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Case Report

Successful pregnancy outcome following uterine artery embolization for cornual ectopic pregnancy: a case report

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ABSTRACT

Cornual ectopic pregnancy is a rare but potentially life-threatening condition that often requires prompt intervention. Uterine artery embolization (UAE) has emerged as a valuable treatment modality for controlling haemorrhage and preserving the uterus. However, UAE can compromise endometrial and ovarian function, potentially leading to infertility. While extensive literature exists on the use of UAE for fibroid management and its impact on pregnancy outcomes, data on successful conception following UAE for cornual ectopic pregnancy remain limited. We present a unique case of a 35-year-old woman who conceived and delivered at term following UAE for the management of a ruptured cornual ectopic pregnancy. Despite concerns regarding compromised uterine perfusion and endometrial receptivity post-UAE, the patient achieved a successful pregnancy with the assistance of assisted reproductive techniques. This case underscores the challenges associated with post-UAE fertility and highlights the role of judicious and timely assisted reproductive interventions in achieving favourable reproductive outcomes. This report adds to the limited evidence supporting successful pregnancy following UAE for cornual ectopic pregnancy. It emphasizes the need for individualized fertility counseling and management strategies for women desiring conception after UAE.

Keywords: Cornual ectopic pregnancy, Uterine artery embolization, Assisted reproductive techniques

INTRODUCTION

Uterine artery embolization (UAE) is a minimally invasive procedure primarily utilized for the management of fibroids, but it also finds application in treating conditions such as postpartum hemorrhage and ectopic pregnancies, particularly those located in challenging anatomical sites like the cornual region of the uterus.[1] Cornual ectopic pregnancies are associated with a high risk of rupture, necessitating prompt intervention to prevent life-threatening hemorrhage. UAE involves the selective occlusion of uterine arteries, leading to reduced blood flow to targeted areas, thereby facilitating the resolution of ectopic pregnancies or the reduction in fibroid size. While numerous reports attest to successful pregnancies following UAE used for myoma management, concerns regarding its impact on ovarian reserve and endometrial function have been raised.[2] But when UAE is used for cornual ectopic pregnancy and further fertility challenges are still a gray area.

CASE REPORT

A 35-year-old woman, married for ten years, presented with a history of secondary infertility (P1L0A1) for five years, despite having regular menstrual cycles and normal ovarian reserve. She had a prior diagnosis of polycystic ovary syndrome (PCOS) and irregular cycles, for which she conceived through ovulation induction after four years of marriage. However, at 14 weeks of gestation, she was diagnosed with a left cornual ectopic pregnancy via magnetic resonance imaging (MRI). Initial medical management with methotrexate failed due to persistently rising beta-hCG levels, necessitating UAE.

As part of her secondary infertility evaluation, she underwent laparoscopic hysteroscopy, which revealed a normal uterine cavity with patent fallopian tubes. Despite these findings and a normal semen analysis in her partner, she experienced unexplained infertility for five years. Given the history of UAE and concerns regarding its potential negative impact on fertility, the couple was anxious and opted for assisted reproductive technology (ART).

She underwent ovarian stimulation using the antagonist protocol with recombinant FSH (225 IU) for 10 days and GnRH antagonist (0.25 mg) initiated when the dominant follicle reached 14 mm. Final oocyte maturation was triggered with a GnRH agonist (0.2 mg SC) when three leading follicle measured 17 mm. Ultrasound-guided oocyte retrieval yielded 16 oocytes, of which 12 fertilized, resulting in 10 embryos on day 2. The embryos were cultured to the blastocyst stage, and six high-quality day-5 embryos (graded 4AA and 5AA) were obtained. Following protocol for antagonist cycles with agonist trigger, a fresh transfer was deferred. A frozen embryo transfer (FET) of two day-5 embryos was scheduled in the subsequent cycle after endometrial preparation with estradiol valerate (6 mg) and vaginal progesterone gel. The transfer was successful, with a beta-hCG level of 2400 IU at 14-days post-transfer. A follow-up scan at six weeks confirmed a twin gestation. The pregnancy progressed uneventfully, and she underwent an elective caesarean section at 38 weeks, delivering two healthy female babies.

