Case of a Cesarean Scar Pregnancy Resulting in a Live Birth After in Vitro Fertilization

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Background: Cesarean scar pregnancy (CSP) is a rare form of ectopic pregnancy in which a fertilized embryo implants into the cesarean section scar on the anterior uterine wall. CSP occurs more frequently after assisted reproductive technology (ART) than after spontaneous conception; therefore, understanding the relation between ART and CSP is crucial for appropriate pregnancy management. Because CSP may lead to severe complications, termination of pregnancy during the first trimester is often selected. However, when continuation of the pregnancy is desired, management becomes challenging.
Case: We report a case of CSP following in vitro fertilization and embryo transfer. The patient chose to continue the pregnancy. Magnetic resonance imaging at 19 weeks and 1 d revealed findings suggestive of placenta accreta (also referred to as placenta creta) at the cesarean scar site. Magnetic resonance imaging at 29 weeks and 1 d showed complete replacement of the anterior myometrium by the placenta. At 32 weeks and 3 d, an elective cesarean section and total hysterectomy with bilateral salpingectomy were performed under multidisciplinary management. The placenta was completely attached to the scar area but did not invade adjacent organs, confirming placenta accreta. Both maternal and neonatal outcomes were favorable.
Conclusion: Despite high risks associated with continuing a CSP pregnancy, outcomes can be favorable when management is carefully planned and individualized. Given the increasing prevalence of ART, clinicians should remain aware of the risk of CSP in patients with prior cesarean delivery and focus on early recognition, comprehensive imaging evaluation, and personalized management strategies to ensure optimal maternal and neonatal outcomes.

Key words: Assisted reproductive technology, in vitro fertilization, cesarean scar pregnancy

INTRODUCTION

Cesarean scar pregnancy (CSP) is a rare form of ectopic pregnancy in which implantation occurs within the scar of a previous cesarean section. The estimated incidence is approximately one in 1,700–2,000 pregnancies [1, 2], and accounting for approximately 6.1% of all ectopic pregnancies [3]. With increasing cesarean delivery rates, reports of CSP have correspondingly risen [4].

CSP can lead to serious complications, such as uterine rupture and placenta accreta spectrum, resulting in massive hemorrhage and disseminated intravascular coagulation [5, 6]. Embryonic cardiac activity during early pregnancy is associated with an increased risk of life-threatening bleeding [7]. Therefore, early intervention, such as pregnancy termination, is often recommended [8]. However, management becomes complex when continuation is desired. Approximately one-fourth of CSP pregnancies that continue beyond early gestation result in preterm delivery before 34 weeks of gestation [9], and successful continuation to live birth is rare.

In pregnancies conceived through assisted reproductive technology (ART), the risk of CSP may be elevated because of catheter deviation toward the cesarean scar during embryo transfer [10]. In severe cases, emergency hysterectomy may be required [4], leading to fertility loss. Therefore, pre-transfer evaluation of the uterine scar using ultrasonography or magnetic resonance imaging (MRI) and strategic embryo transfer away from the scar are recommended. Thorough risk counseling and careful management are essential for patient safety. We report a rare case of CSP after in vitro fertilization and embryo transfer that progressed to placenta accreta but was successfully managed at 32 weeks and 3 d of gestation, resulting in favorable maternal and neonatal outcomes.

CASE

A 36-year-old woman (gravida 3, para 2) with a history of two cesarean deliveries conceived via frozen-thawed blastocyst transfer. Early transvaginal ultrasonography performed at another institution revealed implantation at the cesarean scar, leading to a diagnosis of CSP. The patient was referred to our hospital at 17 weeks of gestation for further management.

Transvaginal ultrasonography revealed placental attachment to the anterior uterine wall at the cesarean scar with marked thinning of the myometrium. Pelvic

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Fig. 1 Magnetic resonance imaging (MRI) performed at 19 weeks of pregnancy
MRI findings in a cesarean scar pregnancy (CSP) at 19 weeks of gestation. The arrow indicates the cesarean scar site.

