

Scope and Suction: Hysteroscopic-guided Suction Evacuation of Cesarean Scar Pregnancy – A Safe and Efficacious Treatment for Selected Patients

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Abstract

Objectives: This study aimed to evaluate hysteroscopic-guided suction evacuation for the treatment of cesarean scar pregnancy (CSP).

Materials and Methods: This was a retrospective analysis of CSP over 2 years. This study was conducted at KK Women's and Children's Hospital (KKH), Singapore, thirty-seven patients with a CSP. Hysteroscopic-guided suction evacuation to treat CSP used alone or in combination with laparoscopy depending on residual myometrial thickness (RMT) and future fertility requirements.

Results: The majority of women (29) were diagnosed under 9-week gestation. Just over a third (13) had an RMT of more than 3 mm. Women with an RMT <3 mm had added laparoscopy. In total, 22 women had hysteroscopic-guided suction evacuation with 9 having it performed under laparoscopic guidance because the RMT was under 3 mm. The remaining patients underwent either laparoscopic repair (5 cases) or vaginal repair (1 case) done under laparoscopic guidance.

Conclusion: Hysteroscopic-guided suction evacuation of CSP has the potential to become part of the routine management for uncomplicated cases of CSP in women with an RMT of greater than 3 mm who do not wish for future pregnancy. Its use, in combination with other minimally invasive techniques, can be extended to more complex cases where the RMT is <3 mm and future fertility is desired.

Keywords: Cesarean scar defect, cesarean scar pregnancy, hysteroscopy, laparoscopy, residual myometrial thickness

INTRODUCTION

Cesarean section rates continue to rise although large regional variations do exist.^[1,2] Cesarean section scars may result in areas of myometrial deficiency and the development of a lower uterine niche, or cesarean scar defect (CSD) which can be described in terms of shape, depth, residual myometrial thickness (RMT), and adjacent myometrial thickness.^[3,4] An RMT <2.2 mm is associated with pregnancy complications including uterine rupture and placenta accrete spectrum disorders.^[5] The CSD may form the implantation site of a future pregnancy where there is a lack of the Nitabuch layer which leads to unopposed trophoblastic growth into the myometrium. In clinical terms, cesarean scar

pregnancy (CSP) occurs when the gestational sac implants in the myometrial defect at the site of a previous uterine incision.^[6]

To date, there have only been five randomized studies on CSP,^[7] and evidence-based management remains unclear.^[8-10] Until definitive guidance becomes available, treatment has to be individualized according to clinical presentation, β -hCG levels, imaging features, RMT, and surgeon's skill. Most surgical treatments involve a hysteroscopic or laparoscopic technique or a combined approach, particularly if the RMT is <3 mm. Hysteroscopic resection techniques are not suitable for women with an RMT <3 mm who desire future

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fertility who need a repair through a laparoscopic or vaginal approach.^[11]

We looked retrospectively at the women attending the early pregnancy assessment unit (EPAU) at KKH who were diagnosed with a CSP and underwent either hysteroscopy with suction evacuation alone or under laparoscopic guidance if the RMT was <3 mm with or without defect repair.

MATERIALS AND METHODS

KKH is the largest tertiary maternity unit in Singapore with a delivery rate of approximately 12,000/year and a commensurate number of gynecological attendances. Patients with early pregnancy problems are seen in the EPAU where they are triaged according to provisional diagnosis. Referral sources include family physicians, polyclinics, the private sector, or following early pregnancy dating revealing a complication. After history taking and examination, blood investigations are performed and a pelvic scan. Transvaginal ultrasound is the diagnostic modality of choice for early pregnancy problems including CSP although 3D ultrasound and magnetic resonance imaging are available to aid in diagnosis if the images with TVS are unclear. The following US criteria are used to diagnose a CSP:^[12] (1) gestational sac or the solid mass of trophoblast located anteriorly at the level of the internal os embedded at the site of the previous lower uterine segment cesarean section scar, (2) an empty uterine cavity, (3) a thin or absent layer of myometrium between the gestational sac and the bladder, (4) abundant peritrophoblastic blood flow in the area of the gestational sac as demonstrated by low pulse repetition Doppler study, and (5) an empty endocervical canal.

Following confirmation of a CSP, patients are referred to the cesarean scar clinic which is run by a multidisciplinary team including minimally invasive surgeons, maternal–fetal medicine specialists, and radiologists

Management options are discussed depending on the patient's age and fertility wishes, fetal viability, and RMT as well as hemodynamic stability.