This case highlights the potential challenges of spontaneous conception following uterine artery embolization for cornual ectopic pregnancy and underscores the role of assisted reproductive techniques in achieving successful pregnancy outcomes.

DISCUSSION

The impact of UAE on fertility and subsequent pregnancy outcomes is complex, particularly in the management of cornual ectopic pregnancies. UAE is an effective intervention for controlling hemorrhage and preserving the uterus, but its implications for future reproductive potential require careful evaluation.[1] Cornual pregnancies pose significant challenges due to their deep myometrial invasion and high rupture risk. UAE selectively occludes the uterine arteries, reducing blood supply to the ectopic pregnancy and facilitating its resolution. However, this ischemic effect may extend beyond the targeted area, potentially affecting the surrounding myometrium and endometrium.[2] The formation of fibrotic tissue or scarring in this region may interfere with embryo implantation and increase the likelihood of miscarriage, abnormal placentation, or uterine rupture in future pregnancies.

Effects on ovarian function

A major concern associated with UAE is its potential impact on ovarian reserve. The uterine and ovarian arteries share an anastomotic blood supply, meaning that unintended embolization of ovarian branches can reduce ovarian perfusion, leading to diminished ovarian reserve.[3] This effect is particularly concerning for women over 35, where the natural decline in ovarian reserve compounds the risk of premature ovarian insufficiency. Studies have reported a decline in anti-Müllerian hormone (AMH) levels post-UAE, indicating possible ovarian dysfunction[4]. While some women maintain normal ovarian function after UAE, outcomes are highly variable, underscoring the need for individualized fertility counseling before the procedure.

Effects on endometrial and uterine integrity

Beyond ovarian effects, UAE can impact the endometrium and myometrium, leading to concerns about implantation failure, intrauterine adhesions, and abnormal placentation. The ischemic injury caused by arterial occlusion may weaken the myometrium and predispose the uterus to rupture, particularly in cases of advanced pregnancy or labor.[5] The extent of these effects can vary based on factors such as the type of embolic material used and the technique employed during embolization. Scar formation in the cornual region may also affect future pregnancies, necessitating close obstetric surveillance.[6]

Successful pregnancy outcomes post-UAE

Despite these concerns, successful pregnancies following UAE have been reported, including cases where the procedure was used for cornual ectopic pregnancies. But these reports are very sparse in the medical literature.[7] ART, particularly *in vitro* fertilization (IVF), may help overcome implantation barriers by allowing controlled embryo transfer into a less affected uterine region. Studies have documented live births following UAE, though miscarriage and preterm birth rates may be higher than in the general population.[8] A personalized approach, including close monitoring of subsequent pregnancies and considering caesarean delivery to mitigate uterine rupture risks, is recommended.

The use of UAE in women desiring future fertility remains controversial. The American College of Obstetricians and Gynecologists (ACOG) advises caution due to the limited data on its long-term reproductive outcomes.[9] UAE is typically recommended in reproductive-age women only when alternative treatments are not viable.

Recent meta-analyses provide further insight into pregnancy outcomes post-UAE, particularly when performed for fibroid uterus. One study found that while approximately 40% of women achieved pregnancy following UAE, miscarriage rates were significantly higher compared to other minimally invasive treatments.[10] Another systematic review reported that UAE is associated with reduced postoperative pregnancy rates compared to controls, reinforcing concerns about its impact on fertility.[11] However, live birth rates among those who

successfully conceived were comparable to those seen in the general population, suggesting that while UAE poses challenges to fertility, it does not entirely preclude future pregnancies.[12]

CONCLUSION

The current body of evidence highlights the need for high-quality studies to understand the impact of UAE on fertility, particularly in specific conditions like cornual ectopic pregnancy. However, due to the rarity and complexity of this condition, large-scale studies remain a challenge. In this context, case reports and smaller studies play a crucial role in shedding light on the reproductive outcomes and management strategies following UAE. Documenting such cases contributes to clinical decision-making in women desiring future pregnancies.

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