AOGD BULLETIN

Volume 27 I November 2026 I Monthly Issue 7

WITH HER: HEAL, EMPOWER, RESPECT- EVERY STEP OF THE WAY

Theme:

Minding the gap-A comprehensive guide to cesarean scar disorders (CSDi)



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Volume 27 • Monthly Issue 6 • October 2026

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Dr. Reeta Mahey & Dr. Seema Singhal on behalf of Association of Obstetricians & Gynaecologists of Delhi

Published from
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From the President's Desk



Dear Colleagues and Esteemed Members,

Greetings from the AOGD Family!

It is my pleasure to present this special issue of the AOGD Bulletin on Caesarean Scar Disorders (CSDi) dedicated to recognition, diagnosis and management of CSDi. Caesarean section has saved countless lives, and it remains one of the most important operations in our specialty. In India, roughly one in five births is now a caesarean, and in many private settings the rate is close to one in two. With recent rise in number of emergency and elective caesarean sections, the problems related to the caesarean scar are on the rise. These group of complications are collectively termed as Caesarean Scar Disorders (CSDi). It reminds us to think beyond the operating table and follow our patients for the rest of their reproductive lives.

This issue, "**Minding the Gap: A Comprehensive Guide to Caesarean Scar Disorders**," covers how to recognise the niche, how to diagnose it reliably, how to choose the right treatment for each woman, and how to manage scar pregnancy promptly. Most importantly, it asks whether we can prevent the defect through better surgical technique at the first caesarean section. Prevention is where the greatest benefit lies.

I hope this issue will give all the readers recent information about CSDi and their management options depending upon symptoms and future fertility desire. Especially the young colleagues are likely to get benefit who perform caesareans every day. I am grateful to our authors and contributors, whose academic insights capture the spirit of progress and make sure each advance becomes better care for our patients. Let us keep nurturing our passion for gynaecology and stay curious, compassionate and committed as we work together to shape the future of women's healthcare.

Dr Neena Malhotra

Head of Department, Obstetrics and Gynaecology, AIIMS, New Delhi

President, AOGD

From the Secretarial Desk



Dr K Aparna Sharma
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Dear AOGD Members,

Every caesarean sections leaves a scar but not every scar heals the same way. In few women, the uterine wall heals only partially which leaves a pouch-like defect called a niche, or isthmocele. Depending on the imaging method used, a niche is found in a large proportion of women after a caesarean delivery. Majority of these women are asymptomatic, however, in a significant number of women , the "gap" left behind leads to abnormal bleeding, pain, subfertility and serious obstetric complications. This issue, "**Minding the Gap: A Comprehensive Guide to Caesarean Scar Disorders**," is about that gap. It covers the gap in healing, and also the gap in our awareness, diagnosis and management. The importance of this subject extends across all levels of healthcare. Whether in outpatient clinics, emergency rooms or specialised tertiary-care units, clinicians must be equipped to recognise these conditions and provide timely, evidence-based care.

In this issue, a comprehensive overview of CSDi, encompassing their definition, classification, clinical presentation, diagnostic modalities and contemporary management strategies has been discussed. Particular emphasis has been placed on the role of imaging, especially transvaginal ultrasonography, in the assessment of caesarean scar defects, as well as the evolving approaches to the management of caesarean scar pregnancy. Equally important is the discussion on preventive strategies and evidence-based practices that may help minimise scar-related complications following caesarean delivery. We hope the contributions in this issue will enhance clinical understanding, stimulate academic discussion and encourage the adoption of best practices in everyday clinical care.

We are deeply grateful to all our authors for their scholarly contributions and timely submissions. We also thank the editorial team for their hard work. We welcome your feedback for future issues.

Happy reading!

AOGD Secretariat
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From the Editor's Desk


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Dear AOGD Members,

It gives us immense pleasure to present this issue of the AOGD Bulletin, dedicated to an increasingly relevant and evolving area of obstetrical and gynaecological practice Caesarean Scar Disorders.

With the rising rates of caesarean deliveries, the spectrum of complications associated with caesarean scars has gained considerable clinical significance. What was once considered an incidental finding is now being increasingly recognised as an important contributor to gynaecological symptoms, reproductive challenges and obstetric complications. From caesarean scar niches presenting with intermenstrual bleeding and secondary infertility to the potentially life-threatening condition of caesarean scar pregnancy (CSP), these disorders warrant greater awareness, timely diagnosis and appropriate management.

This bulletin features the articles on various aspects of Caesarean Scar Disorders (CSDi) including its increasing prevalence, the proposed mechanisms, the recent consensus-based definition of CSDi, standardised assessment with transvaginal ultrasound and its management strategies. The issue covers the full range of options, from medical therapy to hysteroscopic niche resection and laparoscopic or vaginal repair. It emphasises that treatment should depend on the woman's symptoms, her reproductive plans and the residual myometrial thickness. The article on Caesarean Scar Pregnancy covers risk factors, early ultrasound diagnosis, the link with placenta accreta spectrum, and the expanding range of management options. Early recognition and timely intervention make a large difference in this condition. In the article Preventing Caesarean Scar Defect: Can We Improve the Technique of the Index Caesarean?, authors review the evidence on the various techniques and other modifiable factors.

We extend our sincere appreciation to all our contributors and reviewers for their dedication and efforts in bringing together this informative and clinically relevant issue. Their collective contribution has made this edition possible.

We hope you find this issue enriching, thought-provoking and, most importantly, useful in your clinical practice.

With warm regards,

The Editorial Team

Caesarean Scar Defect: The New Post-Caesarean Epidemic

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INTRODUCTION

The clinical significance of a uterine niche or isthmocele has recently been refined through an international modified Delphi consensus (2023), which introduced the term Caesarean Scar Disorder (CSDi) for a niche that caused symptoms[1] pain, and infertility, but there is little consensus in the literature on the distinction between the sonographic finding of a niche and the constellation of associated symptoms.To achieve consensus on defining the clinical condition that constitutes a symptomatic uterine niche and agree upon diagnostic criteria and uniform nomenclature for this condition.A consensus based modified electronic Delphi (eDelphi. A uterine niche is described as an indentation of ≥ 2 mm at the caesarean scar site measured via transvaginal ultrasound at least 3 months following caesarean delivery ; and the constellation of symptoms resulting from a niche are termed CSDi.[1]

According to the Delphi consensus, the essential diagnostic criteria for CSDi include (1) that

- A women should be premenopausal
- With symptom onset after a caesarean delivery
- Symptomatic with one primary or two secondary symptoms for least three menstrual cycles
- After ruling out other causes attributing to the symptom.

This would differentiate symptomatic women with those identified with mere sonographic finding.

PRIMARY SYMPTOMS FOR CSDI INCLUDE THE FOLLOWING:

- Postmenstrual spotting
- Pain during uterine bleeding
- Secondary infertility associated with intrauterine fluid
- Technical difficulties during embryo transfer

SECONDARY SYMPTOMS FOR CSDI INCLUDE:

- Abnormal vaginal discharge
- Dyspareunia
- Chronic pelvic pain
- Avoidance of sexual intercourse
- Negative self-image
- Odor associated with abnormal blood loss
- Secondary infertility without intrauterine fluid
- Unexplained secondary infertility following caesarean delivery
- Discomfort during participation in leisure activities

CONDITIONS TO BE EXCLUDED BEFORE CONFIRMING CSDI DIAGNOSIS:

- Vaginal or uterine infections
- Cervical dysplasia
- Other intrauterine pathologies
- Alternative causes of postmenstrual spotting: hormonal contraceptives or intrauterine devices
- Anovulatory menstrual cycles

RISK FACTORS AND ETIOPATHOGENESIS

Isthmocele or niche formation results from defective myometrial healing influenced by surgical, anatomical and maternal factors[2]

1. Surgical and technical factors
    - **Advanced labour:** Caesarean delivery at cervical dilatation ≥5 cm, especially with a deeply engaged fetal head, leads to a thin uterine segment.
    - **Low hysterotomy incision:** Incisions extending to the cervix involve poorly contractile cervical tissue and compromise scar healing.
    - **Endometrial inclusion during closure:** Incorporation of endometrial tissue within the myometrial suture line may interfere with anatomical healing, potentially promoting endometrial entrapment, local inflammation and isthmocele formation.
    - **Inadequate myometrial approximation:** Misalignment or incomplete incorporation of the muscular edges also impairs the scar healing.
    - **Locked sutures:** Tissue strangulation and compromised microvascular perfusion may lead to tissue ischemia and defective healing.
    - **Single layer versus double layer closure:** Evidence remains conflicting. Closure quality, endometrial exclusion and tissue perfusion may be more important than the number of layers alone. However, single layer closure should be avoided.
2. Anatomical factors
    - **Retroflexed uterus:** Persistent mechanical tension

across the scar may impair healing.

- **Adhesions:** Traction on the lower uterine segment may interfere with scar remodelling.

3. Maternal and obstetric factors

- Repeated uterine incisions in women with multiple caesarean deliveries.
- Obesity.
- Diabetes mellitus.
- Smoking and advanced maternal age.
- Postoperative infection.

A symptomatic isthmocele may resolve without intervention; therefore, not all symptomatic cases require treatment.

DIAGNOSIS OF CSDI

Transvaginal 2-D Ultrasonography (TVS) is the primary imaging method advocated by modified Delphi consensus published by Jordans et al in 2019 for assessment of uterine niche[3] which includes the following:

1. Identification: A niche is defined as an anechoic or hypoechoic indentation at the previous cesarean scar site, measuring ≥2 mm in depth. (Figure 1 A)
2. Sagittal plane measurements: (Figure 1 B-D)
   - o Depth: Maximum depth of the niche into the anterior myometrium.
   - o Length: Maximum longitudinal dimension of the niche.
   - o Residual myometrial thickness (RMT): Minimum myometrial thickness between the niche apex and uterine serosa.
   - o Adjacent myometrial thickness (AMT): Thickness of the unaffected myometrium adjacent to the niche.
3. Transverse plane to measure the maximum niche width. (Figure 1 E)
4. Morphology: Document whether the niche is simple, has one branch, or is complex with multiple branches.

   For enhanced visualization and clearer delineation, gel or saline infusion sonohysterography is preferred when required. 3-D TVS aids the diagnosis and Doppler may help differentiate a niche from other uterine abnormalities. Table 1 shows diagnostic criteria for CSDi.

Table 1. showing Diagnostic Criteria for Caesarean Scar Disorder (CSDi) (Adapted from Mueleman Klein et al 2023).

Must have:	Plus at least one primary symptom:	Or at least 2 secondary symptoms:
Sonographic evidence of CSD of 2mm or more in depth	Postmenstrual spotting	Dyspareunia
Minimum 3 regular menstrual cycles after CS prior to diagnosis	Pain during uterine bleeding	Abnormal vaginal discharge
Premenopausal status	Technical issue with catheter insertion during embryo transfer	Chronic pelvic pain
Initiation or significant worsening of symptoms after CS	Secondary unexplained infertility combined with intrauterine fluid	Avoidance of sexual intercourse
Ruled out cervical dysplasia, infection, uterine cavity pathology and AUB from ovulatory or other iatrogenic causes		Odour associated with abnormal blood loss
		Secondary unexplained infertility despite ART
		Negative self-image
		Discomfort during participation in leisure activities

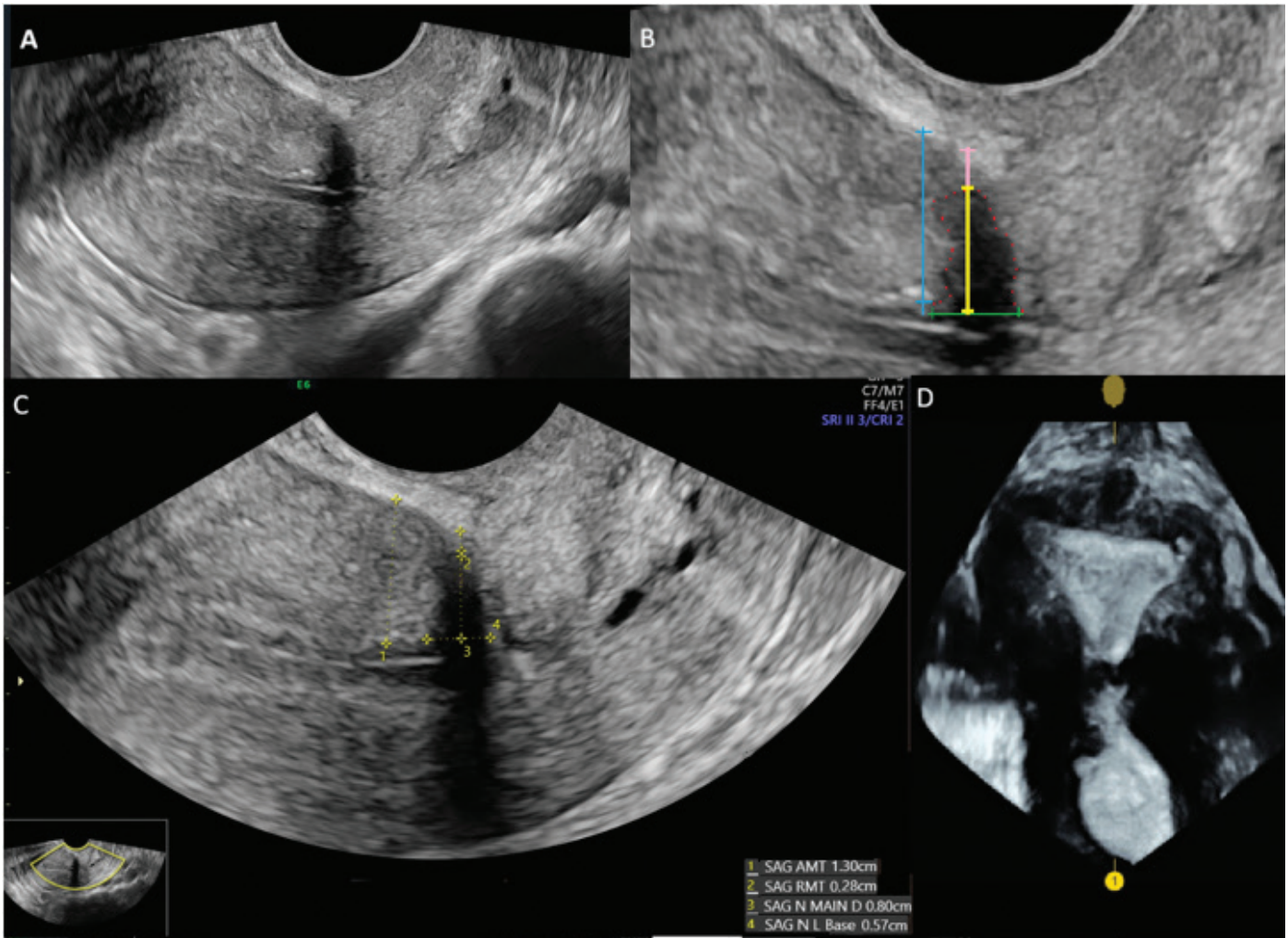
Routine screening for a niche in asymptomatic women with a prior cesarean delivery is unnecessary and not recommended (4). A diagnostic algorithm is proposed in Figure 2.

MANAGEMENT

The treatment approach is individualised to cater to the troublesome symptoms or for reproductive concerns.

MEDICAL MANAGEMENT

Pain and bleeding symptoms can be resolved with the use of hormonal therapy, including combined oral contraceptives and the levonorgestrel intrauterine system (LNG-IUS), without the need to correct the anatomical defect.



(A) Two-dimensional sagittal view demonstrating an anechoic niche at the previous cesarean scar site.

(B) Sagittal TVS view demonstrating standardized niche measurements: blue line indicates adjacent myometrial thickness (AMT), pink line represents residual myometrial thickness (RMT), yellow line indicates niche depth, and green line represents niche base (length) and the red dotted area, is the area of niche.

(C) Sagittal view showing sonographic measurements of AMT, RMT, niche depth, and niche base, with corresponding values.

(D) Three-dimensional (3D) coronal reconstruction demonstrating the morphology of the cesarean scar niche.

(E) Transverse view demonstrating measurement of the maximum niche width.

