HLJ Mak 麥浩樑
PCH Kwok 郭昶熹
HHL Chau 周海倫
MK Chan 陳文光
SCH Chan 陳慈欽
SCS Chan 陳從心

Uterine fibroid embolisation in Chinese women: medium-term results

子宮肌瘤栓塞術在中國婦女的中期結果

Objective. To evaluate the medium-term results of uterine fibroid embolisation in Chinese women with symptomatic uterine fibroids.
Design. Prospective case series study.
Setting. Gynaecology and Interventional Radiology units in a public hospital, Hong Kong.
Patients. Patients with symptomatic fibroids who underwent uterine fibroid embolisation in Queen Elizabeth Hospital from October 1998 to June 2004.
Results. Fifty women (mean age, 42.9 years, median follow-up period, 27.5 months) were recruited. Most (82%) had menorrhagia as the chief presenting symptom. Embolisation was successful in 49 (98%) women. Complications occurred in 12 (24%) patients, but were all self-limiting. Significant decrease in the median clinical uterine size (14 weeks vs 10 weeks) and median volume of the largest fibroid on magnetic resonance imaging (157.9 mL vs 45 mL) were observed during the first year. The reduction seemed to be maintained till the last follow-up. Menorrhagia improved in 34 (84%) patients, dysmenorrhoea in 28 (88%), pelvic pain in 18 (82%) and abdominal mass in 15 (83%). Poor response was found for urinary symptoms (29% improvement). Eight (16%) patients underwent hysterectomies after uterine fibroid embolisation. On logistic regression analysis, the only significant predictive factor for symptomatic improvement was fibroid volume reduction at 6 months (P=0.03).
Conclusion. Uterine fibroid embolisation is an effective uterine-preserving therapy in patients with symptomatic fibroids; overall symptomatic improvement was estimated as 80%. Uterine or fibroid size reduction correlated well with clinical outcome. The impact of uterine fibroid embolisation on young women wishing to conceive is yet to be determined.

目的：在有症狀的子宮肌瘤的中國婦女中，評估子宮肌瘤栓塞術的中期結果。
設計：預期病例系列研究。
安排：香港一所公立醫院的婦科及介入放射部。
患者：由1998年10月至2004年6月，曾在伊利沙伯醫院接受子宮肌瘤栓塞術的子宮肌瘤患者。
結果：有五十名婦女（平均年齡42.9歲，覆診期中位數27.5月）參與研究。大部分（82%）婦女的主要症狀是月經過多。栓塞術在49個（98%）婦女成功進行。併發症在12名（24%）病人發生，全都是自限的。在第一年間，臨床子宮大小中位數（14週對10週）和磁力共振下最大肌瘤體積中位數（157.9毫升對45毫升）均明顯減少。月經量多在34名（84%）患者有改善，而經痛在28名（88%）患者，盆腔痛在18名（82%）患者，及腹痛在15名（83%）患者有改善。小便症狀改善的情況不理想，只有29%改善。8名（16%）患者需在栓塞術後進行子宮切除術。組織回歸分析顯示，肌瘤體積在六個月的縮小程度是唯一可顯著預測症狀改善的因素（P=0.03）。
結論：子宮肌瘤栓塞術對有症狀的子宮肌瘤患者是一個有效和能保全子宮的治療。在我們的一組患者上，八成有整體症狀的改善。子宮肌瘤縮小程度和臨床效果有很好的相互關係。子宮肌瘤栓塞術對年輕而希望懷孕的婦女的影響則有待判斷。

Key words:
Embolization, therapeutic;
Leiomyoma;
Magnetic resonance imaging;
Uterus;
Women

關鍵詞：
栓塞術，治療性；
平滑肌瘤；
磁力共振造影；
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Queen Elizabeth Hospital, 30 Gascoigne Road, Kowloon, Hong Kong:
Department of Obstetrics and Gynaecology
HLJ Mak, MRCOG, FHKAM (Obstetrics and Gynaecology)
SCS Chan, MRCOG, FHKAM (Obstetrics and Gynaecology)
Department of Radiology
PCH Kwok, FHKAM (Radiology)
HHL Chau, FHKAM (Radiology)
MK Chan, FHKAM (Radiology)
SCH Chan, FRCR, FHKAM (Radiology)

Correspondence to: Dr HLJ Mak (e-mail: mhlj01@yahoo.com)

Introduction

Arterial embolisation was first reported in 1995 as a primary therapy for symptomatic uterine fibroid.[1] Patients initially underwent embolisation as an adjunct before myomectomy or hysterectomy to decrease operative bleeding.

