

Beyond the Incision: Navigating the Rising Tide of Cesarean Scar Ectopic Pregnancies in Modern Indian Gynaecology

Dr. Shashi Chauhan

Sr Consultant (Obs & Gynae) Holy Heart Hospital, Rohtak, Haryana

Abstract

Background and context: As surgical deliveries become increasingly normalized worldwide, a severe downstream complication has emerged in gynecological practice: the Cesarean Scar Ectopic Pregnancy (CSEP). CSEP occurs when a blastocyst implants within the myometrial defect of a previous cesarean incision. In India, a country witnessing an exponential rise in cesarean section rates—particularly in the private healthcare sector—the incidence of CSEP is growing at an alarming pace, transforming a once-rare clinical anomaly into a pressing public health concern.

Objective statement: This comprehensive review aims to analyze the growing burden of scar ectopic pregnancies in India, evaluating the biological mechanisms, sociocultural drivers fueling cesarean overutilization, systemic healthcare gaps, and contemporary clinical management protocols.

Methodology summary: A systematic review of peer-reviewed medical literature, demographic surveys (including the National Family Health Survey-5), and professional guidelines from the Federation of Obstetric and Gynaecological Societies of India (FOGSI) was conducted. The analysis synthesizes recent data (2020–2026) to map the clinical and epidemiological landscape of CSEP across diverse Indian socio-economic strata.

Key findings:

1. **Unprecedented Surge in Risk:** C-section rates in Indian private facilities now average 63 percent, creating a massive at-risk population for future scar pregnancies (Gavvala, n.d.).
2. **Diagnostic Delays:** In rural and tribal regions, limited access to early first-trimester transvaginal sonography leads to delayed presentations, often resulting in ruptured ectopic pregnancies and catastrophic hemorrhage (Singh, n.d.).
3. **Complex Sociocultural Drivers:** Non-clinical factors, including family pressure for auspicious birth dates and maternal fear of labor pains (tokophobia), are primary drivers of the initial cesarean surgeries that predispose women to CSEP.
4. **Therapeutic Evolution:** Early detection allows for fertility-preserving treatments, including ultrasound-guided potassium chloride injections and systemic methotrexate, drastically reducing the need for hysterectomies.

Conclusions and recommendations: Mitigating the CSEP crisis requires a dual approach: aggressively reducing primary, non-medically indicated cesarean sections and standardizing early transvaginal ultrasound screening protocols for all pregnant women with a history of uterine surgery.

Keywords: Cesarean scar ectopic pregnancy, maternal mortality, NFHS-5, transvaginal sonography, placenta accreta spectrum, FOGSI guidelines.

1. Introduction

Global Context and Definition

Cesarean scar ectopic pregnancy (CSEP) represents one of the most perilous variations of abnormal embryonic implantation. Historically classified as an extreme medical rarity, CSEP is defined by the implantation of a gestational sac within the fibrous scar tissue and myometrium of a prior hysterotomy or cesarean section.

Globally, the incidence of CSEP has been reported to occur in approximately 1 per 1800 to 2500 cesarean deliveries (Kennedy et al., 2024). While the fallopian tubes account for the vast majority of ectopic implantations, scar pregnancies now constitute up to 6 percent of all ectopic pregnancies in women with a history of at least one cesarean section (Shamsunder et al., 2024).

The condition is broadly categorized into two distinct morphological types based on the trajectory of trophoblastic invasion. **Type I (Endogenous)** implants within the scar but grows inward toward the uterine cavity. **Type II (Exogenous)** involves deep invasion into the myometrial defect, growing outward toward the bladder and uterine serosa. Type II carries an exceptionally high risk of spontaneous uterine rupture, massive intra-abdominal hemorrhage, and maternal death if not intercepted early (Bhattacharjee et al., 2024).

Indian Demographics and Statistics

The Indian demographic landscape presents a unique and troubling incubator for the rise of CSEP. The incidence of this condition is directly proportional to the national cesarean delivery rate. According to the fifth iteration of the National Family Health Survey (NFHS-5, 2019–2021), India is undergoing a profound shift in birthing practices. The national cesarean section rate has surged to an average of 21.5 percent, well above the World Health Organization's recommended threshold of 10 to 15 percent.

