

ABSTRACT

Minimal Access Surgery in Cesarean Scar Pregnancy: Challenges, Outcome and Road Ahead

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ABSTRACT

Introduction: The incidence of cesarean scar pregnancies (CSPs) has increased worldwide due to increase in cesarean deliveries. Laparoscopic management is an effective strategy to deal with CSP resulting in immediate recovery, remediation, and repair of the cesarean scar defect. The diagnosis and management of CSP are challenging, and awareness of this condition is needed among the patients and obstetricians.

Aims and objectives: To study preventable factors, role of minimal access surgery, and outcome in CSPs over a period of 2 years.

Materials and methods: It is a retrospective cohort study in which patient's demographic characteristics, previous obstetric and surgical record, β -hCG, USG parameters, clinical presentation, contraception, etc., were studied.

Results: Eleven cases of CSPs were admitted in a tertiary care hospital from 2019 to 2021. Median maternal age was 28 years with a median parity of two. The most common presenting symptom was vaginal bleeding. Nine out of eleven cases were successfully managed by laparoscopy. Hysteroscopy and ultrasonography were found very useful intraoperatively. Two patients required exploratory laparotomy. One patient had an intrauterine pregnancy following the CSP.

Conclusion: Minimal access surgery remains the mainstay for the treatment of CSP in stable patients. Hysteroscopy and ultrasonography could be very useful during laparoscopic management of CSP. Cesarean scar pregnancy preventable factors are to be taken into consideration while performing cesarean section as the CSP incidence is increasing.

Clinical significance: This study will help in finding out risk factors to CSP. Preventive factors of CSP, if studied further in detail, can help in reducing the incidence of this dreadful pathology. Early diagnosis and timely intervention with the help of minimal access surgery can save young women from losing their fertility.

Keywords: Cesarean scar pregnancy, Hysteroscopy, Laparoscopy minimal access surgery.

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INTRODUCTION

Cesarean scar pregnancy (CSP) is a rare type of ectopic pregnancy where the embryo implants at the site of previous cesarean scar. The reported incidence of CSP is ~1:1800–1:2216.^{1,2} It is of two types endogenous and exogenous. When pregnancy grows toward the uterine cavity, it is called as endogenous CSP, and when pregnancy grows toward the bladder, it is known as exogenous CSP. The risks and complications associated with this condition are severe in nature, those are ruptured uterus, massive hemorrhage, bladder involvement, etc. Continuation of pregnancy further may lead to morbidly adherent placenta and life-threatening complications.³

The incidence of cesarean section has increased worldwide due to various reasons, and so the incidence of CSP has increased significantly in the past decade. This is just a tip of an iceberg raising alarm worldwide. Various conservative and surgical methods have been tried till date, but the standard protocol for management of CSP is yet to be formed.⁴

Advanced minimal access surgery inclusive of laparoscopy and hysteroscopy has provided a ray of hope in the successful management of CSP with less morbidity and quick recovery. Preventable factors, early diagnosis, skills of minimal invasive surgery, and guidelines need to be formed to counter this dreadful condition on priority basis.

Currently, knowledge on the exact etiological factors for CSP is limited though multiple theories have been put forth. Wound healing due to multiple factors like infection, anemia, misalignment,

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etc., causes cesarean scar defect in the anterior wall of the lower uterine segment.^{5–7}

Insufficient decidualization enhances the process of implantation through defective scar site causing invasion through myometrium. Quality of suture material, techniques of suturing, and surgical sterility play an important role in repair at scar site. Various other factors like total number of cesarean sections, dilatation and curettage procedures, short intervals between the present and last pregnancy, cesarean section during labor, planned elective cesarean sections, etc., have been correlated with a higher risk of CSP by different authors.⁸ Various conservative and surgical modalities have been tried while managing CSP with limited success. Since the management part has not been clear among the

treating clinician, it poses a great threat to the patient's life. This study has been planned to evaluate the laparoscopic management of CSP and its outcome with the aims and objective to study the efficacy and outcome of laparoscopic management of CSP and to study the demographic characteristics and various etiological factors leading to CSP.

MATERIALS AND METHODS

This was a retrospective study. It was conducted in the Department of Obstetrics and Gynecology at a tertiary healthcare center over a period of 2 years. Patients with diagnosed CSP were included in the study after satisfying inclusion and exclusion criteria.

CSEP diagnostic criteria advocated on USG.

- Empty uterus with clearly visualized endometrium.⁹
- Empty cervical canal.⁹
- Gestational sac implanted in the lower anterior uterine segment at the presumed site of cesarean section incision site.¹⁰
- Thin or absent myometrium between the gestational sac and the bladder.¹¹
- Doppler flow at the previous caesarean scar and negative-sliding organ sign.^{12,13}

Inclusion Criteria

- Patients with a history of at least one previous CS with β -hCG >5000 IU.
- Diagnosed case of CSP on ultrasonography.
- Consented for laparoscopic management.
- Desirous of future pregnancy.
- Gestational age <12 weeks.

Exclusion Criteria

- Chronic medical disorder for which patients were not fit for the laparoscopic surgery.
- Patient willing for conservative medical management.

Routine history, including demographic characteristics, presenting complaints, etc., was recorded in an approved proforma. Routine blood investigations and serum β -hCG levels were noted. Gestational age on USG was recorded. Diagnosis inferred from the above investigations was analyzed in the study. Surgical management was carried out as per the multimodality approach, i.e., use of minimal access surgery, hysteroscopy, laparoscopy, and cystoscopy along with ultrasonography. The defective scar was excised, and the underlying uterine wall repair was done with intracorporeal suturing.

