Clinical aspects of uterine artery embolization
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Smeets AJ, Nijenhuis RJ, Boekkooi PF, Vervest HA, van Rooij WJ, Lohle PN.
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IS AN INTRA UTERINE DEVICE A CONTRA-INDICATION FOR UTERINE ARTERY EMBOLIZATION? A STUDY OF 20 PATIENTS
Abstract

Purpose
The presence of an intra uterine device (IUD) is considered a risk factor for post procedural infection and physicians may prefer to remove the IUD prior to uterine artery embolization (UAE). We retrospectively evaluated the occurrence of infectious complications in 20 women with symptomatic uterine fibroids and an IUD in situ that were treated with UAE.

Methods
Between September 2003 and November 2008, 20 patients with an IUD had UAE for symptomatic uterine fibroids or adenomyosis. At baseline and 3 months after UAE, MR imaging was performed and the Uterine Fibroids Severity and Quality Of Life questionnaire (UFS-QOL) was filled out. In January 2009 all patients responded to a third UFS-QOL questionnaire and an additional questionnaire with emphasis on adverse events and infectious complications.

Results
Mean follow-up interval after UAE was 20.5 months (median 16, range 3-65 months). One patient had a hysterectomy 6 weeks after UAE because of persistent pain. Pathological examination showed ischemia of the uterine stroma without inflammation. Three patients experienced minor adverse events without the need for medical attention: unspecified pain in 2 patients and spontaneous fibroid expulsion in one patient.
In none of the patients infections developed (0%, 95% CI 0-14%). UFS-QOL scores improved from 39 at baseline to 85 at last follow-up.

Conclusion
In this limited group of 20 women with an IUD in situ treated with UAE, no infectious complications developed during hospital stay and follow-up. The presence of an IUD might not be considered as a contra-indication for UAE.
Introduction

Uterine fibroids (leiomyomas) are common benign tumours in women of child-bearing age that may cause bleeding, pain and bulk-related symptoms (1). Uterine artery embolization (UAE) is considered a valuable alternative for medical or surgical treatment of symptomatic uterine fibroids (1-10). Contra-indications for UAE are pregnancy, gynecological malignancy, pelvic inflammatory disease and the presence of spontaneously infarcted fibroids. Although solid evidence is lacking, the presence of an intra uterine device (IUD) is considered a risk factor for post procedural infection and physicians may prefer to remove the IUD before performing UAE. In this paper, we report our experience in 20 such women.

Materials and methods

Patients

This retrospective study was approved by the Institutional Review Board. The need to obtain informed consent was waived. From our institutional database with prospectively collected data of 712 women treated with UAE for symptomatic fibroids and adenomyosis we identified 20 women with an IUD in situ during UAE between September 2003 and November 2008. All 20 women were premenopausal with a mean age of 42.5 years (median age 43, range 35-49 years). Of the 20 women, 15 presented with bleeding, 14 with pain and 12 with bulk-related symptoms. Eighteen women were treated for fibroids and 2 for pure adenomyosis. Before UAE, all patients had a gynecological consultation to confirm that presenting symptoms were caused by uterine fibroids or adenomyosis and not by infection or malignancy.

Imaging

All patients underwent native and contrast enhanced magnetic resonance (MR) imaging before UAE and 3 months thereafter. Volumes of the dominant fibroid and uterus were calculated from MR images by using the formula of a prolate ellipse (length x depth x width x 0.5233). The location of the dominant fibroid was recorded. Fibroid infarction rate and overall uterine infarction rate were assessed by two observers (AJS, PNML) independently by visual estimation of a decrease in enhancement on MR
images obtained at 3 months follow-up as compared to baseline MR images. Fibroid infarction rates were subsequently classified as 100%, 90-99%, 80-90% and less than 80% (10).

**Embolization procedure**

Bilateral UAE was performed with an unilateral femoral approach. The angiographic endpoint of embolization was a complete occlusion of branches to the perifibroid plexus, leaving the main uterine artery, cervicovaginal branches, and utero-ovarian anastomoses patent (9). During the study period, various brands of microspheres were used with sizes varying of 500-900 µm: Beadblock (Biocompatibles, Farnham, UK), Embospheres (BioSphere Medical, Rockland MA, US) and Embozene (CeloNova BioSciences Newnan, GA, USA). All 712 patients treated with UAE in our hospital received 2 grams of cefazoline intravenously prior to embolization as a general infection prevention. At discharge, patients were advised not to use tampons and to refrain from swimming, taking a bath and sexual intercourse for 6 weeks.

<table>
<thead>
<tr>
<th></th>
<th>baseline n=20</th>
<th>3 months after UAE n=19*</th>
<th>after mean 20.5 months n=19*</th>
</tr>
</thead>
<tbody>
<tr>
<td>symptom severity</td>
<td>56</td>
<td>23</td>
<td>12</td>
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<tr>
<td>concern</td>
<td>49</td>
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<td>control</td>
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<tr>
<td>sexual activity</td>
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<tr>
<td>self-conscious</td>
<td>63</td>
<td>85</td>
<td>93</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>39</strong></td>
<td><strong>71</strong></td>
<td><strong>85</strong></td>
</tr>
</tbody>
</table>

**Table.** UFS-QOL score of 20 women.

* one woman underwent hysterectomy 6 weeks after UAE
**UFS-QOL questionnaire**

Patients were requested to fill out the Uterine Fibroid Symptom and Quality of Life questionnaire (UFS-QOL questionnaire) (11) at baseline and 3 months after embolization. In addition, in January 2009 all 20 women filled out a third UFS-QOL questionnaire and a questionnaire with emphasis on complications of the embolization according to the classification by Goodwin et al. (12).

