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Original Article

The value of hysteroscopic management of cesarean scar pregnancy: a report of 44 cases

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ABSTRACT

Objective: With the incidence of cesarean scar pregnancy (CSP) rising, the reports of serious adverse outcomes of it have increased gradually. The management of CSP remains an inadequately explored clinical field, and there is no consensus on it presently. The present study was performed to investigate the efficacy and safety of operative hysteroscopy in the diagnosis and treatment of CSP.

Materials and methods: Forty-four patients with CSP underwent operative hysteroscopy for removal of scar ectopic pregnancy in our institution. Among them, hysteroscopy was combined with laparoscopy in two patients, three cases with massive hemorrhage were pretreated with bilateral uterine artery embolization before hysteroscopic surgery, and four patients were pretreated with mifepristone (200 mg for 3 days) and methotrexate (25 mg for 2 days). Clinical data, serum β-human chorionic gonadotropin, myometrial thickness, residual conceptus, cesarean scar defect, operation time, blood loss, and hospital stay were recorded.

Results: All of the ectopic gestations were removed entirely by operative hysteroscopy. Mean operation time was 34.8 ± 16.5 minutes (range 20–120 minutes), and mean blood loss was 35.3 ± 24.4 mL (range 5–100 mL). The mean hospital stay was 5.0 ± 3.01 days (range 1–19 days). Cesarean scar defect could be diagnosed in 70% (31/44) of patients, while in 20/32 cases (63%), a conceptus remained after uterine curettage only was performed.

Conclusion: Operative hysteroscopy might be recommended as a first-line treatment modality for patients with a cesarean scar ectopic pregnancy, especially when myometrium thickness between bladder and gestational sac is more than 3 mm.

Introduction

Cesarean scar pregnancy (CSP) is the rare type of ectopic pregnancy, which is defined as the embryo implanting in a previous lower segment cesarean section scar. It is one of the long-term postoperative complications of a cesarean section, accounting for 6.1% of postcesarean ectopic pregnancies and 0.45% of complications of cesarean section [1]. With the increase of cesarean delivery rate and the improvement of diagnostic technology, the incidence of CSP, which is estimated to range from 1:1800 to 1:2216 [1], is on the rise [2–4]. Meanwhile, reports of serious adverse outcomes of CSP have increased gradually, such as uncontrollable bleeding, uterine rupture, and giant uterine artery pseudoaneurysm [3,5,6]. The current treatments of CSP include medical treatment [7–9], uterine artery embolization, and surgical management. Surgical methods include suction curettage, resection of the scar with gestational tissue and wound repair, hysteroscopy, and hysterectomy.

Administration of methotrexate (MTX) is the most common medical treatment. It has an affirmative effect in treating CSP, but a long-term follow-up for β-human chorionic gonadotropin (β-hCG) concentration and CSP mass is needed to confirm this effect [1,3,4]. Moreover, failed cases with massive bleeding require further surgical treatment, and this may cause many toxic side effects [10,11]. Nowadays, intraarterial injection of MTX combined with arterial embolization of both uterine arteries is often used in patients with severe vaginal hemorrhage. This technique may prevent catastrophic vaginal bleeding, allowing time for definitive surgical management to take place [12]. In certain hospitals or private

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clinics, physicians are not acquainted with CSP, which can result in vacuum evacuation or curettage. Intraoperative or postoperative complications can occur, such as profuse hemorrhage, uterine perforation, shock, and even life-threatening events. The most common is heavy hemorrhage, occurring in approximately 80% of patients [13]. Therefore, the objective of the present study was to describe our experience with management of CSP via operative hysteroscopy.

Materials and methods

Between January 2012 and February 2015, 44 patients with CSP treated with hysteroscopy were included in our study. Transvaginal ultrasonography or magnetic resonance imaging was performed to confirm the diagnosis of CSP (Figure 1A and B), using the criteria proposed by Godin et al [14] as follows: (1) both the uterine cavity and cervical canal were empty; (2) location of the gestational sac or mixed-echo mass in the anterior wall of the uterine isthmus or in the cesarean scar defect (CSD); and (3) a diminished myometrium between the bladder wall and the sac or the mass, or a discontinuity in the anterior uterine muscular tissues. Clinical data, serum β-hCG concentration, myometrial thickness, residual conceptus, CSD, operation time, blood loss, and hospital stay were all recorded and analyzed.

