Section: Obstetrics and Gynaecology

Case Series

CAESAREAN SCAR ECTOPIC PREGNANCY: CASE SERIES, OUTCOMES ANALYSIS, AND ALGORITHMIC APPROACH AT A TERTIARY CARE CENTRE

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ABSTRACT

Background: Caesarean scar pregnancy (CSP) is an uncommon and potentially dangerous complication following a caesarean section, with treatment methods continuously adapting as new evidence emerges. **Objective:** To assess CSP cases at a tertiary centre, document treatment results, and suggest a management algorithm that considers patient-specific factors and stability. **Materials and Methods:** This prospective observational study involved 13 cases from June 2024 to August 2025. Data was analysed for demographics, presentation, imaging, beta-HCG levels, management strategies and outcomes. **Results:** The average gestational age was 7.3 weeks (ranging from 5 to 13 weeks), with beta-HCG levels between 418 and 186,857 IU/mL. The most frequent treatments included suction/evacuation (30.8%) and hysterectomy (23.1%), with other options such as medical management. Conservative management was effective in early-stage cases, while advanced or ruptured CSP required surgical intervention. These findings are consistent with recent systematic reviews and institutional studies. **Conclusion:** Early and individualised management enhances outcomes. A step-by-step, algorithmic approach is advised.

INTRODUCTION

Caesarean scar pregnancy is an abnormal implantation of the gestational sac in the area of the prior caesarean delivery (CD) scar.[1] Caesarean scar pregnancy (CSP) is a rare but increasingly identified subtype of ectopic pregnancy characterized by implantation of the gestational sac within the fibrous tissue of a previous caesarean section scar.[2] The increase in the rate of Caesarean Delivery (CD) in the last decades has caused an increment of both short- and long- term complications, such as uterine rupture, Placenta accreta Spectrum (PAS), hysterectomy, Caesarean Scar Pregnancy (CSP) and compromised fertility. The incidence of caesarean scar pregnancy (CSP) is increasing reflecting the global increase in caesarean section (CS) rate which has almost doubled since 2000.[3]

The first case of CSP was reported in 1978 in a patient with a previous caesarean section (CS) who had heavy bleeding and abdominal pain after uterine curettage for a suspected miscarriage at 6 weeks. The Caesarean scar pregnancy can be defined in terms of depth, residual myometrial thickness (RMT), and adjacent myometrial thickness (AMT). When the depth is more than 2 mm or RMT is <5 mm the defect is known as a niche. A large CSD is a defect with a 50%-80% reduction in wall thickness compared to the AMT or if the RMT is <2.2 mm by transvaginal ultrasound (TVUS) or <2.5 mm by hysterosalpingogram.[4]

This abnormal implantation carries significant clinical risks, including severe haemorrhage, uterine rupture, and potential loss of fertility, posing substantial diagnostic and therapeutic challenges. The ultrasound is the primary imaging modality for diagnosis. Approximately one third of the women with caesarean scar pregnancies are asymptomatic. The global rise in caesarean delivery rates, coupled with advances in imaging techniques such as transvaginal ultrasound and MRI, has contributed to the increased detection of CSP and rate has almost doubled since 2000.[5-7] Understanding the evolving risk factors-such as multiple caesarean sections, uterine surgery, and impaired scar healing-is critical for early diagnosis and appropriate management. The most frequent symptom is light, painless vaginal bleeding. Clinical examination is often unremarkable. Some patients have mild lower abdominal pain and tenderness.

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The algorithm for the management of Caesarean Scar Pregnancy is:

1. Diagnosis of caesarean scar pregnancy was confirmed by transvaginal ultrasound ± MRI. The gestational age, viability (cardiac activity), β-hCG level, scar thickness, hemodynamic stability, fertility desire was confirmed.
2. Assess Hemodynamic Status, if the patient was Unstable (shock, active bleeding), then Laparotomy ± Hysterectomy was done. If stable, then proceed to treatment selection.
3. After determining the gestational status:

If 1. Early, Non-viable CSP (≤8 weeks, no cardiac activity, low β-hCG, stable patient), then Systemic Methotrexate (MTX) (preferred) ± Uterine artery embolization (UAE) for bleeding control.

2. Viable CSP (Cardiac activity present, stable patient, fertility desired): Local injection (MTX / KCl) under USG or hysteroscopy guidance ◦ ± UAE or hysteroscopic resection.

