Conservative multidisciplinary management of placenta percreta following in vitro fertilization

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Placenta percreta is an extremely rare and the most severe form of placental invasion, that is associated with severe maternal morbidity and mortality. We report a case of nulliparous woman who underwent 10 cycles of in vitro fertilization (IVF) without any known risk factors. We conserved her uterus by spontaneous vaginal delivery, leaving the placenta in situ, pelvic arterial embolization, and primary resection of the remaining placental tissues. This case demonstrates that repetitive IVF is a possible risk factor for placental invasion, and that conservation of the uterus can be achieved in such cases using a multidisciplinary approach.

Keywords: Assisted reproductive technics; Magnetic resonance imaging; Placenta percreta; Uterine artery embolization; Uterine rupture

Introduction

Complete invasion of the placenta through the myometrium and the uterine serosa is termed placenta percreta. This is the rarest and most severe form of placental invasion, and accounts for 5% to 7% of all placenta accreta cases [1]. Research suggests that the pathophysiology of placenta percreta involves a deficiency of the decidua [2]. Abnormal placentation, including placenta percreta, usually occurs in the lower uterine segment due to a deficiency of decidua at the level of a Cesarean section scar [3]. Other reported risk factors for placenta percreta include placenta previa, maternal age >40 years, multiparity, repetitive abortions, and uterine malformations [4]. Clinically, placenta percreta is associated with a risk of massive postpartum hemorrhage, Cesarean hysterectomy, and severe maternal morbidity and mortality.

Prenatal diagnosis of placenta percreta is therefore necessary and may be life-saving.

The present report describes a case of placenta percreta, which was diagnosed prenatally by magnetic resonance imaging (MRI), in a patient who had undergone in vitro fertilization (IVF). Conservation of the uterus was achieved using a multidisciplinary approach.
Sonographic examination showed a vertex presentation, fetal biometry compatible with 24 weeks’ gestation, an estimated fetal weight of 603 g, and location of the placenta in the right fundus with thinning of the myometrium. MRI of the pelvis was performed to confirm placental invasion. Axial and coronal T2-weighted MRI showed that placental tissue occupied the superolateral aspect of the fundus, and that the full thickness of both the myometrium and the uterine serosa was involved. There were no signs of placental invasion of adjacent organs (Fig. 1).

On admission, tocolytics were commenced to suppress the regular uterine contractions. Betamethasone was also administered to facilitate fetal pulmonary maturation. Despite these measures, the uterine contractions intensified and progressive changes in the uterine cervix were observed; thus, tocolytic therapy was discontinued 6 hours post-admission. The parents were fully informed of the potential complications associated with preterm birth and placenta percreta, and they decided that vaginal delivery should be attempted. Intrapartum fetal heart rate monitoring showed a reassuring pattern. A female newborn weighing 669 g was delivered 30 minutes after stopping tocolytics by spontaneous vaginal delivery, with Apgar scores of 2 and 4 at 1 and 5 minutes, respectively. The newborn was transferred immediately to the neonatal intensive care unit.

Spontaneous delivery of placental tissue did not occur, and
a decision was made to leave the placenta in situ. No significant hemorrhage occurred in the 1 hour period post-delivery. Pelvic arterial embolization was performed at the 1 hour post-delivery to prevent hemorrhage at the time of placental separation. Under fluoroscopic guidance, the bilateral uterine arteries were selectively catheterized and embolized with absorbable gelatin sponge pledges.

Six hours after delivery, maternal tachycardia and vaginal bleeding occurred, and placental detachment or uterine rupture was suspected. Therefore, a decision was made to remove the placenta in the operating room under general anesthesia. Most of the intrauterine placenta was removed vaginally using placental forceps under transabdominal sonography guidance. Emergency laparoscopy was performed, which revealed a ruptured placenta percreta with hemoperitoneum. Exploratory laparotomy was done immediately and primary resection of the remaining placental tissues and closure of the uterine wall was then performed (Fig. 2). The postoperative course was uneventful and the woman was discharged home 5 days postoperatively.

Discussion

The first-line imaging modalities for a diagnosis of placenta accreta are gray-scale ultrasound and color Doppler imaging [5]. MRI is used as an adjunct tool when sonography is inconclusive or the placenta cannot be visualized adequately, as in cases of posterior placenta. Recently, Derman et al. [3] identified sensitive MRI criteria for the diagnosis of placenta accrete. The authors recommended that MRI should not be used in isolation, and that careful correlation with placental sonography and clinical history must be performed in each case.

Hysterectomy is the traditional treatment for placenta percreta, since previous reports suggest that it is associated with a lower rate of mortality than conservative management [6,7]. For two main reasons, many obstetricians tend to perform a Cesarean section in cases of placenta percreta. Firstly, these cases are considered to be at increased risk of hysterectomy. Secondly, the most common clinical scenario in placenta percreta cases is placenta previa after previous Cesarean delivery. In the present case, vaginal delivery was possible as the placenta was located in the uterine fundus, and the maternal vital signs and fetal heart rate were normal. Several reports indicate that uterus-conserving treatment may be used successfully in the management of invasive placentaion [8,9]. The findings of a recent systemic review suggest that various uterus-preserving treatment modalities may be effective in such cases [10]. However, no conclusions about the comparative advantage between any modalities can be generalized.

In most cases, the etiology of placenta percreta is multifactorial, and few cases can be attributed to a single risk factor [1]. In the present case, placenta percreta developed in the absence of any of the above-mentioned risk factors or any previous history of gestational abnormalities. However, the woman had undergone repetitive IVF cycles, which may have changed the risk of placenta percreta. A recent retrospective study identified a significant 13-fold increase in the risk of placenta accreta in IVF pregnancies compared with spontaneous pregnancies [2]. We suggest two possible mechanisms for placental invasion following IVF. Firstly, IVF stimulation protocols may induce morphological and structural changes, and disturb the expression of relevant genes in the endometrium; changes which could contribute to abnormal implantation [11]. Secondly, repetitive entering of the endometrial cavity through the cervix by mechanical means during embryo transfer may damage the endometrium.

The main lessons to be learned from the present case are that repetitive IVF is a possible risk factor for placental invasion, and that conservation of the uterus can be achieved in such cases using a multidisciplinary approach.

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