Forty-two patients with a muscular layer $\geq$ 3mm directly underwent hysteroscopic surgery. Hysteroscopy was carried out under general anesthesia with the patient lying in the supine lithotomy position. First, the uterine cavity was examined to exclude a normal intrauterine gestation, and then, if a CSD with an implanted pregnancy was detected, the location, shape, size, and surface vessel of the conceptive tissues were determined.

The operative process varies depending upon the conditions of gestational mass. The systematic steps are as follows: (1) confirmation of the location of gestational tissue through hysteroscopy; (2) aspiration of the uterine conceptus. If the root of villi is implanted with abundant blood supply, the vessels are electrocoagulated by means of bipolar hysteroscopic rolling ball before suction curettage; (3) hysteroscopy once again to check or clear the residual gestational mass; (4) a hysteroscopic rolling ball is then used for hemostasis; and (5) removal of the conceptus directly via operative hysteroscopy is performed in the patients with gestational tissue remaining after medical treatment or suction curettage (Figure 2A) .

Two patients whose muscular layer was <3 mm received hysteroscopy monitored under laparoscopy. The bladder peritoneum was incised firstly, and the bladder was pushed down to prevent damage to the bladder. Under laparoscopy, uterine suction was carried out to remove most of the gestational tissue. Any remnant of the gestational product was removed by hysteroscopy.

Results

The mean age was 32 years (range 24–45 years). The number of previous pregnancies ranged from one to seven, and 48% (21/44) of cases had two previous cesarean deliveries. The time interval between the previous cesarean delivery and the present CSP ranged from 7 months to 21 years (5.7 years on average). Twelve patients (27%, 12/44) with irregular vaginal bleeding after MTX treatment or suction curettage were referred from other institutions. The other 32 patients presented with missed menses accompanied with abdominal pain, bleeding, or no symptoms. The thickness of myometrium varied from 1.7 mm to 11 mm. The thickness of the myometrium of 42 patients was more than 3 mm, and that of the other two patients was 1.7 mm and 2 mm, respectively.

The mean operation time was 34.8 ± 16.5 minutes (range 20–120 minutes), mean blood loss was 35.3 ± 24.4 mL (range 5–100 mL), and mean hospital stay was 5.0 ± 3.01 days (range 1–19 days) (Table 1).

Forty-four patients underwent hysteroscopic removal of gestational mass successfully. Two of them underwent concurrent laparoscopy to prevent bladder injury. There was no case of uterine perforation. Serum hCG dropped to 18% of the preoperative value at 1 week after operation, and declined to normal 1 month later, as well as the uterus reverting to its original state. Two patients had normal intrauterine pregnancy again in 1 month and 3 months after surgery. Two cases in full-term pregnancy underwent cesarean section with epidural anesthesia, and one of them with pernicious placenta previa and placenta implantation was treated by hysterectomy.

Table 2 shows the data comparing with or without CSD. CSD was observed in 31 patients (70%, 31/44) by hysteroscopy. The difference in the number of cesarean section between the two groups was statistically significant ($p = 0.001$). No significant difference was found in the myometrial thickness, operation time, intraoperative bleeding, and the hospital stay. In addition, 20 cases of remained products of conception after suction curettage accounted for 63% (20/32) of the cohort (Figure 2B). This group of 32 patients received prior suction curettage in our hospital. Correlation between the CSD existence and the residues was analyzed by means of Spearman's correlation, and it showed that the existence of CSD

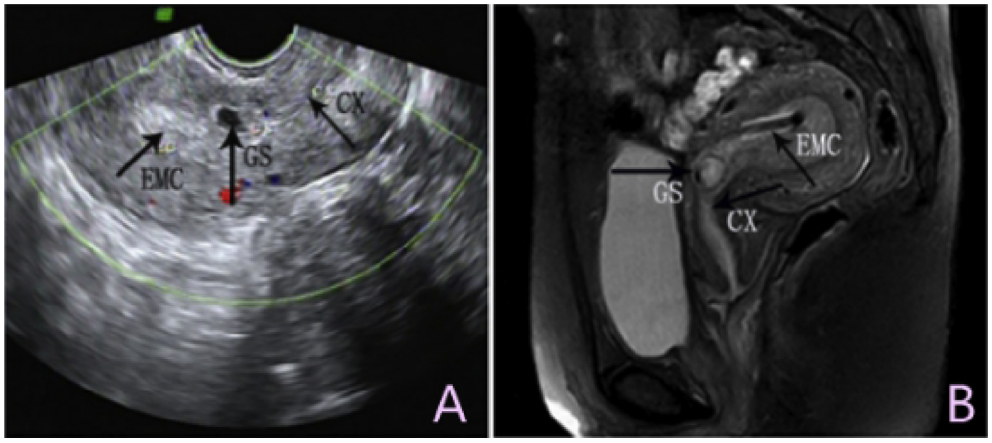

Figure 1. (A) Transvaginal ultrasonography shows a gestational sac (GS) in the lower anterior uterine wall with an empty endometrial cavity (EMC) and cervical canal (CX). (B) Magnetic resonance image shows a gestational sac implanted in the anterior wall of the uterus, and protruded into the uterine cavity.