However, the national average masks severe regional and sectoral disparities. In states like Andhra Pradesh, the overall C-section rate has skyrocketed to 42.4 percent (Gavvala, n.d.). Even more concerning is the privatization of surgical deliveries; the NFHS-5 data reveals that across India, an astounding 63 percent of births in private healthcare facilities are now conducted via cesarean section (Gavvala, n.d.). This unprecedented accumulation of scarred uteri in the reproductive-aged population is directly fueling the surge in CSEP cases presenting at tertiary care centers across the subcontinent.

Cultural and Social Context Specific to India

The etiology of the CSEP epidemic in India cannot be understood purely through a clinical lens; it is deeply entrenched in the nation's sociocultural fabric. Qualitative explorations into Indian obstetric practices reveal that a substantial proportion of primary cesarean sections are driven by non-clinical determinants.

Chief among these is the cultural preference for delivering babies on "auspicious" dates and times, guided by astrological beliefs (Gavvala, n.d.). Elective cesarean sections allow families to strictly control the timing of birth. Additionally, the rising prevalence of *tokophobia*—an intense fear of childbirth and labor pains—combined with a lower threshold for pain tolerance among urban, upwardly mobile populations, has normalized surgical delivery as the "easier" option. Furthermore, provider convenience, fears of medico-legal repercussions in the event of labor complications, and the financial incentives embedded within the private healthcare sector create a systemic bias toward surgical intervention.

Problem Statement and Research Objectives

Despite the alarming rise in at-risk patients, CSEP remains underdiagnosed in peripheral healthcare settings, leading to catastrophic maternal outcomes. The primary objective of this article is to synthesize the current epidemiological, clinical, and sociological data surrounding CSEP in India. By bridging global diagnostic benchmarks with local realities, this analysis aims to identify the gaps in current Indian obstetric care and propose culturally tailored, evidence-based management frameworks.

Scope and Limitations

This review focuses primarily on the Indian healthcare ecosystem, utilizing recent epidemiological data and clinical case series published between 2020 and 2026. While global benchmarks are included for comparative context, the recommendations are explicitly tailored to Indian infrastructure, encompassing both state-of-the-art urban tertiary centers and resource-limited rural facilities.

Visual Content Integration Suggestion:

- **Infographic:** A dual-axis line chart illustrating the year-over-year rise in India's C-section rates (NFHS-3 to NFHS-5) mapped against the corresponding estimated rise in CSEP incidence.
- **Heatmap:** A geographic map of India highlighting states with C-section rates exceeding 30 percent (e.g., Andhra Pradesh, Telangana, Kerala) to visually denote the "high-risk zones" for scar pregnancies.

2. Methodology

Research Design and Approach

This article employs a mixed-methods narrative review design, integrating qualitative sociological research on Indian maternal care with quantitative clinical outcome data. The approach was structured to evaluate CSEP not merely as a localized surgical emergency, but as a systemic public health crisis resulting from shifting demographic behaviors.

Database Search Strategy

A comprehensive literature search was executed utilizing academic databases, including PubMed, Google Scholar, and localized Indian medical registries. Search strings incorporated combinations of terms: "*cesarean scar ectopic pregnancy*," "*CSEP*," "*NFHS-5 cesarean rates*," "*FOGSI guidelines ectopic pregnancy*," and "*maternal mortality tribal India*."

Inclusion/Exclusion Criteria

Sources were selectively curated based on their relevance to the Indian context and their publication date.

- **Inclusion:** Peer-reviewed clinical case series, retrospective cohort studies from Indian tertiary hospitals, sociological analyses of birth preferences in India, and recent FOGSI protocols published between 2015 and 2026.
- **Exclusion:** Studies lacking clear diagnostic criteria for CSEP, predatory journal publications, and data sets predating 2015 that do not reflect modern ultrasound diagnostic standards.

Data Analysis Framework

The collected data was synthesized using a thematic analysis framework. Clinical data regarding the efficacy of methotrexate, potassium chloride (KCl) injections, and surgical interventions were aggregated to compare success rates. Sociological data was analyzed using Braun and Clarke's framework to isolate primary drivers of elective cesareans.

Timeline and Scope

The review captures the evolving landscape of gynecological practice up to early 2026, encompassing the lingering impacts of the COVID-19 pandemic on maternal health access and the latest advancements in minimally invasive surgical techniques available in metropolitan India.

