

Combined Laparoscopic and Hysteroscopic Management of Cesarean Scar Pregnancy: A Case Series

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Abstract: Cesarean scar pregnancy (CSP) is an uncommon form of ectopic implantation associated with risks of severe hemorrhage, uterine rupture, and loss of fertility. With rising cesarean delivery rates, CSP is increasingly encountered, yet optimal management remains debated. A combined minimally invasive strategy—using hysteroscopic guidance for precise intrauterine resection and laparoscopic access for hemostasis and layered scar repair may enhance safety while preserving reproductive potential. **Objective:** To assess the safety and efficacy of a combined laparoscopic and hysteroscopic approach in managing cesarean scar ectopic pregnancies, focusing on surgical outcomes and complications in a series of eight cases. **Methods:** Eight patients with a cesarean scar pregnancy (CSP) diagnosed by transvaginal ultrasound were managed at our institution. Initial management (systemic methotrexate and/or ultrasound-guided intragastric injection in selected cases) was followed by a combined laparoscopy and hysteroscopy to remove gestational tissue and repair the uterine scar. Intraoperative blood loss, need for conversion to open surgery or additional interventions, and postoperative recovery were recorded. **Results:** All eight patients were successfully treated without conversion to laparotomy. Seven patients underwent fertility-preserving laparoscopic-hysteroscopic resection of the scar pregnancy, and one patient with life-threatening hemorrhage and completed childbearing underwent a laparoscopic hysterectomy. No severe intraoperative complications occurred; notably, none of the patients experienced uncontrolled hemorrhage, and there was no need for blood transfusion or reoperation in this series. Postoperative recovery was uneventful in all cases, with rapid decline of serum β -hCG and preservation of the uterus (in those desiring future fertility). **Conclusion:** A combined laparoscopic and hysteroscopic approach is a safe and effective therapeutic option for cesarean scar pregnancies. This minimally invasive technique allowed precise removal of the gestational sac and repair of the uterine defect with minimal blood loss and avoidance of open surgery. Our case series supports emerging evidence that operative resection (via laparoscopy with hysteroscopic guidance) offers high success rates with low morbidity, making it a valuable alternative to more invasive or medically-only management. Further larger studies are warranted to confirm these outcomes and guide standardized management for CSP.

Keywords: Cesarean Section, Hysteroscopy, Laparoscopy, Pregnancy, Ectopic, Uterine Diseases

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Introduction

Cesarean scar pregnancy (CSP) is a rare form of ectopic pregnancy in which the embryo implants into the fibrous scar of a prior cesarean delivery. Its incidence is low but increasing in parallel with rising cesarean section rates, estimated at approximately 1 in 1,800–2,500 pregnancies(1). Despite its rarity, CSP poses a high risk of serious maternal complications, including severe hemorrhage, uterine rupture, and placenta accreta spectrum, which can lead to hysterectomy or even maternal mortality(2). Because of these risks, termination in the first trimester is usually recommended for CSP; however, the optimal management approach to terminate and treat a CSP safely remains uncertain(3).

A wide variety of therapeutic modalities for CSP have been described in the last decade, ranging from medical therapy to surgical interventions. Medical management often involves systemic or local methotrexate (MTX) injections (sometimes combined with dilation and curettage). At the same time, interventional radiologic methods like uterine artery embolization (UAE) can be used adjunctively to control bleeding. Surgical options include dilatation and curettage under ultrasound guidance, hysteroscopic removal of the gestational sac, laparoscopic resection of the implantation site, or open uterine surgery, as well as, in refractory cases or those without fertility desire, hysterectomy(4). However, there is no consensus on the single best treatment strategy for

CSP. Comparative studies and reviews indicate that no unified management protocol exists due to the limited availability of high-quality data, and the choice of treatment often must be individualized based on the clinical presentation and available expertise (1, 5). Recent guidance from obstetric societies also acknowledges that surgical, medical, and minimally invasive therapies have all been used for CSP; however, the optimal treatment remains unknown (1).

One promising approach for treating CSP, especially in cases at higher risk of hemorrhage, is a combined minimally invasive surgical technique: laparoscopic resection of the ectopic pregnancy with concurrent hysteroscopic assistance. Laparoscopy provides excellent access to the uterine serosal surface and vasculature for controlling bleeding and repairing the uterine defect, while hysteroscopy allows for direct visualization inside the uterine cavity and scar niche to ensure complete removal of trophoblastic tissue (6). This combined approach aims to maximize the removal of the ectopic pregnancy and restoration of the uterine integrity, while minimizing blood loss and preserving fertility. In this report, we present a series of eight patients with cesarean scar ectopic pregnancy who were managed with laparoscopic-assisted hysteroscopic surgery. We describe the clinical presentation and management of each case, evaluating the outcomes with a focus on demonstrating the feasibility and benefits of the combined approach in this challenging condition.