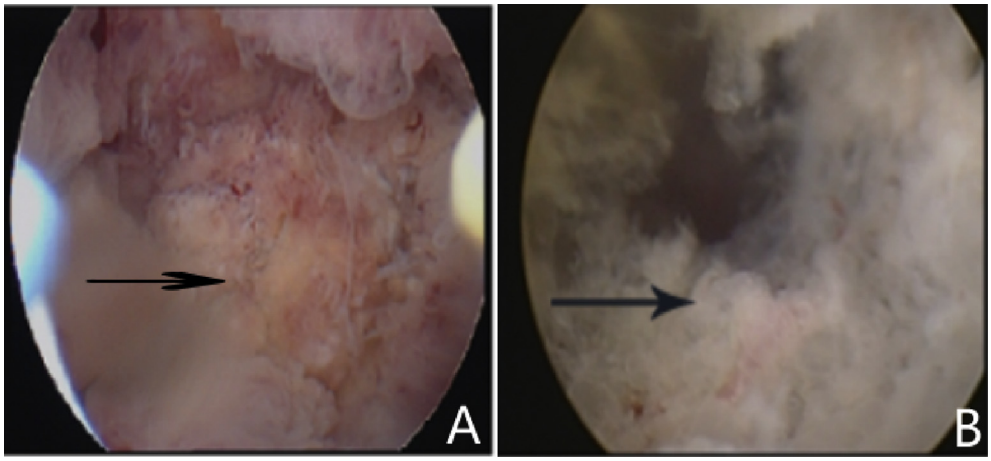

Figure 2. (A) Residues of gestational mass after induced abortion. (B) The hysteroscopy shows plenty of villus retained after uterine aspiration.

Table 1
Clinical date of patients and results of treatment with hysteroscopy.

	Age (y)	Previous pregnancies (*n*)	No. of CS	Interval from last CS (*n*)	Thickness of myometrium (mm)	Operation time (min)	Blood loss (mL)	Hospital stay (d)
Mean	32.2	3.7	1.5	5.7	3.8	34.8	35.3	5
Minimum	24	1	1	0.7	1.7	20	5	1
Maximum	45	7	2	21	11	120	100	19

CS = cesarean section; LSCS = lower segment cesarean section.

Table 2
Comparison of the influence of cesarean scar defect (CSD) on operation.[a]

Group	Cases	No. of CS	Myometrial thickness (mm)	Operation time (min)	Intraoperative bleeding (mL)	Hospital stay (d)
CSD	31	2 (1–2)	3 (1.7–11)	30 (20–120)	20 (5–100)	4 (1–12)
No CSD	13	1 (1–2)	3.4 (2.2–5.5)	30 (20–45)	20 (5–50)	4 (2–19)
Z value		−3.404	−0.454	−1.336	−1.052	−0.688
p[b]		0.001	0.650	0.182	0.293	0.491

[a] Values are given as median.
[b] Mann–Whitney *U* test.

correlated with the conceptus residue ($r = 0.377$, $p = 0.036$) (Table 3).

Discussion

It is well known that CSP is considered to be a rare and dangerous complication of cesarean section. Although the incidence is not high, CSP is associated with life-threatening complications such as uterine rupture, massive hemorrhage, and the need for hysterectomy, with subsequent loss of fertility; therefore, early diagnosis and timely treatment is very important [3,4,15]. Nowadays, the treatment objective for a CSP is to terminate the pregnancy, reduce bleeding, and reserve the patient's fertility. Since Larsen and Solomon first reported CSP in 1978 [16], its etiology and pathogenesis has not been clarified, the most reasonable hypothesis is that the conceptus enters the myometrium through a microscopic dehiscent tract of activity [14]. Because of its rarity and the particularity of growth, management of CSP remains an inadequately explored clinical field, and there is no consensus on it presently. An individualized therapeutic regimen should be applied to treat the CSP, after consideration of relevant patient factors (such as age, myometrial thickness, clinical symptoms, fertility demand, etc.), available facilities, and physicians' skills [17,18].