3. Large Gestation / Failed Medical Management / Scar Defect Repair Needed, then laparoscopic resection & scar repair (preferred if expertise available) or laparotomy if laparoscopy not feasible.

4. If severe bleeding and no fertility desire or failed conservative management, then hysterectomy (definitive, life-saving) is done.

The follow up of the patients is done by

- Serial β-HCG monitoring until undetectable
- Ultrasound to confirm resolution
- Counselling is done and advised to delay the conception ≥1 year and discuss the recurrence risk also.

Diagnostic evaluation of CSP relies primarily on characteristic ultrasound findings, including an empty uterine cavity and cervical canal, a gestational sac embedded at the caesarean scar site, and reduced myometrial thickness between the bladder and sac,[6] with MRI serving as a complementary modality in complex cases. Treatment modalities vary widely, encompassing medical management with systemic or local methotrexate, expectant management, and surgical interventions such as hysteroscopic resection or laparoscopic excision.[7] These approaches require careful individualization based on gestational age, hemodynamic stability, and reproductive goals to optimize maternal safety and preserve fertility. Once diagnosed, the recommendation is to offer early termination of pregnancy because of the potential risks of continuing the pregnancy. Currently, first trimester termination is recommended to minimize complications. Multidisciplinary collaboration is essential to develop tailored treatment plans that balance these priorities effectively.

Aims and Objectives

- To report a prospective case series of 13 Caesarean scar pregnancies with detailed outcomes.
- To analyse efficacy and safety of various management strategies.
- To formulate a practical, evidence-based management algorithm.

MATERIALS AND METHODS

This prospective interventional study included a case series which comprised of 13 confirmed CSP cases managed between June 2024 and August 2025 at Govt. Medical College Patiala, a tertiary care centre after taking clearance from institutional ethical committee. Transvaginal ultrasound is the first line modality for diagnosing CSP criteria's. Diagnosis followed Society for Maternal-Fetal Medicine (SMFM) and ACOG criteria:

- Empty uterine cavity
- Empty cervical canal
- Gestational sac located in the anterior lower uterine segment/ at the level of prior caesarean scar
- Thin or absent myometrium between the gestational sac and the bladder
- Increased peritrophoblastic / peri placental vascularity on doppler.

Data abstracted included: age, parity, number of LSCS, gestational age, beta-HCG, presenting signs/symptoms, imaging, management [medical, surgical], and follow-up. Descriptive statistics summarized distributions and frequencies. Institutional protocols prioritized conservative management in stable, early, non-viable CSP and surgery for late or emergent presentations-as described in current international reviews and single institution experiences.[5]

RESULTS

Thirteen patients presented with CSP during this time period. Their demographic profile, clinical presentation, imaging findings, period of gestation, treatment and outcomes were analysed.

Our study reflects:

- Average POG at diagnosis as 5 to 7 weeks (69.2%)
- All patients were symptomatic except one
- All with at least one prior LSCS, most has 2-3.
- Beta hcg levels: 418 to 186857 IU
- CSP confirmed in all
- Conservative surgical management (suction and evacuation) being the most common (53.8%) followed by definitive surgery (hysterectomy) (23%) followed by medical management (0.8%).

Symptoms: Vaginal bleeding and pain were most common. Several patients reported with recent medical abortion kit intakes.

Two conservatively managed patients recovered with regular menses. Advanced/ruptured caesarean scar pregnancies required hysterectomy or more complex surgery, these required transfusion and critical care. But the patients recovered and were discharged in satisfactory condition. The following table reflects

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the results of our study. 3 patients were lost to follow up.

