

## Original Article

# Successful management of cesarean scar pregnancy with vacuum extraction under ultrasound guidance

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**Aim:** Cesarean scar pregnancy (CSP) is a rare type of ectopic pregnancy. The gestational sac is implanted in the myometrium at the site of a previous cesarean section. Mothers with CSP are faced with risks of unpredictable massive bleeding or more fatal complications. The purpose of this retrospective study was to assess the feasibility, efficacy, and reliability of the intraoperative ultrasound-guided vacuum aspiration method as an effective treatment option for CSP.

**Methods:** We undertook a retrospective analysis of CSP patients who had undergone the vacuum aspiration method, by reviewing patient records from the period October 2015 to January 2018. All of the operations were carried out under general anesthesia, with patients in the lithotomy position, using suprapubic ultrasonography guidance. A vacuum aspirator was used to aspirate the whole pregnancy material without perforating the previous cesarean section scar.

**Results:** Ten women with CSP were managed successfully by ultrasound-guided vacuum extraction without complications or further interventions, such as reoperation or methotrexate administration. Three of the 10 patients needed uterine Foley catheter tampon (50 cc) for 4 h after vacuum extraction alone was applied. During the study period, two additional patients who did not meet the criteria for the vacuum extraction method alone were managed with methotrexate plus vacuum application. Because of the rarity of the condition, the majority of CSPs are case reports or small case series reported in published works, with no consensus on the preferred course of treatment.

**Conclusion:** The vacuum extraction method seems to be a good and practical way of treating CSP. Comparisons of efficacy should be undertaken but large sample sizes are required. We hope this study brings a new perspective for larger sample-sized studies, considering the technique is feasible and applicable.

**Key words:** cannula, cesarean scar, cesarean scar pregnancy, ectopic pregnancy, vacuum extraction

## INTRODUCTION

CEASAREAN SCAR PREGNANCY (CSP) is a rare type of ectopic pregnancy, which is defined as the embryo implanting in a previous lower segment cesarean section (C/S) scar.<sup>1</sup> In CSP, the gestational sac is implanted in the myometrium at the site of a previous C/S. It is important to be able to diagnose the condition as early as possible in order to provide treatment.<sup>2</sup> Mothers with CSP are faced with risks of unpredictable massive bleeding or more fatal complications, such as uterine rupture, hemorrhagic shock, and mortality.

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The first case of CSP was reported in 1978 by Larsen and Solomon.<sup>3</sup> With the increasing trend in C/S rates and the improvement of diagnostic technology, the incidence of CSP is increasing, which is estimated to range from 1:1,800 to 1:2,216.<sup>4</sup> According to data from the Organisation for Economic Cooperation and Development, Turkey's cesarean rate is 531 per 1,000 deliveries, which is the highest among comparable countries.<sup>5</sup> Because of the incremental trend in C/S, the CSP rate is also expected to rise.

Patients with CSP are at risk for uterine rupture and potentially life-threatening hemorrhage, which may lead to hysterectomy, with dramatic consequences for their reproductive future. Because of the rarity of the condition, most CSPs have been published as case reports or small case series.

The treatment experience is based mainly on case series, and thus no therapeutic protocols have been established universally.<sup>6</sup> The purpose of this retrospective study was to assess the feasibility, efficacy, and reliability of the intraoperative ultrasound-guided vacuum aspiration method as an effective treatment option for CSP.

## METHODS

WE UNDERTOOK A retrospective analysis of CSP patients using records from the Department of Obstetrics and Gynecology at Bülent Ecevit University Training and Research Hospital (Zonguldak, Turkey) for the period between October 2015 and January 2018. This study was approved by the Ethics Committee of Bülent Ecevit University Faculty of Medicine, and written informed consent from each patient was obtained before treatment.

The diagnosis of CSP was based on patient's history, physical examination, increased levels of serum  $\beta$ -human chorionic gonadotropin ( $\beta$ -hCG), and ultrasonography findings. The preoperative diagnosis was made on the basis of transvaginal ultrasound, visualizing an enlarged hysterotomy scar with an embedded mass, which may bulge beyond the anterior contour of the uterus.<sup>7–9</sup> Other findings include presence of trophoblasts between the bladder and the anterior uterine wall, no fetal parts in the uterine cavity, absence of myometrium between the gestational sac and the bladder, Doppler evidence of perfusion of the peritrophoblastic vasculature, and discontinuity of the anterior uterine wall in the sagittal plane.<sup>1,10,11</sup>

Data were abstracted from the original hospital charts, operation notes, doctor progress notes, discharge summaries, nursing notes, and outpatient medical records. Intraoperative estimated blood loss was noted routinely in these kinds of operations in our clinic, calculated by measuring the aspirator volume after the operation.