Figure 1. Transvaginal ultrasonographic assessment of a cesarean scar disorder

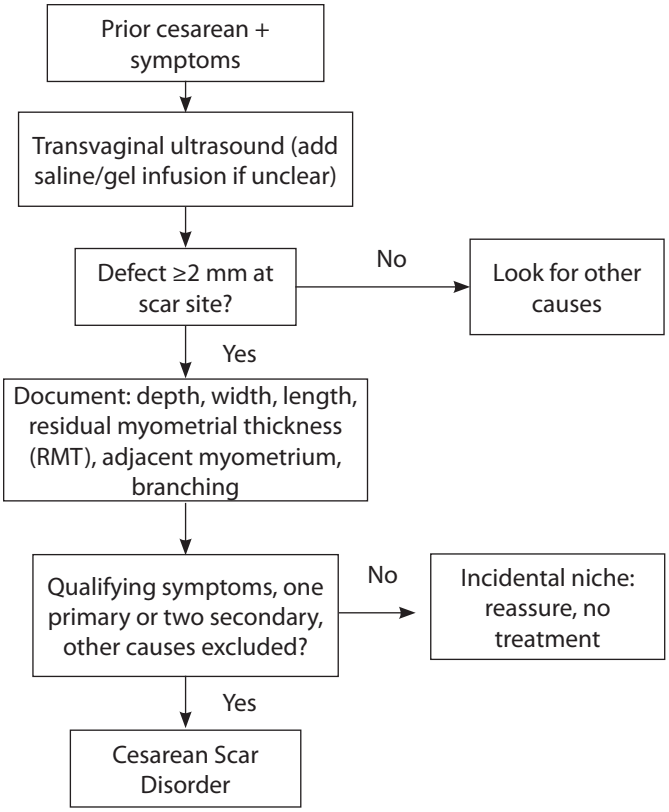


Figure 2. Flowchart showing the diagnosis algorithm.

A recent randomized trial by Yan et al. (2026) comparing LNG-IUS with hysteroscopic niche resection in 208 women demonstrated comparable improvement in postmenstrual spotting at six months. At 36 months follow up, a reduction of 50% in spotting was assessed which was observed in 98.9% LNG-IUS users versus 51.7% following hysteroscopic resection. These findings support LNG-IUS as an effective long term option for appropriately selected women not seeking immediate pregnancy.[5]

HYSTEROSCOPIC NICHE REMODELLING

This primarily addresses bleeding symptoms without reconstructing the myometrial defect (4) and is an option in symptomatic women with RMT ≥3 mm. Resection of the niche rim facilitates drainage of retained menstrual blood. During procedure if abnormal vessels are identified, they may be selectively coagulated .

Unlike reconstructive surgery, hysteroscopy does not restore myometrial thickness. Careful patient selection is therefore essential to minimize the risk of uterine perforation and bladder injury.

LAPAROSCOPIC NICHE REPAIR:

Laparoscopic approach is preferred in symptomatic women desiring future fertility, particularly when RMT <3 mm. Repair involves identification of the defect, excision of fibrotic tissue, and multilayered myometrial re-approximation. Concomitant hysteroscopic guidance may facilitate precise niche localization through transillumination (4). (Figure 3B)

Transvaginal repair remains an alternative for low-lying accessible defects in experienced hands.

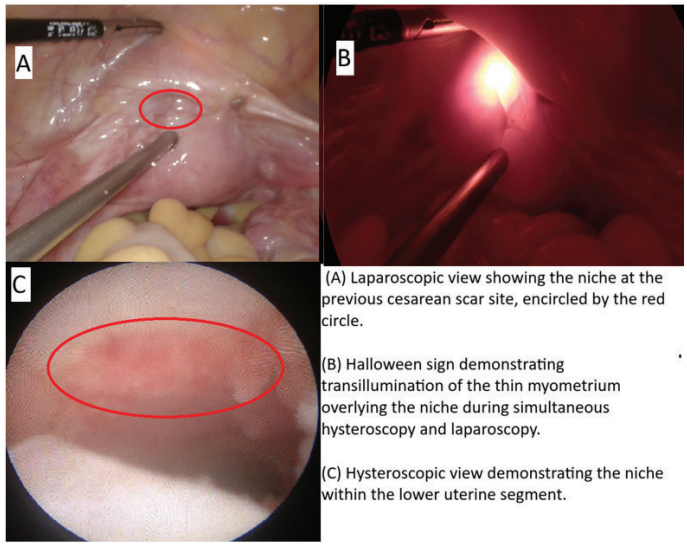


Figure 3. Laparoscopic and hysteroscopic visualization of cesarean scar disorder (niche)

RECENT EVIDENCE ON SURGICAL MANAGEMENT AND FERTILITY OUTCOMES

- **Surgical outcomes:** Busnelli et al. (2025) reported pooled natural conception rates of 53% (95% CI 28–77%) and 45% (95% CI 33–57%), and live-birth rates of 63% (95% CI 49–77%) and 51% (95% CI 40–63%) following hysteroscopic and laparoscopic isthmocele repair, respectively. However, evidence establishing a causal improvement in fertility remains uncertain.[6]
- **Emerging indocyanine green (ICG) guided surgery:** Tam et al. (2025), in a case report, described hysteroscopic and robotic assisted laparoscopic isthmocele repair in a woman with previous endometrial ablation and dense pelvic adhesions. In this case indocyanine green (ICG) (2cc/5 mg) was instilled into the uterine cavity and near-infrared imaging facilitated precise localization of the niche, distinguishing the defect from distorted tissue planes during adhesiolysis.[7].

CONCLUSION

Recent advances in defining cesarean scar disorder, standardized ultrasound assessment, and minimally invasive surgical techniques have improved its management. Treatment should be individualized according to symptoms, residual myometrial thickness, and fertility goals, while meticulous uterine closure remains essential for prevention.

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Diagnosis of Caesarean Scar Defect

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INTRODUCTION

Caesarean scar defect (CSD), also termed as "uterine niche" or "isthmocele", is an indentation at the site of a previous caesarean scar.[1] With increasing caesarean delivery rates, recognition of this defect has become important in women presenting with postmenstrual spotting, abnormal uterine bleeding, dysmenorrhoea, chronic pelvic pain, secondary infertility or difficult embryo-transfer.

A niche may, however, be an incidental imaging finding; its presence alone does not establish that it is responsible for symptoms.[2]in terms of strengths, weaknesses, opportunities and threats (SWOT analysis The diagnostic task is therefore twofold: to identify and characterise the defect, and to interpret its morphology in the clinical context.

DEFINITION AND TERMINOLOGY

The International Modified Delphi Consensus defines an ultrasound niche as an indentation at the caesarean scar with a depth of **at least 2 mm**.[1] This threshold is an imaging definition, not a severity grade or an indication for treatment.

Hysteroscopic definition of uterine niche- The Hysteroscopic Consensus uses a different visual definition, it defines any indentation in the myometrium at the previous caesarean site as uterine niche.[3] A hysteroscopic evaluation should always be combined with ultrasound because depth cannot be measured endoscopically. However, it should be described as small, medium, large, or extreme in relation to the size of cervical canal subjectively**.**[4]

Classification: Niches are classified morphologically as:

- Simple niche: a single indentation without branches.
- Simple niche with one branch: a main niche with one narrower extension.
- Complex niche: a defect with more than one branch.

A branch is a thinner extension of the main niche directed towards the serosa. The defect may appear triangular, semicircular, round, rectangular or irregular/cribriform.

DIFFERENT MODALITIES TO DIAGNOSE CSD

1. **Transvaginal (2-D) Ultrasonography:** First-line Investigation

   TVS is accessible, inexpensive and allows dynamic assessment of the lower uterine segment (LUS). The examination should visualise the entire anterior LUS in the sagittal plane, identify the cervical canal and internal os, and sweep laterally to assess the full width and any branches.

A midsagittal view is the starting point; transverse or 3D views may help define width and complex morphology (Figure 1). Although 3D-TVS can be useful for spatial orientation, it has not been shown consistently to outperform a high-quality 2D examination.[1] (Figure 2)

Probe position and pressure influence niche visibility. Gentle variation in pressure and scanning from the anterior or posterior fornix may improve delineation. Intracavitary fluid can act as a natural contrast medium. Colour Doppler is not mandatory, but may help distinguish a niche from vascular lesions, adenomyosis, adenomyoma or other myometrial abnormalities.

HOW TO MEASURE UTERINE NICHE USING ULTRASOUND

- Sagittal plane: Start by gentle scanning in midsagittal plane, with good visualization of cervical canal, then moving transvaginal probe laterally to both sides to identify correct sagittal plane.
- Transverse plane: Start in sagittal plane, with uterine niche in vision while rotating transvaginal probe from sagittal to transverse plane
- Screen entire lower uterine segment from cervix to corpus to detect possible branches in transverse plane
- The length, depth and width of the niche should each be measured in the plane in which it is largest; this is not always the midsagittal or mid-transverse plane.

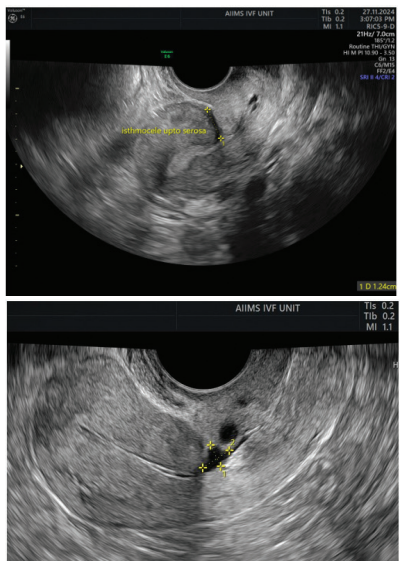


Figure 1. Transvaginal ultrasound demonstrating a caesarean scar niche.

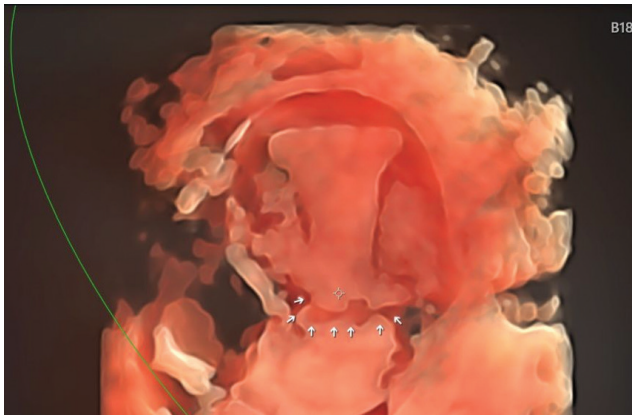


Figure 2: 3D TVS showing CSD (marked by arrows)

STANDARDISED CSD MEASUREMENTS: THE 2019 DELPHI APPROACH[1]

The modified Delphi procedure by Jordans and colleagues provides a reproducible framework for sonographic assessment. The essential measurements are obtained in the plane of maximum dimension, with the smallest residual myometrial thickness (RMT) recorded separately. Measurements should be made in sagittal and transverse planes as appropriate; complex niches may require more than one plane.

FOUR STEP ROADMAP FOR EVALUATION OF UTERINE NICHE:

1. Measurements of Length, depth and width of CSD (Figure 3, Table 1)
2. Classifying niche by identifying branches as simple, simple with one branch and complex niche
3. Measuring adjacent myometrial thickness and residual myometrial thickness (Table 1) RMT is relevant to anatomical characterisation and surgical planning, but should not be interpreted in isolation as a definitive predictor of uterine rupture or as an automatic indication for repair.
4. Other measurements for research purposes: The distance between the vesicovaginal fold (VV) and the apex of the niche is a useful measurement if surgery is considered. It is given a positive value if the apex of niche is located cranial to VV fold and similarly, negative value if located caudally. Also, distance from external os (Figure 4) should preferably be documented. All these measurements help in planning surgeries.

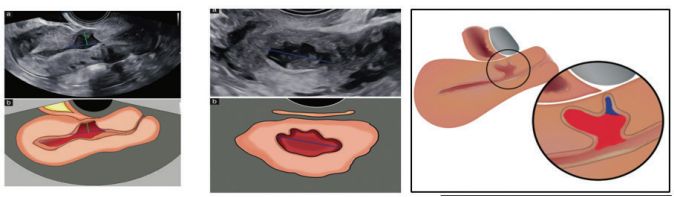


Figure 3: Schematic diagram showing measurement of length, depth and width of CSD. simple uterine niche with one branch[1]

Table 1. Standardised sonographic measurements of a uterine niche

Parameter	How to measure / report	Plane
Niche length	Maximum longitudinal extent of the defect parallel to uterine cavity/cervical canal	Sagittal
Niche depth	Perpendicular distance from the line joining the niche edges to the deepest point of the defect	Sagittal
Niche width	Maximum transverse width could be at the base or apex of the defect	Transverse
Residual myometrial thickness (RMT)	Shortest distance from niche apex to the outer myometrial/ serosal border; perpendicular to the border with serosa	Sagittal; minimum value
Adjacent myometrial thickness (AMT)	Thickness of intact myometrium adjacent to the niche at the border of the niche base, perpendicular to the cervical canal where the myometrium is thickest	Sagittal
Branches	Number, direction and separate dimensions where feasible	Multiple planes

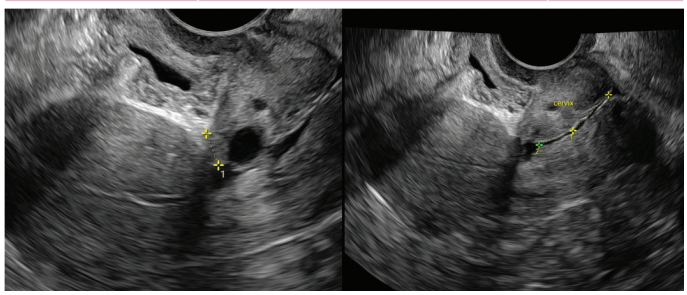


Figure 4: TVS showing RMT and second picture showing distance of CSD from external cervical os

2. Saline infusion sonohysterography (SIS)

When the niche is not clearly seen on TVS, or its contour is incompletely defined, saline or gel infusion sonohysterography (SIS/GIS) improves delineation by distending the uterine cavity and outlining the defect. 5 (Figure 5)

A thin catheter is placed in the uterine cavity and sterile saline is instilled slowly while the lower segment is examined. The contrast column outlines the niche, its communicating opening, depth, branches and any retained fluid or debris.

SIS may identify defects missed on unenhanced TVS and is particularly useful when the cavity is collapsed or when the defect communicates poorly with the endometrial cavity. Otherwise, TVS remains the modality of choice. A 2026 study of 403 women

reported a sensitivity of 42.15% and specificity of 100% for 3D-TVS, compared with 3D-SIS. 6width, residual myometrial thickness (RMT

Best location of catheter used in contrast sonography is just in front of niche (caudal to its most distal part) or, if possible, cranial to its most proximal part, at start of gel/saline contrast infusion, then pulling catheter slowly backwards towards base of niche. While performing ultrasound following saline infusion, catheter can be left in front of niche. 2in terms of strengths, weaknesses, opportunities and threats (SWOT analysis

There is no established universal preference for saline over gel. If fluid is already present in the cavity, additional infusion may not be necessary. Timing should be individualised; the optimal cycle day has not been definitively established. Assessment should not be performed too soon after caesarean delivery, when scar dimensions may not yet be stable.



Figure 5. Transvaginal saline-contrast sonohysterography outlining a caesarean scar defect. Reproduced from Dominguez et al., 20232in terms of strengths, weaknesses, opportunities and threats (SWOT analysis

3. Magnetic resonance imaging (MRI)

MRI is not routinely required when TVS or SIS provides adequate characterisation. It is useful when ultrasound findings are equivocal, the anatomy is complex, there is a large or laterally extending defect, or additional pelvic pathology needs assessment.

Sagittal T2-weighted images can demonstrate the fluid-containing indentation in the anterior lower uterine segment, the residual myometrial layer and its relationship to the bladder and adjacent structures. (Figure 6)

MRI offers a wider field of view and multiplanar assessment, but is more expensive and less accessible. Current evidence does not establish it as superior to TVS or contrast sonography for routine niche diagnosis.

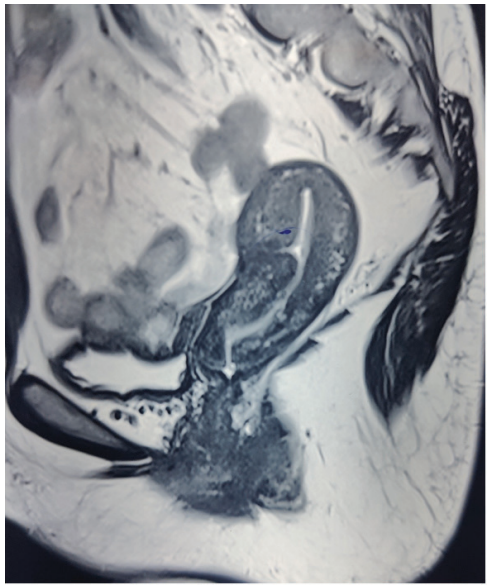


Figure 6. Sagittal MRI demonstrating an isthmocele and the residual myometrial layer.