3. Discussion

3.1 Biological and Technical Factors and Evidence Pathogenesis and the "Niche" Defect

The fundamental biological prerequisite for a cesarean scar pregnancy is a microscopic defect in the healing of a prior lower segment cesarean section (LSCS). This defect, often referred to as a uterine "niche" or isthmocele, creates a micro-environment where a blastocyst can aberrantly implant (Patel, 2015). Research suggests that single-layer uterine closure techniques, combined with poor localized vascularity during the healing process, may exacerbate the formation of these niches. Once implanted, the trophoblastic tissue aggressively invades the thinned myometrium because the scar tissue lacks the protective decidualization seen in a normal endometrial cavity.

The Specter of Placenta Accreta Spectrum (PAS)

If a Type II CSEP remains undetected and progresses beyond the first trimester, it frequently evolves into Placenta Accreta Spectrum (PAS). PAS is a severe condition where chorionic villi directly adhere to or deeply invade the myometrium and surrounding organs like the bladder (Tang, n.d.). In India, the increasing incidence of PAS parallels the rising cesarean rates. Pregnancies complicated by early scar implantation and subsequent PAS are heavily associated with massive postpartum hemorrhage, frequent requirements for massive blood transfusions, and life-saving peripartum hysterectomies.

Diagnostic Modalities: The Role of TVS and MRI

FOGSI guidelines explicitly state that a high index of suspicion is required when evaluating any pregnant woman with a prior cesarean history. The gold standard for early diagnosis is Transvaginal Sonography (TVS) combined with color Doppler imaging (Kennedy et al., 2024).

The classic ultrasonographic diagnostic criteria for CSEP include:

- An empty uterine cavity and an empty endocervical canal.
- A gestational sac embedded in the anterior lower uterine segment at the site of the previous scar.
- A thin (less than 3 mm) or entirely absent myometrial layer between the gestational sac and the bladder wall.
- Prominent peritrophoblastic vascular flow surrounding the sac on Doppler imaging (Hegde, 2017).
- A negative "sliding organ sign" (the inability to displace the gestational sac from the anterior wall using gentle probe pressure).

When ultrasound findings are equivocal—particularly when distinguishing between a true CSEP and a cervical ectopic pregnancy or an evolving miscarriage trapped in the cervical canal—Magnetic Resonance Imaging (MRI) serves as a critical adjunct. MRI provides superior soft-tissue contrast, allowing clinicians to accurately map the depth of myometrial invasion and bladder involvement (Giriya, n.d.).

Visual Content Integration Suggestion:

- **Medical Illustration:** A side-by-side comparative diagram showing normal fundal implantation, Type I (Endogenous) CSEP growing into the cavity, and Type II (Exogenous) CSEP invading the bladder wall.

3.2 Sociocultural Challenges Specific to India The "Auspicious" Birth and Tokophobia

The biological reality of CSEP is inherently linked to India's unique sociocultural dynamics surrounding childbirth. In many parts of India, particularly among the urban middle and upper classes, childbirth has been heavily medicalized. The qualitative research by Gavvala (n.d.) highlights that family pressure plays an immense role in surgical decision-making. Astrological charts and the desire to deliver a child at an "auspicious" date and time frequently override clinical recommendations for vaginal delivery.

Concurrently, a growing fear of perineal tears and the physical exhaustion of labor—tokophobia—drives maternal requests for planned cesareans. Unlike in many Western contexts where midwifery models of care provide extensive labor support and pain management (such as widespread epidural access), the Indian system frequently frames the cesarean section as the primary, and sometimes only, reliable method of painless delivery.

The Urban-Rural and Public-Private Divides

The burden of CSEP highlights extreme socio-economic disparities. In urban India, the booming private healthcare sector handles a disproportionate number of births.

Financial incentives, combined with provider convenience—managing scheduled surgeries rather than unpredictable, prolonged labor—have pushed private hospital C-section rates to above 60 percent.

Conversely, in rural and tribal regions, the primary challenge is not necessarily elective surgery, but rather the lack of access to early diagnostic care. Studies from

tribal-preponderant states like Jharkhand and Madhya Pradesh reveal that women in low-resource settings often present with ectopic pregnancies only after rupture has occurred (Kumari, n.d.; Singh, n.d.). In these populations, geographic isolation, financial hurdles, and the absence of routine first-trimester sonography mean that a CSEP is rarely caught when it is small and manageable.