With SingHealth Centralised Institutional Review Board approval (2021/2720) and informed consent, if the patient was stable, the CSP was unruptured and the RMT was >3 mm, hysteroscopic-guided suction evacuation, as described below, was offered with the addition of laparoscopic guidance, if the RMT was <3 mm with the possibility of proceeding to either laparoscopic or vaginal repair of CSP should complications arise or the patient was expressing a wish for future pregnancy.

Hysteroscopic-guided suction evacuation

The procedure was performed under general anesthesia. A gemeprost (Cervagem) pessary was inserted at least 2 h preoperatively for cervical preparation.

At the time of induction of general anesthesia, 1 g IV tranexamic acid was given; and at the commencement of the surgery, if there was no anesthetic contraindication, 0.25% pitressin (20 unit is in 160 ml 0.9% NaCl) was injected into the cervix at the 5 and 7 “o” clock positions to a total of 5–10 ml with the aim of decreasing perioperative blood loss.

A 0.9% NaCl 5.5-mm hysteroscope was then inserted through the external os and slowly advanced to the level of the scar pregnancy and the distance between the scar pregnancy and external os was measured using the hysteroscope and index finger as shown in Figure 1.

The hysteroscope was then further advanced to allow visualization of the uterine cavity above before being slowly withdrawn back to the level of the CSP where the NaCl jet flow from the hysteroscope was used to hydro dissect the sac and contents from the uterine wall. This “hydro compression” further reduced the blood loss.

The hysteroscope was then removed and a size 6 or 7 suction catheter with tubing was placed at the external os and gently advanced to reach the CSP at the previously measured distance [Figure 2] and suction was applied for between 3 and 5 min. This not only resulted in the suction of the products of conception but also stopped the bleeding by collapsing abnormal vessels. The suction catheter was then advanced into the uterine cavity and withdrawn slowly toward the CSP area when again suction was applied for a further 3–5 min.

The hysteroscope was then reinserted to check the niche for any residual products of conception which could be retrieved by further suction or with a hysteroscopic grasper or scissors. Figures 3 and 4 show the hysteroscopic appearances of the CSP area preoperatively and postevacuation. If there was persistent bleeding at the end of the procedure, a Foley catheter was inserted into the cervical canal and the balloon was inflated at the level of the niche providing compression to any bleeding vessels and causing ischemia of any remnant trophoblastic tissue at the CSP site. This was removed after 8 h. The total estimated blood loss was recorded at the end of the procedure.

The patients were discharged the following day, if stable, with arrangements to be reviewed in the CSP clinic with a beta-hCG level 4 weeks later to ensure resolution.

All patients who were diagnosed with a CSP between April 2020 and May 2022 were included in this retrospective cross-sectional observational study. Demographic features, beta-human chorionic gonadotropin (beta-hCG) levels, US features of CSP, treatment modalities, complications, and estimated blood loss were obtained from the patient's records [Table 1 and Figure 5].

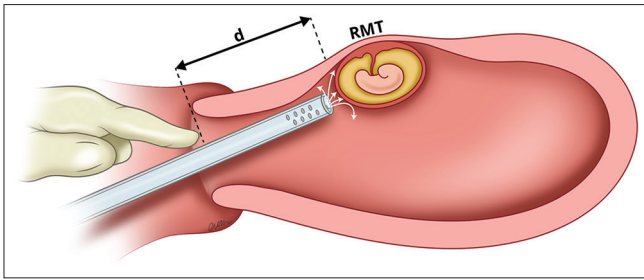


Figure 1: Measuring the distance (d) of the cesarean scar pregnancy location from the external os. RMT-Residual myometrial thickness

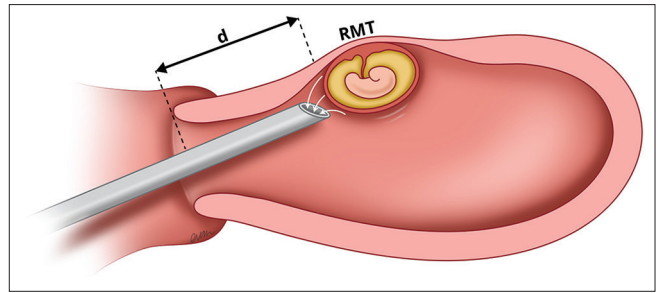


Figure 2: Demonstrating the placement of the suction evacuation to suck out the cesarean scar pregnancy. RMT: Residual myometrial thickness