Selection criteria of patients for our vacuum extraction method were: pregnancies <8 weeks gestation,  $\beta$ -hCG level <10,000 mIU/mL, hemodynamically stable patients, no sign of rupture of uterus.

The patients who did not meet the criteria for the vacuum extraction method were treated with intramuscular methotrexate (MTX) plus the vacuum extraction technique, if they were hemodynamically stable.

If the patients were not hemodynamically stable or rupture of previous uterine incision scar was diagnosed, then laparotomy was applied in order to extract the ectopic material and undertake primary repair of the uterine rupture. However, if it had been impossible to repair ruptured previous cesarean incision during laparotomy in hemodynamically unstable patients, then we would have carried out hysterectomy. Fortunately, that scenario did not happen, as all of the cases were recognized during the first trimester.

All of the operations were carried out in the operating theater, under general anesthesia, with the patient in the lithotomy position, using suprapubic ultrasonography guidance. A vacuum aspirator was connected to the general aspiration system with a maximum pressure generated of  $-500$  Pa to aspirate the whole pregnancy material without perforating the previous cesarean scar of the uterus. Flexible Karman cannulae 4, 5, and 6 mm (Plasti-Med, Istanbul, Turkey) were used with the vacuum aspirator, in conjunction with applicable adaptors. Operations lasted for approximately 20 min. In cases of intractable uterine hemorrhage after

**Table 1.** Features of patients with cesarean scar pregnancy in our clinic

Case	Preop Hgb (g/dL)	Preop $\beta$ -hCG (mIU/mL)	Intraop estimated blood loss (mL)	Hospital stay (days)	Erythrocyte transfusion (unit)	Gravidity; parity	Number of previous C/S	Gestational age (weeks + days)
1	11.2	3,412	100	5	0	G2P1	1	5 + 1
2†	10.1	4,211	125	5	1	G2P1	1	5 + 2
3	12.4	5,610	100	4	0	G2P1	1	6 + 1
4†	10.4	1,255	50	3	1	G3P2	2	5 + 1
5	11.0	6,534	110	5	0	G3P2	2	6 + 2
6	12.1	8,452	100	4	0	G3P2	2	7 + 0
7†	9.6	7,451	90	6	1	G2P1	1	7 + 1
8	10.2	8,420	60	3	0	G2P1	1	7 + 4
9	11.1	7,569	85	4	0	G3P2	2	6 + 4
10	9.7	5,421	74	3	0	G2P1	1	5 + 5
11‡	10.5	13,700	180	6	0	G3P2	2	8 + 1
12‡	10.9	14,500	150	7	0	G4P3	2	8 + 3

†Patients who needed uterine 18-Fr gauge Foley catheter tampon (50 cm<sup>3</sup>) for 4 h after vacuum extraction alone applied.

‡Patients who were managed by intramuscular methotrexate plus vacuum extraction.

$\beta$ -hCG,  $\beta$ -human chorionic gonadotropin; C/S, cesarean section; Hgb, hemoglobin; Intraop, intraoperative; Preop, preoperative.

vacuum extraction of the CSP, an 18-Fr gauge Foley catheter balloon tamponade (50 cm<sup>3</sup>) was used for 4 h.

## RESULTS

**A** TOTAL OF 12 women with CSP were enrolled in this retrospective study, as shown in Table 1. Ten of the 12 patients were successfully managed with the ultrasound-guided vacuum extraction method, without further interventions, such as reoperation or MTX. Three of the 10 patients needed uterine 18-Fr gauge Foley catheter balloon tamponade (50 cm<sup>3</sup>) for 4 h after vacuum extraction.