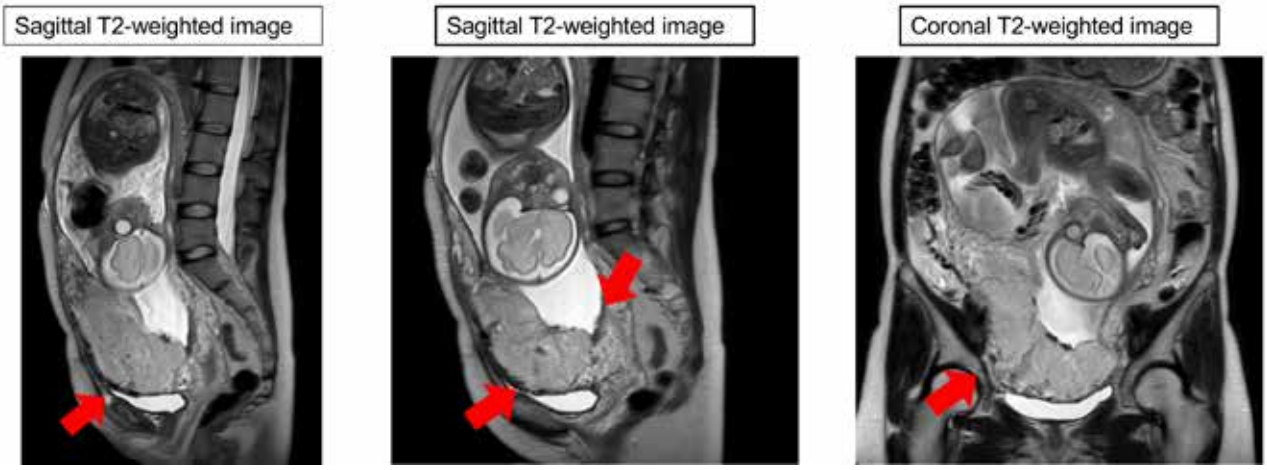

Fig. 2 Magnetic resonance imaging (MRI) examination at 29 weeks and 1 d of gestation
MRI findings at 29 weeks and 1 d of gestation. The arrow indicates the cesarean scar site. Although irregularities of the serosal surface and obscuration of the boundary with the bladder were observed, no obvious myometrial dehiscence was noted.

MRI at 19 weeks of gestation demonstrated near-complete replacement of the anterior myometrium with placental tissue, suggesting placenta accreta (Fig. 1).

After counseling regarding the high risk of hemorrhage and potential need for hysterectomy, the patient elected to continue the pregnancy under close monitoring. The patient was hospitalized at 28 weeks. MRI performed at 29 weeks confirmed total replacement of the myometrium by the placenta (Fig. 2). At 31 weeks, the patient experienced premature rupture of membranes with bleeding, making further prolongation of the pregnancy unfeasible. Following multidisciplinary discussions with the urology and radiology teams, an elective cesarean section and hysterectomy were performed at 32 weeks and 3 d.

Before delivery, bilateral ureteral catheters and femoral arterial sheaths were inserted. The fetus was delivered via a fundal transverse uterine incision. The newborn weighed 1,842 g with Apgar scores of six and eight at 1 and 5 min, respectively, and an umbilical pH of 7.361. Subsequently, bilateral uterine artery embolization was performed, followed by total hysterectomy.

Intraoperatively, multiple neovascularizations were observed over the anterior lower uterine segment; however, there was no bladder invasion, and separation was straightforward (Fig. 3). The operative time was 4 h and 13 min, with a blood loss of 1,610 mL and no transfusion required. Histopathological examination confirmed that the cesarean scar area was replaced by placental tissue, consistent with simple placenta accreta (Fig. 4). The postoperative course was uneventful, and the patient was discharged on postoperative day 6.

DISCUSSION

This case represents a rare instance of a CSP following in vitro fertilization and embryo transfer that progressed to placenta accreta while the pregnancy was maintained until 32 weeks of gestation. CSP results from the implantation of a fertilized embryo into a microscopic defect in a prior cesarean scar. Although

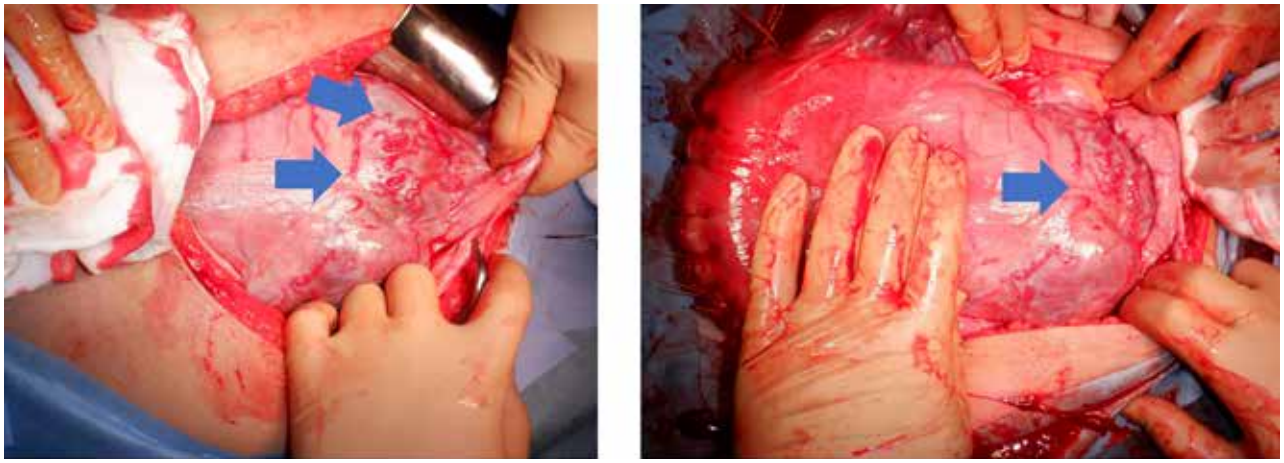

Fig. 3 Intraoperative photograph
Intraoperative findings during cesarean delivery for cesarean scar pregnancy (CSP). The placenta was completely attached to the cesarean scar site, and the myometrium was entirely replaced; however, the continuity of the uterine serosa was preserved, and no evidence of placenta percreta was observed.