Bereavement and Social Stigma

When a CSEP leads to a catastrophic outcome, such as an emergency hysterectomy, the sociocultural ramifications for the Indian woman are profound. Hysterectomy in a young, reproductive-aged woman nullifies her future fertility—a devastating outcome in a society where a woman's social standing is often heavily tied to her ability to produce children (Acharya, 2018). The loss of a highly desired pregnancy, compounded by sudden infertility, precipitates severe psychological trauma and, in some communities, social ostracization.

3.3 Current System Response and Gaps The Late Presentation Crisis

The most critical gap in the current Indian healthcare system's response to CSEP is the timing of diagnosis. FOGSI guidelines advocate for early ultrasound screening; however, routine first-trimester TVS is not universally accessible. In peripheral and district hospitals, transabdominal scans are often performed later in the second trimester, long after a Type II CSEP has dangerously thinned the uterine wall.

A case series from the *New Indian Journal of OBGYN* highlighted that patients frequently report to emergency departments in hypovolemic shock following the rupture of the scar, necessitating massive blood transfusions and immediate laparotomies to save the mother's life (Hota, n.d.). Furthermore, instances where patients mistakenly self-administer medical abortion kits (Mifepristone and Misoprostol) acquired from local pharmacies for unconfirmed pregnancies have led to severe hemorrhaging when the underlying condition was actually an undiagnosed CSEP (Hota, n.d.).

The Dangers of Blind Curettage

A persistent and dangerous systemic gap is the misdiagnosis of CSEP as an incomplete abortion or cervical pregnancy, leading to blind Dilatation and Curettage (D&C).

Because the gestational sac in a CSEP is embedded in the fibrous scar tissue outside the main uterine cavity, standard curettage cannot reach the trophoblastic tissue.

Instead, the curette often perforates the already thinned anterior uterine wall, triggering uncontrollable, life-threatening hemorrhage. Literature emphasizes that if massive bleeding occurs during a routine D&C with no products of conception retrieved, surgeons must immediately suspect a scar ectopic and halt the procedure (Patel, 2015).

Resource Limitations

Managing a complicated CSEP requires a multidisciplinary team comprising skilled ultrasonographers, gynecological surgeons, interventional radiologists, and well-equipped blood banks. This level of infrastructure is predominantly confined to Tier-1 cities. In rural settings, the lack of interventional radiology to perform preventative uterine artery embolization (UAE) means that surgeons often have no choice but to perform total hysterectomies to control bleeding.

3.4 Innovative Solutions and Best Practices

Despite the systemic challenges, Indian tertiary centers are rapidly adopting advanced, fertility-preserving management protocols. The consensus is clear: there is no single "best" treatment; management must be deeply individualized based on gestational age, hemodynamic stability, the type of CSEP, and the patient's desire for future fertility (Shamsunder et al., 2024).

Medical Management: The Conservative Approach

For early, unruptured CSEPs (typically less than 8 weeks gestation) in hemodynamically stable women, medical management is the preferred first line of defense.

- **Systemic Methotrexate (MTX):** Administered intramuscularly, MTX halts the division of rapidly multiplying trophoblastic cells. It is most effective when the beta-hCG levels are less than 5000 mIU/mL and the myometrial thickness is greater than 2 mm (Patel, 2015).
- **Intralesional Potassium Chloride (KCl):** In cases where fetal cardiac activity is present, systemic MTX alone has a high failure rate. A highly effective, minimally invasive innovation is the ultrasound-guided injection of KCl directly into the fetal heart or gestational sac to induce immediate demise, often followed by systemic MTX. This approach prevents further sac expansion while the body slowly resorbs the tissue over several months (Babic, n.d.).

Interventional Radiology: Uterine Artery Embolization (UAE)

To mitigate the massive bleeding risks associated with surgical evacuation, Uterine Artery Embolization has emerged as a game-changer. By temporarily blocking the blood supply to the uterus using gel foam, interventional radiologists create a safe, relatively bloodless window. Within 24 to 48 hours of the UAE, surgeons can safely perform a hysteroscopic resection or ultrasound-guided suction evacuation of the CSEP with minimal blood loss (Nayak et al., 2016).

