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Re-intervention after uterine leiomyoma embolisation is related to incomplete infarction and presence of submucous leiomyomas

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ABSTRACT

Objective: To evaluate outcome of invasive gynecological re-interventions after uterine artery embolisation (UAE) in relation to leiomyoma characteristics.
Design: A cohort of 114 women with symptomatic myomas underwent UAE. Myoma characteristics were determined by contrast-enhanced magnetic resonance imaging (MRI) before and 6 months after treatment. The median follow-up time after UAE was 55.9 months; (range 20–116). Data on gynecological re-interventions were obtained for all patients and were analysed using the Kaplan–Meier method. Data were obtained on frequency of invasive re-interventions: major myoma procedures (hysterectomy, re-embolisation, laparoscopic or abdominal myomectomy) and outpatient hysteroscopic myoma procedures. Myoma characteristics with impact on outcome of re-interventions were determined by statistical analysis.
Results: Total re-intervention rate was 35.1%. Hysterectomy was performed due to myoma related symptoms in 6.1% of patients, but 23.7% of patients underwent additional uterine procedures, mainly outpatient hysteroscopy (15%). Major myoma re-intervention correlated with the extent of the infarct at follow-up MRI ($n = 107$). Patients had undergone major re-intervention (3 years) as follows: infarct group C (<80%, $n = 16$) 44%, infarct group B (80–99%, $n = 16$) 19%, and infarct group A (100%, $n = 75$) 10.1% ($(p < 0.01)$ for both A vs B + C and A + B vs C). Major re-interventions were not associated with the presence of submucous myomas; but the hazard ratio (CI 95%) for undergoing hysteroscopic re-intervention was 8.4 (2–29) ($p = 0.001$) in patients with submucous myomas, but 12.7 (5–35) ($p < 0.0001$) in patients with more than one submucous myomas.
Conclusions: Complete infarction after UAE reduces the need for major re-interventions. Assessment of complete infarction may be considered to improve quality in UAE procedures. Patients with more than one submucous myoma at UAE may often have hysteroscopic removal of residual myomas.

Introduction

Uterine artery embolisation (UAE) has an overall patient satisfaction rate similar to hysterectomy and myomectomy and offers an advantage with regards to a shorter hospital stay, but has an increased likelihood of requiring surgical intervention within two to five years after UAE [1].

The completeness of myoma infarction may be assessed by post-UAE contrast-enhanced magnetic resonance imaging (MRI). The rate of complete infarction has only been related to outcome in three studies with mid- [2] to long-term follow-up [3–5] which used contrast-enhanced MRI two to seven days after UAE [2,3] or after 6 months [5].

Treatment of submucous myomas by UAE is controversial [6]. Presence of a dominant submucous myoma [7–9] has not been related to an untoward clinical outcome, while the effect of the presence of additional smaller or multiple submucous myomas is unclear. Submucous myomas may migrate to an intra-cavitary position after UAE and cause bleeding, pain [10], infectious morbidity [11], persistent discharge, and expulsion [12,13].

Abbreviations: UAE, Uterine artery embolisation; MRI, Magnetic resonance imaging; TVS, Transvaginal ultrasound; SIS, Saline infusion sonography; CRN, Civil registration number; D&C, Dilations and curettages; H, Hysterectomies; C-SE, 500–700-μm-diameter polyvinyl alcohol microspheres (Contour-SE, Boston Scientific, Natick, Mass); BB, 700–900-μm-diameter acrylamido polyvinyl alcohol microspheres (Bead Block, Biocompatibles).

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Symptomatic patients with submucous myomas after UAE may be treated with either outpatient hysteroscopy or a wait-and-see approach, and the latter may lead to hysterectomy [14].

The aim of the present study is to evaluate the myoma related re-interventions after UAE when patients were followed in an endoscopic gynecologic setting and relate the outcome to myoma characteristics at MRI before and after treatment.

Materials and methods

Between May 2003 and March 2011, 117 consecutive women for whom UAE was planned at Aarhus University Hospital, Denmark, were included into a prospective, observational cohort study. The Region Committee on Biomedical Research approved the study as a quality improvement study.

Patients referred with symptomatic uterine myomas demanding surgery (bulk-related symptoms or/and heavy or prolonged uterine bleeding) and a wish to preserve their uterus were offered UAE.