STRUCTURED ULTRASOUND REPORTING PROFORMA

The 2019 Delphi paper standardises what should be measured. The following practical proforma adapts its consensus parameters for routine reporting.

Table 2. Suggested ultrasound reporting proforma for caesarean scar defect

Section	Items to document
Clinical details	Indication/symptoms; number and dates of caesarean deliveries if known; interval from last delivery; cycle day; modality (TVS/SIS/MRI)
Location and morphology	Anterior LUS at previous hysterotomy; number of niches; shape; simple/one branch/complex; contents (fluid, blood, mucus); communication with cavity
Measurements	Length, depth, width, minimum RMT, AMT; units in mm; specify plane and whether contrast was used
Branches and adjacent findings	Number, direction and dimensions of branches; intracavitary fluid; fibroids, adenomyosis, adhesions or other relevant pathology; Doppler findings if obtained
Impression	CSD present/absent; morphology; all key dimensions and minimum RMT; associated findings; limitations of visualisation

Distances from the niche to the vesicovaginal fold and external os may be added when relevant for surgical planning or research, but are not essential core measurements.

4. Structured hysteroscopic reporting of CSD

Hysteroscopy allows direct visualisation of the niche from the uterine cavity and is valuable when performed for

associated abnormal bleeding, infertility evaluation or operative treatment.

It can reveal retained blood or mucus, a dynamic flap/valve, polyps, crypts, cystic spaces, fibrotic tissue, placental remnants and abnormal vascularity. However, it does not provide a reliable measurement of niche depth, width or RMT; ultrasound must be performed alongside it.

The 2024 modified Delphi consensus by Min [3] and colleagues recommends a standardised reporting form. (Figure 8) Diagnostic hysteroscopy should preferably be performed without cervical dilatation, which can alter niche appearance. The hysteroscope diameter should be recorded.

The examination should begin with an overview of the cervical canal and niche. Separate images or video clips should be captured for abnormalities, followed by documentation of the uterine cavity and tubal ostia. The niche should be classified as simple, simple with one branch or complex. Its size may be described subjectively as small, medium, large or extreme in relation to the cervical canal.

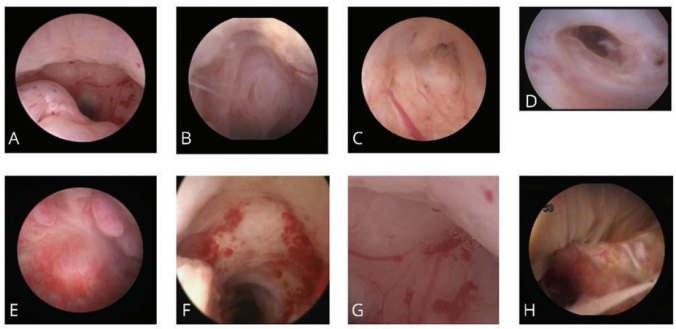


Figure 7. Hysteroscopic features recommended for structured assessment: niche indentation, cystic formations, crypts, lateral branches, polyp-like structures, fibrosis, vascularity and mucus. Reproduced from Min et al., 2024[3]

HYSTEROSCOPIC PARAMETERS TO DOCUMENT

The 2024 Delphi consensus recommends recording:

- Location: within the cervical canal or more proximal in the uterine cavity.
- Morphology: simple, simple with one branch or complex.
- Structural features: cystic formations, crypts, lateral branches, polyp-like structures, fibrotic tissue and dynamic valve.
- Contents: blood, mucus, placental remnants and endometrial tissue.
- Vascularity: number of vessels (fewer than five or at least five) and whether vessels bleed when distension pressure is released.
- Extent: estimate the proportion of the niche occupied by each feature, where possible.

A cystic formation is a closed sac-like fluid-filled structure bulging from the surface. A crypt is a cystic space with open communication to the niche. Fibrotic tissue appears as focal hard white tissue without vessels. A dynamic valve is a partial or complete obstruction of niche outflow that moves with changes in distension pressure.

How many niches are present? .....
(if more than 1, score every niche separately)

Classification
O Simple niche
O Simple niche with 1 branch
O Complex niche

Size
O Small
O Medium
O Large
O Extreme

Can you see the complete niche and the internal os in one view?
(measured 1-2 cm below lowest rim niche)
O yes
O no

Is the niche visible in
O the cervix
O the uterine cavity

The niche is .....mm located from the external os

Are the following items present in the niche

Cystic formations *Closed sac-like structure filled with fluid visible that is bulging the surface of the niche*	O yes O No
Crypts *Cysts with an open connection to the niche*	O yes O No
Lateral branches *A smaller part of the niche directing towards the serosa that has a smaller width then the niche itself*	O yes O No
Polyp like structures *Endometrium like focal growth*	O yes O No
Fibrotic tissue *A focal hard tissue with a white surface without vessels*	O yes O No
Dynamic valve in the niche *A dynamic partial or complete obstruction of the niche outflow which moves when changing pressure*	O yes O No
Blood	O yes O No
Mucus	O yes O No
Placental remnants	O yes O No
Endometrium	O yes O No
Vessels	
Easily bleed by releasing pressure	O yes O No
Amount of vessels	O less than 5, O equal or more than

Diameter hysteroscope ..... mm

Do not forget to store pictures/video

Figure 8. Structured hysteroscopic niche registration form proposed by the 2024 Delphi consensus. Reproduced from Min et al., 2024.[3]

Importantly, hysteroscopic assessment should not be used to measure niche depth or RMT. These measurements must be obtained by ultrasound.

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Calendar for AOGD Monthly Clinical Meeting 2026-2027

27th November 2026	MAMC & LNJP Hospital
18th December 2026	Sir Ganga Ram Hospital
29th January 2027	Dr RML Hospital
26th February 2027	UCMS & GTB Hospital
19th March 2027	LHMC & SSK Hospital
30th April 2027	ESI, Basaidarapur Hospital

Decoding Isthmocele: From Clinical Presentation and Tailored Treatment

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INTRODUCTION

An isthmocele is a discontinuity of the lower anterior myometrial layer at the site of a previous caesarean section (CS), with preserved serosa, measuring at least 2 mm in depth. The same lesion is described in the literature as caesarean scar defect (CSD), caesarean scar niche and uterine diverticulum; the terms are used interchangeably. It is now recognized as a distinct clinical entity rather than an incidental sonographic finding. Reported prevalence ranges from 20% to 80%, depending on the population studied and the imaging method used, and it is increasing with increasing CS rates. The condition is a growing concern for patients and clinicians because it can affect both quality of life and reproductive capacity.

ETIOLOGICAL RISK FACTORS

CS is by far the most common cause, and the risk rises with each operation: a niche is seen in about 61% of women after one CS, 81% after two and almost 100% after three. The defect reflects incomplete healing of the hysterotomy. Risk factors fall into three groups:

- Obstetric history: Number of previous CS, the strongest and most consistent factor.
- Circumstances and technique of the caesarean: Advanced cervical dilatation at the time of CS (more than 5 cm); a low hysterotomy, about 2 cm below the vesicouterine pouch, typically in women in advanced labour, where the incision falls on cervical rather than isthmic tissue; and uterine closure technique, whose role remains debated.
- Factors impairing wound healing: Peripartum infection, anemia, diabetes and obesity.

Because several of these factors are modifiable at the index operation, prevention begins with caesarean technique and with avoiding unnecessary primary CS.

CLINICAL FEATURES

Only 30–50% of women with a niche are symptomatic. Symptoms fall into three groups: abnormal uterine bleeding, pain and secondary infertility.

Abnormal uterine bleeding. Postmenstrual spotting is the hallmark symptom, reported by 60–80% of symptomatic women. Menstrual blood pools in the niche and drains slowly after the period ends. Prolonged menstrual bleeding and intermenstrual bleeding are also seen.

Pain. Dysmenorrhoea, chronic pelvic pain and dyspareunia, attributed to chronic inflammation, adhesions and endometriosis or adenomyosis at the scar.

Secondary infertility. Infertility is reported in 4–19% of women with a niche and may be the only presenting complaint. Proposed mechanisms are:

- Intrauterine fluid from the niche, which is embryotoxic;
- Chronic inflammation (endometritis);
- Impaired uterine contractility;
- Impaired sperm migration and vitality;
- Physical barrier to implantation and to embryo transfer

A niche also carries risk for the next pregnancy: miscarriage, caesarean scar pregnancy (CSP), placenta praevia, placenta accreta spectrum, and uterine dehiscence or rupture.

DIAGNOSIS AND ASSESSMENT

Transvaginal sonography (TVS) is the first-line investigation, and the residual myometrial thickness (RMT) it yields is the single measurement that drives treatment (Detailed description of assessment of CSD is mentioned in chapter 2).

TREATMENT TRIAGING

Treatment is planned as per answers to the following question:

- Primary symptoms
- Does the woman want future fertility
- Residual myometrial thickness?

An asymptomatic niche found incidentally in a woman with no fertility concern needs no treatment.

SYMPTOMATIC ISTHMOCELE FUTURE FERTILITY NOT REQUIRED

Medical management is first line: the levonorgestrel intrauterine system (LNG-IUS), combined oral contraceptive pills or a GnRH agonist (maximum of 3-4 doses). These reduce or abolish menstrual flow and so the pooling of blood in the niche. Surgery is reserved for women whose symptoms persist.

Symptomatic isthmocele requiring future fertility

A niche should be addressed in a woman with secondary infertility even when infertility is the only symptom. The

work-up proceeds in three steps:

1. Incidental diagnosis during infertility evaluation, noting fluid in the cavity and chronic endometritis.
2. Detailed TVS evaluation of niche anatomy, in particular RMT.
3. Exclusion of other causes of infertility.

Non-invasive treatment. A GnRH agonist, three doses, may be tried before surgery when fluid in the cavity is the only problem in a woman planned for embryo transfer, with no menstrual symptoms, a small defect and RMT of 3 mm or more. It induces amenorrhoea and suppresses bleeding, inflammation and endometriotic tissue within the niche.

Surgical repair (isthmoplasty). Four factors shape the plan: desire for future fertility, number of previous caesarean deliveries, period of gestation at previous deliveries, and RMT. Previous abdominal surgery and previous failed repairs also influence the approach. RMT decides the route.

	RMT ≥ 3 mm	RMT < 3 mm
Route	Hysteroscopic isthmoplasty	Laparoscopic or robotic repair +/- hysteroscopic guidance; vaginal or open repair as alternatives
Principle	Resection of the niche edges and coagulation of the niche bed to improve drainage; myometrium is not restored	Excision of the defect and layered resuturing, restoring myometrial thickness
Best suited to	Smaller defects with adequate myometrium	Women desirous of fertility; larger defects with severe symptoms
Advantages	Short procedure, early recovery, conception can be attempted soon after	Restores wall thickness; combined hysteroscopic guidance localises the defect precisely
Limitations	Risk of uterine perforation and bladder injury; not suitable when RMT is below 3 mm	More invasive; conception delayed (6 months minimum)

In laparoscopic repair, simultaneous hysteroscopy identifies the limits of the defect by transillumination and confirms cervical patency after closure. Postoperative imaging documents the restored myometrium before conception is permitted.

STEPS OF LAPAROSCOPIC ISTHMOCELE REPAIR

Under general anaesthesia, the patient is placed in the dorsal lithotomy position. A uterine manipulator is inserted, and the abdomen is prepared and draped. Pneumoperitoneum is established, and laparoscopic ports are inserted. The pelvis is inspected to identify the caesarean scar defect (CSD) and assess surrounding adhesions.

- **Dissection of the vesicouterine peritoneal fold:** The vesicouterine peritoneal fold is identified and incised. The bladder is carefully dissected from the lower uterine segment and mobilised inferiorly. Adhesiolysis is performed as required to facilitate adequate exposure of the defect and to protect the bladder during subsequent dissection (Fig. 1 a–c).
- **Identification and delineation of the defect:** Hysteroscopy is performed, and the light source is used to transilluminate the uterine cavity. The hysteroscopic light is visualised laparoscopically at the site of the isthmocele, allowing precise localisation of the defect and delineation of its margins (Fig. 1d).
- **Dissection of the caesarean scar defect:** The defect is carefully dissected to expose the fibrotic scar tissue and define the extent of the niche. Dissection is performed under direct vision, maintaining awareness of the bladder and the adjacent uterine structures (Fig. 1 e).
- **Excision of fibrotic margin-** The fibrotic and poorly vascularised edges of the defect are excised using an appropriate energy device or laparoscopic scissors. Excision is continued until healthy, vascularised myometrial margins are obtained, while preserving as much viable myometrium as possible (Fig. 1f).
- **Reconstruction of the uterine wall-**The defect is repaired laparoscopically using delayed absorbable sutures (e.g., V-Loc).. A two-layer closure is performed to approximate the myometrial edges, restore the integrity of the lower uterine segment, and improve residual myometrial thickness. The first layer approximates the deeper myometrial edges, while the second layer reinforces the reconstruction and covers the initial suture line (Fig. g).

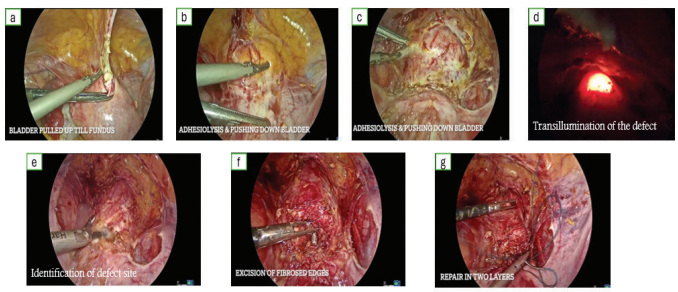


Figure 1: Intra-operative findings in a case of CSD with an RMT of 1 mm planned for laparoscopic repair. (a, b) The pulled-up, adherent bladder being dissected with an ultrasonic energy device (Harmonic ACE); (c) further dissection, pushing the bladder down to expose the previous scar and the lower uterine segment; (d) hysteroscopic transillumination of the CSD; (e) incision over the CSD with the Harmonic ACE; (f) excision of the fibrotic edges of the CSD; (g) two-layer repair of the isthmocele with barbed sutures.

STEPS OF HYSTEROSCOPIC ISTHMOCELE REPAIR

Hysteroscopic repair is done when patient is symptomatic and residual myometrial thickness is >3mm. Under anaesthesia, the cervix is dilated minimally and a bipolar resectoscope is introduced. The distal (caudal) edge of the niche, and the proximal edge if it obstructs drainage, is resected to flatten the defect and allow free outflow. The base of the niche is then coagulated with a rollerball to destroy ectopic endometrium and abnormal vessels. The shaving of the edges of the isthmocele provides symptomatic improvement and prevents collection of blood inside the defect (Figure 2).

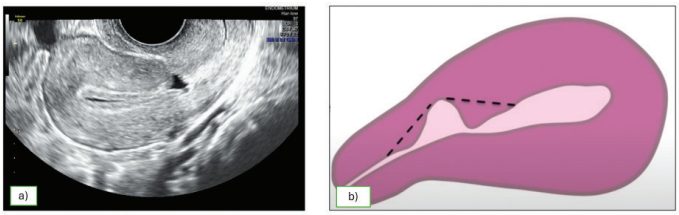


Figure 2 (a): TVS image showing isthmocele, adequate RMT and fluid in the cavity; and (b) Hysteroscopic isthmoplasty: Pictorial depiction of shaving the edges of isthmocele to prevent the blood collection.

COUNSELLING

Before any repair the woman should be counselled about:

- expected outcomes, complications and the limitations of treatment;
- the chance of incomplete repair and recurrence;
- the persisting increased risk of caesarean scar pregnancy, placenta accreta spectrum and uterine rupture.

Pregnancies after repair need close follow-up, with elective caesarean delivery at 35–37 weeks.