Case Presentations:

Patient Population: Eight patients with a diagnosed cesarean scar ectopic pregnancy were treated at our tertiary care center. All patients had at least one prior low-transverse cesarean delivery (range: 1 to 5 previous C-sections). Gestational age at diagnosis ranged from 5 to 12 weeks. Six patients presented with vaginal bleeding (ranging from light spotting to heavy, prolonged bleeding), while two patients were asymptomatic and had their CSP detected incidentally on early ultrasound. Transvaginal ultrasound was the primary diagnostic tool in all cases, revealing a gestational sac implanted in the anterior lower uterine segment at the site of the cesarean scar; one case demonstrated a living embryo with cardiac activity within the scar at 8 weeks' gestation. Baseline serum β -hCG levels varied widely (approximately 5,000 to 86,000 IU/L) and did not clearly correlate with symptom severity.

Initial Management: Given the potential for hemorrhage with surgical disruption of a vascular CSP, all patients underwent an initial conservative intervention aimed at reducing trophoblastic viability and vascularity prior to definitive surgery, except in one case of acute hemorrhage. Six patients received systemic methotrexate (MTX) therapy (single or multi-dose regimen) after diagnosis. In two of these MTX-treated cases, β -hCG levels continued to rise or plateau (e.g., Case 1 had β -hCG increase from 8,124 to 14,244 IU/L after one MTX dose) before proceeding to surgery. Two patients (Cases 2 and 3) had evidence of fetal cardiac activity on ultrasound. These patients underwent an ultrasound-guided intragestational injection of potassium chloride (KCl) into the gestational sac to achieve fetal asystole, followed by a short observation period. In one patient (Case 7) who presented with massive vaginal bleeding and hematuria, there was no opportunity for MTX therapy; this patient was taken for definitive surgical management immediately due to hemodynamic concerns.

Surgical Technique: Definitive management for seven out of eight patients was a fertility-sparing combined laparoscopic and hysteroscopic procedure. Under general anesthesia, diagnostic hysteroscopy was first performed in each case to localize the cesarean scar defect from inside the uterine cavity. The protruding gestational sac or retained products of conception (RPOC) within the scar area were identified hysteroscopically (often appearing as a bulge or mass in the lower anterior uterine wall). Using hysteroscopic instruments (loop or grasper and cautery as needed), the intrauterine portion of the sac and any visible placental tissue were

carefully detached and removed under direct visualization. Immediately thereafter, laparoscopy was undertaken (with 3–4 ports) to address the external aspect of the scar pregnancy. The uterine serosa overlying the cesarean scar was inspected; in several cases, a bulge with increased vascularity was noted at the scar site corresponding to the pregnancy. The bladder was reflected downward if necessary to expose the lower uterine segment fully. Resection of the ectopic pregnancy implantation site was then performed laparoscopically, either by excising the myometrial scar defect or by curetting the area from the serosal side, depending on the size of the mass. In all cases, we achieved hemostasis laparoscopically using a combination of bipolar cautery and suture closure of the uterine scar defect. The uterine incision at the scar was closed with absorbable sutures in one or two layers as needed to reinforce the area. A prophylactic bilateral uterine artery ligation (at the ascending uterine arteries) was performed in one case with very high vascularity to control bleeding. Throughout the laparoscopic portion, concurrent hysteroscopic guidance was available to ensure no residual tissue remained; by the end of the combined procedure, both hysteroscopic and laparoscopic views confirmed complete removal of the gestational sac. Estimated blood loss for the combined procedures was low (ranging approximately 50–300 mL). None of the seven combined cases required conversion to open surgery (laparotomy), and none required intraoperative blood transfusion.