Exclusion criteria: Myomas removable by a single hysteroscopic resection procedure; adenomyosis without concomitant myomas; more than 20% of myomas infarcted at pre-interventional MRI; suspicion of sarcoma; prior pelvic artery surgery. Patients with a pregnancy wish were only offered UAE, when hysterectomy was the alternative. In these patients, UAE was performed in the presence of regrowth of several myomas after prior myomectomy, or in the presence of diffuse leiomyomatosis (multiple myomas in which normal myometrial tissue was difficult to find). Patients with largest myoma diameter > 11 cm or uterus and/or myoma mass over umbilicus were offered surgery [15,16] although the evidence for this approach is controversial [17]. At the start of embolization the criteria's were defined by consensus with referring gynecologists in the region. However, the general preference of patients and physicians in the region was hysterectomy, and only a small numbers of patients were treated according to the protocol.

UAE was performed by two experienced interventional radiologists as described [18]. The vascular supply to the ovaries and the uterus was ascertained by angiography. Selective catheterisation of both uterine arteries was performed by road-map guidance with 4- and 5-F end-hole catheters or a coaxially advanced microcatheter. UAE was achieved by deploying 500–700-μm-diameter polyvinyl alcohol microspheres (Contour-SE; Boston Scientific, Natick, Mass) (C-SE) ($n = 29$) or 700–900-μm-diameter acrylamido polyvinyl alcohol microspheres (Bead Block; Biocompatibles) (BB) ($n = 83$). Two patients had both particle types.

Leiomyoma-related symptoms were recorded at pre-UAE interviews with respect to the following categories (yes, no): abnormal bleeding, bulk related symptoms, dysmenorrhea, and urinary related symptoms. Clinical follow-up with TVS was performed at 3 months, and contrast-enhanced MRI and clinical follow-up (visits) were performed at 6 months at which time patients were asked to compare the severity of their current and pre-UAE symptoms (worsened, unchanged, improved, or resolved). Patients were at least followed until the patient experienced, that sufficient symptom control had been achieved (improved or resolved symptoms in all categories). Interviews before and after UAE were conducted and recorded by two gynecologists (MD, GE).

In the first 6 months after UAE, we followed symptomatic patients with a "wait-and-see" approach. Thereafter, we offered re-interventions to patients with insufficient symptom control. Outpatient hysteroscopy were preferred in patients with submucous myomas. The median time to the last clinical follow-up (visit) was 14 months range (6–77). Myoma-related re-interventions during clinical follow-up at our institution were recorded and registered in a database. All admissions and pathologic reports in Denmark are registered by the patient's civil registration number (CRN). Complete coverage of all readmissions in the whole country was obtained by the use of the patients' CRNs. We checked for admissions to other institutions and with the central pathology database if any other procedures had been performed at other centres after the last clinical follow-up. Four additional procedures were found. To secure complete data coverage on all gynaecological re-interventions and indications, some patients were contacted by phone. The last check-up in the databases was performed in September 2012. After UAE the follow-up time in the database was median 55.9 months; range (20–116).

Myoma number, type, and size were evaluated and recorded at hysteroscopy. Pathologic reports were recorded at all surgical re-interventions. Uterine smooth muscle tumours were categorized in leiomyomas, uterine sarcomas (including leiomyosarcomas) and

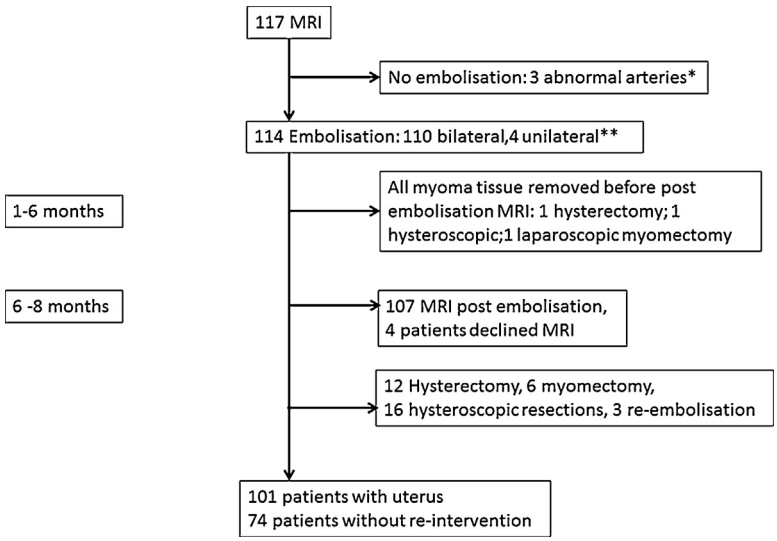

Fig. 1. Flow diagram of 117 patients in the study. UAE was not completed in three patients: in two because the myoma was supplied from an ovarian artery and the patients declined ovarian embolisation; in one patient because the uterus was supplied by abnormal uterine arteries. Unilateral embolisation was performed in four cases: in two due to technical difficulties and arterial spasm. A successful re-embolisation was performed in one of these cases. In the remaining two, a uterine artery could only be identified at one site.

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