DIFFICULT DECISION MAKING

Some situations have no clear answer and call for individualised, shared decisions. Two illustrative examples:

- A 32-year-old with one previous term caesarean and a caesarean scar ectopic pregnancy already treated by laparoscopic repair, now with a large defect and infertility. The choice lies between a repeat laparoscopic repair and surrogacy or adoption.
- A woman with a unicornuate uterus and one previous term caesarean, undergoing IVF and planned for frozen embryo transfer, with RMT of 2.5 mm and fluid in the cavity. The fluid argues for treatment before transfer, while the borderline RMT and the uterine anomaly complicate the choice of route.

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Caesarean Scar Pregnancy - Risk Factors, Diagnosis, Prognosis, and Management options

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INTRODUCTION

Caesarean scar pregnancy (CSP) is a pregnancy that implants within the myometrium at the site of a previous caesarean section (CS) scar. (Fig.1) The Society for Maternal-Fetal Medicine (SMFM) recommends the term caesarean scar ectopic pregnancy for the same [1]. The true incidence is unknown because the condition is probably underdiagnosed, but single-centre estimates range from 1 in 1800 to 1 in 2656 pregnancies, and it appears to be rising with higher CS rates and better ultrasound detection.[1] It carries a substantial risk of severe maternal morbidity because diagnosis is often delayed and the optimal treatment is not established.[1] Expectantly managed cases show high rates of haemorrhage, placenta accreta spectrum (PAS) and uterine rupture [1]. With CS rates rising, most obstetricians would encounter this condition at some time and early recognition is the most effective way to prevent its complications.

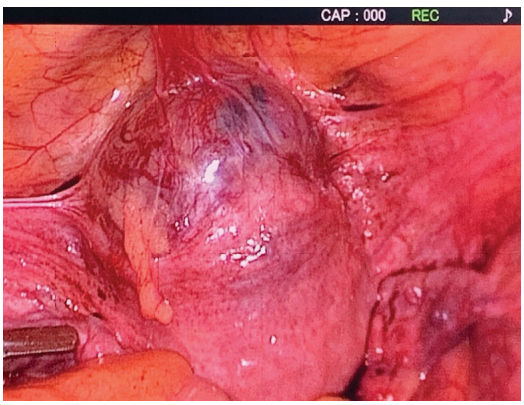


Fig.1: Laparoscopic view of CSP

RISK FACTORS

A previous CS is the only absolute prerequisite, and it is not clear whether the number of previous CS modifies the risk.[1] The prevailing explanation is that a poorly healed scar, with a defect (niche) in the myometrium, allows the blastocyst to burrow into the scar. Women with a previous CSP are also at risk of recurrence.[2] Any woman with a previous CS who has bleeding or pain in early pregnancy should be evaluated for a possible CSP along with the other differentials.

DIAGNOSIS

Clinical presentation

Presentation ranges from asymptomatic ultrasound detection to uterine rupture with haemoperitoneum. In a review of published series cited by SMFM, the mean gestational age at diagnosis was 7.5 ± 2.5 weeks; about one-third of women were asymptomatic, one-third had painless vaginal bleeding, and nearly one-quarter had pain with or without bleeding [1]. Because symptoms are non-specific, diagnosis mainly depends on imaging supported by serum b-HCG and clinical bi-manual examination findings of fullness & tenderness in anterior fornix with a bulky or normal sized uterus.

Ultrasound and other investigations

1. Transvaginal sonography (TVS) is the primary modality.[1] Typical findings are an empty uterine cavity and cervical canal, a gestational sac embedded in the anterior lower uterine wall at the scar, thinned-out myometrium between the sac and the bladder, and prominent peri-trophoblastic vascularity on colour Doppler [1]. Distinguishing CSP from similar-looking conditions, such as a miscarriage in progress or a cervical pregnancy, can be difficult[1], so one should not hesitate in taking an expert review.
2. Serum beta-human chorionic gonadotrophin (β-hCG) is useful for monitoring but not for diagnosis.
3. Magnetic resonance imaging (MRI) is a useful adjunct when ultrasound findings are equivocal or when bladder involvement is suspected. Where indicated, MR angiography or contrast-enhanced MRI may be added to define vascularity and the extent of myometrial invasion.

Residual myometrial thickness and classification

Residual myometrial thickness (RMT) is the thickness of myometrium between the sac and the bladder. It should be measured on a sagittal TVS image with a partially filled bladder, taking three measurements at the thinnest point while excluding the bladder wall and placenta; colour Doppler helps confirm that the measured layer is myometrium.[3] RMT helps to predict outcome.[3] A sac may be implanted on the scar (endophytic, type 1) or in the niche (exophytic, type 2), explained in Table 1 and outcomes differ between these patterns.[3,4] Ban *et al.* proposed five clinical types based on RMT and sac size in 2023, giving us a detailed insight into understanding management of CSP (Table 2, Fig.2).[5]

Table 1. Classification of CSP to help with management decision

Description	On the scar / Endogenous implantation (type I)	In the niche/ Exogeneous implantation (type II)
Pathophysiology	Implantation of the CSP on the well-healed scar of a previous cesarean birth.	Implantation of the CSP within the defect or "niche" of an incompletely healed scar.
RMT	≥3 mm	<3 mm
Management	Ultrasound or Hysteroscopy guided Suction and Evacuation.	Laparoscopic excision of scar ectopic and suturing of uterus.
Prognosis	Better. Can progress towards term as placenta accreta.	Worse. More chances of rupture.

Table 2. Classification of CSP based on RMT and Sac diameter on TVS

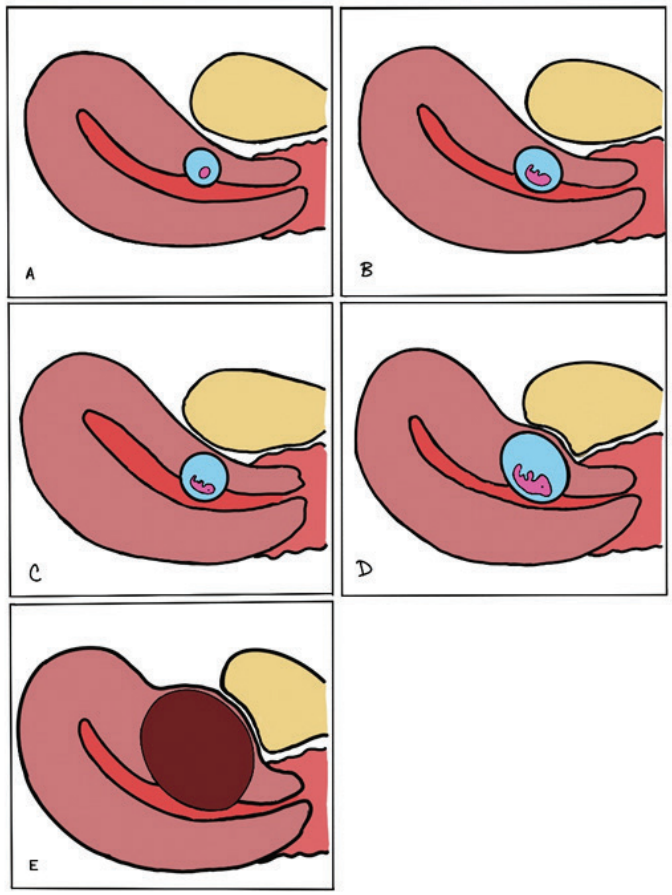
Type	Anterior RMT on TVS	Sac diameter	Recommended first-line surgery
I	>3 mm	Any	Suction curettage ± hysteroscopy, under ultrasound guidance
IIA	1–3 mm	≤30 mm	Suction curettage **with** hysteroscopy, under ultrasound guidance
IIB	1–3 mm	>30 mm	Hysteroscopy with laparoscopic monitoring or excision, or transvaginal excision
IIIA	<1 mm	≤50 mm	Laparoscopic excision or transvaginal excision
IIIB	<1 mm	>50 mm	Laparoscopic excision after UAE, or laparotomy

Adapted from Ban *et al.*[5]. RMT: residual myometrial thickness; TVS: transvaginal sonography.

MANAGEMENT OPTIONS

Treatment of CSP should not be delayed once the diagnosis is made. The choice of therapy depends on haemodynamic status, type of CSP, RMT, cardiac activity, β-hCG level, fertility wishes and available expertise (Table 3). Wherever possible, women should be managed at a tertiary centre with maternal-fetal medicine, interventional radiology and blood bank support.[1]

Expectant management, systemic methotrexate (MTX) alone and sharp curettage alone are not recommended; curettage carries a haemorrhage risk of about 28%.[1,2]



Adapted from Ban et al.[5]. RMT: residual myometrial thickness; TVS: transvaginal sonography.

Fig. 2: Schematic representation of the clinical classification of CSP (Panels A-E, corresponding to types I, IIa, IIb, IIIa and IIIb) based on anterior myometrial thickness and average sac or mass diameter.

1. Intragestational MTX is a suitable medical option, alone or combined with other modalities, though resolution is slow.[1]
2. Ultrasound-guided suction aspiration suits early first-trimester CSP (5-7 weeks)
3. Wedge resection, by laparoscopy, hysteroscopy or occasionally laparotomy, removes the pregnancy and allows scar repair.[1] Fig. 3,4,5
4. In selected high-risk cases, preoperative super selective uterine artery embolization may be considered, especially in type IIIB to reduce blood loss.[2,5]

Shoelace knots/clipping of uterine arteries at origin and intraoperative vasopressin are also commonly used strategies, however they must be used judiciously in expert hands with caution. Gravid hysterectomy is reserved for completed families, life-threatening haemorrhage or second-trimester CSP [1]. A haemodyanamically unstable woman needs emergency surgery; where expertise is lacking, stabilise and refer rather than attempt blind curettage. For referral of a patient with haemorrhage after

a blind curettage, intrauterine balloon tamponade can be used.

Follow up:

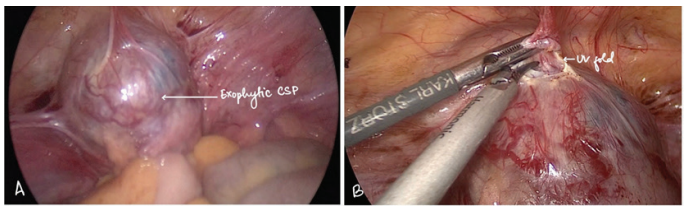
1. Expectant management (If patient choses): Weekly follow-up with serum hCG and TVS are performed until the hCG is undetectable and the pregnancy recedes completely on imaging, which can take several months to occur.
2. Following surgical management of caesarean scar pregnancy: Patients require close postoperative surveillance of vital signs, bleeding and haemoglobin, with anti-D for Rh-negative women. Serial β-hCG and repeat transvaginal ultrasonography exclude residual trophoblast. Medical amenorrhoea may promote in healing of repaired scar. Contraception for three to six months is advised, with counselling on recurrence and early scanning in future pregnancies.

Table 3. Management options for CSP

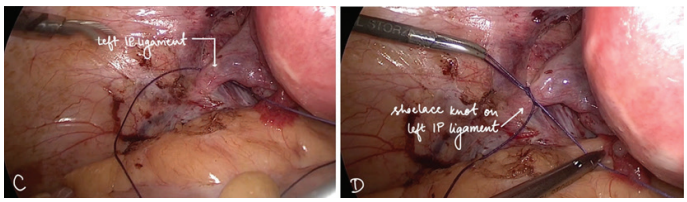
Option	Position	Ref.
Expectant management	Recommended with caution (GRADE 1B); if the pregnancy is continued, elective CS at 34 0/7–35 6/7 weeks	[1]
Intragestational MTX	Suggested for medical treatment, alone or with other modalities (GRADE 2C)	[1]
Systemic MTX alone	Not recommended (GRADE 1C)	[1]
Ultrasound-guided suction aspiration	Suggested (GRADE 2C); typically for early first-trimester CSP (Endophytic type at 5–7 weeks)	[1]
Operative resection (wedge resection)	Suggested (GRADE 2C) for exophytic type; by laparoscopy, hysteroscopy or, less commonly, laparotomy; allows scar repair	[1]
Sharp curettage alone	To be avoided (GRADE 2C); D&C haemorrhage risk 28%	[1,2]
Adjuncts (UAE, HIFU)	For selected cases at high risk of haemorrhage; highly selective UAE preoperatively	[2,5]
Gravid hysterectomy	Only when future childbearing is not desired or in life-threatening haemorrhage; may be preferred for second-trimester CSP	[1]

Based on SMFM Consult Series #63 [1]. GRADE, Grading of Recommendations Assessment, Development and Evaluation; MTX, methotrexate; CS, caesarean section; D&C, dilatation and curettage; UAE, uterine artery embolization; HIFU, high-intensity focused ultrasound.

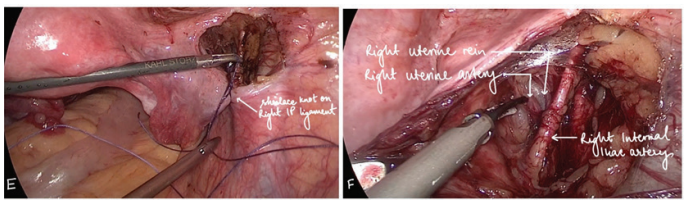
Fig.3 (A-N): Intraoperative images of laparoscopic management of Exophytic type of CSP – unruptured



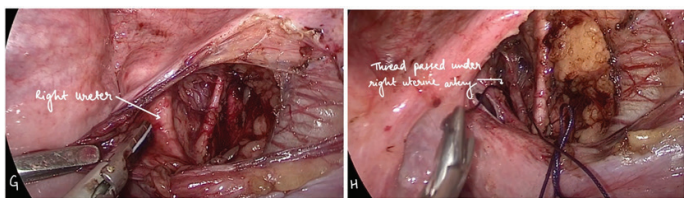
3 A - large CSP before; 3 B - Dissecting the UV fold and pushing the bladder down



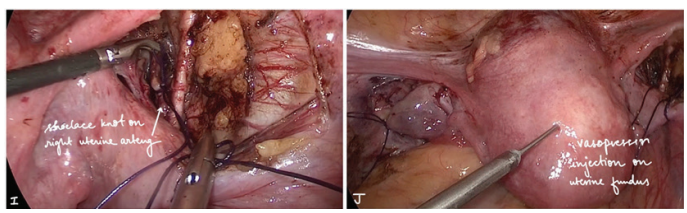
3 C - laparoscopic view of left IP ligament, with suture passed around it ; 3 D - shoes lace knot tied on left IP ligament



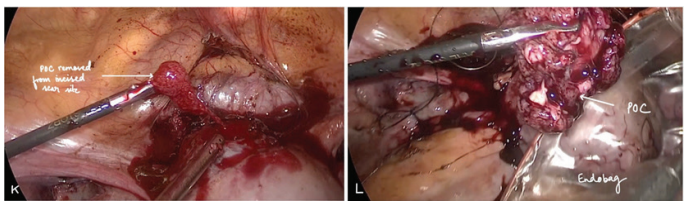
3 E - shoes lace knot tied on right IP ligament ; 3 F - retroperitoneal dissection to identify right internal iliac artery, rt uterine artery and vein



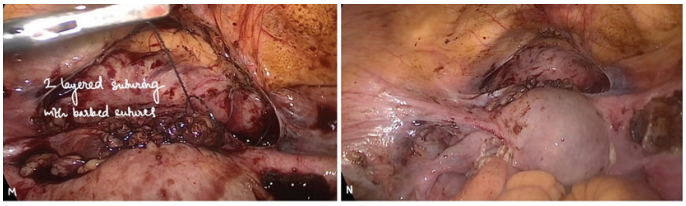
3 G - laparoscopic view of ureter, right internal iliac artery and rt uterine artery ; 3 H - identifying right uterine artery arising from right internal iliac artery



3 I – placing shoe lace knot on right uterine artery ; 3 J - Injecting vasopressin at the uterine fundus to temporarily decrease uterine vascularity

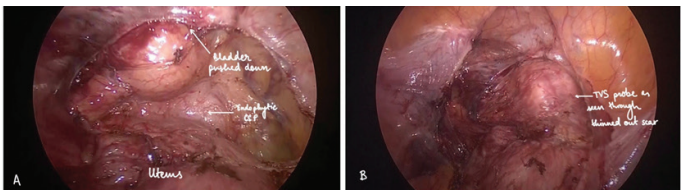


3 K –Excising the wedge around the CSP and removing the retained products of conception(RPOC) ; 3 L – enbag removal of the RPOC



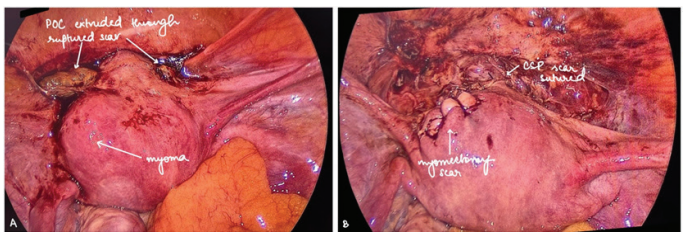
3 M – suturing the uterine defect with barbed suture in 2 layers; 3 N – final view post repair & bilateral salpingectomy

Fig.4: Intraoperative images of Endophytic type of CSP



4 A – laparoscopic image during suction evacuation after pushing bladder down; 4 B – transvaginal ultrasound (TVS) probe seen post suction evacuation

Fig.5: Intraoperative images of Exophytic type of CSP – ruptured



5 A–ruptured exophytic CSP with extruded POCs seen at bilateral angles of the previous scar line ; 5 B – final laparoscopic view after repair of the defect, in this case myomectomy was also done over the left anterior uterine wall and sutured appropriately

PROGNOSIS

Prognosis depends on RMT[3], the implantation pattern[4], gestational age at diagnosis and the promptness of diagnosis and treatment. Expectant management carries high rates of haemorrhage, PAS and uterine rupture, and SMFM advises against it.[1] If a woman chooses to continue the pregnancy after counselling, repeat CS at 34 0/7 to 35 6/7 weeks is recommended with frequent meticulous high risk management.[1] With treatment, outcomes are generally good. In a systematic review, methotrexate (MTX) or potassium chloride injection had an overall success rate of 62%, defined as no further intervention, whereas dilatation and Evacuation (D&E) carried a 28% risk of haemorrhage.[2] In the cohort used to derive the Ban classification, 85% of women had a negative β-hCG within three weeks of surgery and 95.2% resumed menses within eight weeks.[5] Women should be counselled about the risks of a future Recurrent CSP and later infertility.[1], advised to use strict contraception if they desire no more children.[2], and offered an early first-trimester TVS in any later pregnancy with a focussed evaluation on the site of implantation.