Table 1: Details of the patients treated

Age / Obstetrical Formula / Prev LSCS	Gestational Age at Diagnosis	Beta HCG at Diagnosis (IU/ml)	TVUS/MRI Findings	Treatment Modality
27 yrs old G5P2L2A2 with prev 2 LSCS	6 weeks POG	2558 Repeat: 27,102	GS sac with yolk sac and fetal pole without cardiac activity at prior scar site, myometrium 1.5 mm	Injection methotrexate + letrozole, f/b suction and evacuation
31 yrs old G3P2L2 prev 2 LSCS	7 weeks POG	186857	Scar site ectopic pregnancy and myometrial thinning on TVUS	Suction and evacuation
32 yrs old G3P2L2 prev 2 LSCS	10 weeks POG	1249 Repeat: 535	10 mm GS sac at prior scar site on MRI	Suction and evacuation
29 yrs old G3P2L2 prev 2 LSCS	6 weeks 3 days POG	2229 Repeat: 625.5	RPOCs seen at scar site on MRI	Suction and evacuation
35 yrs old G3P2L2 prev 2 LSCS	7 weeks POG	2533 Repeat: 167	GS sac seen at LUS without cardiac activity	Suction and evacuation
32 yrs old G3P2L2 prev 2 LSCS	13 weeks POG	449 Repeat: 251	14 mm RPOCs at scar site	Laparoscopic guided suction and evacuation
28 yrs old G2P1L1 prev 1 LSCS	5 weeks POG	2245	GS sac adjacent to scar site on TVUS	Suction and evacuation
34 yrs old G6P3L3A2 prev 3 LSCS	5 weeks POG	46,054	Scar site pregnancy and myometrial thinning	Hysterotomy followed by bladder repair
35 yrs old G3P2L2 prev 2 LSCS	6 weeks POG	418	1.3–1.6 cm structure at LUS with myometrial thinning (<2 mm)	Hysterotomy with bilateral tubectomy
31 yrs old P3L3A1 prev 1 LSCS	History of multiple MTP kit intake and prior D and C	51,860	Endometrial thinning 40–41 mm, hypervascular adherent RPOCs at scar site	Suction and evacuation leading to profuse bleeding → laparotomy → hysterectomy
32 yrs old G3P2L2 prev 2 LSCS	Presented with ruptured scar site ectopic pregnancy			Emergency laparotomy followed by hysterectomy and bladder repair; 4 PRBCs, 4 FFP and 2 PCs transfused
31 yrs old P3L3A1 prev 3 LSCS	20 weeks POG, history of D and C 15 days back		Adherent placenta seen on MRI	Laparotomy followed by subtotal hysterectomy; 3 PRBCs transfused intraop

DISCUSSION

Our study reflects spectrum of management options, from conservative to definitive surgery guided by clinical stability, imaging findings, and patients wish for fertility. Findings at RHP are consistent with literature, which emphasizes that no single modality is universally superior instead management must be individualised.

Our findings align with recent systematic reviews and multi centre reports describing the heterogeneity of CSP presentation and the absence of a consensus management pathway.[2] In our cohort, conservative management using suction or methotrexate was successful for stable, early, or non-viable CSP, confirming results from Wang et al. and Karahasanoglu et al.[7] High-dose intravenous MTX infusion with folinic acid rescue, has been reported to have a success rate of 85.7% by other authors.[8]

The risk of catastrophic haemorrhage, placenta accreta, and uterine rupture- in both our series and published literature-requires that late presenters and unstable cases be triaged to prompt surgery (hysterectomy).[9,10] Our management algorithm (see below) mirrors proposals from recent expert reviews, stratifying by stability, gestational age, and fertility wishes.[7] The surgery was done in our study in cases of haemorrhage or failed conservative management which was similar to study done by Andrea Kaelin Agten et al

Success with suction/evacuation and methotrexate in our and comparable cohorts supports their use for early CSP with favourable anatomy. Failure or progression of conservative management-including rising beta-HCG or increased bleeding-should prompt escalation according to published guidelines.[2,3]

CONCLUSION

The management of caesarean scar pregnancy (CSP) requires a nuanced, patient-centred approach that integrates clinical stability, gestational age, and reproductive intentions. The increasing rates of the caesarean sections in the recent years have increased the incidence of caesarean scar pregnancies with

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time. Our proposed algorithm, aligned with recent expert recommendations, emphasizes early detection through routine ultrasound screening and prioritizes conservative interventions such as suction/evacuation combined with methotrexate for early-stage CSP with favourable anatomical features. Close monitoring is essential, with prompt escalation to more invasive procedures in cases of treatment failure, rising beta-HCG levels, or increased haemorrhage, consistent with established guidelines. Counselling plays a very important role and the patient should be explained about more chances of the caesarean scar pregnancy in patients with history of previous caesarean scar pregnancy managed conservatively. Implementing a stratified, algorithmic management plan can significantly reduce morbidity associated with CSP while optimizing fertility preservation. The evidence from our cohort and international literature supports this tailored strategy as effective and safe. Ultimately, multidisciplinary collaboration and individualized care plans remain critical to balancing maternal safety with reproductive outcomes in this complex clinical condition.

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