Successful Conservative Treatment of a Cesarean Scar Pregnancy with Uterine Artery Embolization

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SUGAWARA, J., SENOO, M., CHISAKA, H., YAEGASHI, N. and OKAMURA, K. Successful Conservative Treatment of a Cesarean Scar Pregnancy with Uterine Artery Embolization. Tohoku J. Exp. Med., 2005, 206 (3), 261-265 — Ectopic pregnancy developing in a previous Cesarean section scar is rare and is associated with catastrophic complications, such as uterine rupture and uncontrollable bleeding, which may lead to loss of the uterus. The operative treatments that have been reported for cesarean scar pregnancy are dilatation and curettage and excision of trophoblastic tissues using either laparotomy or laparoscopy. Recently, conservative treatment of scar pregnancy with locally and/or systemically administered methotrexate (MTX) has been reported. However, recent reports demonstrated that cases treated with MTX sometimes required laparotomy later because of excessive bleeding. In this series of cases we have demonstrated that viable cesarean scar pregnancies can be treated safely by selective transarterial embolization in combination with subsequent dilatation and curettage and local or systemic injections of MTX. In these three cases, uterine artery embolization proved to be a useful procedure for preventing uncontrollable bleeding and unnecessary uterine loss.

Cesarean scar pregnancy is an ectopic pregnancy implanted in the myometrium at the site of a previous Cesarean section scar. It is the rarest type of ectopic pregnancy and may lead to severe, catastrophic complications, such as uterine disruption and hemorrhage (Herman et al. 1995). Due to the severity of complications, it is important that early and accurate diagnosis of the disorder is obtained in order to preserve fertility. Recently, conservative treatment of scar pregnancy with locally and/or systemically administered methotrexate (MTX) has been reported (Lai et al. 1995; Godin et al. 1997; Ravhon et al. 1997; Seow et al. 2001). While these treatments avoid the need for unnecessary laparotomy, the control of profuse bleeding by conservative interventions has never been described precisely. In this report, we describe three cases of viable cesarean scar pregnancies that were treated safely by selective uterine artery embolization in combination with subsequent dilatation and curettage, and/or MTX therapy.
Case 1

A 34-year-old female, gravida 3, para 2, with a previous history of 2 cesarean sections, was referred to our hospital for possible cervical pregnancy at 5 weeks gestation, as assessed by reliable menstrual dating. Physical examination demonstrated stable vital signs while bimanual examination revealed a slightly enlarged uterus with no adnexal masses. Transvaginal ultrasound showed a well-defined, 1.6-cm-diameter gestational sac containing a yolk sac in the isthmic area of the lower, anterior wall of the uterus. Only 7 mm of thickness separated the sac from the urinary bladder. There was no fluid in the cul-de-sac. The ultrasound findings were compatible with a cesarean scar pregnancy. Laboratory analysis demonstrated that the serum level of the \( \beta \)-subunit of serum human chorionic gonadotropin (\( \beta \)-hCG) was 17,504 mIU/ml. As a consequence of the degree of vaginal bleeding, the patient underwent a bilateral uterine artery embolization with pledgets (Gelfoam, Pharmacia and Upjohn, Kalamazoo, MI, USA). The following day, under the guidance of transvaginal sonography, a 17-gauge needle was introduced into the gestational sac through the cervix, followed by aspiration of amniotic fluid and injection of 20 mg of MTX into the sac and surrounding myometrium. No vaginal bleeding was observed after uterine artery embolization and administration of transvaginal MTX. Seven days after uterine artery embolization, serum \( \beta \)-hCG levels remained elevated at 14,978 mIU/ml. The patient was given the choice of repeat arterial embolization following evacuation or systematic MTX administration, with the latter treatment being preferred. MTX was therefore administrated systemically for 5 days (20 mg/day), resulting in a progressive decline in serum \( \beta \)-hCG levels. By the 40th day after uterine artery embolization, serum \( \beta \)-hCG levels had normalized and resolution of scar pregnancy was confirmed. The patient reported no side effects of the MTX treatment such as nausea and stomatitis while both liver function and bone marrow suppression were unchanged.