KEY POINTS

1. Stay aware of CSP as a diagnosis. Suspect it in any woman with a previous cesarean who presents with early pregnancy bleeding or pain, since it can only be diagnosed if it is thought of.
2. Scan early. Perform an early transvaginal ultrasound in high-risk women. The diagnosis is sonographic: a sac implanted at the scar, thin or absent myometrium, and prominent vascularity. Always measure and record the RMT and gestational sac size.
3. Never wait, and avoid inadequate treatment. Expectant management is not appropriate, and neither systemic methotrexate alone nor sharp curettage alone should be used. Timely referral is key, especially in resource restricted settings.
4. Individualise treatment and refer early. Choose the approach based on RMT, sac size, the patient's clinical stability, and available expertise. If the necessary skills are lacking, arrange a timely transfer to a tertiary care centre preferably with experienced endoscopists.
5. Counsel and follow up. Provide proper counselling and follow-up after treatment, including recurrence risk and contraception, and advise an early scan in any future pregnancy. Patients managed with suction evacuation should be told about the implications of isthamocele formed later.

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Prevention of Cesarean Scar Defect: Revisiting Cesarean Surgical Techniques

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INTRODUCTION

Caesarean section is the most commonly performed major surgery in women worldwide, and its rising rate has brought one of its long-term complications to attention: the caesarean scar defect (CSD), also called **isthmocele** or **uterine niche.**[1]

Because CSD is associated with significant menstrual, sexual and fertility problems and impairs quality of life, strategies to prevent it have become increasingly important.[2] Treatment through hysteroscopy, laparoscopy or the vaginal route is possible but not always curative, so **prevention at the time of the primary caesarean** is the most practical strategy.[3].

RISK FACTORS

Patient-related factors

- Number of previous caesarean sections: Strongest and most consistent risk factor.
- Retroflexed uterus: Causes tension on the scar and reduces perfusion of the lower uterine segment.
- Factors impairing wound healing: Obesity, diabetes, smoking, and connective tissue factors.
- Preoperative anaemia Associated with poorer scar healing and a thinner residual myometrium.

Labour-related factors

- Advanced cervical dilatation and prolonged labour: These result in a very low hysterotomy that is poorly vascularised and has little muscle.
- Emergency caesarean in the second stage.
- Chorioamnionitis and postoperative infection.

Surgical factors

- Low placement of the incision, near the internal os.
- Closure technique: Locked sutures, incomplete myometrial approximation, inclusion of endometrium in suturing and ischaemia from excessive haemostatic sutures.
- Suture material and tissue handling.
- Adhesion formation between the scar and the anterior abdominal wall, which pulls on the healing myometrium.

STEPS FOR PREVENTION OF NICHE DURING PRIMARY CAESAREAN DELIVERY

The two most important determinants of successful hysterotomy healing after caesarean delivery are the location of the incision and the surgical technique used for closure.

1. Location of the Incision - The anatomic site of incision whether in the corpus, lower uterine segment, or cervix—determines the tissue composition, vascularity, and contractility at the wound margins. These, in turn, influence how the scar remodels and how well it withstands subsequent pregnancies.

   1.1 Optimal Placement and Opening of the Hysterotomy

   The incision should be in the lower uterine segment, above the bladder reflection and clearly above the internal os. In advanced labour, the segment is thinned and stretched, hence the operator should consciously move the incision a little higher. An incision placed in cervical tissue heals poorly because that tissue has little muscle and a poor blood supply. Cervical tissue also contains mucus-secreting glands. Retention cysts that form within the scar can prevent proper approximation of the edges.4

   1.2 Myometrial Marking of the Incision Edges

   After delivery, the lower segment is oedematous and bleeding, and the retracted upper edge is much thicker than the thin lower edge, making the true myometrial margin hard to identify. Shibata and colleagues marked the myometrium using ethyl violet or indigo-carmine dye at the hysterotomy so that each stitch takes real muscle thickness and the upper edge is matched to its corresponding lower edge. This avoids overlapping and incomplete approximation (Figure 1 and 2).5

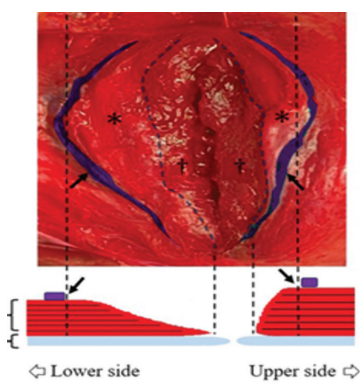


Fig. 1 Arrow: marking the upper and lower segments of incision.

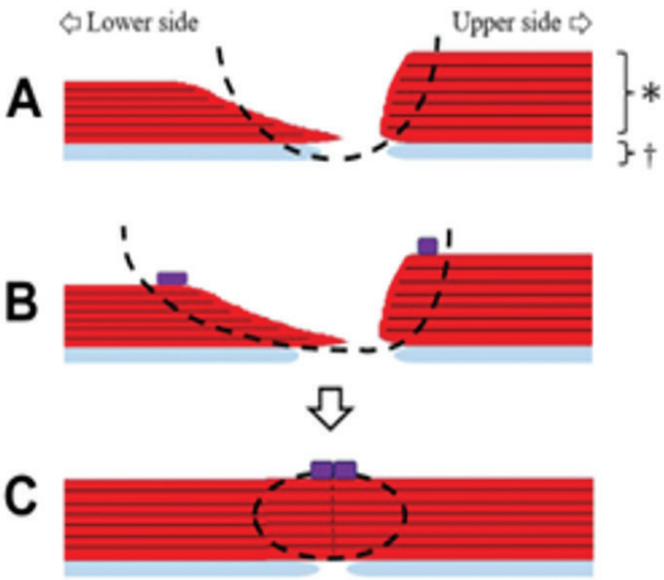


Fig. 2 (A) Without uterine marking- incorrect suture placement (B) uterine marking clarifies where the suture should be inserted and retracted. (C) alignment of edges enables accurate wound closure (Adapted from (Shibata T, Nishijima K, Shukunami K, Kotsuji F. Myometrial marking to improve suturing of the uterine incision at cesarean delivery. Am J Obstet Gynecol. 2026;233(6):S115–S117.)

1.3 Avoid Bladder Flaps: Avoid routine creation of a bladder flap, as it is associated with lower incisions and a higher rate of niche development.4

1.4 Anatomical Reconstruction of the Lower Uterine Segment

Newer reconstructive techniques aim to restore the anatomy of the lower segment rather than simply close the incision. Precise edge identification and alignment are central. The thick upper edge and thin lower edge must be matched, because a mismatch is a well-recognised cause of a thin, wedge-shaped defect. A recent prospective comparative study involving 42 women compared a novel lower uterine segment reconstruction technique with conventional continuous suturing :

- Scar length was shorter: 1.5 to 2 cm vs 4 to 5 cm.
- Mean myometrial thickness was greater: 6.3 mm vs 3.3 mm.
- No pronounced isthmocele was seen with the new technique, compared with 80% in the conventional group.
- Inflammatory changes were less frequent: 9.1% vs 45.4%.
- These benefits persisted at 3 and 6 months of follow-up. The study had small sample size and needs confirmation, but it supports careful reconstruction of the segment.[6]

2. CLOSURE TECHNIQUE FOR THE PREVENTION OF SCAR DEFECT

2.1 Single-Layer versus Double-Layer Closure

This remains the most debated issue.

CAESAR and CORONIS trials: Large randomised trials found no difference in short- or long-term maternal outcomes between single- and double-layer closure. However, neither trial standardised the specific suture technique.

CSTACT trial (Bamberg et al): Double-layer closure gave a greater residual myometrial thickness (RMT) than single-layer closure (7.9 mm vs 6.7mm) which was statistically significant.

NICEST trial: double-layer closure resulted in fewer severe scar niches and thicker RMT at 6 and 12 months.

A second layer may improve RMT, but the critical factor for optimal healing is excluding the endometrium or decidua from the suture line.7 (Fig. 3 and 4).

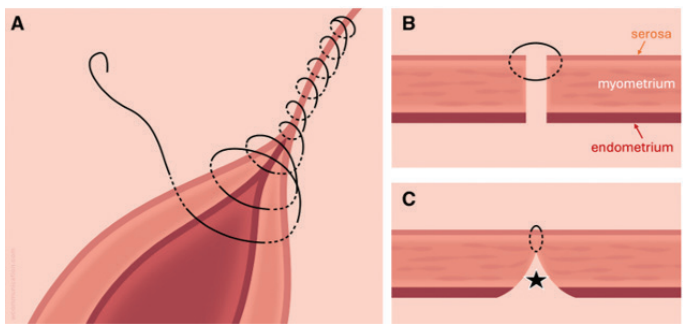


Fig.3 (A) Superficial closure of the uterine wall in single layer, not including endometrium. (B) Inclusion of less tissue may reduce strangulation but could cause incomplete approximation. (C) Black star shows incomplete myometrial approximation.

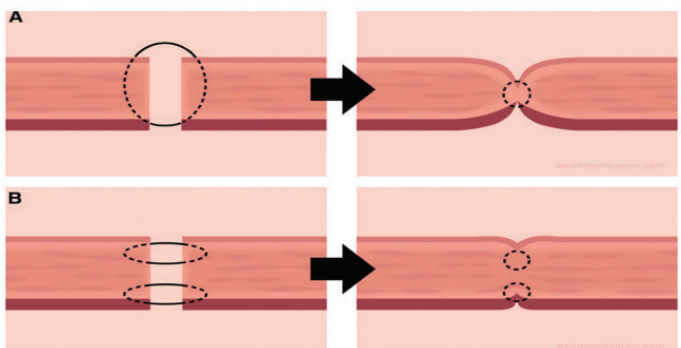


Fig 4 (A) Single layer closure causes tissue contraction and strangulation. (B) 2- layer closure permits better approximation. (Adapted from Bujold E, Romero R. Uterine closure after cesarean delivery: surgical technique, biological rationale, and clinical implications. Am J Obstet Gynecol. 2025;233:S82–S102)

2.2. Unlocked, Endometrium-Sparing Double-Layer Closure

The first layer is an unlocked continuous suture through the myometrium that avoids the endometrium, and the second layer imbricates and reinforces it. Locking leads to the strangulation of tissue and reduces blood flow to the healing edges. A comparative study including 180 women compared this technique with traditional locked double-layer closure. With the unlocked, endometrium-sparing technique:

- Isthmocele rates were lower: 7.2% vs 39.2%.
- RMT was greater: 13.91 mm vs 10.18 mm.
- Operating time was shorter, and fewer additional haemostatic sutures were needed.
- Postmenstrual spotting, dysmenorrhoea and chronic pelvic pain were significantly less frequent.
- Suture technique was the only independent predictor of isthmocele in the study.8 Different techniques may be indicated for different clinical settings, as unlocked double-layered sutures can be very useful in preventing uterine niche (improved approximation) if tissue strangulation is avoided, whereas single-layer techniques may be optimal for thin myometrial edges (repeat caesarean sections).[9]

2.3. Suture Orientation: Parallel versus Perpendicular

Sutures running parallel to the hysterotomy distribute tension equally along the wound axis rather than concentrating it at discrete points, reducing focal ischaemia and tearing. Among 497 women undergoing primary caesarean before labour, parallel-layered closure gave fewer scar defects (7.9% vs 16.3%, P = 0.009) and fewer long-term gynaecological symptoms (1.5% vs 7.8%, P = 0.004) than perpendicular single-locked closure. The purse-string technique uses the same orientation.[7]

2.4. Continuous Modified Vertical Mattress Closure (Babu and Magon Technique)

This technique uses a continuous modified mattress suture designed to guarantee layer-to-layer apposition of the cut margins: decidua to decidua, myometrium to myometrium and serosa to serosa. Conventional single- and double-layer closures do not ensure this, and exhibit considerable inter-surgeon variability. The technique was devised to remove that variability and prevent thinning of the lower segment.

Recent randomised trials support it. In a trial comparing the Babu and Magon closure with conventional double-layer closure, the risk of both niche and large niche formation was significantly lower with the modified mattress technique.[11] This reinforces the principle of precise anatomical apposition of like tissue to like tissue, without locking or strangulation, matters more than the number of layers.

2.5. Suture material

Synthetic absorbable sutures are preferred for hysterotomy closure because they provide predictable absorption and reduced tissue inflammation compared with catgut. Although large studies demonstrate comparable rates of uterine rupture, catgut may be associated with thinner residual myometrium and more scar defects. Monofilament sutures may modestly increase residual myometrial thickness compared with multifilament sutures, albeit with slightly longer operating time. Barbed sutures can shorten closure time and, when used in a double-layer technique excluding the endometrium, may reduce niche formation. Antimicrobial-coated sutures may benefit women at high risk of infection. Overall, rapidly absorbable synthetic monofilament sutures represent a biologically favourable option for optimal scar healing.[7]

ADJUNCTS TO SURGICAL TECHNIQUE: REGENERATIVE AND PHARMACOLOGICAL APPROACHES

1. **Intra-operative platelet-rich plasma (PRP) and mesenchymal stem cell (MSC) injection:**

Platelet-rich plasma may enhance angiogenesis and tissue remodelling, while mesenchymal stem cells may reduce fibrosis and promote myometrial and endometrial regeneration. However, evidence remains preliminary, and neither intervention is currently suitable for routine clinical practice.[4]

2 **Postoperative alpha lipoic acid (ALA) supplementation:**

Alpha-lipoic acid is a simple, non-invasive adjunct with antioxidant and proangiogenic properties. It may enhance myofibroblast activity, neovascularisation, and scar maturation, potentially reducing niche formation and improving residual myometrial thickness. Larger multicentre trials are required before routine recommendation.[5]

The goal of uterine closure after caesarean delivery is to restore the organ's structural integrity while preserving its function for future pregnancies. Halsted's

principles of safe surgery, gentle handling, meticulous haemostasis, preservation of blood supply, precise apposition of tissues, elimination of dead space and tension free closure remains the cornerstone of the durable repair.

The REPAIR principles of uterine closure after caesarean are - 7

- R: Restore anatomy: This is the cardinal principle of surgical repair.
- E: Exclude endometrium/decidua: This tissue can interfere with wound healing, generate adenomyosis/endometriosis and carry bacteria from the uterine cavity into the wound.
- P: Preserve tissue integrity by handling gently and using atraumatic instruments.
- A: Approximate both edges of the endomyometrial junction, myometrium to myometrium, and serosa to serosa.
- I: Ischemia prevention: Use unlocked & tension-free sutures and avoid strangulation.
- R: Reduce dead space: layered closure fills potential cavities, limiting haematoma formation and reducing the risk of infection.