However, many patients' symptoms resolved and their fibroids shrank after embolisation, and surgery was not required. Interest in uterine fibroid embolisation (UFE) has increased since then; an estimated 10 000 UFEs were performed in the US in 2003.[2]

Numerous reports on the outcome of fibroid embolisation have been published.[3-7] More than 80% of patients reported symptomatic improvement and shrinkage of the fibroid to about half of the initial size was noted on imaging. Uterine fibroid embolisation was first performed in our hospital in 1998. Using this technique, our initial experience at treating symptomatic fibroids in Chinese patients was encouraging; 75% of the 12 women noticed symptomatic improvement.[8] Other reports from Asia have also been published,[9-11] but long-term data in Chinese patients are lacking. We report our medium-term results of UFE in Chinese women in Hong Kong.

Methods

This is a prospective case series study of all the women who underwent uterine fibroid embolisation in Queen Elizabeth Hospital, Hong Kong, from 14 October 1998 to 16 June 2004 inclusive. The same protocol was used for patient recruitment, embolisation procedure, and follow-up as described previously.[8] Patients with symptomatic fibroids that warrant surgical treatment, but wished to preserve their uterus, refused surgery, or were at high risk from surgery were recruited. Exclusion criteria included uncontrolled bleeding diathesis, pregnancy, chronic pelvic inflammatory disease, and asymptomatic fibroids. Gynaecologists and interventional radiologists assessed all the women before the procedure.

Under local anaesthesia, angiography was performed via the right femoral artery in the digital angiographic unit. 4-French (4-Fr) or 5-Fr Cobra-1 or Sidewinder-1 catheters, were passed via both internal iliac arteries, in turn. Both uterine arteries were identified and selectively catheterized. Blood supply to the uterus and fibroids was confirmed on angiography. If vasospasm or a small uterine artery was encountered, 2.7-Fr to 3-Fr micro catheters were used. Polyvinyl alcohol (PVA) particles with a diameter of 355-500 μm or 500-700 μm were used for embolisation of the uterine arteries bilaterally, until stasis or near stasis was achieved. Post-embolisation arteriography was performed to ensure occlusion of the vessels. No attempts were made to specifically embolise the feeding vessels of the fibroid, as the particles flow preferentially to the fibroid by its natural blood flow. For peri-procedural pain relief, a patient-controlled analgesia (PCA) pump of intravenous morphine was used and ketorolac suppositories were used thereafter.

After discharge, patients were followed up at 2 weeks, 3 months, 6 months and 12 months, and half-yearly or annually thereafter. Clinical uterine size was assessed during each visit and recorded as if to indicate gestational age in weeks. Uterine size considered 'bulky' clinically was recorded as '5 weeks' and that of 'normal size' as '4 weeks'. Haemoglobin and gonadotrophin levels were checked at each visit during the first year, and thereafter the haemoglobin level was checked during each visit.

Magnetic resonance imaging (MRI) of the pelvis was performed before embolisation to assess the number, site, and size of the fibroids. The volume of the dominant fibroid was measured by multiplying the product of the three dimensions of the fibroid by 0.523, assuming the fibroid to be ovoid. The presence of other pathologies such as adenomyosis was also noted. Magnetic resonance imaging of the pelvis was repeated at 3, 6, and 12 months after embolisation, to assess the change in volume of the fibroid and the uterus.

