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CLINICAL ARTICLE

Factors associated with successful transabdominal sonography-guided dilation and curettage for early cesarean scar pregnancy

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ABSTRACT

Objective: To investigate factors associated with successful transabdominal sonography-guided dilation and curettage for the treatment of cesarean scar pregnancy (CSP). *Methods:* In a retrospective study, data were reviewed from patients who received transabdominal sonography-guided dilation and curettage (TASDC) as the primary treatment for early CSP at The Second Xiangya Hospital, Changsha, China, between 2009 and 2013. *Results:* Among 232 patients, 185 (79.7%) women with CSP were successfully treated with TASDC. Among them, 81 (43.8%) required insertion of a Foley catheter into the lower uterine segment to stop bleeding. The complication rate was 37.9% (88/232) and the failure rate was 21.3% (47/232). Overall, 28 (12.1%), 5 (2.2%), and 4 (1.7%) patients with massive intraoperative uterine bleeding were treated with wedge resection of the uterus, hysterectomy, and uterine artery embolization as a secondary treatment, respectively. In binary logistic regression analysis, pregnancy of 7 weeks or less and pregnancy without missed abortion were associated with successful TASDC for patients with CSP ($P < 0.001$). *Conclusion:* Pregnancy of 7 weeks or less and pregnancy without missed abortion were found to be important factors for successful TASDC among patients with CSP. Wedge resection was the main secondary treatment to preserve the uterus and remove gestational tissue among patients with massive bleeding.
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1. Introduction

In cesarean scar pregnancy (CSP), the embryo implants in a cesarean scar. It is an extremely rare form of ectopic pregnancy, occurring in 0.2% of women with a history of previous cesarean delivery [1]. The prevalence of CSP is increasing owing to the rising rate of cesarean delivery [2,3]. CSP can lead to severe complications such as uterine rupture and profuse bleeding, which eventually lead to hysterectomy. Therefore, early diagnosis and treatment are critical for both preventing complications and successful preservation of the uterus [4–7].

The clinical symptoms and signs of CSP are usually nonspecific. As a result, early diagnosis of CSP depends on imaging examination. Transvaginal sonography (TVS) seems to be an effective diagnostic tool for early CSP, with 86.4% sensitivity [7]. CSP is frequently misdiagnosed as inevitable abortion and treated by dilation and curettage, which can lead to massive bleeding. Magnetic resonance imaging (MRI) is commonly used to differentiate between inevitable abortion and CSP, as well as to evaluate myometrial invasion to establish the therapeutic strategy for CSP.

Various treatments—including dilation and curettage [8], uterine artery embolization (UAE) [9], local or systemic methotrexate administration [10], hysteroscopy [11], and wedge resection [12,13]—have been used to treat CSP with different rates of complication [5]. However, the optimum treatment for CSP remains controversial. CSP is a unique type of ectopic pregnancy associated with the uterine corpus [6]. Because of its simplicity, dilation and curettage is commonly used for the treatment of CSP; however, its reported effectiveness and outcomes are inconsistent among studies owing to small sample sizes [4,5,8,14]. In addition, the factors that affect the successful treatment of CSP patients by dilation and curettage need to be determined. As a result, the aim of the present study was to investigate factors associated with successful dilation and curettage treatment for patients with CSP.

2. Materials and methods

In a retrospective study, data were reviewed from the medical records of patients with CSP who were treated at The Second Xiangya Hospital of Central South University, Changsha, China, between January 1, 2009 and December 31, 2013. Patient information was collected with approval from the Institutional Review Board of The Second Xiangya

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Hospital. Because it was a retrospective study, informed consent was not deemed necessary.

All patients were diagnosed by TVS coupled with increased levels of serum β-human chorionic gonadotropin (β-hCG). Patients diagnosed with CSP were shown to have an empty uterine cavity and cervical canal, a visible gestational sac at the anterior wall of the isthmus with or without a diminished and/or discontinuous myometrial layer between the bladder and the gestational sac, the presence of functional trophoblastic circulation in Doppler imaging, and a negative "sliding organs sign" [15,16] on TVS. MRI was used to confirm the diagnosis when the TVS evaluation was uncertain.

Length of pregnancy, the location and size of the gestational sac, and myometrium thickness at the cesarean site were recorded. Although the sonographic classification of CSP remains unclear, CSP with a gestational sac involving the uterine cavity or cervix canal was defined as type I, whereas that with a bulging sac was defined as type II [8] in the present study (Fig. 1).

Before performing transabdominal sonography-guided dilation and curettage (TASDC), blood products, Foley catheter, and the materials and instruments necessary for hysterectomy and UAE were made available in case of emergency. Gestational tissue at the cesarean scar was first evacuated under the guidance of TAS with a full bladder, followed by suction of the uterine cavity. A 23-G Foley catheter guided by TAS was inserted into the lower uterine segment, and the balloon was inflated with 20–80 mL of saline to generate enough compression force without traction to stop the bleeding for patients with an intraoperative blood loss of more than 200 mL. UAE was performed for patients with continuous bleeding after 30 minutes of observation and without visible residual gestational tissue on ultrasonography. Laparotomy was carried out for patients with a blood loss of more than 500 mL after 30 minutes of observation with residual tissue detected by ultrasound. A blood loss of more than 500 mL with or without secondary treatments was considered a complication.