Case 7 (Hysterectomy): One patient in our series required a different approach. Case 7 was a 38-year-old G5P2 with two prior C-sections who presented at 6 weeks of gestation with profuse vaginal bleeding and new-onset hematuria. Ultrasound showed a cesarean scar pregnancy with deep invasion towards the bladder (suspected type 2 CSP) and a large amount of periuterine fluid concerning for bleeding. Her β -hCG was ~28,000 IU/L. In this acute scenario, the patient (who had completed childbearing) was counseled that hysterectomy might be the safest definitive management. An emergency laparoscopy was performed, which revealed significant bleeding from the lower uterine segment. A total laparoscopic hysterectomy (TLH) was carried out, successfully removing the uterus with the implanted gestation. The bladder was carefully dissected off the uterus and was found to be uninvolved but extremely close to the implantation site. Pathology confirmed a cesarean scar ectopic pregnancy with chorionic villi invading into the myometrium. The patient had an uneventful postoperative recovery.

Table 1: Case Presentations

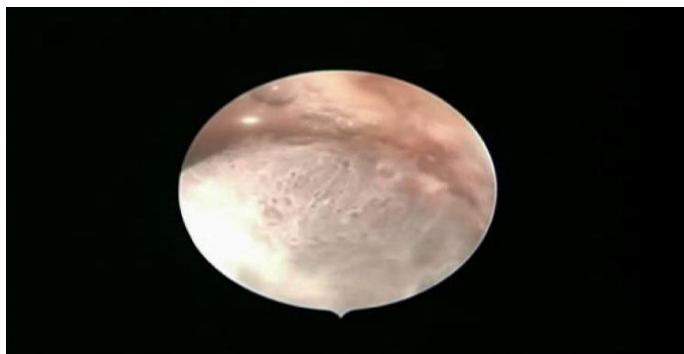
Case	Parity	Gestation	Presenting Complaint	Diagnosis	β -hCG (IU/L)	Management	Outcome
1	G4P2+0	6+ weeks	USG showing scar ectopic	TVS	8124→14244	MTX, Lap+Hystero	Successful, no complications
2	G4P1+2 (Prev 1 C/S)	8 weeks	Irregular spotting	TVS + Cardiac activity	40,000→32,000	Intra-sac KCl, Lap+Hystero	Uneventful recovery
3	G5P4+0 (Prev 4 C/S)	9 weeks	USG-confirmed scar ectopic	USG Pelvis	86,000→62,000	KCl, MTX, Lap+Hystero+BTL	Recovery with tubal ligation
4	G4P3+0	8+ weeks	Asymptomatic, USG finding	TVS	12,000→18,000	MTX, Lap+Hystero	Recovered well
5	G4P2+1 (Prev 1 C/S)	12 weeks	Continuous bleeding	USG pelvis	84,000→80,000	MTX, Lap+Hystero	Stable post-op
6	G5P3+1	7 weeks	Irregular bleeding	USG pelvis	6000→5000	MTX, Lap+Hystero	Successful
7	G5P2+2 (Prev 2 C/S)	6 weeks	Excess bleeding, haematuria	USG pelvis	28,000	Total Laparoscopic Hysterectomy (TLH)	Required a hysterectomy due to the severity
8	G6P5 (Prev 5 C/S)	5+ weeks	PV spotting	USG pelvis	5000	Lap+Hystero	Successful, no complications

Outcomes: All patients recovered without major postoperative complications. There were no cases of postoperative hemorrhage, infection, or thromboembolism. Serial β -hCG levels in the weeks

following surgery showed a rapid decline to non-pregnant levels in all cases, confirming the complete removal of trophoblastic tissue. Uterine preservation was achieved in 7 of 8 patients. Those seven women resumed

regular menstrual cycles within 1–2 months after the procedure. At follow-up (ranging from 3 to 12 months post-procedure), none of the fertility-preserving surgery patients had evidence of uterine scarring

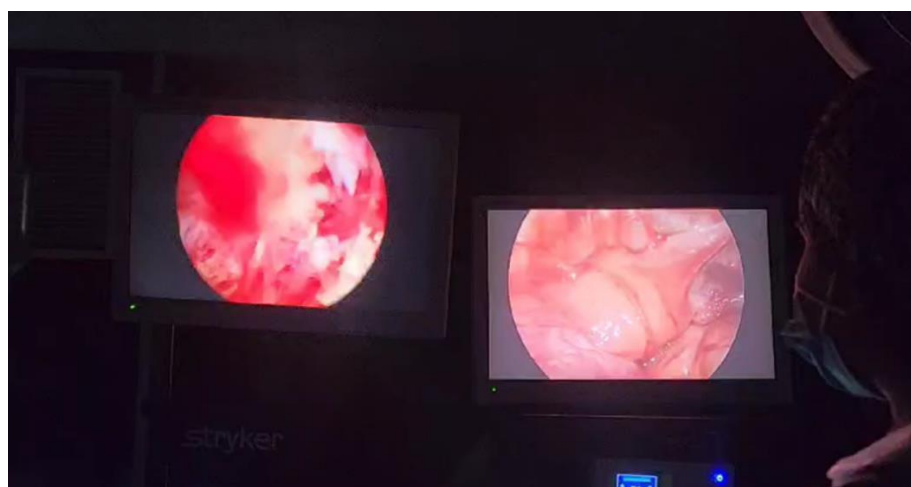
complications such as synechiae on imaging, and all were counseled regarding future pregnancy risks and contraception. The patient who underwent TLH was stable and satisfied with definitive treatment.