Patients' response to embolisation was assessed by a questionnaire, administered from October to December 2004. Patients were approached either during follow-up or by telephone to complete the questionnaire. It consisted of four parts. Part 1 enquired about change in the symptoms experienced in the past 6 months, including: menorrhagia, dysmenorrhoea (pain during menstruation), pelvic pain (pain outside of menstruation), abdominal mass, and urinary symptoms (frequency or voiding difficulty). Seven responses were possible (cured/much better/slightly better/same/slightly worse/much worse/no such symptom before and after the procedure). This part was skipped for patients who underwent hysterectomy after UFE. Part 2 asked about the overall symptomatic improvement in the past 6 months. The same categories were used as in part 1, but excluded "no symptom before and after the procedure". In part 3, the patients were asked whether UFE was an effective treatment for uterine fibroid. Part 4 was administered only to those patients who underwent surgical treatment for fibroids, either previous myomectomy or subsequent hysterectomy. They were asked to choose the best treatment for uterine fibroids according to their personal experience of both procedures.

For patients who underwent hysterectomy after UFE or unplanned readmissions, the medical records were retrieved for operative details and complications. Statistical analyses were performed using Statistical Package for the Social Science (version 11.0; SPSS Inc, Chicago [IL], US). The statistical significance of changes in uterine size and volume of larges fibroid between baseline, 1 year after UFE, and last follow-up were evaluated using the paired *t* test or Wilcoxon's signed-rank test as appropriate.

Logistic regression analysis for binary outcomes was performed to identify independent predictive factors for success. Overall symptomic change (inferred from responses to the questionnaire) was used as the outcome ('improved' defined as cured, much better or slightly better; 'not improved' defined as no change, slightly worse or much

worse), whereas the independent variables included: age, fibroid location, main symptoms, uterine volume reduction, fibroid volume reduction at 6 months, and at 12 months. A two-tailed P value of less than 0.05 was considered significant.

Results

During the study period, 50 Chinese women underwent UFE in our unit. Their mean age was 42.9 years (standard deviation [SD], 3.9 years). All women were pre-menopausal. The median follow-up period was 27.5 months (range, 6-68 months). Regarding the chief presenting symptom, most women (82%) complained of menorrhagia, followed by abdominal mass (8%), dysmenorrhoea (4%), urinary symptoms (4%), and pelvic pain (2%). If all presenting symptoms are inclusively accounted for, menorrhagia remained the most common symptom (92%), followed by dysmenorrhoea (74%), abdominal mass (52%), urinary symptoms (52%), and pelvic pain (46%). Seven (14%) patients had undergone previous myomectomies.

The median clinical uterine size before treatment was equivalent to a 14-week gravid size (interquartile range [IQR], 10-14.5 weeks). On MRI, the median volume of the largest fibroid was 157 mL (IQR, 71-380 mL), while the median uterine volume was 647 mL (IQR, 457-864 mL). The commonest site of the dominant fibroid was intramural (61.2%), followed by submucosal (20.4%) and subserosal (10.2%). In three patients, the uterus was enlarged due to diffuse adenomyosis while co-existing adenomyosis and uterine fibroid was found in one patient. Magnetic resonance imaging features of adenomyoma (rather than a fibroid) were evident in one patient. In three patients, the assessment was performed by ultrasound instead of MRI (because of metallic heart valves in two patients and claustrophobia in one patient).

Both uterine arteries were successfully embolised in 49 (98%) of the patients. In the remaining patient, the left uterine artery failed to be embolised due to spasm. A repeat attempt at embolisation 2 days later was also unsuccessful. At the third attempt 1 month later, the artery was patent but a tight stenosis was noted at its origin. Cannulation was therefore performed with a micro-catheter and embolisation finally achieved. In another patient, a second embolisation was performed after the initial attempt failed to shrink the uterus. Mild extravasation of contrast from a uterine artery was observed in one woman. Computed tomography of the pelvis revealed no pelvic haemorrhage and the patient remained stable. Eighteen (36%) of the patients developed low-grade fevers immediately post procedure; all were self-limiting. The median hospital stay was 3 days (IQR, 2-4 days).