In our study, as shown in Table 1, there were two patients who did not meet the criteria for the sole application of the vacuum extraction method in our retrospective data. The two patients'  $\beta$ -hCG values were 13,700 and 14,500 mIU/mL. They were managed successfully by intramuscular MTX at one dose, calculated by 50 mg/m<sup>2</sup>, plus the vacuum extraction method.

All of the patients with CSP in this study (12 patients in total: 10 who underwent vacuum extraction alone and two treated with MTX plus vacuum extraction) were followed for at least for 6 months. None of them was admitted to the clinic for further treatment.

## CONCLUSION

**I**N A SUBSEQUENT pregnancy of women who previously underwent C/S, the new gestation can implant in the previous cesarean section scar and result in CSP. Rates of C/S have been rising in recent years, especially regarding the medicolegal issues in obstetrics, therefore the incidence of CSP is rising as well.

Because of the rarity of the condition, the majority of CSPs are published as case reports or small case series, with no consensus on the preferred course of treatment. Generally, termination of pregnancy in the first trimester is strongly recommended, as there is a high risk of subsequent uterine rupture, massive bleeding, and life-threatening complications.

The optimal treatment for CSP is unclear and therapy should be adjusted to the patients' clinical presentation and preference of fertility preservation.

A patient who shows signs of hemorrhage or hemodynamic instability will require surgical intervention, such as laparotomy, laparoscopy, or possible hysterectomy.<sup>1,12</sup> In a hemodynamically stable patient, treatment generally involves the vaginal route, such as dilation and curettage, hysteroscopy and suction evacuation or MTX therapy, or uterine artery embolization.<sup>2,6,13</sup> A combination of local injection under ultrasound guidance and systemic MTX was

found to be effective in a series of 26 cases of CSP.<sup>4,14</sup> Treatment with MTX alone could be used in surgically difficult and risky parts of the uterus, such as cornual pregnancy;<sup>15</sup> however, for CSP, MTX alone is not adequate, according to our clinical experience. Operative hysteroscopy is also a viable surgical intervention.<sup>16,17</sup> However, there are insufficient reports and data to suggest which approach is most effective.

Although treatment of first trimester CSP does not usually result in diffuse vaginal or intra-abdominal hemorrhage, there have been reports of severe bleeding complications following treatment. In these cases, adjuvant use of an inflatable Foley balloon catheter to treat or restrain massive blood loss has been reported.<sup>7,18</sup> We also used this technique in three of our patients after vacuum extraction to prevent active hemorrhage.

In our study, the selection criteria of patients for our vacuum extraction method were: pregnancy <8 weeks gestation,  $\beta$ -hCG levels <10,000 mIU/mL, hemodynamically stable patients, and no signs of rupture of the uterus were diagnosed.

There were two patients who did not meet the criteria mentioned above in our retrospective data, in that their  $\beta$ -hCG values were >10,000 mIU/mL. They were managed successfully by intramuscular MTX and the vacuum extraction method.

Suction curettage is also a good and practical treatment in CSP, but it might be insufficient in some cases and adjuvant MTX could be needed.<sup>8,13</sup> The suction power of the vacuum evacuation technique is much more powerful than conventional suction curettage, so our patients, who met the criteria, did not need adjuvant MTX.

Our research has some limitations; for instance, the sample size was small, so we could not claim our technique to be universally applicable to all patients with CSP. Also, because of the small sample size, statistical analysis could not be carried out to compare with other techniques. It could be much more informative, for future research, if all of the patients were followed until their later pregnancies, and data could be reported.

We hope this study will provide a new perspective for studies with larger sample sizes, considering our technique was shown to be feasible and applicable.

In conclusion, vacuum evacuation therapy is a feasible treatment for CSP. It is suitable for hemodynamically stable CSP patients in their first trimester. Adjuvant treatments are not required.

## DISCLOSURE

Approval of the research protocol: The protocol for this (retrospective) research project was approved by the Ethics

Committee of Zonguldak Bülent Ecevit University, Faculty of Medicine, Approval No. 2018-123-/25/04. It conforms to the provisions of the Declaration of Helsinki.

Informed consent: Written informed consent was obtained from each patient before treatment.

Registry and the registration no. of the study/trial: Zonguldak Bülent Ecevit University, Faculty of Medicine, Zonguldak, 67100, TR, 2018-123-/25/04.

Conflict of interest: The authors declare no conflict of interest.

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