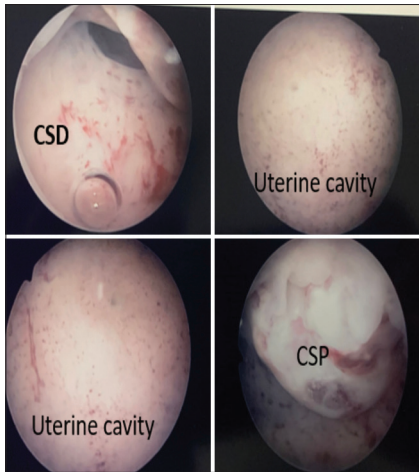


Figure 3: Hysteroscopic appearance of the cesarean scar pregnancy before suction evacuation. CSD: Cesarean scar defect, CSP: Cesarean scar pregnancy

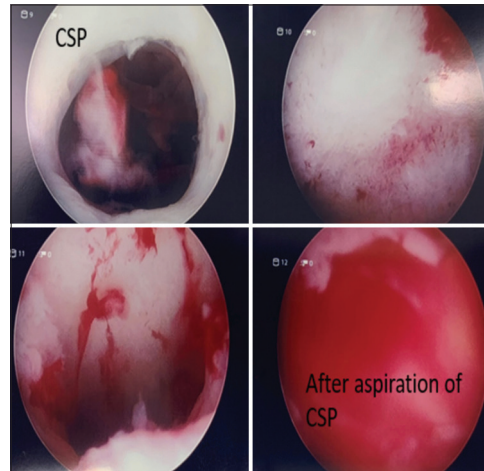


Figure 4: Hysteroscopic appearance of CSD after the evacuation of cesarean scar pregnancy. CSD: Cesarean scar defect

RESULTS

In total, 37 patients were diagnosed as having CSP between May 2020 and June 2022. After the exclusion of three patients, who opted to continue the pregnancy despite rigorous counseling on the intrinsic risks and were subsequently monitored in the high-risk antenatal clinic and delivered by the obstetric “accrete team,” the treatment outcomes of 34 patients were available for the final analysis. The general clinical features of the study group are summarized in Table 1.

Of the 34 patients initially diagnosed with a CSP and entered into the study, 12 (35.3%) were more than 39 years old and 24 (70.5%) had had two cesarean sections or more. The majority (28) were diagnosed under 9-week gestation with more than half having a beta-HCG level >10,000iu at presentation despite 52.9% having a negative FH at diagnosis. Only 13 (38.2%) of the women had an RMT of more than 3 mm. Women with an RMT <3 mm were still eligible for inclusion but with added laparoscopy.

In total, 22 women had hysteroscopic-guided suction evacuation with 9 having it performed under laparoscopic guidance because the RMT was <3 mm. The remainder

of patients having laparoscopy had either laparoscopic repair in 5 patients and one repair being done vaginally under laparoscopic guidance. The median blood loss in the hysteroscopic-guided suction evacuation cohort alone was 50 ml. Among the remaining six women, two had methotrexate, three had a laparotomy, and one was finally diagnosed with a miscarriage [Surgical Flow Chart 1].

DISCUSSION

The occurrence of CSP is closely related to the cesarean section rate with a previous review reporting an estimated incidence of CSP of between 1 in 1800 and 2600 pregnancies globally, which represents 6% of all ectopic pregnancies in women with prior cesarean delivery.^[13] The diagnosis of CSP is increasing due to advances in imaging and heightened clinical awareness and experience, as afforded by dedicated EPAU’s which triage early pregnancy abnormalities. Management under 9 weeks has been associated with lower maternal morbidity.^[14] In our series, the majority of cases diagnosed before 9 weeks with an RMT of more than 3 mm were managed by HSE alone with an estimated median blood loss was 50 ml [Figure 5]. This finding emphasizes the importance of early diagnosis to achieve the best outcome supporting evidence that women pregnant after a