Complications after UFE occurred in 12 (24%) of the patients and are summarised in Table 1. The most common was pelvic inflammatory disease, but only two of five patients yielded positive bacteriological growth. In all of these patients the latter complication resolved following receipt of antibiotics and none had surgical treatment. Amenorrhoea with raised follicle stimulating hormone (FSH) developed 2 years after UFE in two patients (aged 47 and 49 years) and within the first year in the third patient (aged 49 years). Passage of the fibroid vaginally occurred 3 months after UFE in two patients and 2 months after UFE in the third; two had abdominal pain preceding passage of the fibroid and were readmitted for pain relief. Pain relief was immediate once the fibroid was passed. The fibroid was avulsed vaginally in one patient and completely passed out in the other two patients. Magnetic resonance imaging showed disappearance of the fibroid and all patients noted significant improvement in menorrhagia. In the patient with pyometra, her fibroid size decreased by 40% in the first year post-embolisation and her heavy menstrual flow did not normalise till some time later. However, 5 years after embolisation she complained of vaginal spotting on and off, and an endometrial aspirate yielded straw-coloured fluid. She was therefore managed as having pyometra with drainage by Foley's catheter. Dilatation and curettage performed 2 weeks later revealed smooth muscle necrosis and because of her symptoms as well as concerns about possible malignancy, she underwent hysterectomy. Pathology showed leiomyoma with hyaline necrosis and endometritis.

Table 1. Complications

Complication	Patient No. (%)
Pelvic inflammatory disease	5 (10)
Passage of fibroid	3 (6)
Massive uterine necrosis	0
Raised follicle stimulating hormone with amenorrhoea	3 (6)
Pyometra	1 (2)
Total	12 (24)

During the first year after UFE, a significant decrease in uterine size was observed clinically and on imaging. The median clinical uterine size decreased from gravid size of 14 weeks to 10 weeks (IQR, 6-13 weeks; P<0.0001; Table 2). The median volume of the largest fibroid decreased from 157.9 mL to 65.4 mL at 3 months, 43.1 mL at 6 months, and 45 mL at 12 months (P<00001; Fig). The median percentage reduction in volume of the dominant fibroid was 48.4% at 3 months, 64% at 6 months, and 58.4% at 12 months. The reduction seemed to be maintained till the last follow-up, where the median clinical uterine size further reduced to 9 weeks' gravid size (P=0.01). The change in clinical uterine size was further classified according to whether the patient did or did not undergo hysterectomy. For all patients, the median clinical uterine size was 14 weeks at pre-UFE and decreased to 10 weeks at 1-year follow-up and 9 weeks at last follow-up. For those who did not require hysterectomy, the median uterine size decreased from 13 weeks (pre-UFE) to 7 weeks (post-UFE). The median

Table 2. Clinical outcomes

Clinical outcomes	Pre–uterine fibroid embolisation	1 year post–uterine fibroid embolisation	Last follow-up
Median clinical uterine size (IQR) [gestational weeks]	14 (10-14.5)	10 (6-13)	9 (6-12)
Mean haemoglobin (SD) [g/dL]	9.6 (2.8)	11.3 (2.0)	11.6 (2.0)
No. of patients receiving transamin (%)	35 (70)	15 (30)	11 (22)

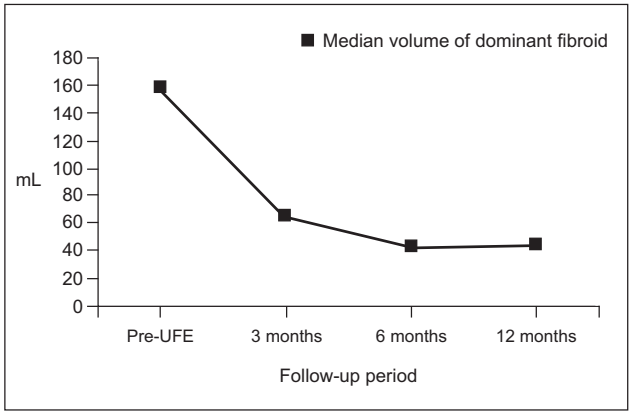

Fig. Median size of dominant fibroid before and after uterine fibroid embolisation (UFE)

Table 3. Characteristics of patients undergoing hysterectomy after uterine fibroid embolisation, n=8

