Original article

Uterine artery embolisation

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KEYWORDS

Embolisation
Fibroid
Hysterectomy
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ABSTRACT

Purpose of study: Fibroids are commonest benign tumour of the uterus. It presents with bleeding per vagina in most of the cases. Surgical treatment consists of myomectomy or hysterectomy with or without salpingo oophorectomy, with its inherent morbidity, prolonged hospital stay and psychosocial problems. Surgery is not the best option especially in unmarried and nullipara.

Materials and methods: Thirty-five patients were subjected to uterine artery embolisation (UAE). Mean age was 35.51 ± 7.36 years. Two patients were suffering from advanced carcinoma of cervix, 32 had fibroid of uterus, one had endometriosis. Three patients were unmarried, three did not have any issue, three had associated haemodynamically significant cardiac disorders, one had polycystic renal disease, and one had hypernephroma. Four patients had multiple fibroids. The UAE was done through contralateral femoral artery puncture, bilaterally, with the help of Judkin's right coronary catheter. Ultrasound was repeated after 3 months.

Results: The UAE was successful in all patients. Mean procedural time was 75 minutes. Hospital stay was 1 day only. Bleeding stopped in all 35 patients. One patient had recurrence of bleeding after 2 months and underwent surgery. Fibroids disappeared in eight patients, decreased in size by > 75% in 11 patients, and by 50–75% in six patients. Five patients did not report back with ultrasound. Two patients had normal delivery after UAE.

Conclusion: Uterine artery embolisation is effective therapy to stop uterine bleeding. It is effective in controlling the symptoms in uterine fibroids and also decreases the size of fibroids. Hospital stay is only 1 day.

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Uterine fibroids are among the most common tumours of the female reproductive tract that occur in pre-menopausal women. In one study of women, 17–44 years of age undergoing tubal sterilisation, fibroids were found in 9% of whites and 16% of blacks.¹ The overall incidence has been reported to be 29.7/1000 patient/year, with considerable variation according to age.² In most studies, the peak incidence has been shown to occur among women who are in their early to mid-40s.^{3,4} These are among the commonest causes of bleeding per vagina (P/V), among young females. Other causes of bleeding are ante-partum haemorrhage, post partum haemorrhage, dysfunctional uterine bleeding, and carcinoma of uterus and cervix.

Materials and methods

Thirty-five non-randomised patients having excessive bleeding P/V were taken up for uterine artery embolisation (UAE). All the patients were evaluated in the Obstetrics and Gynaecology (OBG) Department of our college. All were subjected to clinical examination followed by ultrasonography. The patients suspected to have malignancy were subjected to endometrial biopsy. Those found to have malignancy were excluded. Patients found to have uterine fibroids or advanced stage of malignancy, not responding to chemotherapy/radiotherapy were taken up for UAE. The patients were explained the procedure and the possible complications. Only if they agree for the procedure, were they taken up for UAE.

The procedure was done under local anaesthesia. Urinary bladder was catheterised. Bilateral femoral artery puncture

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Figure 1 Abdominal aortogram showing pelvic vessels and uterine arteries.

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Figure 2 Embolisation of right uterine artery completed.

was done and 7f femoral sheaths were inserted. Abdominal aortogram was done with Pig tail catheter (Figure 1) and pelvic vessels were seen and size and origin of uterine arteries from internal iliac arteries was defined. Then, the uterine artery was approached from contralateral approach with the help of right Judkin's catheter. Catheter was inserted through femoral artery, then external artery, and common iliac, going to opposite common iliac, internal iliac, and then uterine artery was selectively hooked. Polyvinyl alcohol (PVA) particles of the size of 500–700 micron were pushed through the catheter, mixed in contrast agent. The process was continued till artery was blocked and reflux of contrast was seen (Figures 2 and 3). The same procedure was repeated on opposite side.

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Figure 3 Embolisation of left uterine artery.

The procedure was done on one side, only if the other uterine artery was very small.

The patients were kept in the hospital overnight. Urinary catheter was removed after the procedure.

The patients were asked to come with ultrasound after 3 months and 6 months. Size of fibroid was compared with the pre-embolisation size.

Results

Uterine artery embolisation was done in 35 patients. Table 1 shows the clinical profile of the patients.

Thirty-two patients had uterine fibroids, four out of which had multiple fibroids. Two patients were of advanced carcinoma of cervix and were having continuous bleeding in spite of high dose radiation and were referred to us from Radiotherapy Department. One patient was having endometriosis. Most of the patients of fibroids came to UAE on their own, after investigation in OBG department. However, three unmarried females, three nulliparous, and five with associated disorders were referred by gynaecologists. One patient was put on hormonal therapy by gynaecologist and developed stroke. When her hormones were stopped, she developed breakthrough bleeding and had to be subjected to UAE in emergency.

Fibroid size more than 5 cm × 5 cm was present in 16 patients. Rest of the patients had size < 5 cm in diameter. Figure 2 shows the results of UAE.

In all patients, procedure was successful. In two patients, due to one small uterine artery, UAE was done on one side. For others, it was done bilaterally.

Table 1
Clinical profile of the patients.

Total patients	35
Mean age (yr)	35.51±7.36
Excessive bleeding P/V (menorrhagia) (%)	35 (100)
Anaemia (%)	28 (80)
Pelvic abdomen (%)	20 (57.14)
Dysmenorrhoea (%)	16 (45.7)
Uterine fibroid (%)	32 (91.42)
Single	28
Multiple	4
Unmarried	3
Nulliparous	3
Associated disorders	5
Cardiac disorders	3
Hypernephroma	1
Polycystic renal disease	1
Carcinoma of cervix (%)	2 (5.72)
Endometriosis (%)	1 (2.85)

P/V: per vagina.