Every treatment method is characterized by different advantages and disadvantages, and the combination of several methods may in some cases produce a more favorable result. In our study, there were four patients presenting with a live embryo after systemic administration of mifepristone and MTX, who were subsequently treated successfully with hysteroscopy. The patient whose hospital stay was 19 days was referred from other institutions, with irregular vaginal bleeding after suction curettage. She was diagnosed as CSP and embryonic residues in our hospital, and pretreated with mifepristone (200 mg for 3 days) and MTX (25 mg for 2 days). However, she suffered severe side-effects after medical treatment, such as vomiting, nausea, and marrow depression. In addition, her level of hemoglobin was relatively low (72.7 g/L). Therefore, the hysteroscopic surgery had to be postponed in order

Table 3
Correlations between cesarean scar defect (CSD) and the residues.[a]

Residues	CSD		Total
	+	−	
+	17	3	20
−	6	6	12
Total	23	9	32

Spearman's correlation analysis.
[a] The 32 patients had received prior suction curettage at our hospital.

to solve the abovementioned problems. The study by Wang and Tseng [19] suggests that suction curettage is suitable for CSP cases of <7 weeks gestation when implantation of villi into the myometrium is not too deep. Generally, the pregnancy tissue could not be completely cleared by manual vacuum suction curettage, which is in agreement with our findings. Twelve patients with irregular vaginal bleeding after therapeutic abortion were confirmed as conceptus residue via hysteroscopy. In addition, there were 20 cases with gestational mass retained after suction curettage in our research.

As described, suction curettage should not be the only treatment of choice to treat CSP. Our experience indicates that hysteroscopy combined with suction curettage has marked advantages in patients with muscle layer ≥3mm. Hysteroscopy has the advantage of identifying the location of gestational sac or mass and the distribution of blood vessels at the implantation site. As guidance for the vacuum evacuation, it can reduce the risk of massive bleeding and uterine perforation. Furthermore, accurate electrocoagulation of the blood vessels under direct vision is critical to prevent surgical hemorrhage.

In women with a history of cesarean section delivery, 60% had CSD that were in the expected location of a hysterotomy incision [20]; in our study this reached 70%. The suturing techniques in the incisions of cesarean section, uterine retroflexion, and the history of multiple cesarean sections were significantly associated with deficient scars [21,22]. Our study confirmed that the number of cesarean deliveries is associated with the formation of CSD. From Table 2, we can consider CSD may increase the risk of gestational mass remaining. Hysteroscopy has a distinct advantage in that point, which can completely resect the gestational mass, significantly shortening the time for β-hCG drop to a normal level and the hospital stay. In addition, it allows for preservation of the patient's fertility, with two patients of our series becoming pregnant during follow-up within half a year.

It is safer to perform hysteroscopy under laparoscopic guidance in the patients with muscle layer < 3mm. Severe pelvic adhesions may have occurred after cesarean section, coupled with a thin myometrium of the lower uterine segment. Therefore, there is a significant risk of uterine perforation and bladder injury during hysteroscopy. However, these complications are usually well avoided in laparoscopy assisted hysteroscopy. Furthermore, even if the uterus is perforated, the cesarean scar can be effectively resected along with its gestational tissue and repaired laparoscopically.

However, it is interesting to note that no changes were observed in the myometrial thickness of the cesarean scar and the existence of CSD after hysteroscopy, which may result in the second CSP during the next pregnancy. One patient (2.3%) had a CSP again 2 months later in our study, although some research has shown that the incidence was relatively low [11,23].

Conclusion

From the treatment experience of our 44 patients, we advocate hysteroscopic treatment to be the first-line therapy of CSP (myometrium thickness ≥3mm). It is a safe and effective treatment with shorter operation and hospitalization time, less intraoperative bleeding, faster recovery, and without severe complications. Hysteroscopy can confirm the diagnosis of CSP, prevent the side effects of MTX, and seems to be an optimal surgical management in patients who desire preservation of fertility. By contrast, because the CSD may increase the incidence of CSP, we should improve the method and technique of suture and reduce the number of cesarean sections to reduce the occurrence of CSD, thus ultimately decreasing the incidence of CSP.

Conflicts of interest

The authors have no conflicts of interest relevant to this article.

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