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## CASE REPORT

# Intramyometrial ectopic pregnancy in an ICSI patient following uterine artery embolization


M Leyder \*, M De Vos, B Popovic-Todorovic, M Dujardin, P Devroey, HM Fatemi

Centre for Reproductive Medicine, UZ Brussel, Laarbeeklaan 101, B-1090 Brussels, Belgium

\* Corresponding author. E-mail address: [MLeyder@uzbrussel.be](mailto:MLeyder@uzbrussel.be) (M Leyder).



Mina Leyder obtained her medical degree at the Free University Brussels in 2004, with first class honours, and completed her specialist training in obstetrics and gynaecology in 2009. She is currently working in the Obstetrics Department at the University Hospital, Free University Brussels. Her current research interests are in prenatal ultrasound and prenatal follow-up of high risk pregnancies.

**Abstract** Myometrial pregnancy represents a rare subtype of ectopic pregnancy. A history of uterine artery embolization (UAE) because of symptomatic uterine fibroids, and assisted reproductive treatment may predispose to this unusual implantation site. A 40-year-old woman with a history of uterine fibroids underwent a transfer of two embryos after intracytoplasmic sperm injection treatment. The combined findings on transvaginal ultrasound scan, pelvic magnetic resonance imaging scan, suction curettage, diagnostic hysteroscopy and laparoscopy were compatible with a diagnosis of ectopic pregnancy within the myometrium, at the site of a necrotized intramyometrial fibroid following UAE. Treatment with systemic methotrexate resulted in successful resolution of this ectopic pregnancy. In conclusion, this study reports a pregnancy within a previously necrotized fibroid. Findings suggest that in patients with a history of UAE for the treatment of uterine fibroids and who subsequently undergo assisted reproductive treatment, the risk of an ectopic pregnancy within the myometrium has to be considered. 

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**KEYWORDS:** assisted reproductive treatment, ectopic pregnancy, intramyometrial fibroid, methotrexate, uterine artery embolization

## Introduction

Ectopic pregnancy has been estimated to complicate approximately 2% of pregnancies that occur after assisted reproduction treatment (Dubuisson et al., 1991; Verhulst et al., 1993). Its higher incidence in the setting of assisted reproduction treatment can be accounted for by predisposing factors such as tubal disease, a history of genital infections, smoking and maternal age (Fernandez and Gervaise, 2004; Lippman

et al., 2003). In analogy with those ectopic pregnancies occurring after spontaneous conception, ectopic implantation after assisted reproduction treatment is not confined to the Fallopian tubes, but can also be located in the cornual and cervical part of the uterus. Rarer subsets of ectopic pregnancy are interstitial and heterotopic pregnancy. Reports of ectopic pregnancy within the myometrium are rare. In one publication, the occurrence of a pregnancy in a subserosal myomectomy scar has been described (Won I Park et al.,

2006). The authors suggested that implantation at this unusual location could have been facilitated by a small sinus tract that had been created during previous uterine surgery.

Uterine fibroids are the most common benign tumours of the female reproductive tract (Worthington-Kirsch et al., 2004). Although the majority of these fibroids remain asymptomatic, some of them cause symptoms of pelvic pain or pressure on surrounding tissues, prolonged periods or failed pregnancy, depending on their size and location. One of the treatment modalities of symptomatic uterine fibroids is uterine artery embolization (UAE), which has been reported to be less invasive than myomectomy, but equally efficient and safe (Mara et al., 2008). The procedure encompasses the reduction of myometrial arterial blood flow, which results in ischaemic necrosis as well as in hyaline and calcifying degeneration of fibroids, while normal myometrium is spared. Fibroid related pain or pressure symptoms and menstrual disturbances are significantly reduced after UAE (Siskin et al., 1999; Worthington-Kirsch et al., 2004). Several randomized controlled studies (EMMY and REST trial) have documented the safety and efficacy of UAE with reduced rates of major complications as compared with myomectomy (Edwards et al., 2007; Hehenkamp et al., 2005). Since the influence of UAE on pregnancy and on fertility has not been fully elucidated (Usadi and Marshburn, 2007), there are conflicting opinions among interventional radiologists with respect to UAE in women who consider a future pregnancy (Parker, 2007).