A. Hysteroscopic Picture of Scar Ectopic



B. Laparoscopic Picture of Scar Ectopic



C. Dual System Approach for Scar Ectopic (both hysteroscopy & laparoscopy)



D. Transvaginal Ultrasound Image Showing Cesarean Scar Ectopic Pregnancy.

Figure 1: Different images during Laparoscopic and Hysteroscopic Management of Cesarean Scar Pregnancy

Discussion

Management of cesarean scar pregnancy remains clinically challenging. However, our case series demonstrates that a combined laparoscopy and

hysteroscopy approach can be highly effective for resolving the condition with minimal morbidity. In this series of eight patients, the laparoscopic-assisted hysteroscopic technique achieved a 100% immediate success rate (complete removal of CSP tissue with resolution of β -hCG) and avoided

the need for an open surgical conversion in all cases. These results are consistent with emerging data in the literature, which suggest that surgical resection methods – particularly minimally invasive approaches – have superior efficacy in CSP treatment compared to sole medical management. A recent systematic review and network meta-analysis, including over 8,000 CSP cases, found that laparoscopic surgery, as well as hysteroscopic removal and other surgical techniques, yielded the highest treatment success rates, significantly higher than those of traditional suction curettage. In the same analysis, purely medical approaches with methotrexate were associated with lower success and higher complication rates; in fact, the authors concluded that systemic methotrexate alone should no longer be recommended as first-line treatment for CSP(6). Our findings reinforce this conclusion – in our series, every patient ultimately required surgical intervention despite several receiving MTX initially, and all achieved definitive resolution only after the operative removal of the scar pregnancy.

Not only is efficacy improved, but safety appears to be enhanced by the use of laparoscopic and hysteroscopic techniques. The combined approach enables the surgeon to directly visualize and address the CSP from both the endometrial and serosal sides, thereby minimizing complications. By performing a laparoscopy, one can suture the uterine defect and control bleeding from the implantation site under direct vision, significantly reducing hemorrhage risk compared to blind curettage(7). Hysteroscopic assistance ensures that no residual products remain in the uterine cavity and that the niche is completely cleared. In our series, no patient suffered severe hemorrhage or required emergent hysterectomy due to bleeding during the combined procedure. This aligns with prior reports noting that hysteroscopic evacuation combined with laparoscopic repair is less invasive and associated with less bleeding and shorter hospital stay than traditional approaches. In contrast, dilation and curettage alone, especially without imaging guidance, is considered risky in CSP due to the inability to visualize the implantation – it carries a high risk of uterine rupture and catastrophic bleeding and is therefore discouraged(7). Our management strategy explicitly avoided blind curettage; if suction aspiration was used, it was performed under direct ultrasound and hysteroscopic guidance, and was immediately followed by laparoscopic resection/repair. This is in line with expert recommendations to avoid sharp curettage as a solitary treatment for cesarean scar pregnancy and instead proceed with operative resection (via laparoscopy or transvaginal approach) or at least use ultrasound-guided suction if surgery is not immediately available(8).

An important consideration in CSP management is the depth of implantation in the scar, which some authors have classified into "type 1" (growing toward the uterine cavity) and "type 2" (growing deeper into the myometrium and toward the serosa or bladder). Type 2 CSP is generally associated with a higher risk of uterine rupture and massive bleeding. Notably, our series included at least one suspected type 2 case (Case 7), which exhibited aggressive invasion and caused significant hemorrhage. For such cases, a combined surgical approach is particularly advantageous. Shen et al. (2021) reported that in type 2 CSP, a strategy of hysteroscopic evacuation combined with laparoscopic resection achieved a primary success rate of 95%, significantly superior to the success rates of medical or simpler approaches (only 27% with D&C alone and 67% with UAE plus curettage). Their study found that for type 1 CSP (less invasive implants), the outcomes of different treatments were more comparable; however, for type 2, the combined hysteroscopy-laparoscopy approach was clearly the most effective (9). Our experience corroborates this: even though one deeply invasive case necessitated hysterectomy, the other cases, including those with moderately high vascularity, were successfully managed with combined minimally invasive surgery. We also incorporated adjunctive measures (like uterine artery ligation in one case) during laparoscopy for hemorrhage control, highlighting that the laparoscopic view allows flexibility to employ additional hemostatic techniques as needed.