CONCLUSION

Caesarean scar defect is a common and largely preventable consequence of caesarean delivery with real implications for menstrual health, fertility and future pregnancies. Treatment options exist, but the most effective step for its prevention is taken at the primary caesarean. Correct placement of the hysterotomy above the internal os, full-thickness, tension- free, unlocked, endometrium-sparing, and edge-matched myometrial apposition, and minimal ischaemic sutures form the core of prevention. Standardisation and audit of closure techniques, alongside multicentre studies evaluating long-term reproductive outcomes, are essential. Regenerative therapies, including platelet-rich plasma and mesenchymal stem cells, and postpartum alpha-lipoic acid supplementation are promising but cannot currently be recommended because of insufficient evidence.

KEY POINTS FOR SURGICAL PRACTICE

- Exclusion of the endometrium in the first layer is the single most important factor in promoting sound uterine healing and reducing niche formation.
- Double-layer closure with an unlocked first layer approximating the endomyometrial junction and a second layer reapproximating residual myometrium—consistently yields thicker residual myometrium and fewer scar defects.
- Fine, parallel suturing minimises tissue strangulation and preserves perfusion; large, deep bites should be avoided.
- Serosal coverage with a third, superficial layer may help reduce adhesion formation and protect exposed myometrium, although high-quality evidence is still limited.
- Synthetic absorbable sutures (preferably monofilament) are recommended; catgut should be avoided.
- The three-layer technique is most suitable for caesarean deliveries performed before or early in labor, when myometrial planes are well defined.

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Journal scan

Snigdha Soni[1], Anamika Das[2]
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Reducing the Long-Term Impact of Cesarean Scar Defects: A Focus on Prevention

Walker SP, Bartels HC, Jurkovic D, Jauniaux E. Am J Obstet Gynecol. 2026; September:540–554. doi:10.1016/j.ajog.2026.04.024

BACKGROUND

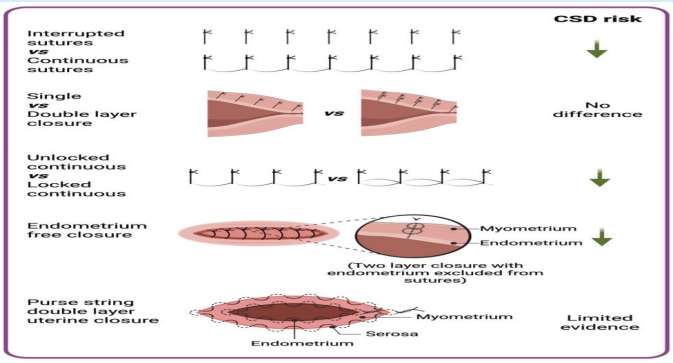
- Cesarean scar defects (CSDs) reported in approximately 40–70% of women following cesarean delivery, depending on the population, imaging technique and definition used.
- A scar niche is characterized by an indentation of at least 2 mm at the cesarean scar.
- Associated gynecological problems include postmenstrual/intermenstrual bleeding, dysmenorrhoea, chronic pelvic pain, dyspareunia and secondary subfertility.
- Obstetric complications associated with scar defects include cesarean scar ectopic pregnancy and placenta accreta spectrum (PAS).
- Optimizing the hysterotomy location, tissue handling and uterine closure technique may improve healing and reduce long-term morbidity.

OBJECTIVE

To evaluate how hysterotomy location, uterine vascularity and closure techniques influence cesarean scar healing, and to examine the role of surgical repair in reducing scar-related complications.

METHODOLOGY

- Clinical Opinion with narrative synthesis of published evidence.
- **Evidence:** Randomized controlled trials, observational studies, systematic reviews and meta-analyses.
- **Key areas evaluated:**
  - Closure techniques, adjunct therapies and surgical repair of established defects
- **Outcomes considered:** Niche formation, residual myometrial thickness (RMT), gynecological symptoms, fertility and subsequent pregnancy outcomes



RESULTS

- **Hysterotomy location:** Incision at the upper portion of the LUS offers better vascularity and healing; robust evidence needed.
- **Double vs Single Layer Closure:** Double-layer closure may improve RMT, but consistent superiority for prevention or subsequent complications not established.
- **Unlocked closure:** May preserve microcirculation and reduce tissue compression and ischemia.
- **Endometrium-free closure:** Associated with reduced niche formation and intermenstrual bleeding in pooled randomized evidence.
- **Interrupted closure:** Promising results have been reported; however, benefits may partly reflect simultaneous exclusion of the endometrium.
- **Purse-string closure:** May reduce niche formation, without consistent improvement in RMT

Peritoneal Closure

- Conflicting evidence
- No closure may promote **bladder–uterine adhesions and scar retraction**, contributing to niche formation

Comparison / intervention	Main Findings
Endometrium-free closure (Meta-analysis of 6 RCTs)	Lower risk of CSD: RR 0.53; Lower risk of intermenstrual bleeding: RR 0.34
Interrupted, endometrium-free vs continuous, endometrium-inclusive double-layer closure — RCT	Scar defects: 2% vs 22%; P<0.0001; contribution of each technique could not be separated
Double-layer vs single-layer closure — NICEST study	RMT: 4.3 vs 4.0 mm; P=0.007; large niches with RMT <3 mm: 9.9% vs 19.4%; P=0.033
Purse-string closure — meta-analysis of 8 studies, 751 participants	Reduced CSD occurrence: RR 0.45; no consistent improvement in RMT

Suture Materials

- **Monofilament sutures:** May improve residual myometrial thickness and reduce niche formation
- **Barbed sutures:** Offer faster closure and uniform tension, with promising scar-healing outcomes.
- **Catgut vs Vicryl:** No clear difference in long-term adverse outcomes in CORONIS.
- Evidence insufficient to establish one universally preferred suture material.

CONCLUSION

- Prevention begins at the time of cesarean delivery
- Appropriate hysterotomy placement, preservation of tissue perfusion and precise myometrial alignment may reduce scar defect formation.
- Unlocked, endometrium-free, and interrupted closure techniques show promise, but no single technique is definitively superior.

Uterine cesarean scar resection during repeat cesarean delivery to prevent uterine niche formation: a randomized controlled trial

Ahmed Alnezamy , Ahmed Zaineldin , Ahmed Ghareib , Waleed Tawfik , Ahmed Sabra and Shreen Aboelezz BMC Pregnancy Childbirth. 2026 May 4;26(1):489.

Background

A uterine niche is not only associated with abnormal uterine bleeding, pain, secondary infertility but also with increased risk of scar ectopic pregnancy and placenta accreta spectrum disorders in subsequent pregnancies. Despite growing evidence on closure techniques, there is limited evidence evaluating preventive scar optimization strategies performed at the time of repeat cesarean delivery.

Objective

To determine the incidence of uterine niche at 6 months postpartum in women with repeat cesarean delivery with resection of the previous cesarean scar versus standard repeat cesarean section without scar resection.

Methodology

- **Study design:** Prospective, parallel-group, randomized controlled superiority trial
- **Study duration:** February to November 2025
- **Participants:** 18–45 years with ≥1 prior cesarean delivery undergoing elective or urgent repeat cesarean section
- **Exclusion criteria:** Uterine fibroids, multiple gestation, chorioamnionitis, placenta previa, abruption, preeclampsia/eclampsia, hepatic, renal dysfunction, uncontrolled diabetes mellitus, anaemia, chronic corticosteroid use, smoking
- **Sample size:** 170 women with a 1:1 allocation ratio. 5 women in each group lost to follow up
- **Study group (n=85):** During repeat cesarean section, the previous cesarean scar was resected (Fig.1)
- **Control group (n=85):** Standard repeat cesarean section was performed without scar resection, followed by identical double-layer continuous unlocked myometrial suturing with closure of visceral uterine peritoneum incorporated into the second run of myometrial sutures.
- **Primary outcome:** Incidence of uterine niche (≥2 mm indentation of myometrium at caesarean scar site) at 6 months postpartum, assessed using saline-infusion sonohysterography(SIS). For niche-positive participants, niche depth, length, width, and residual myometrial thickness were recorded.
- **Secondary outcomes:** Operative time, additional hemostatic sutures and estimated blood loss.

Results

1. At 6 months postpartum, SIS demonstrated a significantly lower incidence of uterine niche in the scar-resection group compared with the control group 45.0% (36/80) vs. 78.8%(63/80), without increase in operative time or intraoperative blood loss.
2. The absolute risk reduction of 33.8%, corresponded to a number needed to treat (NNT) of 3, equivalent to 27 fewer niches per 80 women treated.

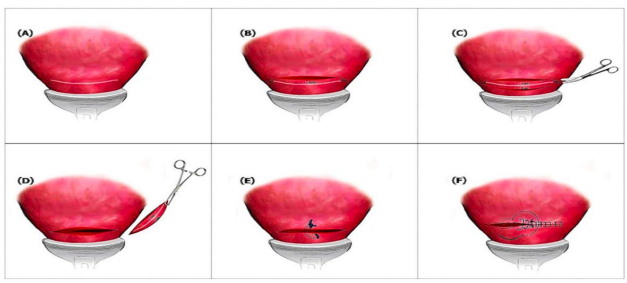


Fig. 1 Diagrammatic representation of scar resection technique. **A** Identification of the site of the previous cesarean section/s scar. **B** Incision is made 5 mm cranial to the scar and extended 5 mm on both sides beyond its lateral ends. **C** After fetal delivery, the scar is resected with 5 mm of the myometrium caudal to it. **D** The resulting uterine incision after scar resection. **E** A vertical mattress suture is applied to the center of the uterine incision approximating its cranial and caudal edges. **F** Double layer continuous suturing of the myometrium incorporating and closing the visceral uterine peritoneum with it

Results

3. **Effect modification by number of previous cesarean sections:** In the control group, strong positive correlation was found between the number of previous cesarean sections and uterine niche occurrence, while in the scar-resection group, no significant correlation was observed (rho=0.58 vs 0.15) indicating a consistent protective effect of scar resection across women with differing numbers of previous cesarean deliveries.
4. **Niche characteristics at 6 months postpartum** In women who developed a uterine niche, median niche depth, length, and width were significantly smaller in the scar-resection group(3.0 vs. 5.0 mm, 2.0 vs. 3.0 mm and 11.0 vs 14.0 mm respectfully). Median residual myometrial thickness was greater in the scar-resection group (8.0 vs 6.0 mm).

Conclusion

Resection of the previous cesarean scar during repeat cesarean delivery was associated with reduced incidence and severity of uterine niche, increased residual myometrial thickness, without apparent increase in operative time or intraoperative blood loss.

Clinical implications: Preventive scar resection during repeat cesarean delivery appears to be a feasible and safe surgical modification to reduce uterine niche formation, supporting the concept that optimizing the scar area at the time of repeat cesarean may enhance myometrial healing, reducing the need for secondary niche repair, and potentially improve reproductive outcomes.

Imaging of the Month

Nishtha Jaiswal[1], Swati Tomar[2], Reeta Mahey[3]
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CASE DETAILS

A 35-year-old woman G5P2L2A2 with two previous lower segment caesarean sections presented with heavy vaginal bleeding with passage of clots and lower abdominal pain. Her menstrual cycles had previously been regular, lasting 3-4 days and occurring 28-32 days. After 1.5 months of amenorrhoea and a positive urine pregnancy test, she had taken MTP pills. She underwent vacuum-assisted check curettage two days before presentation but had recurrent episodes of vaginal bleeding following the procedure.

Her obstetric history was significant for two prior caesarean sections and two previous pregnancy losses, a dilation and evacuation at approximately 3 months gestation in 2018 and later a early spontaneous abortion that was managed medically. There was no significant family history or medical history.

On presentation, the patient was alert and haemodynamically stable. On examination, the abdomen was soft and non-tender. Pelvic examination revealed vaginal bleeding. Ultrasonography showed a gestational sac with heterogeneous contents measuring 2.4 × 2.5 cm in the lower part of uterine cavity at the previous scar site with minimal vascularity on Doppler (Figure 1a). These findings suggested a caesarean scar pregnancy (CSP). Serial serum β-hCG levels showed a decreasing pattern with a 68.33% reduction by day 5 after admission. Additionally, she was detected to have severe anaemia and received one unit packed red blood cells.

Because of recurrent vaginal bleeding and sonographic evidence of CSP with residual myometrial thickness of 0.38 cm, hysteroscopic management was chosen. Hysteroscopy revealed a gestational sac-like structure on the anterior wall of uterus in lower part at the previous scar site. Using a bipolar resectoscope under hysteroscopic guidance, approximately 2 × 2 cm of tissue was removed, followed by gentle vacuum aspiration (Figure 1b). The uterine cavity was then inspected and hemostasis was confirmed.

The patient was hemodynamically stable after the procedure. Her postoperative course was uncomplicated, with no further significant vaginal bleeding, and she was discharged in a stable condition.

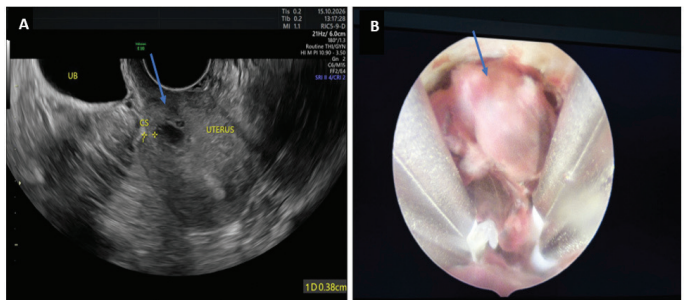


Figure 1. A showing 2D-TVS image with caesarean scar site pregnancy (CSP) with residual myometrial thickness of 0.38 cm; and (b) hysteroscopic resection of products of conception (marked by blue arrows).

LEARNING POINTS

- Suspect CSP early: CSP should be ruled out in any woman with a previous caesarean section, a positive pregnancy test, and bleeding or pain. The risk rises with the number of previous caesarean sections.
- Ultrasound before evacuation: Confirm the location of the gestational sac before giving MTP pills or performing curettage. A low-lying sac at the scar site with thin overlying myometrium points to CSP.
- Blind curettage is risky in CSP: In this case, MTP pills and vacuum curettage were followed by persistent bleeding. Retained tissue at the scar can cause catastrophic haemorrhage or uterine rupture.
- Reassess persistent bleeding after a "completed" abortion: Consider retained products of conception, CSP, or a niche, and repeat the ultrasound with Doppler.
- Individualised Treatment: Consider haemodynamic status, β-hCG level, myometrial thickness, vascularity, gestational age, and the patient's desire for future fertility.
- Hysteroscopic resection is a good uterus-sparing option: It suits a stable patient with an endogestational CSP, minimal vascularity, and adequate residual myometrium. It allows direct visualisation, targeted removal, and confirmation of haemostasis.
- Prevention and counselling: Women with multiple caesarean sections or prior pregnancy losses need early dating and location scans in subsequent pregnancy. They also need contraception counselling, and follow-up planning for future pregnancies, given the risk of recurrent CSP and placenta accreta spectrum.

HER Story.. HER Words..
A Journey from Despair to Hope: Overcoming Isthmocele and Embracing Motherhood Again

Ayushi Negi[1], Swati Tomar[2], Reeta Mahey[3]
[1]Senior Resident, [2]Associate Professor, [3]Professor, AIIMS, New Delhi

We often focus on diagnoses, treatment outcomes and statistics, but behind every clinical journey is a person with hopes, fears and dreams. Through 'HER Story, HER Words', we bring the patient's voice to the forefront, offering a glimpse into one woman's personal journey through the medical illness. Her story is not merely about a diagnosis or its treatment; it is about the courage to face uncertainty, the strength to preserve her hopes for the future, and the determination to hold on to her dream of fertility despite the challenges. Above all, it reminds us that behind every diagnosis is a woman whose voice, choices, aspirations and lived experiences deserve to be heard.

1. **When did you first notice the problem?**

   My menstrual cycles were initially normal and lasted about five days., but they were followed by another ten days of continuous bleeding with clots. In 2021, I consulted a doctor at a private facility when I was diagnosed with an isthmocele.

2. **What were you told about treatment and future fertility?**

   I was advised that surgery was the only treatment option. I was also told that a second pregnancy could be extremely risky. This was deeply distressing for me. In December 2021, I underwent laparoscopic surgery for defect in the uterus, however my symptoms persisted.