Patient characteristics	Patient No. (%)
Indication	
Enlarging uterus	7 (88)
Persistent menorrhagia	2 (25)
Recurrent menorrhagia	1 (13)
Persistent dysmenorrhoea	2 (25)
Operative findings	
Location of largest fibroid	
Subserosal	5 (63)
Intramural	2 (25)
Submucosal	0
Presence of adenomyosis	3 (38)
Presence of parasytic vessels	2 (25)
Presensce of omental adhesions	3 (38)
Complications	
Bleeding of >500 mL	2 (25)
Transfusion required	1 (13)
Pathology	
Mean size of largest fibroid (cm)	10
Necrosis	4 (50)
No necrosis	2 (25)
Predominantly adenomyosis	1 (13)
Necrosis not mentioned	1 (13)

percentage of dominant fibroid reduction is 68.5%. There is no increase in the dominant fibroid size in any of these patients. For those who had a hysterectomy (n=11), the median uterine size remained 16 weeks before and after embolisation. Seven patients had MRI follow-up before surgery. The median percentage of fibroid reduction was only 3%. The dominant fibroid enlarged in three patients and shrunk in four patients. There was a significant correlation between clinical uterine size and uterine volume on imaging before UFE (Pearson coefficient, 0.655; P<0.001) and between clinical uterine size at last follow-up and uterine volume at 12 months (Pearson coefficient, 0.794; P<0.001). The mean haemoglobin level increased from 96 g/L before UFE to 116 g/L during the last follow-up (P=0.028; Table 2).

Eight (16%) of the patients underwent hysterectomy after embolisation. The median interval between embolisation and hysterectomy was 22 months (range, 8-33 months); none were within the first 3 months or as a result of massive uterine necrosis. The indications, operative findings, complications, and pathologies are shown in Table 3. The most common indication was continued enlargement of the uterus after embolisation. Subserosal fibroids were found in five patients. In the other three, one suffered from diffuse adenomyosis, one had co-existent intramural fibroids and adenomyosis, and one had intramural fibroids only. In two patients parasitic vessels to the uterus were found intra-operatively, and one of these patients had significant intra-operative blood loss and received blood transfusion. Necrotic changes of the fibroids were only found in half of the patients' hysterectomy specimens. The proportion of fibroid volume reduction at 3 months in those with subsequent hysterectomy was significantly less than those without (17% vs 52%, P=0.005).

Forty-six (92%) of the patients responded to the questionnaire. Of the four who did not: one was still being followed up but could not be contacted during the period, two defaulted follow-up after embolisation, and one underwent hysterectomy and could not be contacted. The responses to the questionnaire revealed substantial improvement in all except urinary of symptoms (Table 4). Excluding those undergoing subsequent hysterectomies, 39 patients responded to the first part of the questionnaire. Menorrhagia improved in 34 (87%) patients, dysmenorrhoea in 28 (88%), pelvic pain in 18 (82%), and the abdominal mass in 15 (83%). Only six (29%) claimed improved urinary symptoms, with most (67%) patients reporting no change after UFE. The second and third parts of the questionnaire was answered by all 46 respondents—37 (80%) reported overall improvement; 31 (67%) felt satisfied with the UFE procedure; and 35 (76%) considered that UFE was an effective treatment for fibroids. Fourteen patients who underwent both UFE and surgery, which

Table 4. Responses to the questionnaire with respect to individual symptoms, n=46

Symptom	Patient No. (%)						
	Cured	Much better	Slightly better	Same	Slightly worse	Much worse	Symptom improvement*
Menorrhagia, n=39	11 (28)	15 (38)	8 (21)	3 (8)	1 (3)	1 (3)	34 (87)
Dysmenorrhoea, n=32	9 (28)	11 (34)	8 (25)	2 (6)	1 (3)	1 (3)	28 (88)
Pelvic pain, n=22	6 (27)	7 (32)	5 (23)	3 (14)	1 (5)	0	18 (82)
Abdominal mass, n=18	5 (28)	4 (22)	6 (33)	3 (17)	0	0	15 (83)
Urinary symptoms, n=21	2 (10)	4 (19)	0	14 (67)	1 (5)	0	6 (29)
Overall, n=46	7 (15)	19 (41)	11 (24)	7 (15)	0	2 (4)	37 (80)

* No. (%) of patients with symptom cured, much better, or slightly better

Table 5. Summary of published series describing outcomes after UFE[4-7]

