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Case Report

Three-dimensional computed tomographic angiography in the diagnosis and conservative management of cesarean scar pregnancy with prominent neovascularization

Akihiro Takeda*, Sanae Imoto, Kotaro Sakai, Hiromi Nakamura

Department of Obstetrics and Gynecology, Gifu Prefectural Tajimi Hospital, Tajimi, Gifu, Japan

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ABSTRACT

Objective: Cesarean scar pregnancy (CSP) is a rare potentially life-threatening form of ectopic gestation. However, optimal management has not yet been established. Furthermore, there are limited reports on the diagnostic value of three-dimensional computed tomographic angiography (3D-CTA) for the conservative management of this disorder.
Case report: A 33-year-old woman (gravida 3, para 2), with two previous deliveries by low segmental transverse cesarean section, was referred after 5 weeks of amenorrhea. Her serum beta-human chorionic gonadotropin (β-hCG) value was 2921 mIU/mL. Cesarean scar pregnancy was diagnosed by ultrasonography and magnetic resonance imaging. On 3D-CTA, a prominent uteroplacental neovascularized mass was identified. It was supplied by the left uterine artery and a thick draining left ovarian vein. After three cycles of systemic methotrexate (MTX) administration, the serum β-hCG value decreased to 142 mIU/mL. However, the gestational sac enlarged and peritrophoblastic blood flow persisted. In contrast to the ultrasonographic findings, marked reduction of uteroplacental neovascularization at the CSP site with regression of the draining ovarian vein was evident on 3D-CTA. The gestational products were thereafter successfully resected by hysteroscopic surgery without hemorrhagic complications. Fifty-seven days after the initial MTX administration, serum β-hCG reached a normal level.
Conclusion: This case emphasizes that, when selecting the method of intervention, 3D-CTA is potentially useful for evaluating uteroplacental neovascularization in a hemodynamically stable CSP.

Introduction

Cesarean scar pregnancy (CSP) is a rare but extremely dangerous form of ectopic gestation in which the embryo is embedded in the myometrial defect of the lower uterine segment at the site of a previous cesarean section scar [1]. The optimal management of this potentially life-threatening disorder has not yet been established, and a variety of therapeutic procedures are still determined individually without clear management consensus [2].

Our previous report showed that three-dimensional computed tomographic angiography (3D-CTA) is a feasible diagnostic modality to evaluate neovascularization in CSP with significant hemorrhage prior to transcatheter arterial chemoembolization [3]. In the present case report, successful fertility-sparing management of a hemodynamically stable CSP by using the systemic administration of methotrexate (MTX), followed by hysteroscopic resection, is described with the assessment of the interval change of uteroplacental neovascularization at the CSP site by 3D-CTA.

Case report

A 33-year-old woman (gravida 3, para 2), who had two previous deliveries by low segmental transverse cesarean section, was referred with a suspected CSP after 5 weeks of amenorrhea. Physical examination did not detect any remarkable symptoms and did not detect uterine bleeding. The serum beta-human chorionic gonadotropin (β-hCG) value was 2921 mIU/mL (Fig. 1). Hemodynamically stable CSP was diagnosed by initial color Doppler ultrasonography when the gestational sac, which measured 7.6 mm with peritrophoblastic blood flow (Fig. 2A, arrow), was identified in the previous cesarean scar of a lower uterine segment. The ectopic

* Corresponding author. Department of Obstetrics and Gynecology, Gifu Prefectural Tajimi Hospital, 5-161 Maebata-cho, Tajimi, Gifu 507-8522, Japan.
E-mail address: gyendoscopy@gmail.com (A. Takeda).

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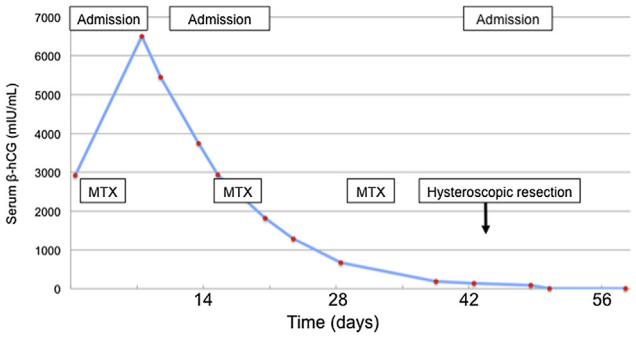

Fig. 1. Changes in serum beta-human chorionic gonadotropin levels related to the treatment of a hemodynamically stable cesarean scar pregnancy. The patient underwent systemic administration of methotrexate (20 mg/body for 5 consecutive days) for three cycles, followed by successful hysteroscopic removal of the retained gestational products. β-hCG = beta-human chorionic gonadotropin; MTX = methotrexate.

gestational sac was further localized on sagittal T2-weighted magnetic resonance imaging (MRI) (Fig. 2B, arrow). On the coronal reconstructed multiplanar image of 3D-CTA (Fig. 2C), a prominent neovascularized mass with an arteriovenous shunt-like structure (Fig. 2C, arrow) was identified in the left lateral lower uterine segment. It was supplied from the left uterine artery with a thick draining left ovarian vein (Fig. 2C, arrowhead).