The role of adjuvant medical therapy in CSP deserves comment. In our protocol, systemic MTX was administered to most patients before

surgery, aiming to reduce trophoblastic proliferation and vascularity. Two patients with a viable embryo received intracardiac KCl injection to stop the heartbeat prior to surgical removal. While these steps likely helped in reducing intraoperative bleeding, medical therapy alone was insufficient to resolve the pregnancies. Current guidelines support the use of intragluteral injections (of MTX or KCl) as an adjunct to surgical treatment in appropriate cases, but recommend against relying solely on systemic MTX as a therapeutic option (8). The Society for Maternal-Fetal Medicine (SMFM) Consult Series #63 (2022) suggests explicitly that local methotrexate injection (into the gestational sac) may be used in combination with other modalities, but that systemic methotrexate by itself has a low success rate and should be avoided as a standalone treatment[18]. Our findings align with this guidance. We observed that even after MTX, definitive surgery was necessary, and indeed, all patients avoided major complications only once the pregnancy was surgically excised. Therefore, we concur that while MTX can be a helpful adjunct (particularly in stopping cardiac activity or shrinking the sac preoperatively), it should not replace surgical intervention in most CSP cases.

Importantly, preservation of fertility is a key goal in treating CSP for women who desire future pregnancies. The combined laparoscopic-hysteroscopic technique in our series successfully spared the uterus in the majority of patients. All seven fertility-preserving cases recovered with an intact uterus and have been counseled on the implications for future fertility. It is known that a history of CSP increases the risk of recurrence and also of placenta accreta in subsequent pregnancies if the scar defect is not well healed(10). By actively repairing the scar defect laparoscopically, we aimed to restore uterine integrity as much as possible. Patients were advised that any future pregnancy should be monitored very early with an ultrasound, given the risk of recurrence. Additionally, consistent with expert recommendations, we counseled all patients about effective contraception to prevent an immediate recurrence and about the risks associated with another pregnancy after a CSP. Some authorities advise considering early elective delivery in any future pregnancy to mitigate catastrophic rupture if a CSP were to continue(8). The patient who underwent a hysterectomy was relieved from these concerns, but the others received individualized advice on future family planning.

Limitations: This case series is limited by the small sample size and its descriptive nature. While our outcomes were uniformly positive, careful patient selection and the availability of surgical expertise in advanced minimally invasive techniques are important factors that may not be present in all settings. We did not directly compare our approach to alternative treatments (such as UAE or primary D&C), so definitive conclusions on relative efficacy must rely on the broader literature. Nonetheless, our results contribute to a growing body of evidence favoring surgical management (especially via minimally invasive routes) for cesarean scar pregnancies.

Conclusion

Combined laparoscopic and hysteroscopic management of cesarean scar ectopic pregnancy appears to be a highly effective and safe approach that offers excellent surgical outcomes while preserving fertility in most cases. In our series, this technique achieved complete removal of the ectopic pregnancy with minimal blood loss, no need for open surgery, and no significant complications. The laparoscopy allows secure repair of the cesarean scar and bleeding control, whereas the hysteroscopy ensures thorough evacuation of the gestational sac – together conferring advantages over single-modality treatments. Given the significant risks associated with cesarean scar pregnancies, we advocate for an active surgical management when feasible, rather than expectant or purely medical approaches. Our experience supports current recommendations that emphasize operative resection (via minimally invasive methods) as a primary treatment for CSP, tailored to the patient's reproductive wishes. Larger studies and long-term follow-up will be valuable to confirm the

reproductive outcomes and recurrence risk after such management. In the interim, a combined laparoscopic-hysteroscopic technique should be considered a valuable option in centers with the appropriate expertise, as it offers a balanced solution to this rare but potentially life-threatening condition by maximizing the chance of cure and minimizing morbidity.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned.

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

AR (Consultant)

Manuscript drafting, Study Design,

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Review of Literature and drafting articles.

IK (Consultant)

Conception of Study, Development of Research Methodology Design,

SZB (Consultant)

Study Design, manuscript review, and critical input.

MAAJ

Data analysis and Data entry

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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