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BRIEF COMMUNICATION

Reproductive and gynecologic health after uterine artery embolization for postabortion hemorrhage

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Severe hemorrhage after abortion has been reported to occur in up to 2% of cases, with the risk increasing based on the gestational duration [1]. Conservative measures are first-line therapies but when these measures fail, more invasive procedures may be attempted, including hysterectomy. Uterine artery embolization (UAE) is an important uterine-sparing treatment in the setting of intractable postabortion hemorrhage [2,3].

The present study addresses the gap in knowledge about fertility and obstetric and gynecologic effects of UAE in the setting of postabortion hemorrhage. The data will provide guidance to clinicians when counseling and offering this important intervention to patients with acute postabortion hemorrhage.

The study was a retrospective, cross-sectional study measuring the reproductive outcomes of women who underwent UAE as treatment for postabortion hemorrhage at San Francisco General Hospital (SFGH) between October, 2001, and December, 2012. Using the database of patients seen at SFGH Women's Options Center (WOC), women who had undergone UAE were identified. This list was cross-matched with a separate log kept by the Interventional Radiology service to ensure all women who underwent postabortion UAE were identified. Women were excluded if they underwent a hysterectomy after UAE.

Patients provided consent to participate in the study either by phone or return of written consent. Surveys were conducted either over the phone or on paper and then mailed in. The survey contained questions about menstrual history, fertility desires, contraceptive practices, pregnancies, and personal well-being since UAE. After the interview, women were provided compensation in the form of gift cards. Descriptive statistics and unpaired *t* tests were used to analyze the results using Stata 12 (StatCorp College Station, TX, USA). Significance was set at $P < 0.05$. Approval for the study was granted by the University of California, San Francisco's Committee for Human Research.

Seventy-four women underwent UAE between October 2001 and December 2012. A total of 17 (23.0%) women could be contacted, two of whom did not want to participate. Of the remaining 15 women, two did not complete the survey, and one was excluded because she had had a hysterectomy following UAE for intractable hemorrhage, leaving 12 (16.2%) completed surveys. The demographic data of eligible women and study participants showed no differences in terms of age, gravidity, parity, prior abortion, gestational age, or days spent in the hospital. The demographic characteristics of the study participants are shown in Table 1. For the 12 participants, the average age at time of UAE was 26 years (range, 20–46 years). Mean gestational age was 21 weeks plus 5 days (range, 18 weeks plus 3 days to 24 weeks).

None of the women contacted reported seeking fertility after the UAE procedure. Fig. 1 shows contraceptive use by respondents after UAE. Two patients had unintended pregnancies. One reported an unintended pregnancy seven months after UAE; that pregnancy ended in an early induced abortion. Another 21-year-old woman reported an unintended pregnancy three months after UAE. The woman was seven months pregnant at the time of the survey and had no pregnancy complications per her report.

In terms of gynecologic health since UAE, most women reported no significant change to their overall health (Fig. 2). Two of the 12 participants reported abnormal menstrual bleeding patterns, including increased flow, unpredictability, duration, or frequency of menstrual flow. The woman who reported unpredictable menses was using the levonorgestrel intrauterine device (IUD) and the participant who reported heavier flow was using a copper IUD. Two women (17%) reported post-UAE symptoms of leg and groin numbness and/or pelvic pain. When asked about menopausal symptoms, one woman aged 46 years old at the time of her procedure went through menopause two years later.

Two women reported vulvar varices after UAE. There were no other specific health complaints noted by the women at open-ended

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Table 1
Participant demographics (n = 12).

Participant	Age, y	Gravidity	Parity	Abortion prior to UAE		Gestational age, w/d	Year of UAE
				Therapeutic	Spontaneous		
1	23	5	4	0	1	22w 2d	2006
2	32	1	0	0	1	21w 5d	2007
3	20	3	2	0	1	23w 0d	2010
4	20	4	2	0	2	22w 6d	2002
5	26	4	2	0	2	19w 0d	2007
6	46	4	1	1	2	18w 3d	2008
7	29	6	4	0	2	21w 1d	2012
8	31	3	1	0	2	23w 4d	2012
9	20	1	0	0	1	24w 0d	2012
10	20	2	0	0	1	21w 1d	2012
11	24	2	0	0	2	24w 0d	2012
12	25	4	2	1	1	19w 6d	2006

Abbreviation: UAE, uterine artery embolization.

questioning. All of the women surveyed reported being satisfied with their treatment and the procedure.

UAE provides a safe and minimally invasive way to treat a variety of gynecologic and obstetric outcomes. A key concern for any provider counseling a woman about UAE is whether the procedure may have any long-term reproductive health consequences. Abortion providers currently rely on data about UAE for postpartum hemorrhage to counsel women undergoing postabortion UAE. While postpartum UAE may be analogous to postabortion UAE, the settings and outcomes may be quite different. The differences in postabortion and postpartum hemorrhage clinical scenarios underscore the reasons to study reproductive health outcomes following postabortion hemorrhage when seeking to understand the effects of treatment in this particular population.