Series/year	No. of patients	Follow-up (months)	Technical success (%)	Improvement on menorrhagia (%)	Other symptom improvement (%)	Reduction of uterine fibroid size (%)
Hutchins et al,[4] 1999	305	12	96	92	Bulk symptoms (92)	48/-
Spies et al,[6] 2001	200	12	99	90	Bulk symptoms (93)	38/58
Walker and Pelage,[7] 2002	400	16.7	98.7	84	Menstrual pain (79)	58/83
Pron et al,[5] 2003	538	3	97	83	Dysmenorrhoea (77), urinary frequency (86)	35/42

included seven of the eight patients who had subsequent hysterectomy responded to the last question. The technique was most commonly chosen (57%) as the most effective treatment. A good correlation was found between symptomatic improvement at 6 months and at last follow-up for menorrhagia (Kendall's tau b coefficient=0.78, P<0.001) and dysmenorrhoea (Kendall's tau b coefficient= 0.79, P<0.001), so the initial symptomatic improvement seemed to be maintained in the medium term.

After logistic regression analysis, the only significant predictive factor for overall symptom improvement was fibroid volume reduction at 6 months (P=0.03).

Discussion

Results from some of the larger published series[4-7] describing UFE are listed in Table 5. Ours is one of the participating centres for the FIBROID registry, which has enrolled 3160 patients (the largest series to date) from 72 contributing sites.[12] Our results in Chinese women are consistent with those in other reports in terms of technical success rate, symptomatic improvement, and reduction of fibroid size. One exception is urinary symptoms, where only nine of 21 patients noticed improvement. Lower urinary tract symptoms are very common in women and can be due to a variety of causes other than uterine fibroids, which may explain the poor improvement in our patients. In many studies 'bulk symptoms' were reported including: abdominal mass, feelings of pressure as well as urinary symptoms. We believed such reporting to be non-specific, and decided to assess urinary symptoms specifically.

The clinical uterine size correlated well with the uterine size on imaging, both before and after embolisation. Uterine size was found to be the only predictive factor for satisfaction after UFE. This implies that physical examination is a good way to monitor the patient's progress and satisfaction and may save post-embolisation imaging costs.

Almost all studies on UFE were non-randomised cohort series. Two randomised controlled trials comparing UFE to hysterectomy have been published.[13,14] They reported shorter hospital stay after UFE than hysterectomy. Another non-randomised multicentre study comparing UFE with hysterectomy revealed substantially improved symptoms in both groups.[15] Hysterectomy was associated with significantly less pelvic pain, but more complications. Nonetheless, embolisation and hysterectomy are not equivalent procedures. In addition, these results may not be applicable to those who chose UFE only in order to preserve the uterus.

Vaginal expulsion of necrotic fragment of submucosal fibroids occurred in three women in our series. This phenomenon was considered a complication of UFE by some investigators, while others felt it was a beneficial outcome of the treatment.[16] We considered these events as complications, as they were associated with pain and discomfort and admission to hospital. When obtaining consent for embolisation, it is therefore essential to warn women with submucosal fibroids about such potential sloughing via the cervix and possible associated symptoms.

There is no clear evidence for repeated UFE in the management of symptomatic fibroids although the safety and efficacy of repeated uterine artery embolisation in managing intractable postpartum haemorrhage has been addressed.[17] Failure to shrink fibroids after embolisation may be due to recanalisation of one or both of the uterine arteries or a collateral blood supply (from ovarian arteries).

Recanalised uterine arteries or collaterals can be embolised in subsequent attempts. In the only patient who had second embolisation in our series, her fibroid size continued to increase after the first attempt, despite clinical improvement in menorrhagia. Pelvic arteriogram 1 year after the first embolisation yielded recanalisation of the left uterine artery that supplied the fibroid.