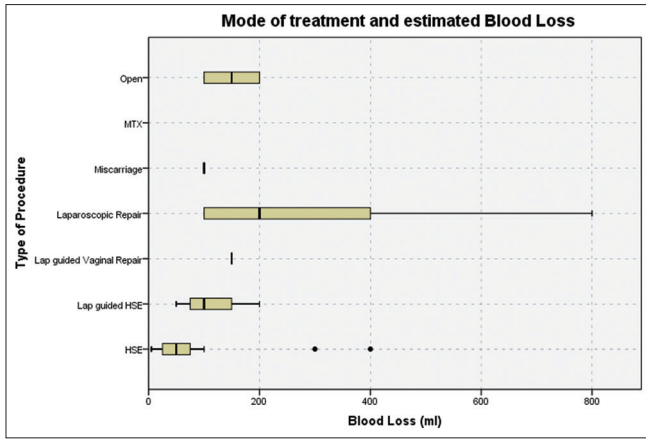


Figure 5: Mode of treatment and estimated blood loss

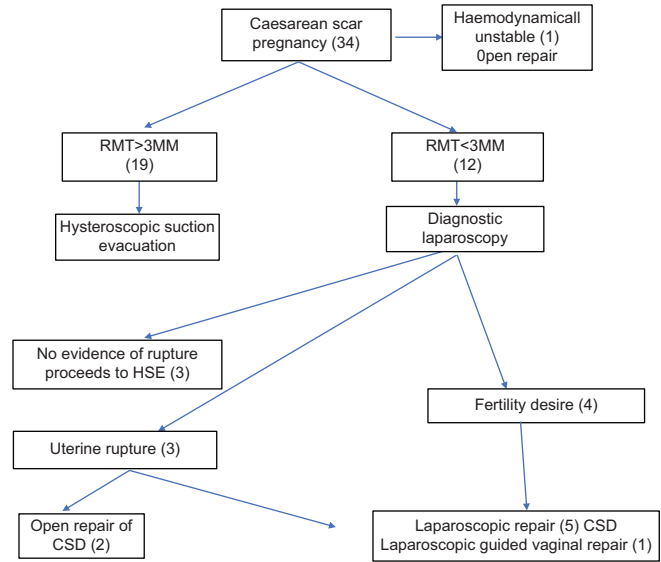
previous cesarean delivery should be screened early in the first trimester of pregnancy.^[14] We arbitrarily chose to differentiate women under and over 39 years on the assumption that women over 39 years have a lower chance of spontaneous conception and with a history of one or more cesarean sections and the chance of recurrence of a CSP are less likely to consider scar revision for future fertility.

This small retrospective study shows that in well-selected cases, hysteroscopic-guided suction evacuation is a safe and efficacious method of treating CSP which can be offered in a single setting.^[15-17] There are several in-built features to reduce blood loss including the administration of tranexamic acid at induction, cervical infiltration with pitressin before inserting the hysteroscope, hydro dissection during gestational sac dislodgement, and the option of inserting a Foley catheter postoperatively. It has advantages over simple dilatation and evacuation in that it allows localization of the pregnancy and visualization to ensure completeness, especially if a grasper or scissors are required. However, it does have the drawback that, by avoiding the resection often involved in the minimally invasive approach, it does not allow contemporaneous myometrial defect repair which leaves the risk of recurrence and other niche-related problems in the future.

Hysteroscopic-guided evacuation is mainly focused on managing the CSP. While not requiring specialist minimally invasive surgery training, it does need practice and general gynecological training to avoid the risk of complications and should be performed in a center with backup facilities including availability of laparoscopy/laparotomy and even interventional radiology with embolization should complications such as uncontrollable bleeding or perforation occur.

Study limitation

The main limitation of this study arises from its retrospective nature and its focus on one surgical approach meaning comparisons to other available methods could not be made.



Surgical Flow Chart 1: Surgical flow chart with the number of cases

Table 1: Description of cesarean scar pregnancy

	n (%)	Mean ± SD/median, IQR (25%-75%)
Age (years)		38±3/38 (35-40)
≤39	22/34 (64.7)	36±2/36 (34-38)
>39	12/34 (35.3)	41±2/41 (40-42)
Previous LSCS		
1	10/34 (29.4)	
2	15/34 (45.5)	
3	6/34 (17.6)	
4	3/34 (8.8)	
GA (weeks)		6.2±1.2/5.9 (5.3-6.5)
<9	28/29 (96.6)	6.0±1.0/5.9 (5.3-6.5)
>9	1/29 (3.4)	9.7 (NA)
Cardiac activity		
Present	16/34 (47.1)	
Absent	18/34 (52.9)	
RMT (mm)		
<3	21/34 (61.8)	
>3	13/34 (38.2)	
BHCG level (iu)		
<10,000	14/34 (41.2)	
>10,000	20/34 (58.8)	

SD: Standard deviation, IQR: Interquartile range, LSCS: Lower segment cesarean section, GA: Gestational age, RMT: Residual myometrial thickness, NA: Not available, BHCG: Beta-human chorionic gonadotropin

CONCLUSION

We advocate that hysteroscopic-guided evacuation be another technique added to the armamentarium of management options for unruptured CSP with an RMT of more than 3 mm with the added advantage over the suction evacuation of direct visualization to allow precision and completion of the

procedure. Its use can be extended for use in women with an RMT <3 mm but with laparoscopic guidance. It is particularly useful for women who do not want future fertility and have no preexisting niche-related complaints.

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Conflicts of interest

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