Because of the patient's strong wish to preserve fertility, she underwent the systemic administration of MTX (20 mg/body for 5 consecutive days) beginning the day after the initial examination. Seven days after the initial cycle of MTX, a temporary rise in the serum β-hCG value to 6497 mIU/mL was noted. Ten days after the MTX injection, a moderate hemorrhage occurred. The fetal pole appeared, although fetal cardiac activity was not detected (Fig. 3A, arrowhead) and peritrophoblastic blood flow persisted (Fig. 3A, arrow). Uterine bleeding was conservatively managed by vaginal gauze packing. It ceased spontaneously. Additional systemic MTX was then administered twice when a delayed decline in the serum β-hCG value was noted (Fig. 1).

Forty-one days after the initial MTX administration, the serum β-hCG value decreased to 142 mIU/mL. However, the size of the gestational sac increased to 23.2 mm and peritrophoblastic blood flow persisted (Fig. 3B, arrow). Because liver damage (aspartate aminotransferase, 67 IU/L; alanine transaminase, 126 IU/L) was noted—presumably because of the side effects of MTX—it was concluded that further medical management would be difficult and surgical removal (e.g., hysteroscopic resection) should be considered.

To determine the needs of preventive uterine arterial embolization prior to hysteroscopic resection, the uteroplacental neovascularization was evaluated again by 3D-CTA. In contrast to the findings by color Doppler ultrasonography, marked reduction of neovascularization (Fig. 3C, arrow) at the CSP site with regression of the draining ovarian vein was evident (Fig. 3C, arrowhead). On the basis of this finding, 44 days after the initial MTX injection, hysteroscopic surgery was performed without preventive arterial embolization [4]. The retained products of conception were identified in the left lateral side of a previous cesarean section scar (Fig. 4A, arrow). Gestational products were firmly attached to the fibrous tissue of the previous cesarean section scar, although hysteroscopic resection with a monopolar loop electrode was successfully completed without significant hemorrhagic complications (Fig. 4B). An immunohistochemical study showed positive staining for β-hCG in the degenerated trophoblastic cells (Fig. 4C). Fifty-seven days after the initial MTX administration, the serum β-hCG reached a normal level. Menstruation resumed 82 days after the initial treatment, and the disease course was uneventful.

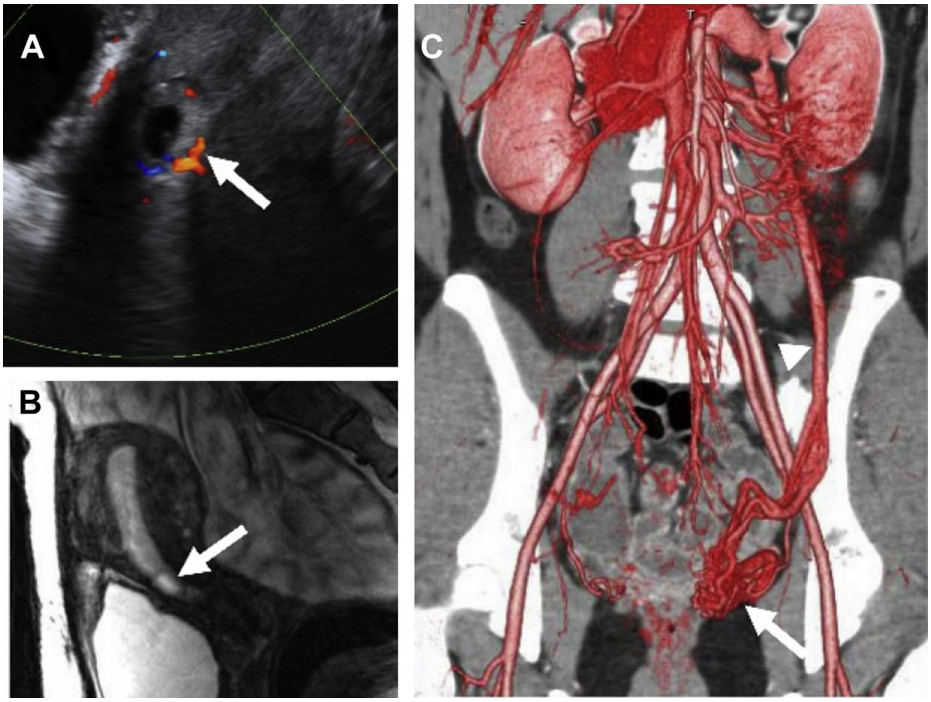

Fig. 2. Diagnostic findings of the hemodynamically stable cesarean scar pregnancy on initial examination. (A) Transvaginal color Doppler ultrasonography shows the gestational sac (arrow) with the peritrophoblastic blood flow localized in the anterior uterine wall at the previous cesarean scar. (B) The sagittal T2-weighted magnetic resonance image shows the gestational sac (arrow) localized in the anterior uterine wall at the previous cesarean scar. (C) The coronal reconstructed multiplanar image of three-dimensional computed tomographic angiography shows a prominent neovascularized mass with an arteriovenous shunt-like structure supplied from the left uterine artery (arrow) with a thick draining left ovarian vein (arrowhead) in the left lateral lower uterine segment.