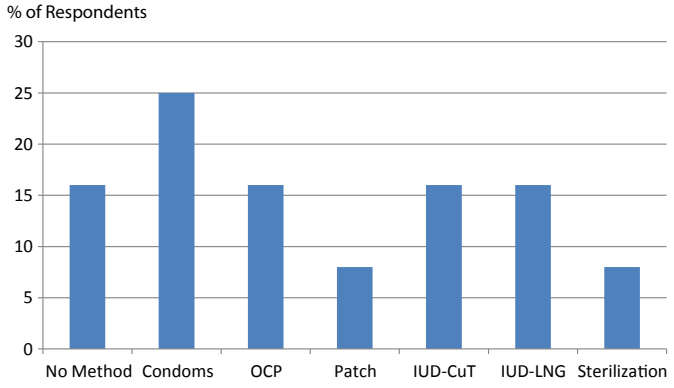

Fig. 1. Contraception reported after uterine artery embolization. Abbreviations: OCP, oral contraceptive pill; IUD-CuT, copper-T intrauterine device; IUD-LNG, levonorgestrel-releasing intrauterine device.

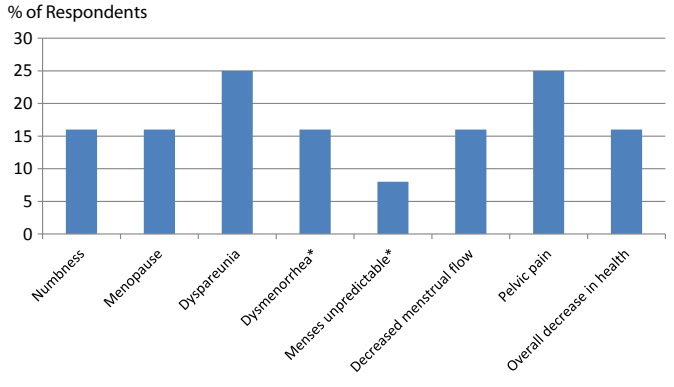

Fig. 2. Gynecologic outcomes. For the asterisked categories, one patient was menopausal.

The most comprehensive review of postpartum UAE found that the majority of studies reported over 90% normal return to menses and high fertility rates for those women attempting pregnancy [4]. Although none of the participants in the present study desired pregnancy, two of 12 (17%) reported unintended pregnancies within a year of their UAE. This suggests that women undergoing postabortion UAE are able to conceive and may do so shortly after their procedures.

Overall, women reported a rapid return to menses, reinforcing the short-term action of the embolization material. Only one of the participants not using an IUD reported changes in menstrual flow and/or increased dysmenorrhea, and one 51-year-old woman reported menopausal symptoms. It cannot be concluded from this study whether UAE was directly or indirectly associated with these symptoms. However, it is reassuring that no consistent change reported in menses and hormonal symptoms was found that appears directly related to postabortion UAE.

One complaint that was reported by two women included vulvar varices following UAE. A literature review did not find any association between UAE and this outcome, nor is there a clear anatomic explanation for their occurrence. However, it could be postulated that temporarily increased blood flow to pelvic structures could lead to varices. Further study would need to be conducted to address this question.

The present study addresses an important research question. The greatest limitation is the small sample size, which highlights the challenges inherent in studying this population.

UAE following postabortion hemorrhage is a safe way to avoid hysterectomy. The data suggest that there are minimal long-term reproductive health consequences to UAE in the postabortion setting. More research would help confirm these promising results, documenting obstetrical outcomes as well as identifying other potential long-term gynecologic adverse effects from postabortion UAE.

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Conflict of interest

The authors have no conflicts of interest.

References

[1] Bartlett LA, Berg CJ, Shulman HB, Zane SB, Green CA, Whitehead S, et al. Risk factors for legal induced abortion-related mortality in the United States. Obstet Gynecol 2004;103(4):729–37.
[2] Steinauer JE, Diedrich JT, Wilson MW, Darney PD, Vargas JE, Drey EA. Uterine artery embolization in postabortion hemorrhage. Obstet Gynecol 2008;111(4):881–9.
[3] Haddad L, Delli-Bovi L. Uterine artery embolization to treat hemorrhage following second-trimester abortion by dilatation and surgical evacuation. Contraception 2009;79(6):452–5.
[4] Berkane N, Moutafoff-Borie C. Impact of previous uterine artery embolization on fertility. Curr Opin Obstet Gynecol 2010;22(3):242–7.

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