Postoperative weekly serum β-hCG levels and ultrasonography were performed until serum β-hCG returned to normal (<5 mIU/mL) and the CSP mass subsided under sonography. Patients with sonographic detection of residual gestational tissue 2 weeks after surgery were treated with hysteroscopy followed by methotrexate.

Successful TASDC was defined as normal serum β-hCG levels without CSP mass, residual pregnancy tissue, or major complications causing further treatment (i.e. UAE, laparoscopic surgery, laparotomy, hysteroscopy, or hysterectomy). Patients with a blood loss of more than 500 mL that was successfully stopped by Foley compression without residual tissue were also considered to have been treated successfully. Patients with failed TASDC included those who needed further surgical or medical interventions or UAE.

The data were analyzed via SPSS version 17.0 (SPSS Inc, Chicago, IL, USA). χ^2 and *t* tests were used to assess the statistical significance of categorical data and continuous data, respectively. Factors associated with successful TASDC were identified by binary logistic regression. $P < 0.05$ was considered significant.

3. Results

During the study period, 232 patients with CSP underwent TASDC as a primary treatment and their characteristics are shown in Table 1. There was no significant difference between the successful and failed TASDC groups in age, number of previous cesarean deliveries, serum β-hCG level, type of CSP, fetal heartbeat, or myometrium thickness at the implantation site. The length of pregnancy was less than 7 weeks among most women with successful TASDC, whereas the length of pregnancy was at least 7 weeks among most with failed TASDC (Table 1). Among 30 patients with missed abortion, only 7 (23.3%) were successfully treated by TASDC. Among all women, the range of myometrial thickness at the implantation site measured by TVS was 1.2–6 mm.

The success rate of TASDC for patients at 5^{+0}–5^{+6} weeks, 6^{+0}–6^{+6} weeks, 7^{+0}–7^{+6} weeks, and 8 weeks or more of pregnancy was 94.7%, 90.4%, 57.8%, and 7.1%, respectively, indicating that the success of TASDC decreases as the pregnancy proceeds beyond 7 weeks (Table 2). The associations between success rate of TASDC and length of pregnancy, myometrium thickness at the implantation site, missed abortion, type of CSP, fetal heartbeat, serum β-hCG level, number of cesarean deliveries, and gestational age were evaluated by binary logistic regression analysis, which indicated that a pregnancy length of less than 7 weeks and pregnancy without missed abortion were associated with successful TASDC ($P < 0.001$) (Table 3).

Among the patients with successful treatment, more than two-fifths required the insertion of a Foley catheter into the lower uterine segment to stop the bleeding for a blood loss of more than 200 mL (Table 4). Massive intraoperative bleeding (>500 mL) was observed for 78 (33.6%) patients, of whom 28 (12.1%) required urgent wedge resection, 5 (2.2%) hysterectomy, and 4 (1.7%) UAE plus methotrexate injection. Specifically, wedge resection and hysterectomy were performed for patients with massive bleeding and residual gestational tissue. UAE plus methotrexate injection was used to stop massive bleeding for patients without visible residual tissue on ultrasonography. The blood loss during wedge resection and hysterectomy was 290.2 ± 77.0 mL and 262.0 ± 57.2 mL, respectively ($P = 0.44$). No blood transfusion was needed in these secondary surgeries. Methotrexate administration followed by hysteroscopy was used to remove residual tissue for 10 (4.3%) women without massive bleeding.

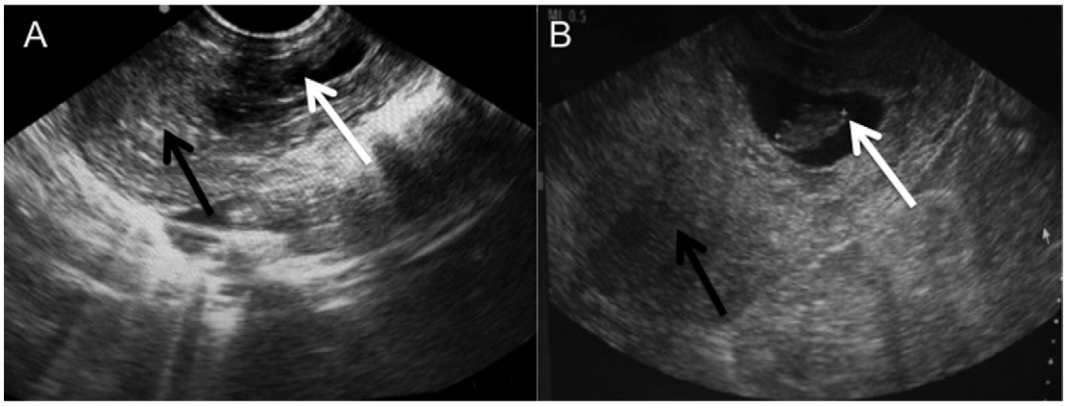

Fig. 1. Transvaginal sonography imaging of the two types of CSP. (A) CSP type I: the gestational sac is implanted in the cesarean scar at the anterior uterine wall involving the cervico-isthmic space. (B) CSP type II: the gestational sac bulges toward the outer myometrium and is implanted in the cesarean scar at the anterior uterine wall. Abbreviation: CSP, cesarean scar pregnancy. White arrows indicate the gestational sac; black arrows indicate the empty uterine cavity.

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