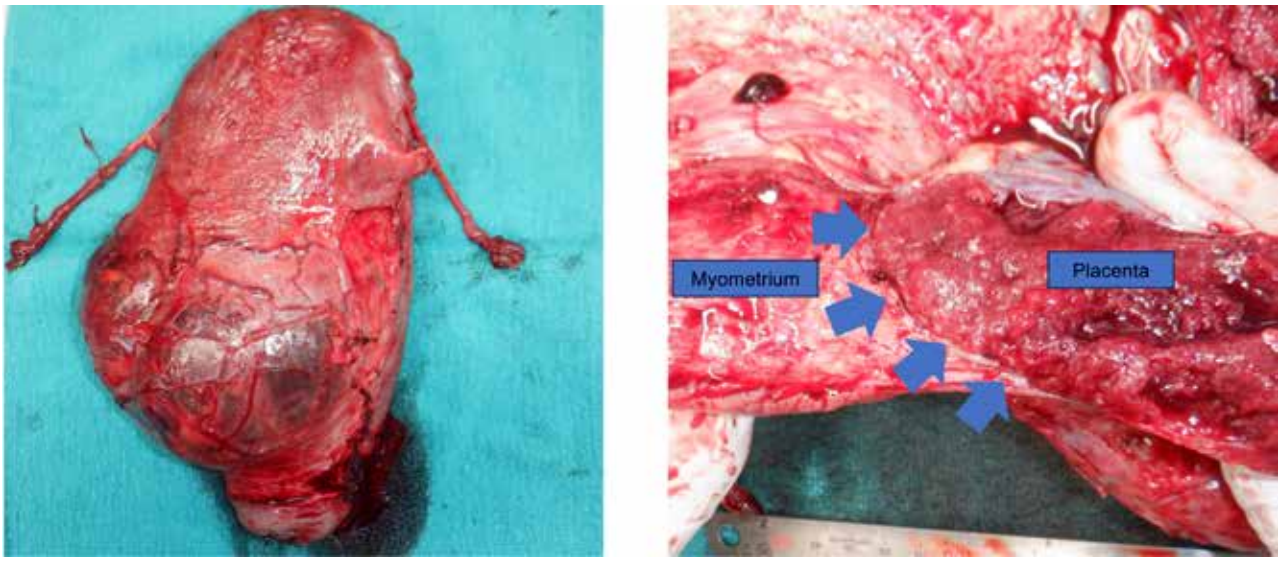

Fig. 4 Specimen findings
Specimen obtained from hysterectomy with bilateral salpingectomy. The cesarean scar on the anterior uterine wall was completely replaced by placental tissue, and the myometrium was absent. The serosa was preserved, and no invasion into the bladder was observed.

early termination is often recommended, some patients opt to continue the pregnancy, and there is no established management consensus.

Timor-Tritsch *et al.* reported that 10 of 60 patients with CSP desired pregnancy continuation. Among these, four delivered live infants by cesarean section at 32–36 weeks; three of them required a hysterectomy due to placenta percreta. Five patients developed severe complications — including uterine rupture, abnormal bleeding, and bulging membranes — between 15 and 20 weeks, all of which necessitated hysterectomy and resulted in pregnancy loss. One patient was still pregnant at the time of the final follow-up. Overall, eight of the ten women who opted to continue the pregnancy ultimately required hysterectomy, and only four achieved a live birth [8]. These findings highlight the extremely high risk associated with pregnancy continuation in CSP, making management decisions particularly challenging. Most cases that progress beyond mid-gestation develop placenta percreta or bladder invasion, leading to emergency hysterectomy and massive hemorrhage.

Our case is noteworthy because the pregnancy was safely continued under careful monitoring, and the placenta remained intact without invasion.

As reported previously, the incidence of cesarean scar pregnancy (CSP) among women who underwent IVF-ET was approximately 1 in 909, which is expected to be higher than that in natural conception [11]. During embryo transfer, the catheter tip may deviate toward the cesarean scar, thereby increasing the risk of scar implantation [10]. Therefore, precise, ultrasound-guided embryo transfer and pre-transfer scar assessments are crucial. In ART pregnancies, early diagnosis and detailed imaging, including MRI, are key to assessing the degree of placental invasion

and determining the optimal timing of delivery. Collaboration between reproductive medicine and perinatal care teams is essential for improving outcomes. Further research is warranted to establish standardized evaluation methods, embryo-transfer techniques, and CSP risk-stratification models for patients undergoing ART.

CONCLUSION

We report a rare case of a CSP after in vitro fertilization that progressed to placenta accreta and was successfully managed until 32 weeks and 3 d, resulting in a live birth.

Although continuation of a CSP pregnancy carries significant risks, well-planned management can lead to favorable outcomes in select cases.

Given the increasing use of ART, clinicians should consider the risk of CSP in patients with a previous cesarean section and emphasize early diagnosis, careful imaging evaluation, tailored embryo-transfer strategies, and management to ensure maternal and neonatal safety.

ACKNOWLEDGMENTS

None.

CONFLICTS OF INTEREST

None.

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