3. **How did this affect you physically and mentally?**

   The condition took a toll on me physically, but its emotional impact was far greater. For years, I lived with the fear that I might never be able to have another child. The uncertainty surrounding my fertility was emotionally exhausting, and I had almost lost hope of experiencing motherhood again.

4. **What did the doctors at AIIMS explain to you?**

   When I consulted at AIIMS, New Delhi, everything changed. The doctors explained my condition in detail and reassured me that it could be treated and that a future pregnancy was possible. Their compassionate counselling and reassurance gave me renewed hope. It was an immense emotional relief to know that having another child was still a possibility.

5. **How was your treatment and pregnancy journey?**

   In August 2024, In August 2024, I underwent another surgery for the uterine defect at AIIMS New Delhi. The team supported me throughout my treatment and follow-up visits, addressing all my concerns and guiding me at every step.

   I conceived in April 2025, and the team continued to provide me with guidance, reassurance and care throughout my pregnancy. Their constant support made this journey much more reassuring and helped me navigate it with confidence.

6. **What finally made you agree to the treatment?**

   The clarity, compassion and confidence with which the AIIMS team explained my condition and treatment options made all the difference. They patiently addressed my concerns, explained the possibilities and helped me understand my situation. Their encouraging counselling gave me the confidence to proceed with the treatment and believe that a successful pregnancy was possible.

7. **How do you feel about the decision you made?**

   I feel immensely grateful that I placed my trust in AIIMS, New Delhi. I already have an eight-year-old daughter, and the decision to have another child was an important one for our entire family.

   Today, my daughter has a little sister, who has become one of the most precious gifts in our lives. People often say that children are gifts from God. In my case, I feel that my doctors helped make this beautiful gift possible. They restored my hope when I had almost lost it and helped me fulfil a dream I once thought was beyond reach. I will remain eternally grateful to them for their dedication, kindness and unwavering support.

8. **What would you like to tell another young woman in the same situation?**

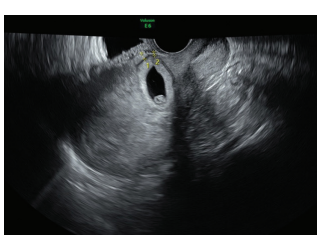
   I would like to tell every woman facing a similar situation to never lose hope. Every patient's condition and circumstances are different, so it is important to seek the right medical advice and consider a second opinion whenever necessary.

   My own journey taught me that what may initially seem impossible can sometimes become possible with the right treatment, expert guidance and emotional support. The doctors at AIIMS gave me hope at my lowest point, and today, I am blessed with a beautiful, healthy daughter.

Brain Boost Zone

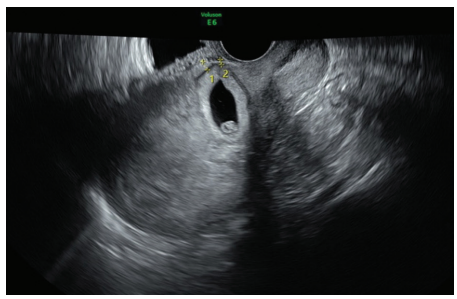
Neha Varun[1], Priyanka Das[2]
[1]Additional Professor, [2]Senior Resident, Department of Obstetrics & Gynaecology, AIIMS, Delhi

1. A 34-year-old woman with two previous caesarean deliveries presents with prolonged menstruation and brownish spotting for 5–7 days after her periods. TVS reveals a defect at the anterior lower uterine segment scar containing fluid. What is the most likely explanation for her symptoms?
   A. Endometrial hyperplasia
   B. Cervical incompetence
   C. Retention of menstrual blood within the niche
   D. Uterine arteriovenous malformation
2. A woman with postmenstrual spotting has a suspected niche, but the dimensions are poorly delineated on routine TVS. Which investigation may improve visualisation of the defect?
   A. Plain abdominal radiograph
   B. Saline infusion sonohysterography
   C. Magnetic Resonance Imaging (MRI)
   D. Hysterosalpingography
3. A woman with symptomatic niche is being evaluated for surgical repair. Which of the following measurements is the most critical parameters to triage the route of surgery.
   A. Endometrial thickness
   B. Ovarian volume
   C. Residual myometrial thickness (RMT) over the niche
   D. Cervical length
4. A 30-year-old woman, P2L2 with previous two LSCS, has an incidental caesarean scar niche on TVS. She has regular menstruation, no pelvic pain and no fertility concerns. What is the most appropriate management?
   A. Immediate hysteroscopic resection
   B. Laparoscopic scar repair
   C. Reassurance and expectant management
   D. Hysterectomy
5. A 30 year old, G2P1L1 with a previous cesarean section presents at 7 weeks of gestation. TVS shows a gestational sac implanted in the anterior lower uterine segment at the level of the scar, with a thin myometrial layer between the sac and bladder. What is the most likely diagnosis?



   A. Cervical pregnancy
   B. Pregnancy of unknown location
   C. Caesarean scar pregnancy
   D. Inevitable abortion
6. A 32-year-old woman, G2P1L1A1 with one previous LSCS, came for a routine check-up after a positive urine pregnancy test. Ultrasound at 7 weeks showed a gestational sac with an embryo but no cardiac activity, and a missed abortion was diagnosed. She was given misoprostol 800 mcg sublingually, repeated once 1 week apart, but had only two episodes of spotting and did not pass any tissue. A repeat transvaginal ultrasound was done a week later.

   Which finding on the repeat scan most reliably confirms a caesarean scar ectopic pregnancy?

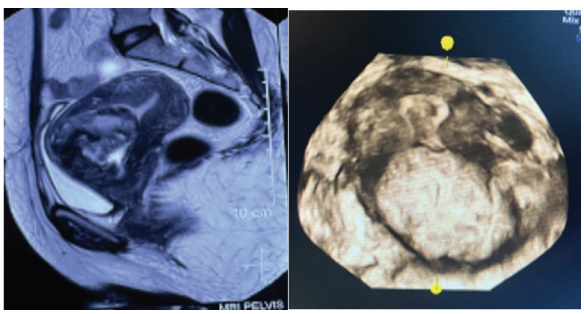


   A. A gestational sac in the lower uterine segment near the internal OS, with an empty upper cavity and a peri-trophoblastic ring of colour flow
   B. A gestational sac embedded in the anterior lower uterine segment at the previous caesarean scar, with an empty uterine cavity and cervical canal, thinned out myometrium between the sac and the bladder and peri-trophoblastic vascularity.
   C. A flattened gestational sac in the lower uterine segment that moves against the anterior wall when the probe presses on the cervix
   D. A gestational sac below the internal os in a barrel-shaped cervix, with an empty uterine cavity
7. A 29-year-old woman with CSP at 6 weeks has no fetal cardiac activity. She is stable, and TVS shows an RMT of 4.2 mm. The gestational sac is accessible from the uterine cavity, with no evidence of bladder involvement.

Which approach may be considered in an appropriately selected patient?

A. Hysteroscopic resection after specialist assessment
B. Mandatory hysterectomy
C. Blind sharp curettage without ultrasound guidance
D. No follow-up after treatment

8. A 28 year-old woman with a G2P1L1 with previous LSCS at 6+3 weeks with the diagnosis of CSP was treated with a single dose of methotrexate. Her β-hCG has fallen from 3,063 to 1,834 to 1,337 mIU/mL, but the bleeding and abdominal pain continued, and cesarean scar ectopic mass increased in size. Ultrasound shows a lesion with grade 3 vascularity at the anterior lower segment.



What is the next best step?

A. A second dose of methotrexate
B. Ultrasound-guided suction evacuation
C. Uterine artery embolization, then laparoscopic excision with scar repair
D. Multi-agent chemotherapy for resistant GTN

9. A 31-year-old with one previous caesarean has 6 days of postmenstrual spotting and pain during menstruation. She wants another pregnancy. Saline sono-hysterography shows a large niche with RMT 1.5 mm. Which procedure is most appropriate?

A. Hysteroscopic niche resection
B. Levonorgestrel intrauterine system
C. Laparoscopic niche resection with layered closure, under hysteroscopic guidance
D. No treatment now; double-layer closure of the uterus at her next caesarean

10. A 38-year-old with two previous caesareans has had troublesome postmenstrual spotting for 2 years and has completed her family. Ultrasound shows a niche with RMT 4.5 mm. She wants the least invasive effective option. What is the most appropriate first-line management?

A. Levonorgestrel intrauterine system
B. Hysteroscopic niche resection
C. Laparoscopic niche resection and repair
D. Total laparoscopic hysterectomy

Answers:

1-B, 2-B, 3-C, 4-C, 5-C, 6-B, 7-A, 8-C, 9-C, 10-A

Wellness Corner

Bone Health in Women: Prevention as the Best Protection

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INTRODUCTION

Bone health is a lifelong predictor of mobility, independence, and quality of life in women. Osteoporosis, rightly called a "silent disease," usually remains undetected until a fragility fracture occurs. Such fractures, especially of hip, spine, wrist, humerus, and pelvis, are associated with deformity, chronic pain, loss of independence, recurrent fractures, and increased mortality. Women are especially vulnerable because of their lower peak bone mass than men, in addition to accelerated bone loss after menopause due to estrogen deficiency. Therefore, contemporary women's health care must move beyond treating fractures after they occur and focus instead on early identification, risk stratification, timely screening, and evidence-based prevention.[1]

GENDER-SPECIFIC RISKS

Bone health in women is closely linked to reproductive and hormonal biology and the peak bone mass is largely achieved by early adulthood. Poor nutrition, low body mass index, vitamin D deficiency, sedentary lifestyle, smoking, changed eating habits, excessive exercise with menstrual dysfunction, and functional hypothalamic amenorrhea may compromise bone health predisposing to early skeletal fragility. Several gender-specific conditions increase long-term fracture risk in females. Premature ovarian insufficiency (POI), early menopause, surgical menopause, prolonged hypoestrogenism, chemotherapy-induced ovarian failure, and aromatase inhibitor therapy are important factors predisposing to accelerated bone loss. Though pregnancy and lactation usually cause temporary and reversible changes in bone density, but severe back pain, height loss, or vertebral fracture in the peripartum period should never be dismissed as "normal." A careful menstrual, obstetric, lactational, menopausal, oncological, and medication history is therefore paramount in every woman being evaluated for bone health.[2]

LIFESTYLE AND NUTRITIONAL INTERVENTIONS

Lifestyle modification remains the foundation of bone-health optimization. Adequate dietary calcium, vitamin D, and protein are crucial to maintain skeletal strength. Current bone-health guidance recommends approximately 1,000 mg/day of calcium for women aged 50 years or younger and 1,200 mg/day for women aged 51 years or older, preferably through diet with supplementation only when dietary intake is inadequate. Vitamin D requirements vary with age, sun exposure, skin pigmentation, clothing patterns, diet, obesity, malabsorption, and baseline serum levels. In India, hypovitaminosis D is widely prevalent across age groups, including pregnant women, lactating mothers, and adults, making public and policy-based awareness and individualized targeting particularly important.(3) Regular weight-bearing activity, resistance training, posture correction, balance training, and core strengthening help preserve bone mass, keep muscle toned and optimised and reduce falls. Smoking cessation, avoidance of heavy alcohol intake, maintenance of healthy body weight, fall-proofing the home environment, vision correction, and review of sedative or hypotensive medications especially in elderly women are simple but powerful interventions that go a long way in optimizing bone health.

SCREENING AND EARLY DIAGNOSIS

Screening is the most important tool of prevention. Dual-energy Xray absorptiometry remains the standard test for bone mineral density assessment. Current recommendations emphasise screening of all women aged 65 years or older, and younger postmenopausal women with risk factors suggestive of increased fracture risk. Risk tools such as FRAX can help decide who requires DXA and who may need pharmacological therapy. A history of fragility fracture after the age of 50 should be considered a major warning sign and should trigger a comprehensive bone-health evaluation rather than being treated as an isolated orthopaedic event.[4] Evaluation should also include screening for secondary causes when clinically indicated. These include vitamin D deficiency, hyperthyroidism, hyperparathyroidism, renal disease, liver disease, malabsorption, inflammatory arthritis, celiac disease, chronic glucocorticoid use, anticonvulsants, proton-pump inhibitors, aromatase inhibitors, and other medications that impair bone metabolism. Vertebral fracture assessment should be considered in women with height loss, kyphotic back, or chronic back pain.

PHARMACOLOGICAL PREVENTION AND TREATMENT

Lifestyle changes and dietary supplementation are essential, but they do not substitute for osteoporosis management in high-risk women. Bisphosphonates (antiresorptive therapy)

remain the first-line therapy for many postmenopausal women who are at high fracture risk. Denosumab is an effective alternative, but it should not be stopped abruptly without overlap with antiresorptive therapy because rapid bone loss and rebound vertebral fractures may occur. Women who are at high risk, such as those with multiple vertebral fractures, recent major osteoporotic fracture, or very low bone density, may benefit from anabolic-first strategies using agents such as teriparatide, abaloparatide, or romosozumab, that cause rapid gain of bone density followed by maintenance with antiresorptive therapy.[5] Hormonal therapy has a selective role. In women with POI or early menopause, appropriate estrogen replacement until the usual age of natural menopause helps protect bone, provided there are no contraindications. In recently menopausal symptomatic women, hormonal therapy may be considered after individualized assessment of cardiovascular, thrombotic, breast, and endometrial risks. Treatment decisions should be patient-specific, fracture-risk-based, and should be regularly reviewed.

ROLE OF FRACTURE LIAISON AND MULTIDISCIPLINARY CARE

Every fragility fracture is a sentinel event. Unfortunately, many women with hip, spine, or wrist fractures undergo fracture fixation or arthroplasty without being evaluated for osteoporosis. Fracture liaison services may bridge this gap by ensuring DXA assessment, vitamin D correction, fall-risk reduction, initiation of anti-osteoporosis therapy, and long-term follow-up. Collaboration between orthopaedic surgeons, geriatric medicine experts, gynaecologists, endocrinologists, physiotherapists, and primary-care physicians is essential to prevent the next fracture.

CONCLUSION

Bone health in women should be protected before it is lost. Awareness, exercise, nutrition, menstrual and menopausal history, early screening, correction of metabolic deficiencies, fall prevention, and timely pharmacological therapy form the pillars of prevention. The goal is not merely to improve a DXA T-score, but to preserve mobility, dignity, independence, and quality of life. Preventive bone care in women is no longer optional. It is an much needed public-health strategy across adolescence, reproductive life, menopause, and old age.

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AOGD Clinical Meeting from DDU Hospital held on 30.10.2026

MOLECULAR DISSECTION OF RECURRENT HYDATIDIFORM MOLE

Meenakshi[1], Poonam Laul[2], Urvashi Miglani[3], Ritu Mittal[4], Aishwarya[5]

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Department of Obstetrics and Gynecology, Deen Dayal Upadhyay Hospital

Introduction

Recurrent hydatidiform mole (RHM), defined as two or more molar pregnancies, may result from mutations in maternal effect genes involved in genomic imprinting and early embryonic development. We report a case of recurrent complete hydatidiform mole associated with a homozygous novel KHDC3L frameshift variant.

Case details

A 32-year-old gravida 3 abortion 2 presented with bleeding P/V following 8 weeks of amenorrhea. She had two previous complete molar pregnancies in 2022 and 2023, both managed with suction evacuation with subsequent Beta HCG surveillance till normalization. TVS revealed a 5x5x4 cm heterogenous intrauterine mass with multiple cystic spaces and increased vascularity, without a gestational sac. Serum Beta HCG was 2,72,800miu/ml. Suction evacuation was performed and histopathology confirmed complete hydatidiform mole. Serial weekly Beta HCG monitoring was done till it became negative. Patient was offered genetic evaluation in view of recurrent molar pregnancy. Whole exome sequencing identified a homozygous novel KHDC3L c.225del frameshift variant classified as likely pathogenic, consistent with autosomal recessive inheritance.

Discussion

KHDC3L is a maternal effect gene essential for early embryogenesis and genomic imprinting. Biallelic loss of function variants is associated with recurrent complete molar pregnancies. This case highlights the diagnostic value of molecular genetic evaluation in recurrent molar pregnancies. The absence of molar tissue genotyping and parental segregation analysis limits definite characterization of the variant.

Conclusion

Genetic evaluation should be considered after 2 or more molar pregnancies. Comprehensive genetic counselling of the couple becomes the mainstay of the management and includes pathogenesis, prognosis and options available to them. These couples must be offered the option of IVF with donor oocyte or adoption.