Case 2

A 28-year-old female gravida 3, para 2, was referred to our hospital at 7 weeks of gestation because of painless vaginal bleeding. The patient’s medical history was notable for two cesarean sections and two dilatation and curettages. At presentation she was hemodynamically stable with a hemoglobin of 12.7 g/100 ml. Sonographic examination demonstrated a well-formed, 1.9-cm-diameter gestational sac with a crown-rump length of 7.9 mm and fetal cardiac activity in the lower, anterior wall of the uterus. Only 3 mm of myometrium was visualized in the anterior wall of the cervix (Fig. 1). Laboratory analysis showed a markedly elevated serum \( \beta \)-hCG level of 28,428 mIU/ml indicating a diagnosis of ectopic pregnancy in a previous cesarean section scar. Painless, heavy vaginal bleeding continued intermittently. The patient was counseled regarding the risk of possible hysterectomy although in order to preserve fertility, conservative management was undertaken. Using a right femoral artery ap-
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approach, bilateral angiographic uterine artery embolization was performed successfully using Gelfoam pledgets. Following this procedure, 20 mg of MTX was injected into the sac and the surrounding myometrium. While no vaginal bleeding occurred immediately after this treatment, a recurrence of increased vaginal bleeding 3 days after the initial embolization led us to perform a repeat uterine artery embolization. The next day, a dilatation and curettage was carried out successfully with minimal bleeding. Serum β-hCG declined successively to a level of 302 mIU/ml 7 days post-evacuation. The patient was discharged with restricted activities at home. One week following discharge it was confirmed that the patient had no pain, minimal bleeding, and an undetectable level of serum β-hCG.

Case 3

A 31-year-old female gravida 2, para 1 with a previous history of a cesarean section and a therapeutic abortion was referred to our hospital at 7 weeks of gestation for possible cervical pregnancy. Transvaginal ultrasound confirmed a 1.6-cm-diameter gestational sac with a crown-rump length of 8.8 mm and cardiac motion in the lower, anterior wall of the uterus. There was no myometrium between the sac and the bladder wall. Color Doppler examination demonstrated strong circular perfusion (Fig. 2). The ultrasonographic findings were compatible with a cesarean scar pregnancy with the diagnosis being confirmed by a serum β-HCG level of 34,774 mIU/ml. In an attempt to preserve fertility, conservative management was undertaken. To prevent profuse bleeding, bilateral uterine artery embolization was performed successfully followed by injection of 20 mg of MTX into the sac and the surrounding myometrium. On day 3 after uterine artery embolization, serum β-hCG levels were 31,201 mIU/ml and therefore MTX was administered systemically for 5 days (20 mg/day). This treatment resulted in a continuous decline in serum β-hCG levels with a measurement on the 20th day after initial embolization being 2,686 mIU/ml. However, the following day, heavy vaginal bleeding recurred and transvaginal color-flow Doppler examination revealed significant intralesional blood flow. A second arterial embolization was then performed resulting in a dramatic decrease in blood perfusion surrounding the trophoblastic tissue and only a scant reddish discharge.

Fig. 2. Transvaginal color Doppler sonography showing surrounding vessels (Case 3).
Transvaginal ultrasound confirmed a 1.6-cm-diameter gestational sac, crown-rump length 8.8 mm with cardiac motion in the lower, anterior wall of the uterus. There was no myometrium between the sac and the bladder wall (Arrow heads). Transvaginal color-flow Doppler ultrasound showed strong circular perfusion surrounding the gestational sac (Arrows).
being observed. On the 37th day after the initial treatment, a dilatation and curettage was carried out under laparoscopic observation. A 10-ml Foley catheter balloon was then placed within the cervical canal and inflated to prevent the bleeding. On the 47th day after the initial embolization, serum $\beta$-hCG levels had fallen to 6.2 mIU/ml and the patient was discharged home with minimal bleeding.