Several case series of pregnancies following UAE have been reported, some with adverse outcomes, such as miscarriage, preterm delivery, placental abnormalities and malpresentation (Carpenter and Walker, 2005; Goldberg et al., 2004; Pron et al., 2005; Walker and McDowell, 2006; Zdenek et al., 2008). It has been suggested that advanced maternal age and infertility treatment may contribute to some of the complications of UAE (Parker, 2007; Walker and Bratby, 2007). It still remains unclear if these complications are less frequent and less severe than those associated with myomectomy. Although further comparative studies are needed there is some evidence showing a reduction of pregnancy and live delivery rates after UAE (Zdenek et al., 2008). In the absence of a wish to preserve fertility, myomectomy can be offered to women with symptomatic fibroids. However, myomectomy is associated with longer operating and hospitalization times as compared with UAE, larger estimated blood loss, risk of bowel and bladder injury, and uterine scarring.

As far as is known, this is the first case of an ectopic pregnancy following assisted reproduction treatment in a necrotized fibroid, 8 months after uterine artery embolization.

## Case presentation

A 40-year-old gravid-2 para-0 A1 (miscarriage) woman visited the out-patient clinic of reproductive medicine because of male-factor infertility. She complained of heavy periods but was otherwise asymptomatic. A pelvic ultrasound scan revealed the presence of two fibroids; one smaller fibroid was localized within the myometrium and measured 15 mm, and the second one was a subserosal fibroid, located in the posterior uterine wall and measuring 40 × 50 mm. Subsequent

magnetic resonance imaging (MRI) scans were consistent with the ultrasound findings. The patient agreed to undergo a percutaneous transcatheter embolization procedure of the left uterine artery with microsphere particles of 700 µm (Contour PVA embolization particles; Boston Scientific, USA). Embolization was restricted to the left uterine artery since this artery was found to be the dominant supplying artery (Bratby et al., 2008). The procedure was uneventful.

Because of the advanced maternal age, fertility treatment was commenced after 3 months. The patient underwent three consecutive cycles of intrauterine insemination with her partner's spermatozoa, without achieving a pregnancy. A hysterosalpingogram showed irregularities within the uterine cavity, with delayed passage of the contrast liquid through the Fallopian tubes on both sides. To rule out the possibility of a structural abnormality within the uterine cavity, a diagnostic hysteroscopy and an endometrial biopsy were carried out, which gave normal results. This suggests that the abnormal findings on hysterosalpingogram most likely represented an artefact. The pelvic ultrasound findings at that time showed a significant size reduction of the uterine fibroids, to approximately 50% of their initial size prior UAE.

The patient underwent an ICSI treatment cycle 2 months later. Ovarian stimulation was achieved with 200 IU recombinant follicle-stimulating hormone (rFSH; Puregon, Organon, USA) starting on day 2 of the menstrual cycle and 0.25 mg of gonadotrophin-releasing hormone antagonist (Ganirelix, Organon) starting from day 6 of stimulation. Final oocyte maturation was achieved with 10,000 IU of human chorionic gonadotrophin (HCG) (Pregnyl, Schering Plough, USA). Six oocytes were retrieved. On day 3 after ICSI, two embryos were transferred using a Cook embryo replacement catheter (K-SOFT 5000, Cook, Queensland, Australia). The embryo transfer procedure was uneventful. Ultrasound scan guidance was not applied during this procedure. Luteal-phase support was provided with vaginal micronized progesterone (Utrogestan, Besins Healthcare, Belgium) (200 mg three times daily). A pregnancy was achieved. Luteal-phase support was discontinued at detection of serum HCG (Fatemi et al., 2007).

An ultrasound scan was performed at 6 weeks and 6 days of gestation and revealed a hypoechogenic structure in the uterine cavity, resembling a gestational sac. However, a double decidual ring was not noticed, nor was there a fetal pole or a yolk sac. The ultrasound image of the adnexes was normal and there was no free fluid in the Douglas space. At that moment, the serum HCG concentration was 35,741 IU/l. Furthermore, an irregular, partially hypoechogenic and partially hyperechogenic mass was visualized in the left cornual part of the uterine wall, within one of the previously necrotized fibroids. Clinical symptoms were absent.

Due to the intrauterine presence of a pseudo-gestational sac, a diagnostic suction curettage of the uterus was performed. Histopathological examination showed a decidualized endometrium without the presence of trophoblast tissue. It was therefore decided to perform a diagnostic laparoscopy and hysteroscopy. On the day of operation, the serum HCG concentration was at 44,395 IU/l and the progesterone concentration at 4.5 µg/ml. On laparoscopy, the volume of the uterus appeared enlarged, both adnexes were of normal size and there was no ascites. Hysteroscopy showed

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