DAMAGE-CONTROL SURGERY BEYOND HYSTERECTOMY AND INTERNAL ILIAC ARTERY LIGATION: A LIFELINE IN PLACENTA PERCRETA

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[1]Consultant, [2]Specialist, [3]SMO, [4]Senior Resident,

Department of Obstetrics and Gynaecology, Deen Dayal Upadhyay Hospital, New Delhi.

Introduction

Placenta accreta spectrum (PAS), particularly percreta, can cause catastrophic haemorrhage. When conventional haemostasis fails, damage-control surgery (DCS), including pelvic packing, can bridge resuscitation and definitive management.

Case details:

A gravida 5, para 2, abortion 2 woman at 37 weeks was referred with diagnosed PAS. She had two previous caesarean deliveries and curettage. Imaging suggested invasive placentation. Emergency surgery was performed for tachycardia, an irritable uterus, and a shock index of 1.2. After delivery through an upper-segment incision, dense adhesions and bladder involvement were encountered. Caesarean hysterectomy and bilateral internal iliac artery ligation were performed. Blood loss reached 3.5 litres. Persistent pelvic venous oozing continued despite haemostatic sutures; hypotension required noradrenaline. Four mops were placed for pelvic packing, drains inserted, and she was transferred intubated to ICU. After stabilisation, re-exploration and pack removal were done at 48 hours. She was extubated and discharged on postoperative day 18. The patient received 9 units PRBC, 4 units RDP, and 8 units FFP.

Discussion

Hysterectomy and internal iliac artery ligation may not control diffuse venous bleeding in advanced PAS. DCS prioritises rapid haemorrhage control, temporary abdominal management, resuscitation, and delayed re-exploration. Multidisciplinary decisions, blood-product support, accurate pack counts, and removal are essential.

Conclusion

Pelvic packing is a valuable damage-control option for refractory PAS haemorrhage. Early recognition and coordinated care may be lifesaving when haemostasis is not immediately achievable.

ABDOMINAL PAIN – TIP OF A CATASTROPHIC VASCULAR ICEBERG

Harvinder Kaur[1], Shivani Barthwal[2], Usha Yadav[3]
[1]Senior Specialist, [2]Senior Resident, [3]Senior Specialist
Department of Obstetrics and Gynecology, Deen Dayal Upadhyay Hospital

Introduction

Placenta percreta is the most severe form of placenta accreta spectrum (PAS), characterized by chorionic villi penetrating the entire myometrium and breaching the uterine serosa. Although usually diagnosed in the third trimester, it can rarely cause spontaneous uterine rupture and massive intraperitoneal haemorrhage during the second trimester.

Case Report

A 36-year-old gravida 4, para 2, living 2, abortion 1 woman with two previous lower-segment caesarean sections presented at 24 weeks of gestation with severe, progressively worsening lower abdominal pain and inability to pass stool or flatus for one day. There was no history of trauma. Examination revealed abdominal distension, sluggish bowel sounds and a reassuring fetal heart rate. Subsequently, tachycardia, pallor, marked tenderness, guarding and rigidity developed. Ultrasonography showed a single live fetus, a low-lying placenta and haemoperitoneum, without obvious uterine rupture. Emergency laparotomy revealed placental tissue penetrating the myometrium and serosa through an approximately 2-cm anterior uterine defect. A stillborn fetus weighing 350 g was delivered through an upper-segment incision. Total hysterectomy with bilateral salpingectomy was performed. Intraoperative blood loss was approximately 3,000 mL, necessitating transfusion of blood products. Histopathological examination confirmed the diagnosis. The patient received intensive postoperative care and was discharged in stable condition eight days after surgery.

Discussion

Previous caesarean delivery and low-lying placenta are important risk factors for PAS. Placenta percreta may remain undiagnosed antenatally and present as an acute surgical abdomen. A reassuring fetal heart rate and symptoms mimicking bowel obstruction can delay recognition. Ultrasound findings of haemoperitoneum warrant urgent evaluation and intervention.

Conclusion

Early suspicion, prompt resuscitation, emergency surgical management and multidisciplinary care are crucial to reducing maternal morbidity and mortality in this rare, life-threatening condition.

AOGD Subcommittees Chairperson Election (2027-29)
Call for nominations

Nominations are invited from eligible AOGD members for the post of chairperson of following subcommittees:

1. Adolescent Health sub-committee
2. Endometriosis sub-committee
3. Endoscopy sub-committee
4. Fetal Medicine and Genetics sub-committee
5. Oncology sub-committee
6. QI Obst & Gynae Practice sub-committee
7. Urogynaecology sub-committee

Last date for submission of nominations is **15/12/2026**

- ✓ Applications by desirous candidates should be submitted on the prescribed form available on AOGD website (www.aogd.org) / bulletin / office, with due entry in the office register in a sealed envelope & through email aogdaiims2026@gmail.com
- ✓ Nominations as per the eligibility criteria should reach AOGD secretariat: Room no. 714, 7th Floor, Mother & Child Block, Department of Obst. & Gynae, AIIMS Hospital, New Delhi- 110001 (Phone no. 9717392924) by **15/12/2026.**

Dr. K. Aparna Sharma (Secretary AOGD, 9971372695)

Important announcement : The chairpersons after being nominated have the responsibility to call for application for members of their respective subcommittee for up to a maximum of 10 members.

Eligibility Criteria for AOGD Sub-committee chairperson

1. The chairperson of a sub-committee should have been a member of the sub-committee in question for at least one term, with one term being equivalent to two years, prior to his/her appointment as chairperson of that sub-committee.
2. He/she should have been a member of the AOGD for fifteen years.
3. He/she should have experience in the field related to the subcommittee.
4. He/she should have completed at least fifteen years from the date of his/her registration as a medical practitioner. Further, he/she should have held a senior / faculty position for not less than that of associate professor, senior consultant or an equivalent there of in his/her respective organization, for a period of at least five years .
5. No person should hold chairperson ship of the same subcommittee for two consecutive terms with each term comprising of two years. Further, a person who has been chairperson of one subcommittee cannot be nominated as chairperson of another subcommittee unless separated by a duration equivalent to two terms of the subcommittee.
6. The Executive Committee may lay down additional criteria for the eligibility and pre-requisites for appointment as chairperson of each sub-committee from time to time.
7. An eligible member must send an application for nomination as chairperson of a sub-committee stating therein his/her previous experience in the field related to the sub-committee and future vision for furthering the goals of the AOGD through such sub-committee. One person shall not apply for chairpersonship of more than one sub- committee at a time. The application shall be scrutinized by the Executive Committee of AOGD for nomination as chairperson.
8. In the event of more than one application being received for appointment as chairperson of a subcommittee, and in the absence of unanimous decision of the Executive committee in this regard, the Executive Committee shall decide the nomination by cast of secret ballot.
9. The tenure of the chairperson of subcommittee shall be for a period of two years.

Previous Events, October, 2026

CME on "Her Health Journey – Adolescence to Menopause" organized by FOGSI–ICOG in collaboration with AOGD on 11th October, 2026 at Sir Ganga Ram Hospital, New Delhi. It was attended by 108 delegates.







Mission Adolescent Health conducted by Adolescent Health subcommittee in association with DGF on 14th October, 2026 which was attended by 57 delegates.



MISSION ADOLESCENT HEALTH

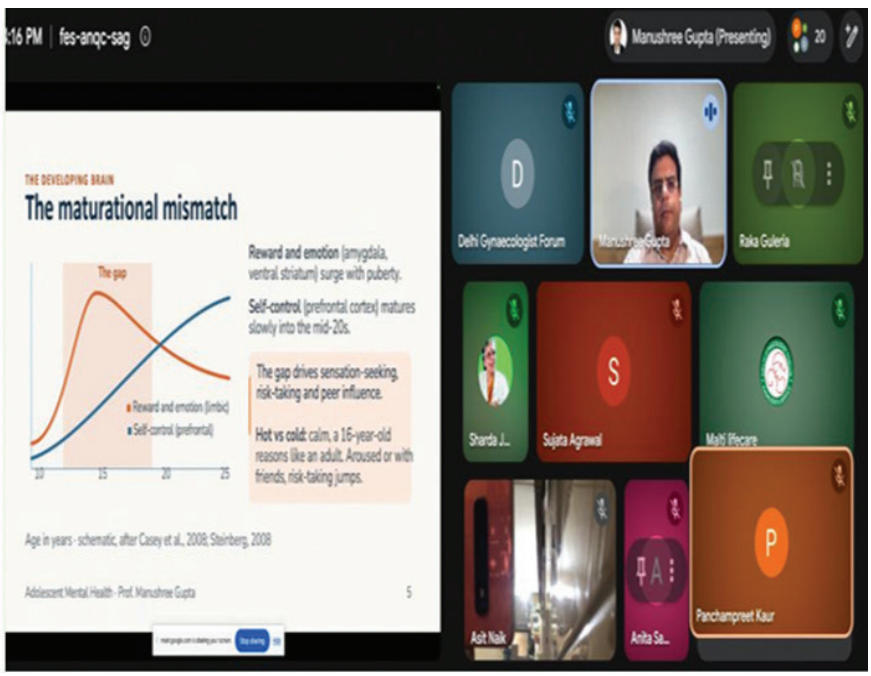
Delhi Gynaecologist Forum Adolescent Health Subcommittee in association with Adolescent Health Subcommittee AOGD

Wednesday, October 14th 2026, 4:00-5:00 pm

Adolescent Mental Health- From Awareness to Action "The Role of Healthcare Professionals"

Patron: Dr Sharda Jain
Welcome Address: Dr Raka Guleria

Time	Talk	Speaker	Experts/Panelists
SESSION 1 4:00-4:20 pm	TALK Mental Health Awareness in Adolescents	Guest Speaker: Dr Manushree Gupta (Psychiatrist)	Dr Sharda Jain Dr Rajesh Kumari Dr Sujata Aggarwal Dr Seema Gupta Dr Bharti Yadav (Paediatrician)
4:20-4:30 pm	Capsule: 10 Key Points (Pediatrician's Perspective)	Dr Bharti Yadav	
SESSION 2 4:30- 5:00 pm	PANEL DISCUSSION Adolescent Mental Health: Digital Media, Challenges and Mental Health Awareness	Dr Raka Guleria Dr Panchampreet Kaur	Dr Sunita Arora Dr Anita S Anand Dr Monika Gupta Dr Mahima Kak Nagpal Dr Raghu (Paediatrician) Dr Nisha Sachdeva (Psychologist)



A Health Awareness Initiative conducted by Public Awareness Committee, under Anemia Mukt Bharat, on 17th October, 2026 at Little Flowers Senior Secondary School. It focused on antimicrobial resistance (AMR), anaemia awareness and dental hygiene with active participation by 88 students, parents and teachers.



CME on Anaemia and Medicolegal issues conducted by Medicolegal Subcommittee on 22nd October, 2026 at Wood Apple Residency which was attended by 35 delegates.



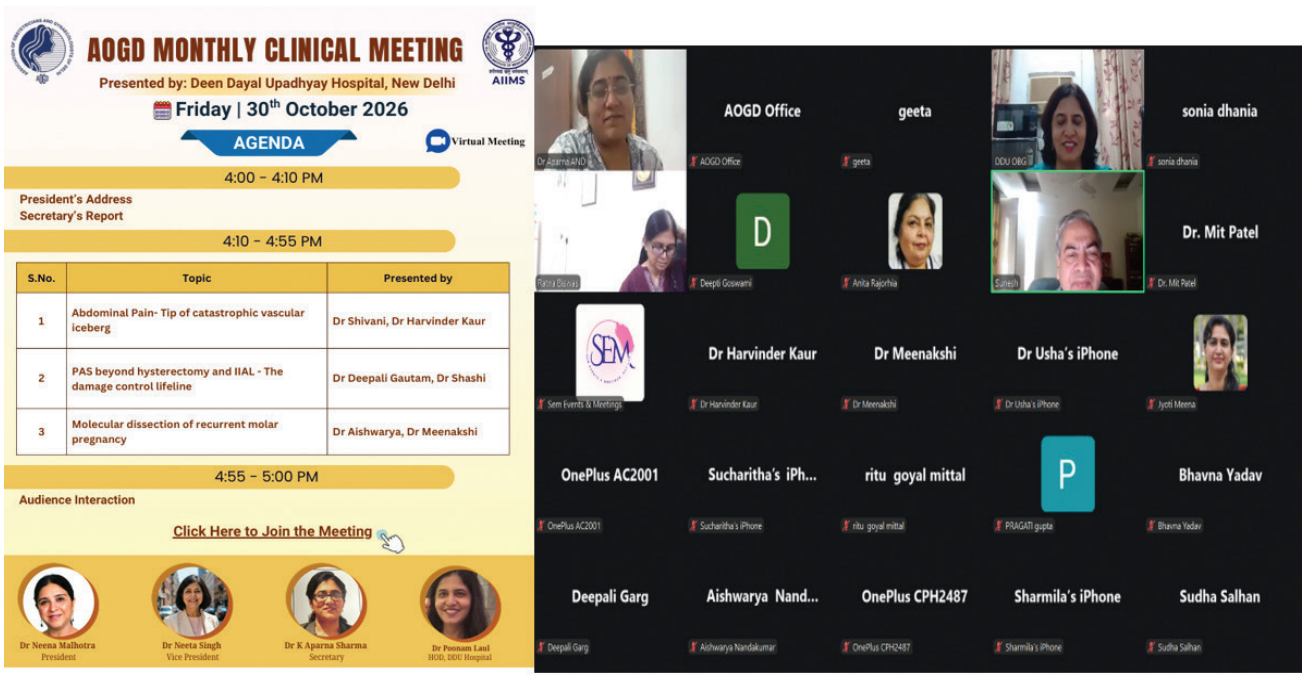


CME on "HPV Infection – Colposcopy & CIN" conducted by Oncology Subcommittee and the Indian Society for Colposcopy and Cervical Pathology (ISCCP) on 24 October, 2026 at ESIC Medical College. It focussed on current approaches to cervical cancer screening, colposcopic diagnosis and management of preinvasive lesions and was attended by 70 delegates.





The AOGD Monthly Clinical Meeting (virtual) conducted by the Department of Obs & Gynae, DDU Hospital on 30th October, 2026 which was attended by 59 participants.



Association of Obstetricians & Gynaecologists of Delhi

MEMBERSHIP FORM

Name:.....

Surname: .....

Qualification (with year): .....

Postal Address: .....

City:..... **State:** ..... **Pin code:** .....

PHOTO

Place of Working: .....

Residence Ph. No. ..... **Clinical / Hospital Ph. No.** .....

Mobile No:..... **Email:** .....

Gender: Male:..... **Female:**.....

Date of Birth: Date.....**Month** ..... **Year**.....

Member of Any Society:.....

Cheque/DD / No: .....

Cheque/Demand Draft should be drawn in favour of: AOGD 2026

FOR ONLINE TRANSFER THROUGH NEFT/RTGS

Name of Account: AOGD 2026

Account no: 45142130513

Name of Bank: State Bank of India

Branch: AIIMS, New Delhi

IFSC code: SBIN0001536

MICR code: 110002005



For Life Membership	: Rs. 11,000 + Rs. 1,980 (18% GST applicable) = Rs. 12,980/-
For New Annual Membership*	: Rs. 2,000 + Rs. 360 (18% GST applicable) = Rs. 2,360/-
For Old Renewal Membership+	: Rs. 1,200 + Rs. 216 (18% GST applicable) = Rs. 1,416
Entrance Fees (Payable once)	**: Rs. 400/-**

Encl.: Attach Two Photocopies of All Degrees, DMC Certificate and Two Photographs (Self attested)

*** Annual Membership is for the calendar year January to December.**

*** In case of renewal, mention old membership number.**

*** Life membership on or after 1st January, 2022 shall have to renew the life membership after 20 years. The minimum renewal amount will be 25% of the prevailing subscription fee at time of renewal.**

Note: 18% GST will be applicable as FOGSI requires it.

Send Complete Membership Form Along with Cheque / DD and Photocopy of required documents to the secretariat.
For online transaction send scan copy of all documents with payment slip on given mail id

Secretariat

AOGD Office, Room No. 714, 7th Floor, Mother & Child Block, Department of Obstetric and Gynaecology, All India Institute of Medical Science (AIIMS), New Delhi- 110029

Tel.: 011-29576771, (M): 9717392924 | Email Id: aogdaiims2026@gmail.com

AOGD SECRETARIAT

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