There are two concerns for younger women undergoing UFE. First is the risk of ovarian failure. Fortunately it ensues in less than 3% of women aged below 45 years.[3,4,18] Second is the effect of embolising the uterine arteries on fertility and pregnancy outcome. No pregnancies were observed after UFE in our group; all of our patients either had completed their families or had no desire to conceive after treatment. Several case series of pregnancy after UFE have been reported. An increase in Caesarean section rate was reported in one group.[19] In yet another group of 21 pregnancies, two patients had placenta praevia and one had placenta accreta.[20] There did not appear to be an increase in low-birth-weight babies. It seemed that fertility was not adversely affected by UFE, but there may be an increased risk of obstetric complications. However, the available evidence is still scanty compared with the literature on pregnancy after myomectomy. Till further data are available on the safety of embolisation for future pregnancy, UFE should not be considered a first-line treatment for women with a strong desire to conceive.

The reported incidence of hysterectomy due to complications, eg infection, was 1 to 2%,[3-5] and is usually performed within 6 months after embolisation. Surgery performed more than 6 months later is usually a result of treatment failure. Depending on the length of follow-up, the reported rate ranged from 1.5 to 28%.[21-23] In our series, 16% patients required hysterectomy, and from the indications and time interval it is likely that all were due to treatment failure. It seemed that adenomyosis and the presence of subserosal fibroids were the main reasons for failure. However, our numbers were too small to make a definite comment. Marret et al[22] reported a 17.2% recurrence rate, defined as return of symptoms requiring further treatment. The two predictive factors identified were large fibroid size and large numbers of fibroids. Patients with subserosal fibroids were excluded from their study. Whether adenomyosis is a contra-indication to embolisation or a contributing factor to failure is debatable. While some authors reported clinical failure due to adenomyosis,[24,25] others reported symptomatic improvement and uterine volume reduction.[26,27]

Part 4 of the questionnaire was designed to assess preference for the treatment of fibroids in patients who had both embolisation and surgical treatment. It may be argued that UFE will be favoured by those who failed myomectomy before, and similarly rejected by those who failed UFE and underwent hysterectomy later, thus limiting the validity of the question. Among the 14 subjects who answered this part, seven had previous myomectomies and seven had hysterectomies after embolisation. The order of preference for the former was UFE (4), myomectomy (2) and none of the above (1), while that for the latter was UFE (4), hysterectomy (2) and myomectomy (1). It appeared that those who failed myomectomy had a preference toward UFE, but UFE was still favoured by those who failed the procedure and required hysterectomy. Possibly some viewed hysterectomy as an irreversible final resort to their problem. However, the subjects responding to this part of the questionnaire were heterogeneous and the numbers small Thus, caution must be exercised in judging this data.

Our study has several limitations: the small number of patients limits the validity of the regression analysis of less common symptoms such as pelvic pain. Detailed information about patient's preference for embolisation over surgical treatment was not available. As our questionnaire enquired about symptoms in the past, recall bias may be introduced, especially in patients who underwent hysterectomy. Furthermore, the questionnaire was not validated. A validated questionnaire measuring the quality of life of women suffering from uterine fiborids is available.[28] Translation and validation of a Chinese version would greatly enhance outcome assessment.

In conclusion, our medium-term results showed that UFE is an effective uterine-preserving therapy in selected patients with symptomatic fibroids. Eighty percent of patients reported overall improvement; 24% developed complications that were self-limiting and none were serious. Uterine or fibroid size reduction correlates well with clinical outcome. Hysterectomies were performed in 16% of patients. The impact of UFE on young women wishing to conceive is yet to be determined. Long-term data regarding complications and recurrences are lacking at the moment. A well-designed randomised controlled trial of embolisaton against surgical treatment of fibroids with adequate numbers and follow-up is needed to address the role of UFE in gynaecology.

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Corrigendum

"Oncogenic osteomalacia associated with an occult phosphaturic mesenchymal tumour: clinico-radiologico-pathological correlation and ultrastructural studies" (August 2006;12: 319-21). On page 320, in the third paragraph, line 18 should have read "and CD34, and about 30% of cells were positive for FGF23" rather than "and CD34, and in about 30% were positive of cells for FGF23" as printed. On page 321, line 3 should have read "demonstrated production of FGF23 within tumour cells featuring myofibroblastic or pericytic differentiation." rather than "demonstrated production of FGF23 within tumour cells, thus confirming myofibroblastic or pericytic differentiation." as printed.