Table 2
Results of uterine artery embolisation.

Total patients	35
Successful procedure	35
Bilateral UAE	33
Unilateral UAE	2
Relief of amenorrhoea	35
Procedure time (min)	60–90
Hospital stay	1 day
Complications	
Recurrence of bleeding	1
Pain abdomen/back after discharge	4 patients
Fever	1 patient
Mean fibroid area before UAE (cm ²)	33.74±24.9
Mean fibroid area after UAE (cm ²)	17.5±21.15
Follow-up ultrasound	27 patients of fibroid
Fibroid disappeared	5 (18.5%)
Reduced by >75%	11 (40.74%)
Reduced by 50–75%	6 (22.22%)
Reduced by <50%	5 (22.22%)
Normal delivery after UAE	2 patients

UAE: uterine artery embolisation.

One patient had recurrence of bleeding P/V after 2 months and refused for repeat procedure and underwent surgery. Another patient who had a very large fibroid, continued to have pressure symptoms, underwent surgery. All other patients had good relief of symptoms and were satisfied. On repeat ultrasound, eight patients had no fibroid seen. In 11 patients, fibroid size decreased by >75%, in six by 50–75% and in five by <50%. Five patients were lost to follow-up without coming back with ultrasound. Two patients reported back with normal delivery after UAE.

Discussion

Uterine fibroids are benign monoclonal tumours of the uterus composed of smooth muscle cells and an extracellular matrix of collagen, fibronectin, and proteoglycan.⁵ As they grow, fibroids cause enlargement of the uterus. Fibroids that are located in a submucosal position, as well as intramural fibroids that abut the endometrial lining, are associated with heavy menstrual bleeding,³ whereas the presence of large fibroids or the overall enlargement of the uterus is associated with local pressure, pain, or compressive effects. Although, uterine fibroids are benign, they can cause considerable symptoms. The most frequent symptom is menorrhagia, with iron-deficiency anaemia often occurring as a result. Dysmenorrhoea, pelvic pain and pressure, dyspareunia, urinary frequency and urgency, and other pelvic symptoms may occur. Symptoms are often of sufficient severity to necessitate surgical intervention.

Treatment for uterine fibroids is generally indicated only when symptoms are severe enough to be unacceptable to the patient. There is no evidence that women with no symptoms or with mild symptoms benefit from intervention. Exceptions may include women with severe anaemia or with hydronephrosis due to ureteral obstruction.

Uterine fibroid embolisation is a percutaneous procedure that results in the occlusion of the perfibroid vessels and ischaemic infarction of the fibroid.⁶ The treated fibroids shrink over the course of several months to years.⁷ As a result, symptoms associated with the presence and growth of the fibroids are reduced.

Uterine artery embolisation as a primary therapy for fibroids was reported by Ravina in 1995.⁸ With a mean follow-up of 20 months, symptoms resolved in 11 (16). Three patients had partial improvement, and the residual heavy bleeding subsequently controlled with progestins. There were two failures, one of which required hysterectomy 6 weeks after the procedure and another requiring myomectomy 6 months after the procedure.

Worthington-Kirsch reported the results in 53 patients treated with technically successful procedures in 52.⁹ Follow-up at 3 months indicated marked improvement in 88% in menstrual bleeding patterns. For the 31 patients with bulk-related symptoms, 29 (94%) experienced marked improvement. The mean reduction in fibroid volume was 46% in the 32 patients in whom follow-up ultrasound was performed. Complications included extensive infarction requiring in hysterectomy 12 days post-procedure in one patient. Two patients required re-hospitalisation for post-embolisation syndrome. Another patient developed a self-limited episode of upper gastrointestinal haemorrhage secondary to vomiting.

The randomised trial of embolisation vs. surgical treatment for fibroids was a multicentre study of 157 patients in the United Kingdom who were randomly assigned to either surgery (hysterectomy or myomectomy) or embolisation.¹⁰ The investigators found no differences in health-related quality of life between the two groups after treatment, although women in the surgical group reported a greater reduction in symptoms. More major adverse events occurred in the surgical group than in the embolisation group during the initial

hospital stay, whereas the reverse was true after discharge. With a median follow-up of 32 months, the likelihood of re-intervention was much higher among the patients who underwent embolisation than among those who underwent surgery (20% vs. 2%, $P < 0.001$). Ten interventions occurred among patients in the embolisation group in the first year, presumably owing to a failure of embolisation to relieve symptoms, and 11 occurred during the subsequent follow-up period. Another long-term study showed that by 5 years after treatment, 20% of patients who had undergone embolisation required reintervention.¹¹

In our study, two patients had recurrence of symptoms and underwent surgery. Relief from excessive bleeding was found in 33 patients (94.28%). The result is consistent with other studies. In contrast to other studies, the average size of fibroids was larger in our patients, with largest being 10 cm × 10 cm and around 50% having a size of more than 5 cm × 5 cm. Still majority of the patients had significant regression in size of fibroids and symptom relief in most of the patients.

The complications were minimal, fever in one patient and pain in abdomen/back in four patients, all responded to medical therapy.

Conclusion

Uterine artery embolisation is an effective therapy to control P/V bleeding from any cause. It is a good alternative to surgery in uterine fibroids. Bleeding is controlled in >90% and regression in size of fibroids occurs in majority. It is especially useful in unmarried females and women who have not completed their family.

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