteroscopy confirmed a submucous myoma and endometrial biopsy showed atrophic endometrium. The patient desired to retain her uterus, was informed of alternative choices including traditional hysterectomy and endoscopic procedures including transcervical myoma resection. She elected to undergo embolization which was performed under unconscious sedation. Aided by digital subtraction and 'road-mapping' to identify the

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Figure 1. Digital subtraction angiogram showing left uterine artery with characteristic blushing and hypervascularity associated with myomas.

uterine arteries, a procedure identical to the first case report was performed. Figure 1 shows the 'road map' view of the left uterine artery prior to embolization. In Figure 2, a post-embolization view, no blood flow is seen distal to the catheter. The patient received Ketorolac

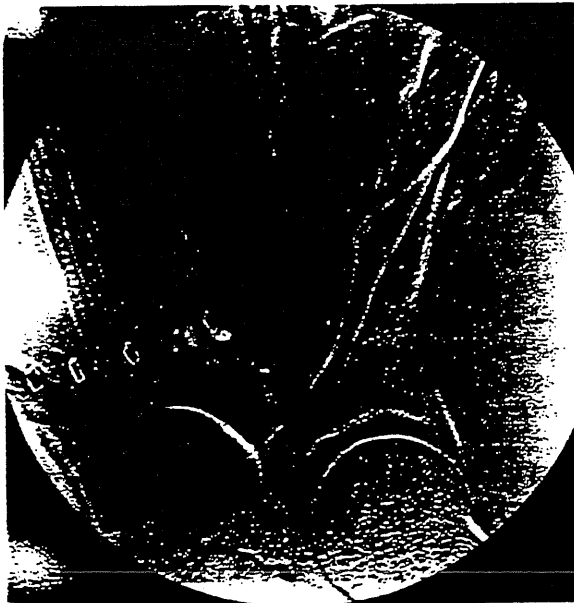


Figure 2. Angiogram immediately after injection of polyvinyl alcohol with no demonstrable flow.

60 mg intramuscularly at the termination of the case. The patient left the hospital 6 h after her procedure and suffered no post-operative complications.

Examination at 6 weeks post procedure revealed a markedly reduced uterus. Ultrasound examination showed a uterus and individual myomata reduced in size to 30% of their pre-procedure size. The patient stated that her post-menopausal bleeding stopped immediately following the procedure and had not returned. She noted marked decrease in pressure and pain following the procedure.

Discussion

Uterine myomata affect thousands of women, accounting for approximately one-third of the estimated 600 000 hysterectomies performed annually in the United States [5]. The common surgical procedure places a large cost upon health care, as well as a morbidity of nearly 50% of patients undergoing this surgery [6]. Myomectomy by laparotomy has similar high rates of morbidity including transfusion and post-operative fever [7]. Embolization of uterine arteries through an intra-arterial approach has a recognized high success rate for treating patients with post-partum haemorrhage as well as non-obstetric haemorrhage in the malignant and benign disease setting. In malignant cases a permanent thrombogenic agent is commonly used. PVA particles such as those used in this series, while considered permanent, allow the radiologist access to the same arterial site if repeat procedures are needed. When temporary haemostasis is needed in a benign condition for a patient requiring future fertility, an absorbable agent such as cellulose is injected into the artery. This would be the traditional treatment for post-partum haemorrhage.

Ravina [4] first described the use of intra-arterial embolization to not only control haemorrhage but also to decrease the size of myomata. Our patients showed encouraging results when treated with this same technique. While our follow-up period is only 6 months, Ravina's group showed maximal diminution of myoma size at that period. Immediate cessation of menorrhagia was reported for our two cases as well as all but two of Ravina's series. Ravina's group is up to 24 months of follow up after embolization and no regrowths of myomata have been noted [8]. In addition, the immediate post-procedure pain which Ravina's patients experienced did not trouble our patients. Perhaps the addition of intra-arterial injection of lidocaine, coupled with an intramuscular injection of Ketorolac will continue to give adequate analgesia for other patients in our series. Ischaemia is often associated with the pain after embolization. Unlike Ravina who used particles in the 300–500 μm range for embolization, we used particles

in the 500–700 μm range. Perhaps this is the reason for less post-operative pain. We will have to wait to see if we obtain the same long-term success with shrinkage of myomas. We do embolize both uterine arteries, as anatomic studies suggest a bilateral blood supply for myomas.

The low incidence of morbidity with embolization compared to hysterectomy, as well as the procedure's lack of post-operative pain, allow patients to return to home and work in a short period of time. Some patients complain of a low grade fever following embolization. This is thought to be secondary to ischaemia [9]. Few abscesses have been noted to accompany embolization and are thought to result from over-zealous injection of extremely small particles [10]. Sarcomatous degeneration of myomata can occur. The reported incidence of this phenomenon is lower than 2 per 1000 myomata [11]. Nonetheless patients must be followed carefully to assure that they will not experience this change. Also, we are attempting to biopsy myomata of patients undergoing embolization. Equally important is pre-procedure evaluation to rule out endometrial hyperplasia or malignancy as a cause of bleeding, even in the presence of myomata. Consideration should be given to other causes of pain in the pelvic area such as endometriosis and adhesions, neither of which would respond to embolization. In some cases a laparoscopy may be indicated prior to embolization.

Our initial results offer encouragement to continue our work, and report on longer term follow-up on a larger group of patients.

References

- 1 Brown BJ, Heaston DK, Poulson AM, Gabert HA, Mineau DE, Miller FJ. Uncontrollable postpartum bleeding: a new approach to hemostasis through angiographic arterial embolization. *Obstet Gynecol* 1979; **54**: 361–5
- 2 Oliver JA, Lance JS. Selective embolization to control massive hemorrhage following pelvic surgery. *Am J Obstet Gynecol* 1979; **135**: 431–2
- 3 Evans S, McShane P. The efficacy of internal iliac artery ligation in obstetric hemorrhage. *Surg Gynecol Obstet* 1985; **160**: 250–3
- 4 Ravina JA, Herbreteau D, Ciraru-Vigneron N, Bouret JM, Houdart E, Aymard A, Merland JJ. Arterial embolisation to treat uterine myomata. *Lancet* 1995; **346**: 671–2
- 5 Carlson KJ, Nichols DH, Schiff I. Indications for hysterectomy. *N Engl J Med* 1993; **328**: 856
- 6 Dicker RC, Greenspan JR, Strauss LT, Cowart MR, Scally MJ, Peterson HB et al. Complications of abdominal and vaginal hysterectomy among women of reproductive age in the United States. *Am J Obstet Gynecol* 1982; **144**: 841–8
- 7 La Morte AI, Lalwani S, Diamond MP. Morbidity associated with abdominal myomectomy. *Obstet Gynecol* 1993; **82**: 897–900
- 8 Ravina J. Personal communication
- 9 Gilbert WM, Moore TR, Resnick R, Doemeny J, Chin H, Bookstein JJ. Angiographic embolization in the management of hemorrhagic complications of pregnancy. *Am J Obstet Gynecol* 1992; **166**: 493–7
- 10 Choo YC, Cho KJ. Pelvic abscess complicating embolic therapy for control of bleeding cervical carcinoma and simultaneous radiation therapy. *Obstet Gynecol* 1980; **55**: 76S–8S
- 11 Leibsohn S, d'Ablaing G, Mishell DR, Schlaerth JB. Leiomyosarcoma in a series of hysterectomies performed for presumed uterine leiomyomas. *Am J Obstet Gynecol* 1990; **162**: 968–76