Uterine Artery Embolization Combined with Methotrexate in the Treatment of Cesarean Scar Pregnancy: Results of a Case Series and Review of the Literature

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ABSTRACT

Purpose: To explore the clinical value of uterine artery embolization (UAE) combined with methotrexate in the treatment of cesarean scar pregnancy (CSP) before and after uterine curettage.

Materials and Methods: From August 2009 to April 2012, 15 patients with CSP treated with UAE (before or after uterine curettage) were analyzed retrospectively. Eleven subjects with a definite diagnosis of CSP were offered preventive UAE combined with methotrexate before uterine curettage. The other four patients, who were misdiagnosed as having an intrauterine pregnancy, were treated with emergency UAE for uncontrollable massive hemorrhage after uterine curettage. Clinical data, treatment sequence, and outcome were analyzed, and a brief review of the published literature summarizing UAE in the treatment of CSP was performed.

Results: Eleven patients with definite CSP received preventive UAE combined with methotrexate followed by uterine curettage, and CSP was resolved successfully without hysterectomy. In the four misdiagnosed patients, three were treated successfully with emergency UAE. The other patient underwent uterine curettage and emergency UAE followed by repeat curettage, but hysterectomy was performed because of continued severe hemorrhage.

Conclusions: Based on a small number of patients, it appears that UAE may be an effective means of treating CSP, including treatment in an emergency setting. Further study is required before the safety and effectiveness of UAE can be confirmed.

ABBREVIATIONS

CSP = cesarean scar pregnancy, UAE = uterine artery embolization

Cesarean scar pregnancy (CSP), an ectopic form of pregnancy characterized by implantation of a gestational sac within a previous cesarean section scar, is life-threatening because of the increased risk of rupture and excessive hemorrhage. The first case of CSP was reported in the English medical literature in 1978 by Larsen and Solomon (1). Since 2000, the incidence of CSP has increased significantly, to 6.1% of all ectopic pregnancies in those with previous cesarean sections, which may reflect the increasing number of cesarean sections being performed and the improved accuracy of diagnosis of ectopic pregnancies by color Doppler transvaginal ultrasonography (US) (2–6).

In patients who undergo cesarean section, the myometrium thins out to merge with the thin and fibrous scar of uterine incision, so the placental attachment in the lower segment may consist of merely connective tissue instead of decidua basalis and myometrium. Pathologic examination of excised CSP alone and in hysterectomy specimens demonstrated clusters of trophoblast cells as well as scattered syncytiotrophoblast cells invading the myometrium

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through a microscopic dehiscent tract created by a previous cesarean section procedure or other uterine surgery (7,8). Placenta accreta occurs when all or part of the placenta attaches abnormally to the myometrium. If the placenta invades into the myometrium, it is termed placenta increta. A placenta percreta invades through the myometrium to the level of the serosa or continues into adjacent organs (9,10). Thus, a CSP can be distinguished from a placenta increta pathologically or by imaging based on the presence of the fetal pole in the scar itself, whereas, in a placenta increta, the placenta invades the myometrium while the fetus is in the uterine cavity.

In the past, the preferred treatment option for CSP was to perform an emergency laparotomy with the possible need for hysterectomy to avoid lethal hemorrhage (11,12). Currently, methods for the management of CSP include systemic chemotherapy with methotrexate, local injection of embryocide agents, uterine curettage, hysteroscopic evacuation, laparoscopic management, excision of the involved lower segment of the uterus, uterine artery embolization (UAE), and expectant management (13–18).

Although conservative treatment of scar pregnancy with locally and/or systemically administered methotrexate has been reported, because of the relative rarity of CSP, there has been no clear consensus on the standard treatment. Termination of pregnancy in the first trimester is strongly recommended to prevent life-threatening complications and to maintain the possibility of future pregnancy, as well as the patient's health and quality of life (7,19–23).

The aim of this study is to explore the clinical value of UAE combined with methotrexate in the treatment of CSP before and after uterine curettage and to briefly review published articles on current management of CSP.

MATERIALS AND METHODS

Patients

From August 2009 to April 2012, 15 consecutive patients with CSP treated with UAE (before or after uterine curettage) in a single hospital were analyzed retrospectively (**Table 1**). The study protocol was approved by the ethics committee of our hospital. Written informed consent was obtained before UAE from each participant with CSP.

CSP was confirmed by a thorough history evaluation, including obstetric, reproductive, and surgical history; physical examination; US findings; and increased levels of progesterone and serum total human chorionic gonadotropin between 6 and 9 weeks of gestation. US diagnosis is based on an empty endometrial cavity and cervical canal and gestational sac with or without fetal cardiac activity located in the lower anterior myometrium at the level of the previous caesarean scar (5,7).

Procedure

The 11 patients with a definite diagnosis of CSP were offered preventive UAE before uterine curettage. A right transfemoral approach was used for artery access, and each uterine artery was superselectively catheterized with a 4- or 5-F Roberts uterine catheter (Cook, Bloomington, Indiana) or 4- or 5-F Cobra catheter (Cordis, Roden, The Netherlands). Before UAE, 50 mg of methotrexate was dissolved in 40 mL of physiologic saline solution. This dose was split between the two uterine arteries and infused via the arterial catheter. UAE was performed by an experienced radiologist with the use of Gelfoam particles (500–1,000 μm in diameter) mixed with nonionic contrast medium. Angiography was performed after UAE to confirm that the bilateral uterine arteries were

Table 1. Clinical Characteristics of 15 Women with CSP Treated with UAE before or after D&C of Uterus

Characteristic	UAE First (n = 11)	D&C First (n = 4)
Age, y		
Mean ± SD	33 ± 3.5	34 ± 7.4
Range	30–40	29–45
Gestational age, d		
Mean ± SD	45.1 ± 7.7	53.8 ± 5.9
Range	35–62	45–58
No. of cesarean sections	1.18	1.25
Interval		
Delivery to CSP, y	5.4 ± 4.3 (1.5–14)	4 ± 2 (1–5)
Between treatments, d	7.55 ± 12.07 (1–43)	In 24 h
ThCG on admission (mIU/mL)	33,796.25 ± 29,290.35	35,508.79 ± 70,151.53
Progesterone on admission (nmol/L)	54.89 ± 40.68	20.85 ± 20.95
Hemoglobin (g/L)	122.18 ± 8.57	NA*
Platelet count (10^9/L)	230.9 ± 44.4	NA*
Prothrombin time (s)	12.83 ± 0.75	NA*
Prothrombin activity (%)	109.11 ± 14.97	NA*

CSP = Cesarean scar pregnancy, D&C = dilation and curettage, NA = not available, ThCG = total human chorionic gonadotropin, UAE = uterine artery embolization.

* Measurement not available because of massive hemorrhage during or within 24 h after D&C or because hemoglobin, platelet count, and prothrombin time on admission did not reflect the condition at emergency UAE.

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