Maternal outcomes in the form of successful laparoscopic management, repair of organs like bladder, bowel, ureter, hemorrhage requiring blood transfusion, ICU management, follow-up clinical examination, onset of regular menstrual cycles, and future pregnancy outcome were recorded.

RESULTS

All the patients enrolled in the study underwent laparoscopic management of CSP. The average age of the patients in the study was 28 years. Nine patients had undergone one cesarean section in the past. Nine patients presented with anemia with Hb <10 gm/dL. Six patients presented with gestational age less than 7 weeks, while five patients presented after 8 weeks of gestation. Nine patients presented with β -hCG >10000 IU. Patients with CSP were admitted with complaints of vaginal bleeding or pain in the abdomen, but

Table 1: Patients with history of previous cesarean section and D&C

Procedure	Number of patients
LSCS-1	9
LSCS-2	2
D&C before LSCS	2
D&C after LSCS	5

Table 2: Duration between previous cesarean section and current pregnancy (years)

Time elapsed since last LSCS	Number of patients
12–18 weeks	3
18–24 weeks	3
>24 weeks	5

Table 3: Cesarean section—emergency during labor/elective

LSCS	Frequency	Percent (%)
Emergency LSCS during labor	3	27.27
Elective LSCS (not in labor)	8	72.72

the majority of them (54.5%) presented with no symptoms on admission. A total of seven patients provided a history of dilatation and curettage (D&C) for termination of pregnancy in the past. Five patients had undergone D&C after cesarean section (Table 1).

Eight patients had a history of elective cesarean section in the past. All the patients were not aware of the importance of birth spacing after cesarean section, and hence the contraceptives were not used regularly by them. Six patients conceived within 24 months of the last cesarean section (Table 2).

In our study, nine (81%) patients underwent cesarean section electively at term in the past (Table 3).

Seven patients required blood transfusion during surgery, while two patients had undergone exploratory laparotomy for bladder repair. Both these patients presented with gestational age of more than 10 weeks with higher β -hCG levels and significant-size CSP on admission. These two patients were managed in the surgical ICU for 2 days. Overall, nine patients were managed successfully through laparoscopic surgery. The average blood loss noted was 100–300 mL, and surgery duration was 90–120 minutes. Only one patient produced a discharge summary or surgical notes of the previous cesarean section, so details of the surgical procedure, the patient's recovery, and instructions on discharge could not be retrieved for rest of the patients. Overall, nine (81.8%) patients were successfully managed by minimal access surgery. One patient conceived spontaneously after 2 years of laparoscopic management of CSP.

DISCUSSION

Mean age of the patients presented with CSP in our study was 28 years, which is comparable with the results conducted by Xiao et al. The mean age in their study was 30.7 ± 3.4 years.¹⁴ It shows that young women were at risk of losing their fertility. Chuang et al.¹⁵ argued that the number of previous cesarean sections does not appear to be a factor for CSP. In our study, nine patients of diagnosed CSP had a history of one cesarean section in the past.

Nine patients were found anemic on admission (Hb <10 gm/dL). Chen et al.,¹⁶ in their study concluded that anemia and single-layer

uterine closure might contribute to the occurrence of cesarean scar defects.¹⁷ Anemia leads to predisposition of infections and poor wound healing.

The study conducted by Xiao et al. presented data on symptoms and signs of the patients presented with CSP. About 34.50% of CSP patients experienced vaginal bleeding, 3.40% had pain in the abdomen, 11.30% had bleeding and pain, and 38.10% were asymptomatic.¹⁴ In our study, 54.5% patients were asymptomatic on admission which also elaborates the importance of early diagnosis of CSP.

Luo et al.¹⁸ reported that short intervals between the present and the last pregnancy were correlated with a higher risk of CSP. In our study, six patients presented with CSP had a short interval of less than 24 months from the last pregnancy. It also suggests that patients were unaware of the importance of birth spacing measures, specifically after cesarean section.

Dilatation and curettage procedure is also an additive factor for weakening of the scar, as shown by a study conducted by Shinagawa and Nagayama¹⁹ and Luo et al.¹⁸ In our study, seven patients of CSP had a history of dilatation and curettage procedure for termination of pregnancy.

Shi et al.²⁰ suggested that elective cesarean section performed before the first stage of labor in an undeveloped lower uterine segment affects wound healing. In our study, nine (81%) patients underwent cesarean section electively at term in the past.

Lin et al.²¹ and Bodur et al.²² in their studies concluded that failure rates for systemic MTX were 57% and 45%, respectively, while Lin et al.²¹ concluded that laparoscopic management of CSP was associated with a high success rate (95.5–97.1%).

Drever et al.²³ concluded that patients who receive systemic MTX therapy carried 22–33% risk of future accreta, which is extremely high and raises significant concern.

In our study, nine (81%) patients were managed successfully through laparoscopy with no major complications. Laparoscopic complete excision and strengthening of the scar defect rules out the possibility of the future accreta. Patients were disease-free at the end of the surgery, so frequent follow-ups and prolonged hospitalization were not mandatory.

CONCLUSION

- Laparoscopic management of CSP with multimodality approach has high success rate with minimal complications.
- Early diagnosis helps to avoid serious complications.
- Women of child-bearing age should be counseled on planned pregnancies and adequate birth spacing.
- Due to limited number of cases, further research is recommended in management of CSP with minimal access surgery.

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