**DISCUSSION**

Ectopic pregnancy as a consequence of a scar from a previous cesarean section is rare and is associated with catastrophic complications, such as uterine rupture and uncontrollable bleeding, that may lead to loss of the uterus (Herman et al. 1995). There is increasing evidence that cesarean section is one of the risk factors for ectopic pregnancy, placental pathology, and massive bleeding in subsequent pregnancies (Hemmink and Merilainen 1996). Although the pathophysiology of cesarean scar pregnancy remains to be established, it is possible the conceptus may penetrate the myometrium through a microscopic dehiscent tract of the cesarean section scar (Godin et al. 1997).

Due to the severity of complications, it is important to diagnose scar pregnancy as early and accurately as possible. Nevertheless, diagnosis is often not made until uterine rupture or following hypovolemic shock, while differential diagnosis between ectopic pregnancy located in the scar of a previous cesarean section, progressive spontaneous abortion, and cervico-isthmic pregnancy remains difficult. Transvaginal sonography is a useful tool for diagnosing cesarean scar pregnancy. Under sonography, the gestational sac is located in the lower anterior isthmic lesion of the uterine myometrium, with the muscle layer between the sac and the bladder wall usually being very thin or barely detectable. In these cases, color Doppler ultrasound usually reveals distinct blood flow surrounding the gestational sac. We propose the following criteria for diagnosing cesarean scar pregnancy using sonography: 1) The gestational sac must be present between the bladder and the anterior isthmic portion of the uterus; 2) No trophoblastic tissue must be visible in the uterine cavity and the cervical canal; 3) Circular blood flow surrounding the sac must be clearly visible (Godin et al. 1997; Vial et al. 2000; Seow et al. 2001). The operative treatments that have been reported for cesarean scar pregnancy are dilatation and curettage (Seow et al. 2000) and excision of trophoblastic tissue using either laparotomy (Valley et al. 1998; Vial et al. 2000) or laparoscopy (Lee et al. 1999). Marked vaginal bleeding associated with scar pregnancy is frequently uncontrollable requiring hysterectomy (Herman et al. 1995), although Valley et al. (1998) reported that removal of trophoblastic tissue by hysterotomy was also complicated by massive bleeding. Conservative treatment of scar pregnancy with locally and/or systemically administered MTX has been reported recently (Lai et al. 1995; Godin et al. 1997; Ravhon et al. 1997; Seow et al. 2000). These conservative treatments avoid unnecessary laparotomy and preserve the patient’s fertility. Lai et al. (1995) and Lam et al. (2004) reported cases of cesarean scar pregnancy treated with MTX that required laparotomy later because of excessive bleeding. In all other reports, the control of profuse bleeding has never been described precisely.

Uterine artery embolization is accepted widely as a conservative treatment of various obstetric and gynecologic conditions, including ectopic pregnancy, postpartum hemorrhage, and uterine myoma (Hansch et al. 1999; Nabeshima et al. 2003). Selective uterine artery embolization also appears to be the best method for preventing massive bleeding during surgical procedures, such as dilatation and curettage for cervical pregnancy (Lobel et al. 1990).

In this series of cases we have demonstrated that viable cesarean scar pregnancies can be treated safely by selective transarterial embolization in combination with subsequent dilatation and curettage and local or systemic injections of MTX. These three cases confirm that uterine artery embolization is a useful procedure for preventing uncontrollable bleeding and unnecessary uterine loss. Decisions on treatments options should be dictated in part by gestational age, HCG levels,
and the presence of fetal cardiac activity, although there is need for further discussion on precise criteria pertaining to these decisions.

In conclusion, early and accurate diagnosis of cesarean scar pregnancy is required for conservative treatment to be initiated, thereby preserving the patient’s fertility. To prevent uncontrollable profuse bleeding, we propose that selective transarterial embolization should be performed before and/or after any other management for the termination of pregnancy.

References