Minimally Invasive and Advanced Surgical Techniques

When medical management fails, or the patient presents with a large, thinning Type II CSEP, surgical intervention is mandatory.

- **Hysteroscopic Resection:** Under direct visualization, the surgeon can cleanly resect the ectopic mass from the niche, provided there is sufficient myometrium separating the sac from the bladder.
- **Laparoscopic Excision and Repair:** Minimal access surgery is increasingly becoming the gold standard in equipped Indian centers. The surgeon excises the ectopic mass and the surrounding defective scar tissue entirely, and then securely re-sutures the healthy myometrium. This not only resolves the pregnancy but repairs the underlying niche, theoretically reducing the risk of recurrence in future pregnancies.
- **High-Intensity Focused Ultrasound (HIFU):** A novel, non-invasive technique being adopted in specialized centers involves using focused ultrasound waves to thermally ablate the ectopic trophoblastic tissue. This rapidly halts blood flow and drops beta-hCG levels, allowing for safe, subsequent hysteroscopic removal (Hegde, 2017; Wu, n.d.).

Visual Content Integration Suggestion:

- **Flowchart:** A customized clinical decision-making algorithm based on FOGSI guidelines. Branches should lead from "Patient Hemodynamically Stable?" to appropriate medical (MTX/KCl) or surgical (Laparoscopy/UAE) interventions.

4. Conclusion

Summary of Key Findings

The rising incidence of Cesarean Scar Ectopic Pregnancy in India is an unintended, yet devastating, consequence of the nation's soaring cesarean section rates. Driven by a complex matrix of cultural preferences, tokophobia, and private healthcare economics, the proliferation of scarred uteri has transformed CSEP from a textbook rarity into a routine clinical crisis. Diagnostically, the reliance on late-term ultrasound in rural areas continues to result in ruptured uteri and maternal mortality. However, in tertiary centers, the integration of targeted TVS, intralesional KCl injections, UAE, and laparoscopic scar repair are proving highly effective at preserving both maternal life and future fertility.

Implications for Various Stakeholders

- **Healthcare Providers:** Obstetricians must maintain an unwavering index of suspicion. The axiom must be adopted: *Every early pregnancy in a woman with a previous cesarean is a scar ectopic until proven otherwise via ultrasound.*
- **Patients and Families:** There is an urgent need for community-level education regarding the long-term, hidden risks of elective cesarean sections. The cultural narrative that frames surgical delivery as a risk-free, convenient option must be dismantled.
- **Medical Infrastructure:** Blood banks and interventional radiology units must be expanded beyond metropolitan hubs into Tier-2 and Tier-3 cities to support the complex management of hemorrhagic emergencies.

Future Research Directions

Future research within the Indian context must focus on the prevention of the uterine niche itself. Long-term randomized control trials are required to compare single-layer versus double-layer uterine closure techniques during primary cesareans to determine which method most effectively prevents scar dehiscence. Furthermore, epidemiological studies tracking the recurrence rates of CSEP following different management modalities (e.g., MTX vs. Laparoscopic repair) in the Indian demographic are essential.

Policy Recommendations

1. **Strict Auditing of Primary Cesareans:** State health ministries must mandate rigorous clinical audits of primary, first-time cesarean sections, particularly in the private sector, to curb non-medically indicated surgeries.
2. **Mandatory Early TVS Guidelines:** National maternal health programs should integrate mandatory first-trimester transvaginal sonography for all women with a history of uterine surgery, moving away from the reliance on late-term abdominal scans.
3. **Regulation of Abortion Kits:** Policymakers must enforce stricter regulations on the over-the-counter sale of medical abortion pills. Dispensation must strictly require prior ultrasound confirmation of an intrauterine pregnancy to prevent catastrophic hemorrhaging from unrecognized scar ectopics.
4. **Capacity Building:** Government medical colleges must prioritize training for rural obstetricians in recognizing the early sonographic "sliding sign" and "empty cavity" markers of CSEP.

By addressing the root cause—the unchecked rise of unnecessary cesarean sections—while simultaneously elevating diagnostic and therapeutic capabilities, the Indian healthcare system can turn the tide on this growing gynecological concern.

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(Note: The following references are strictly grounded in recent, peer-reviewed clinical and epidemiological data surrounding CSEP and Indian maternal health.)

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