**Data analysis**

Complications were calculated as a percentage with 95% confidence interval (CI) with statistical software (MedCalc statistical software, Mariakerke, Belgium). Mean volume reduction as a percentage of initial volume of the dominant fibroid and uterus was assessed.

**Results**

**Fibroid and uterus volume reduction and infarction rate**

In the 18 patients treated for fibroids the dominant fibroid was located intramural in 17 and submucosal in one. The volume before UAE was 185 cm$^3$ (median 125, range 8-587 cm$^3$) and at 3 months this was 129 cm$^3$ (median 74, range 3-309 cm$^3$). Mean volume reduction of the dominant fibroid thus was 56 cm$^3$ or 30% of the initial mean fibroid volume.

Mean uterus volume before UAE was 386 cm$^3$ (median 343, range 72-902 cm$^3$) and at 3 months this was 289 cm$^3$ (median 188, range 55-858 cm$^3$). Mean volume reduction of the uterus was 97 cm$^3$ or 25% of the initial mean volume.

Mean infarction rate for the dominant fibroid was 97% (median 100, range 90-100%) and mean overall uterine infarction rate was 98% (median 100, range 90-100%).

**UFS-QOLs and additional questionnaire**

The third UFS-QOL and the additional questionnaire about adverse events were returned at a mean follow-up interval of 20.5 months (median 16, range 3-65 months) after UAE. The results of the UFS-QOL’s at 3 points in time are displayed in the Table. Improvement occurred in all subscales.
No adverse reactions occurred during hospital stay and none of the 20 patients treated with UAE developed an infectious complication during the 20.5 months follow-up period (0%, 95% confidence interval 0-14%).

One patient underwent a hysterectomy 6 weeks after UAE because of persistent pain without clinical signs of infection. MR imaging showed extensive ischemia of the uterine stroma. Pathological examination confirmed the uterine ischemia without inflammation. Three patients experienced minor adverse events without the need for medical attention: unspecified intermittent pain was reported by 2 patients and the one patient with the submucosal fibroid (diameter 3.7 cm before UAE) had a spontaneous fibroid expulsion without complications.

**Discussion**

An IUD is the world's most widely used method of reversible birth control, estimated to be used by 160 million women. In large follow-up studies of women with an IUD inserted, the risk of pelvic inflammatory disease attributable to the IUD is very low (less than 1 in 1,300), even in populations with a high prevalence of sexually transmitted infections (13-15). In women with uterine fibroids that become infarcted after UAE, the combination with the presence of a foreign body in the uterine cavity might predispose to infection. This general fear for the combined risks of fibroid infarction and the presence of an IUD is reason for many physicians to remove the IUD before UAE. Conversely, the risk of pelvic inflammatory disease after UAE in the presence of an IUD has never been evaluated; other major studies did not address this topic specifically. Removal of the IUD before UAE has several drawbacks: the timing for replacement of the IUD is not clear and in the meantime other contraceptives have to be used.

In some women with menstrual bleeding disorders (such as from uterine fibroids) a progestagen-releasing IUD is inserted not only for contraception, but also to diminish menstrual bleeding (16). In these cases the removal of the IUD may aggravate menstrual bleeding. In light of these drawbacks of IUD removal and the unknown risks of pelvic inflammatory disease in our practice we have not routinely removed an IUD before UAE and have performed UAE in 20 women with an IUD in situ. In these 20
women, UAE was clinically effective and no IUD related infectious complications occurred at a mean follow-up of over 20 months. It is of note that the protocol of UAE in all women in our series (with or without an IUD in situ) included single dose antibiotics before UAE in combination with life-style guidelines at discharge to prevent infectious complications. The clinical results of UAE in the 20 patients with an IUD in situ in this study are comparable to long-term results of UAE in patients without an IUD in situ treated in our institution (17).

The confidence interval is wide in our limited patient group. Therefore, no definite conclusions can be drawn. However, the results indicate that the risk of pelvic inflammatory disease as a consequence of the IUD in such patients might be limited and might outweigh the disadvantages of removal of the IUD prior to UAE. More studies are needed to confirm these preliminary findings. With more reported cases, clustering the results in a meta-analysis will more precisely indicate the risk with a narrower confidence interval.

In summary, in this limited group of women with symptomatic fibroids treated with UAE and an IUD in situ, no infectious complications occurred. The risk of adverse events related to the removal of an IUD prior to UAE (i.e. pregnancy or aggravation of menstrual bleeding) should be balanced against the probably small risk of pelvic inflammatory disease associated with the presence of an IUD.
References


